



**ASp**  
la revue du GERAS

**11-14 | 1996**  
**Actes du 17e colloque du GERAS**

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### **Electronic version**

URL: <http://journals.openedition.org/asp/3420>  
DOI: 10.4000/asp.3420  
ISSN: 2108-6354

### **Publisher**

Groupe d'étude et de recherche en anglais de spécialité

### **Printed version**

Date of publication: 1 December 1996  
Number of pages: 33-53  
ISSN: 1246-8185

### **Electronic reference**

Marina Bondi-Paganelli, « Language variations across genres: Quantifiers and worlds of reference in (and around) economics textbooks », *ASp* [Online], 11-14 | 1996, Online since 18 April 2013, connection on 02 May 2019. URL : <http://journals.openedition.org/asp/3420> ; DOI : 10.4000/asp.3420

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# Language variations across genres: Quantifiers and worlds of reference in (and around) economics textbooks

Marina Bondi-Paganelli

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## 1. Introduction: Economics textbooks

- 1 This paper focuses on the relationship between quantifiers and worlds of reference (world of fact vs world of hypothesis) in economics discourse. The corpus examined includes samples of different genres in the area and has been collected to study language variation across genres. The analysis is meant to explore whether quantifiers play a different role in these two worlds of reference, whether these co-occur differently in the various genres of economics discourse and whether they tend to occur in any specific moves or acts that characterise the structure of textbooks as against other genres.
- 2 Economics textbooks have recently received particular attention from a variety of perspectives interested in economic discourse.<sup>1</sup> The issue has been tackled by economists interested in the rhetoric of enquiry like McCloskey (1985, 1994) or Klamer (1987, 1990), by economists interested in problems of teaching economics like Henderson (1987) or Brown (1993) and by applied linguists like Dudley-Evans (1990, 1993), Tadros (1985), Hewings (1987, 1990), Meriel and Thomas Bloor (1993) and Swales (1993), most of them involved in making economic texts accessible to students who are not native speakers of English.<sup>2</sup>
- 3 The notion of world of reference plays an important role in the epistemology of economics. Economic reasoning is often presented in terms of possible worlds: discourse follows a logic of ramification determining the range of possibilities that emerge from a state of affairs. Economics as a science proceeds not only by representing what happens in the actual world, but primarily by exploring what could have or could not have

occurred in actuality. The frequent recourse to references to hypothetical (or fictional) worlds in economics discourse has deserved attention from a variety of points of view, including methodologists of economics, philosophers, epistemologists, rhetoricians, sociologists or historians of economic thought. These have variously articulated the distinction (or the interplay) between theoretical reasoning, speculation, mathematical abstraction, possible worlds, metaphors on the one hand and empirical techniques, data, facts, history (and stories) on the other.

- 4 The issue has an obvious interest for the study of economics discourse and its genres because of its connection with a highly interesting feature of language: factivity. Language can project its ideational meaning on to different plans, as belonging to different worlds: the world of fact and the world of hypothesis. Many linguists concerned with economics textbooks — such as Tadros (1985), Henderson and Hewings (1987, 1990), Hewings (1990) — have accordingly drawn attention to how often economics reasoning is not based on what is presented as fact, but on hypothetical, speculative examples.
- 5 The issue of factivity plays a particularly important role in a genre like the textbook, because of its didactic, educational aims. Myers (1992) argues that while we might be led to believe that a particular statement finds its way into a textbook because it is a fact, it is the reverse which actually occurs: textbooks typically add ‘factive’ certitude to the phenomena being described, by avoiding hedging, by lack of references to the primary literature, by a wide use of simple present and a massive use of cross-references.<sup>3</sup> What textbooks seem to hide is the dialogic nature of economic science, the widely recognised argumentative nature of economics, its discursive structure — what McCloskey calls economics as conversation.<sup>4</sup> Myers draws attention to an interesting paradox of textbooks: the very same features that make them easier for students to read
 

may make it harder for them to deal with other text types they encounter later in a scientific career [...] because they get no sense of how facts are established. (1992: 13)
- 6 My paper is meant to explore whether any similar remarks could be made about the use of quantifiers in economics textbooks, especially if considered in relation to their world of reference. Exact quantification can be regarded as part of the *ethos* of the academic community of economists, but the complexity of empirical data often leads textbook writers to offer “simplified” versions of reality, either by making highly inexact (but effective) generalisations about the real world or by presenting hypothetical model-worlds with their ideal numerical data.
- 7 It is my belief that the expression of quantity could be regarded as a highly relevant category in the description of economic discourse but it does not seem to have received adequate attention from the point of view of applied linguistics, apart from Channell’s studies on approximation (Channell 1990, 1994). Economists have indeed discussed the varying role of mathematical and statistical proof in economic argument from the point of view of the rhetoric of science. McCloskey (1985), for example, devotes the whole of Chapter 8 to “the unexamined rhetoric of economic quantification” (138), criticising the widely held belief that numbers are objective and conclusive and insisting on the fact that they can only be interpreted in relation to some socially agreed standard, accepted by the speech community (141). He does not, however, pay any specific attention to the verbal representation of quantity or to the relative role of quantitative argument as against other types of argument.

- 8 The present paper focuses on the roles played by quantifiers in a few genres of economic discourse, and studies the relationship between their definite/indefinite nature and the factual/non-factual nature of the world of reference of the moves or acts in which they tend to occur.

## 2. Materials analysed

- 9 The reflections presented in this paper are based on two kinds of corpora: a corpus of selected chapters from economics textbooks and a comparative corpus of works written by Paul Samuelson.
- 10 The textbook corpus — which I have designed in order to analyse a wider variety of features — collects selected chapters of 10 standard introductory textbooks: the introductory chapter, a chapter on micro- and a chapter on macro-economics.
- 11 The texts were chosen on the basis of a variety of criteria. They were all major works whose authority is established by their longevity (they have all undergone various editions and regular revisions) and by their being included as set reading texts or reference texts in reading lists for University students (and A-Level students).<sup>5</sup> The authors of these texts often announce that their books have been written as basic introductions to economics; the readers are therefore assumed to be new to the field and both readers and writers are certainly aware of the conceptual distance between them.
- 12 The comparative corpus consists of a small number of works by the same author, namely Paul Samuelson. The main focus of the analysis is on the two major genres of the textbook and the research article. Extracts from Samuelson's well-known *Economics* are compared with a selection of research articles published by Samuelson in professional journals or books; the analysis also includes a small number of articles written for non-professional magazines and newspapers.<sup>6</sup>
- 13 A comparison of works by the same author seemed to offer the best perspective for a study of language variation across genres. A totally different “tenor” of the interaction between writer and reader will usually require different language options to be taken and the same author will usually realise a different “implied author” when writing different genres.<sup>7</sup>
- 14 The choice of the specific author is basically determined by the paper's focus on textbooks and by the unquestionable influence exerted by Samuelson's *Economics* in setting “the standard for post World War II textbooks” (Klamer 1990: 130) with its now fourteen editions. The restriction to a single author, however, and to Paul Samuelson in particular, necessarily has a number of disadvantages of which I am well aware. One may object, for example, that authoritative — “paradigm setting”— figures like Samuelson may in fact be very self-confident in their assertions and therefore be lacking in the traditional self-effacing strategies of most scientific writers. This is certainly true of Samuelson, but it does not seem to have implications in the area of quantifiers. The variation we may notice across genres, moreover, might just be Samuelson's own view of the difference between them, and this — authoritative as Samuelson's may be — certainly cannot make any claim to general validity. Samuelson does not represent the whole field of economics, but he may well be taken as representative and highly influential in the area of American neo-classicism, with its emphasis on the exploration of possible models, rather than on empirical work. I do not therefore make any claim to general validity. My

attempt is rather that of presenting a case study and reading it in the light of the observations previously made on a corpus of textbooks.

### 3. Worlds of reference

- 15 The distinction I take as a starting point is that between what is presented as the world of fact and what is presented as non-fact or counter-fact, both included under the cover-term of “hypothesis”.<sup>8</sup> My distinction between world of fact and world of hypothesis follows very much Sinclair’s distinction between fact and fiction. On the one hand we have utterances where speaker and hearer believe that “what is averred corresponds to a state of affairs” in the world of fact (Sinclair 86: 44). On the other hand we have utterances where this correspondence is irrelevant, such as the one presented in example (1), where a shift to the world of hypothesis is clearly signalled by the initial imperative of the second sentence (my italics):

(1) A production possibility frontier joins together the different combinations of goods and services which a country can produce using all available resources and the most efficient techniques of production. *Assume for simplicity* that a country produces only two goods, food and cloth. (Hardwick, Ch. 1)

- 16 The distinction between fact and hypothesis is not always so easily clear-cut. Sinclair (1986) argues that utterances that are simultaneously fictional and factual — cases of verisimilitude — are cases where we do not know the stance of the writer with reference to actuality and that in these fictional status takes preference over factual. Predictions and quotations would be obvious examples of speech acts where these problems might arise.<sup>9</sup> I have normally considered these as “world of hypothesis” whenever there was some explicit element of authorial “detachment” from the projected text, as can be seen very clearly in example (2).

(2) A common mistake in studies of cause-and-effect relationships is the *post hoc* fallacy. A classic example of the *post hoc* fallacy is *the belief held by the medicine man in a primitive society that both witchcraft and a little arsenic were necessary to kill his enemy*. (Samuelson, Ch. 1)

- 17 The most prominent function of hypothetical moves consists in providing examples or illustrations for the generalisations put forward by the author. Hypotheticality signals like *assume for simplicity* signal to the reader that any questions about actuality are unnecessary and irrelevant and that the information is merely exemplificatory. Hypotheticality is thus a discourse device used by the writer

to narrow down the gap between his conceptual world and that of the reader, so that the reader will be able to understand the generalisation that emerges from the hypothetical statements. (Tadros 1985: 48)

- 18 The shifts between the ideal world and reality, between fact and hypothesis, however, may well be a source of reading problems for students if they are unaware of the shifts and how they should be interpreted.<sup>10</sup> These are therefore marked by various signals. The most obvious will be explicit signals of hypotheticality, but it will also be important, of course, to learn to recognise signals of shifting back to the world of fact.

- 19 Many signals of hypotheticality are discussed by Tadros (1985) in her study of “prediction”, i.e., of the signals that involve a commitment to (“predict”) the occurrence of particular linguistic events. She lists verbs like *assume, suppose, consider; if-sentences*,<sup>11</sup> expressions like *let NG be NG*, use of fictitious characters or places. When trying to

consider hypotheticality at large, in its widest spectrum of situations and functions, the variety of signals increases, to include for example both a verb like *take* and a modal adverb like *hypothetically*. Other examples from my corpus are: *say/let us say, imagine, consider*, use of modals like *may* or *will*, often combined with references to the writer's or the reader's cognitive or expository procedures: *let us illustrate this by considering, we can see this in a simple numerical example, a simple example will illustrate this, to show this, we can now understand...*

- 20 Co-textual features become particularly relevant when the hypothetical moves extend over longer sections of text often including a number of shifts from one world to the other: a hypothetical example might be established in a table, so that any backward reference to that table might imply a shift to the hypothetical mode which was only signalled at the beginning. In Samuelson's chapter on cost analysis, for example, most data are basically related to three hypothetical situations: an anonymous firm described in the first sections of the chapter and two further examples representative of different sectors of the economy (Farmer Gomez and Hot Dog Ventures, Inc).
- 21 Most explicit signals, moreover, will only be interpretable as such within general or specific conventions of economics discourse, i.e. with reference to the whole discourse community or to a specific approach within the discourse community. Expressions such as *everything else constant* or *all other things being equal* - usually presented and discussed explicitly in introductory chapters - conventionally allow economists to work under hypothetical experimental conditions.<sup>12</sup> Other metadiscursive expressions such as *for simplicity* or *a numerical example, a simple example* are normally used to introduce a simplified version of reality, reducing the number of factors to be considered or their numerical attributes. A similar function might be played by *in a closed economy* or even by *under perfect competition*, when the reader believes that perfect competition is an ideal abstraction.
- 22 The issue of quantity and its expression seems to play an important role in this shift from one world to the other: indeed it is often the determining factor, as the analysis has shown.

## 4. Types and functions of quantifiers

- 23 Quantification as a semantic phenomenon can be seen to involve various categories, often including all sorts of scalar sets, from modals to adverbs of frequency and duration. Though recognising the presence of quantitative meaning in these expressions, I have deliberately decided to restrict my analysis to expressions of quantity within the noun group. These still involve a much wider class of elements than would normally be referred to as "quantifiers" in logic, in formal semantics or even in most grammars.
- 24 Quantifiers can be preliminarily defined – in a stricter sense – as determiners whose meaning expresses some notion of quantity - adjectives or pronouns used to say how much of something there is. In Lyons' words, "a determiner tells us which member or which subset of a set of entities is being referred to; a quantifier tells us how many entities or how much substance is being referred to" (1977: 455).
- 25 Irrespective of the formal means by which they are expressed, we are dealing here with the expression of two different notions: the notion of identity (within the process of identification of referents) and the notion of quantity (within a process of

“quantification” of referents). In actual forms the two notions are at times inextricable, although we might at least try to specify which of the potential meanings of an expression are actualised and which receive major emphasis. The indefinite article, for example, undeniably carries an element of quantification (of singular quantity) together with the meaning of “indefinite identity”. It “extracts” one item from a set of discrete items (such as the one normally associated to a countable noun).<sup>13</sup> Its complex meaning potential, however, is not always fully activated; though carrying a meaning of “singular quantity”, *a/an* is normally primarily a marker of indefinite identity. We may regard one meaning as normally foregrounded against the other, though recognising that some contextual features may indeed contribute to activating the “singular” meaning, e.g. in “the real wages of a person move only *a percent or less* from month to month” (Samuelson, Ch. 32).<sup>14</sup>

- 26 The question at issue here is not which definition best suits grammatical or semantic theory. It is rather which definition best helps determine how economists quantify the “Things” they refer to in their textbooks. I have therefore adopted a notional approach to the problem, whereby all lexical variants of the standard closed class quantifiers are considered. This means considering the ideational rather than the logical structure of the noun group, in Hallidayan terms, or recognising — as most notional grammars do — that, although the quantity nouns might look like the head of a noun group, they function semantically like the closed-class quantifiers.
- 27 I will therefore use Quantifiers —in a wider sense— to include all the elements in the noun group that refer to quantities and amounts of things, irrespective of their syntactic class or function:
- 28 • general determiners (the so called “closed-class quantifiers”) like *some, enough, few, many, more, all...* in all their constructions;
  - 29 • “open-class quantifiers”, including adjectives like *certain, numerous, various* and a large class of phrasal quantifiers consisting of a noun of quantity followed by *of*, like *lots of, plenty of, a great deal of...*;
  - 30 • numbers and fractions.
- 31 This variety of elements can play a number of different roles within the structure of the noun group<sup>15</sup> and within the texture of texts.<sup>16</sup> Various mechanisms can be seen in example (3) below, where *one* is used as Deictic to present a first reference (R1), whereas *second* (R2) and *third* (R3) are used as Numeratives and combine with other determiners to create an element of relevance phoricity by presuming a superset of sources (R1, R2, R3) and *the first two* identifies a further set (R1, R2) by virtue of both quantity *strictu sensu* and order.
- (3) Why the difference? *One* source of the discrepancy was a more optimistic administration forecast for economic growth. [...] A *second* source of the difference concerned interest rates. [...] A *third* adjustment partially offset *the first two*. (Dolan, Ch. 11)
- 32 The distinction commonly hypothesised between definite and indefinite also needs clarification. Definite and Indefinite have been applied both to the notion of identity and to the notion of quantity and the two notions are not always clearly distinguished: what we are interested in here is not the fact that *many* is used to signal indefinite identity, but rather the fact that it refers to an indefinite (or inexact) quantity.



- 33 The distinction between definite and indefinite or exact and inexact, however, gets blurred if we consider quantifying as a discourse process, rather than some sort of extra discursual, abstract entity. As already noticed by Halliday (1985: 163), in moving from system to text, an exact numerative expression may be made inexact by submodification or by the use of approximators and inexact numerative expressions may be exact in the context.
- 34 The contextual definition of an inexact numerative expression is a complex issue which cannot be tackled here. Examples (4) and (5) show different ways in which quantification may be “implicit”: the notion of quantity may be an implicature of another textual element or may be carried over“ in an anaphoric chain.
- (4) To illustrate *technical* efficiency, let us consider two bicycle manufacturers. One uses a large number of workers and many machines to produce 1,000 bicycles. The other uses fewer workers and fewer machines to produce *the same number of* bicycles. (Wonnacot, Ch. 1)
- (5) Where (Δ)goods are *complementary* a change in the price of one of them will cause a change in the demand for the other. (Stanlake, Ch. 14)
- 35 The problem of approximate quantities, on the other hand, cannot be ignored. Approximating constructions such as those in examples (6) and (7) are very common.
- (6) [...] between 1950 and 1969, a “rising tide was lifting all boats.” Average family income was rising by *about* 40 percent (even after adjusting for inflation). (Samuleson, Ch. 1)
- (7) If all the British people were content to live at the level of an Indian peasant, all our wants could be easily satisfied with *one or two* hour’s labour each day; we would not experience scarcity. (Stanlake, Ch. 1)
- 36 The notion of approximate quantities and of vague language (Channell 1994) presents an only apparent clash with common expectations about economics. Economists —as also shown by Channell (1990)— make extensive and careful use of approximations in academic writing, though also providing many examples of precise numbers and dates. Economists often designate intervals of numbers rather than precise numbers or quantities, by using approximators like *about*, *around*, *nearly*, *almost*, or by specifying upper or lower limits of quantities with expressions like *at least*, *at most*, etc. Expressions such as *millions of* or *dozens of* can also be considered approximations, where at least some numerical order is suggested. Approximating quantities with round numbers is another strategy. In economics there are certain established conventional approximations which function as the “unmarked form”: British GNPs, for example, are usually counted in millions of pounds, not in pounds and pennies, as can be seen in example (8). There are fields of economics, therefore, where approximation is the standard official measure.
- (8) In 1987 its(GNP)value was £ 354 378 m. (Stanlake, Ch. 17)
- 37 On the other hand there may be —though not very common, especially in economic analysis— exact numbers that turn out to be an approximate representation of a very wide range of values, as in example (9), where hyperbole is at play.
- (9) [...] economics tries to figure out the 1001 puzzles of everyday life. (Samuelson, Ch. 1)
- 38 But —and this is I think one of the most distinctive features of economics textbooks and argument— there are often round numbers that would be interpreted as approximations in the world of fact, but they are intended to count as exact values. The *thousand bicycles* in (4), for example, can only be interpreted as a definite, exact value, because the world of reference is not that of fact, but that of hypothesis.



- 39 Both approximate and indefinite quantities draw attention to the pragmatic dimension of discourse, to the role of context in utterance interpretation and in particular to the role played in interpretation by the set of assumptions in the hearer's / reader's mind - assumptions deriving from a wide variety of kinds of background knowledge: encyclopaedic information, cultural knowledge and assumptions derived from his / her processing of the environment and of earlier parts of discourse. The reader of an academic textbook - however "introductory" that is - has to supply several cultural assumptions in order to identify the intended meaning. And Quantifiers play an important role in this, both at micro-level (where the intrinsic content of all semantically vague terms used in the utterance has to be enriched) and at macro-level, where they are part of a constituted set of methodological assumptions, of an agreement as to what empirical evidence is relevant to a claim, how evidence is to be produced, represented and applied in the situation.
- 40 We can thus identify three basic ways of referring to quantities in economic discourse:
- 41 • "exact" quantities will be those that find a numerically exact definition (or follow conventional approximations that are not perceived as such in the context: they may be regarded as "approximations we live by");
- 42 • "approximate" quantities will be those where intervals are referred to with reference to some numerical value(s), which works either as a limit of the interval or as a reference point;
- 43 • "indefinite" quantities will be those where no reference to numerical values can be established.

## 5. Variation across genres

### 5.1. The general analysis

- 44 The analysis of the textbook corpus has focused on the running text. Though well aware that most quantitative data are actually provided in tables, charts and graphs, I meant to explore whether Quantifiers tend to occur in any specific moves or acts that characterise the structure of economic genres.
- 45 Economics textbooks make extensive use of general-specific patterns where general statements about economic reality and its processes are usually either preceded or followed (or both preceded and followed) by supporting examples or illustrations, in a pattern that might be represented like this:
- (Example(s))^General Statement^(Illustration(s))
- 46 Examples and illustrations can be classified according to whether they are presented as belonging to the world of fact or to the world of hypothesis. The relationship between the two may vary, but most textbooks tend to provide a striking majority of hypothetical examples.<sup>17</sup>
- 47 Considering the possible combinations of Quantifiers and worlds of reference, the analysis has drawn attention to two basic situations:
- 48 a) the use of indefinite (and approximate) Quantifiers in generalisations about the real world, as exemplified in (10)"

- 49 b) reference to definite quantity in speculative reasoning about possible worlds, as exemplified in (11).

(10) During *any* period in which the nation's per capita income increases, *most* Americans benefit, but *a few* are hurt. (Wonnacot, Ch. 23)

(11) Say a firm is producing 1000 hard disks for a total cost of \$10,000. If the total cost of producing 1001 disks is \$10,015, then the marginal cost of production is \$15 for the 1001st disk. (Samuelson, Ch. 8)

Attention can also be drawn to:

- 50 c) the metadiscursive (text-structuring) use of references to definite quantities for expository purposes.

- 51 Exact numerals are often used to pre-modify nouns with a metadiscursive, text-structuring function. These can be either discourse self-reference nouns like *example*, *definition*, *chart*, *table*, *chapter*, *paragraph* etc. or “metacognitive nouns”, i.e. nouns referring to the cognitive tools of exposition or argument, like *advantages*, *aspects*, *elements*, *principles*, *techniques*, *roles*, *reasons* etc. The two categories of nouns<sup>18</sup>—when considered from the point of view of the language system—refer to procedures of language and reasoning and they can both be used in discourse to refer to sections of the text itself, as shown in examples (12) and (13).

(12) *The first part of this chapter* concentrated on the major concepts for measuring costs. But how do business firms actually measure costs? And what kinds of costs do economists include in their calculations? This section explores *these two questions*. (Samuelson, Ch. 8)

(13) *Two elements* of a balance sheet require mention: inventories and fixed assets. *In both cases* the difficulties arise because these assets are used up or consumed over time. (Samuelson, Ch. 8)

- 52 These examples of references to the structure of discourse often account for a large proportion of references to the world of fact, thus leaving an interestingly low number of exact quantifiers referring to the world of economic reality. The tendency, once again, should obviously not be regarded as typical of economics at large, but may be considered characteristic of economics textbooks and of mainstream economics textbooks in particular.

- 53 The three configurations above can be variously related to the different discourses that constitute a textbook: the discourse of the discipline and the discourse of teaching.

- 54 The frequent use of metadiscursive Quantifiers gives great prominence to the interaction between writer and reader, and particularly to the way the writer as teacher guides the reader as student by providing a map of the text and of the discipline.

- 55 The choice of Quantifiers with reference to the world of fact contributes to building up the view of reality that is mediated by the text. The use of indefinite and (fewer) approximate estimates—though not necessarily representative of the whole of academic writing—suits the argumentative purpose of the writer, who presumably wants the reader to focus on general trends, on relationships between forces and factors, rather than on their specific features.

- 56 The use of exact Quantifiers in hypothetical moves most clearly contributes to this process of abstraction from the complexity of reality. The most prominent function of hypothetical moves consists in providing examples or illustrations for the generalisations put forward by the writer: a simplified model of reality allows the reader to concentrate on rules and general laws, rather than on the complexity of empirical data.

57 The use of quantitative expressions in textbooks seems to me strictly linked to the wider rhetorical structures of textbooks, which are quite heavily based on general-specific patterns and on argumentative-expository procedures based on particular cases: examples, illustrations and analogies. A wider range of argumentative and expository procedures in other genres would therefore imply that a different pattern of combinations should be expected.

## 5.2. The comparative analysis

58 The comparative analysis involved a small corpus of materials from a variety of works by Paul Samuelson. It was meant to explore whether the different situations outlined above play a different role in the various structures of the genres considered, depending on the role relationships in which writer and reader are involved. The starting point was the claim —supported by the analysis of the wider textbooks corpus— that the issue of quantification plays a major role in the choice of either factual or hypothetical references.

59 Intuitively, however, the choice between the two worlds of reference could also be influenced by another major factor: the theoretical or applied nature of the matter at issue. We would expect economic theory to make more frequent recourse to hypothetical speculation than economic analysis of current issues.

60 The distinction plays different roles in the different genres. Samuelson's *Economics* is basically an introduction to theory, with only a few chapters on current problems. His research articles are mostly theoretical in nature, although they also provide contributions to a history of economic thought. The few comments analysed present a variety of perspectives.

61 The analysis has centred on Samuelson's textbook and has been partially supported by quantitative data as to the types of Quantifiers used. Quantifiers in the Samuelson corpus have been classified according to the two basic parameters discussed above: their numerical value (Exact/Approximate/Indefinite) and their world of reference (factual/hypothetical). Metadiscursive uses of quantifiers have been marked as a separate factual category, so as to be able to study if there was any consistent variation across genres or areas of interest.

62 Approximation has proved to play a minor role in Samuelson's texts, representing only 3.34% of the occurrences of Quantifiers. Relative frequencies do show great variation across genres. Approximations represent 2.95% of all Quantifiers in textbooks, only 0.73% in articles and a relevant 11.01% in comments. The minimal incidence of approximation in Samuelson's theoretical articles may be related to his vast use of abstract mathematical reasoning.

63 The clearest patterns, however, appear when considering the whole corpus from the point of view of exact Quantifiers and their relation to the world of reference.

### **Textbooks**

64 The analysis of the two editions of Samuelson's textbook has shown similar patterns in the two books, both in terms of the role played by the various kinds of Quantifiers and in terms of the expected "theory vs current problems" distinction.

65 When compared to "current problems" chapters, theoretical chapters do not present a higher incidence of hypothetical Quantifiers in general, but they do present a higher

incidence of hypothetical moves where exact quantifiers play a major role. Exact Quantifiers account for the vast majority of Quantifiers used with reference to the world of hypothesis, both in the 1976 and in the 1992 edition (actually showing a marked upward trend, from 60.67% to 73.41%). In chapters on current problems, the mean is much lower (42.73%). The use of tables and graphs accompanying the verbal text—and offering an additional wealth of quantitative data— does not show relevant variation across the two approaches.

- 66 The analysis also shows some consistent patterns within the theoretical chapters. Table 1 focuses on the role played by exact Quantifiers in the chapters from the two editions considered. It is based on the analysis of four chapters, including 1120 occurrences of Quantifiers. The values are not reported as statistically significant; they are only meant to support to the claim made about the major role of exact Quantifiers within the world of Hypothesis.

Table 1. Exact Quantifiers in theoretical chapters (%)

	A	B	C
1976	60.67	50.9	33.1
1992	73.41	49.14	27.56

A = the proportion of exact Quantifiers to the whole set of Quantifiers with reference to the world of hypothesis

B = the proportion of exact Quantifiers to the whole set of Quantifiers with reference to the world of fact

C = the incidence of metadiscursive occurrences of exact Quantifiers with reference to the world of fact

- 67 Exact Quantifiers do not only account for the vast majority of Quantifiers used with reference to the world of hypothesis: they consistently show higher frequencies within the world of hypothesis than they do within the the world of fact. Here they also present a very high proportion of metadiscursive uses, which leaves very little room (ranging around 20%) for exact quantification of extra-textual referents in the world of fact.

### Research articles

- 68 Research articles show a different trend. The formal language of abstract mathematical reasoning becomes decidedly dominant and the use of exact Quantifiers appears to play a lesser—and less consistent— role in the verbal text.
- 69 A preliminary quantitative observation can be made by comparing the data in Table 1 with those in Table 2. This is based on the analysis of the first subset of research articles, which is made of 8 articles and includes 803 occurrences of Quantifiers. The articles were all written in the 1970s and deal with topics that can be related to those dealt with in the chapters considered in Table 1.

Table 2. Exact Quantifiers in research articles (%)

	A	B	C

1970s	46,54	35,62	22,06
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- 70 The clearest trend shown by the data regards a more restricted use of exact Quantifiers. A more detailed analysis of the values of each article would also show that their role is somewhat less consistent: the pattern according to which exact Quantifiers play a lesser role within the world of Fact than they do within the world of Hypothesis is still the dominant pattern, but one of the articles follows the reverse trend.
- 71 The most interesting feature can be noticed when considering the *use* of exact Quantifiers in hypothetical moves. Hypothetical examples and illustrations are drastically reduced, to show that the intended reader needs no “reinforcement” and no didactic mediation through the use of simplified numerical data. The reader is supposed to share the mathematical background of the writer and the burden of the writer’s argument is mostly carried by logical reasoning on the basis of an abstract model. This model is often established by an opening hypothetical move which creates the premises for the whole argument, as in the following example.
- (14) Assume two goods (say soybeans or manufacturers, or soybeans and “money”, in the sense of abstract purchasing power over the composite goods and services that make up the non-grain totality of the standard of living.  
Assume two periods (say, now and next year).  
Assume 2N persons, who are identical in their tastes, incomes and equal endowments in the two periods of both goods... (*Proof That...*)
- 72 The example above shows that, beyond the mere quantitative reduction, there is in fact an important qualitative change in the role played in research articles by exact quantifiers in hypothetical moves. Rather than building up illustrations to facilitate the reader’s understanding of a complex reality, these moves establish a simplified model of reality as a basis for the whole reasoning.
- 73 An analysis of more recent articles, chosen to represent a wider range of topics and approaches in the author’s production, shows a lot of quantitative variation. This would not allow any generalisation as to the role played by exact Quantifiers within the two worlds of reference. The overall impression is confirmed, however, that the most significant variation is qualitative rather than quantitative: exact quantifiers with reference to the world of hypothesis are meant to establish a model (a scenario) for the whole argument rather than to provide simplified examples.
- 74 The corpus is obviously too small to provide material for further generalisations but at least two tentative observations can be made. First, the use of mathematical demonstration may at times become so dominant as to produce the impression of two parallel texts grafted on to each other by means of numerous metadiscursive references.<sup>19</sup> Second, the only articles that present a massive use of indefinite Quantifiers are also the ones that can be seen as contributions to a history of economic thought (whether presenting a re-evaluation of Smith’s work or focusing on the debate on monetarism) rather than on theoretical demonstration of Samuelson’s own position.<sup>20</sup> This somewhat confirms a relationship between the communicative purpose of the writer and his choice of a specific combination of quantifiers and worlds of reference.

#### Comments

- 75 The small corpus of comments published in non-professional journals is even less representative of a genre. Comparison with the rest of the corpus is also made more

difficult by the fact that it has not been possible to establish an acceptable equivalence in terms of issues dealt with.

- 76 The data show great variation and not many clear trends appear. The role played by exact Quantifiers seems to vary a lot, depending on the nature of the comments. The role of exact quantifiers in hypothetical moves, for example, ranges from 78.57% when dealing with matters of economic policy, to 60.32% when dealing with the history of economic thought and to 42.64 when dealing with some purely theoretical issues.
- 77 We may notice, however, that comments generally present a much wider use of exact Quantifiers in hypothetical moves than in references to the world of fact (an average of 55,35% as against 35,09%). This pattern can be related to the similar pattern found in textbooks and therefore connected to the popularizing aim of the comments.
- 78 Similarity of quantitative patterns, of course, does not necessarily imply similarity of pragmatic and argumentative functions. Exact Quantifiers used with reference to the world of hypothesis do not always take up the rhetorical function we have seen in textbooks. When dealing with matters of theory, they may indeed realize simplified hypothetical examples to illustrate general laws, but the majority of occurrences are found in modalized or projected statements.
- 79 The extract below provides an example of exact Quantifiers in a modalized statement. The statement draws out the practical implications of the main claim made in the comment, which supports the increasing concern for a measure of economic welfare (NEW) as against a measure of economic growth such as GNP.
- (15) It's up to us, the public. If we will it, we can give up half a percent of conventional GNP yearly growth, in order to achieve perhaps an extra quarter of a percent rate of NEW growth. (*From GNP to NEW*)
- 80 The limited choice of articles does not allow any generalization. It still serves our purpose, mainly by showing two things: a) a greater focus on economic analysis normally implies a higher use of quantification with reference to the world of fact and of approximations and b) a greater conceptual difference between reader and writer often induces a wider use of exact – simplified – quantities in hypothetical moves.

## 6. Implications of a genre-based analysis of materials in EAP

- 81 I would like to conclude by briefly pointing out the implications that can be drawn from my analysis in the field of EAP. These may be presented on the guidelines suggested by Halliday (1987) for the field of educational linguistics in general and later adopted by many others. Halliday identifies three main areas in discussions of language learning: learning language, learning through language and learning about language.
- 82 As for the first area, that of learning language, I believe my analysis supports the claim for a genre-based approach to the language syllabus and for students' exposure to a variety of genres. Though focused on a specific language feature and its relationship to some specific moves, the analysis has provided an example of the qualitative if not quantitative role played by language variation across genres in the field of economics discourse. ESP and EAP language materials based on a restricted range of genres –and this often means restricted to specialist textbooks– do not only misrepresent the rhetoric and the communicative purposes of the special interest area, but they also offer

a partial representation of how some key concepts find their verbal expression in the variety of genres that make up the discourse areas that may be relevant to the students' curricula.

- 83 This leads us to the second area to be considered: the area of learning through language. An analysis of the characterising features of a genre offers material for learning about the cultures and ideologies which inform the target language and its uses. The different roles played by factual or hypothetical argument in different approaches to economics or to scientific exposition itself, for example, can be the object of interesting comparative analysis.
- 84 The most important implications, however, seem to me those that can be included within the area of learning about language. Language awareness —irrespective of the role we think it might play as part of learning language— can play an important role in developing critical reading skills. Students of economics could become much better readers by developing an awareness of the forms and functions of both quantification and model building and by learning to understand the different role they play in the different genres, according to the different communicative purposes and to the different “tenors” of the interaction.

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## APPENDIXES

### Appendix 1

#### List of the textbooks

Baumol, W.J. & A.S. Blinder. 1988. *Economics. Principles and Policy*, 4th edn. Orlando: Harcourt Brace Jovanovich.

Begg, D., S. Fischer & R. Dornbusch. 1983. *Economics*. British edition, Maidenhead: McGraw-Hill.

Craven, J. 1984. *Introduction to Economics*. Oxford: Blackwell.

Dolan, E.G. & D.E. Lindsey. 1988. *Economics*, 5th edn. New York: Holt, Reinhart and Winston.

Fischer, S. & R. Dornbusch. 1983. *Economics*. New York: McGraw-Hill.

Hardwick, P., B. Kahn & J. Langmead. 1990. *An Introduction to Modern Economics*. 3rd edn. London: Longman.

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### Appendix 2

#### Previous research

The quantitative data provided refer to materials written both in the 1970s and in the 1990s. The most extensive data across the three genres refer to the '70s. This is due to a variety of reasons: first, this was probably the time when Samuelson —1970 Nobel prize— was most influential; second, more recent editions of his textbook are co-authored; finally, he has recently reduced his contributions to the media. As for the textbook material, four chapters of the X edition of Samuelson's *Economics* (1976) have been compared with chapters on the same topics taken from the XIV edition (Samuelson-Nordhaus 1992).

Research articles considered can also be divided into two subgroups: articles (i-vii) were written in the '70s, whereas articles (viii-xiii) were written in the '90s. Here is the full list: (i) "Optimal Compacts for Redistribution", in R.E.Grieson (ed.) *Public and Urban Economics*, Lexington, Mass. D.C.Heath and Co., 1976; (ii) "A Curious Case Where Reallocation Cannot Achieve Optimum Welfare" in W.L.Smith and J.C.Culberston (eds.) *Public Finance and Stabilization Policy*, New York, North Holland, American Elsevier, 1974; (iii) "Proof that Unsuccessful Speculators Confer Less Benefit to Society Than Their Losses", *Proceedings of the National Academy of Sciences, USA*, Vol.69, May 1972, 1230-33; (iv) "The Consumer Does Benefit from Feasible Price Stability", *Quarterly Journal of Economics*, Vol.86, August 1972, 476-493 and "Rejoinder", 500-503; (v) "Is the Rent Collector Worthy of His Full Hire?", *Eastern Economic Journal*, 1-1, January 1974, 7-10; (vi) "Reflections on the Merits and

Demerits of Monetarism”, in J.J.Diamond (ed.) *Issues in Fiscal and Monetary Policy: The Eclectic Economist Views the Controversy*, De Paul University, 1971; (vii) “Samuelson on the Neoclassical Dichotomy: A Reply”, *Canadian Journal of Economics*, Vol5, N.2, May 1972, 284-292. (viii) “Two Conservation Laws in Theoretical Economics”, in R. Sato, R.V. Ramachandran (eds.), *Conservation Laws and Symmetry. Applications to economics and finance*, Boston, Kluwer, 1990; (ix) “Deterministic Chaos in Economics: An Occurrence in Axiomatic Utility Theory”, in K. Velupillai (ed.), *Non Linear and Multisectoral Macrodynamics. Essays in honour of Richard Goodwin*, Houndmills, Macmillan, 1990; (x) “Long-run Risk Tolerance When Equity Returns Are Mean Regressing: Pseudoparadoxes and Vindication of ‘Businessman’s Risk’”, in W.C.Brainard, W.D.Nordhaus, H.W.Watts (eds.), *Money, Macroeconomics and Economic Policy. Essays in honor of James Tobin*, Cambridge, MIT Press, 1991; (xi) “Logic of the Historical Transformation Problem. Exchange ratios under simple commodity production”, in G.A. Caravale (ed.), *Marx and Modern Economic Analysis, Vol.1, Values, Prices and Exploitation*, Aldershot, Edward Elgar Publishing, 1991; (xii) “The overdue recovery of Adam Smith’s reputation as an economic theorist”, in M.Fry (ed.), *Adam Smith’s Legacy. His place in the development of modern economics*, London, Routledge, 1992; (xiii) “A Long-open Question on Utility and Conserved-energy Functions”, in M.Majumdar (ed.) *Equilibrium and Dynamics. Essays in honour of David Gale*, Houndmills, Macmillan, 1992.

The small corpus of comments includes: (i) “Pioneers of Economic Theory”, *New York Times*, October 26, 1972; (ii) “From GNP to NEW”, *Newsweek*, April 9 1973, 102; (iii) “Nobel laureate Leontief”, *Newsweek*, November 5, 1973, 94; (iv) “Capital Shortage or Glut?”, *Newsweek*, August 26 1974, 73; (v) “Social Darwinism”, *Newsweek*, July 7, 1975, 55; (vi) “Economic Policy - Where is it leading?”, *Boston University Journal*, No1, 1975, 30-36; (vii) “Milton Friedman”, *Newsweek*, October 25, 1976, 89; (viii) “Christmas Economics”, *Newsweek*, December 25 1976, 54; (ix) “Nobel Choice: Economists in contrast”, *New York Times*, October 10, 1975; (x) “In Search of the Elusive Elite”, *New York Times*, June 26, 1976.

## NOTES

1. Textbooks and their role within scientific discourse have received greater attention since Kuhn’s claim that they aim to “communicate the vocabulary and syntax of a contemporary scientific language” (1970: 136).
2. Various features have been studied: the use of metaphors (Henderson 1982, McCloskey 1985, Klamer 1988), the use of graphs, tables and figures (Henderson and Hewings 1987), the complex use of conditionals (Mead and Henderson 1983), the abstract language of model-building (Mason 1990, Henderson and Hewings 1990), hedging (Bloor and Bloor 1993), the various signals of hypotheticality in predictive structures (Tadros 1985) or in illustrations (Henderson and Hewings 1987, Hewings 1990).
3. Myers has variously dealt with the problem in a series of studies devoted to the rhetorical strategies of the biological sciences (Myers 1986, 1990, 1992). In a study on how the discovery of the structure of DNA is represented in a variety of genres (research reports, news reports, popularizations), textbooks are considered in terms of how both the actors and the narrative sequences of discovery are variously reinterpreted: “experiments seem to take place without researchers”, “human actors are removed” and “we are left with molecules and techniques” (Myers 1990: 109). The narrative of the discovery—carefully built as such in news articles and reviews—is frozen into a fact, with no names, no chronology and no mention of the way research

took its insight from virus models, “leaving the discovery fixed in the spatial, atemporal array of the ordered presentation of information” (id.: 115).

4. The issue is central both to Klammer’s analysis of the first 12 editions of Samuelson’s *Economics* (Klammer 1990) and to Swales’ analysis of how the paradox of value is represented in textbooks (Swales 1993).

5. See the list of the textbooks in Appendix.

6. See Appendix 2.

7. The comments written for newspapers and magazines, of course, are not taken as representative of “economic journalism” at all, although they may be fairly representative of the stance usually taken by the well-known economist when addressing a wider audience than the specific academic community.

8. The distinction most commonly adopted in semantics is along the three lines, a) factuality, involving a commitment to the truth of what is said, b) non-factuality, involving no commitment to the truth of what is said and c) counter-factuality, involving a commitment to the falsehood of what is said. See, for example, Leech (1974: 301-304) or Lyons (1977: 793-809). The distinction between non-fact and counter-fact can be ignored for the purposes of the present paper.

9. For a discussion of these and other issues with reference to the distinction between world of fact and world of hypothesis in economics textbooks, see Bondi (1995).

10. The question becomes particularly relevant if the overall status of the text is allowed to obscure the shifts: “Our conventions of verbal interaction require us to settle at the outset of any artefact (in speech or writing) whether it is factual or fictional. No matter how fact and fiction may be mixed up in the individual utterances of the artefact the overall status is not affected” (Sinclair 1986: 59). The problem is also recognised by Henderson and Hewings (1987: 38ff.) in their study of the reading skills required by economics textbooks.

11. Tadros (1985: 43) lists two structures: if + NP + VP (past verb), +NP + VP (past modal) and if + NP + VP (present verb), + NP + VP (present or past modal), provided that (i) the noun in the first NP does not make reference to an entity which is actual; (ii) ‘if’ is not paraphrasable by ‘whenever’ in that context.

12. Henderson and Hewings (1987: 54) notice that Samuelson and Nordhaus make constant use of *all other things being equal* to “alert the reader to a generalization, simplification or abstraction”.

13. The notion of “extracting” an item from a set dates back to Culioli’s studies (1970, 1975), where articles are seen as markers of “enunciative operations” that concern the set of possible referents of a noun.

14. Though well aware of the status of the indefinite article in terms of a theoretical description of quantification I have not normally “counted” the indefinite article as an explicit expression of quantity. Its use outside those very limited cases where contextual features highlight the singular quantity element do not seem to me to contribute to the “rhetoric of quantification” and its style.

15. From the point of view of the experiential structure of the noun group (Halliday 1985), Quantifiers could be both non-specific Deictics and Numeratives (exact or inexact), where “the Deictic element indicates whether or not some specific subset of the Thing is intended” (160) (*e.g. many textbooks*) and “the Numerative element indicates some numerical feature of the subset: either quantity or order, either exact or inexact” (163) (*e.g., the many textbooks*).

16. From the point of view of the texture of texts, we can follow Martin’s description of the identification system in English (1992: 98-129). We may then notice that Quantifiers play a decisive role in “presenting participants”, i.e., introducing not otherwise recoverable items to the text. But they can also be shown to combine with specific deictics in “presuming participants”, i.e., referring to them as already recoverable. This can be done both in terms of “reminding phoricity” (presuming that the identity of the participant being realized is recoverable), and in terms of “relevance phoricity” ordinal numbers, for example, imply

reference to a superset, “a group of participants relevant to the participant being identified by virtue of including it as a member” (Martin 1992: 112). This mechanism suggests including the ordinal numerals among the Quantifiers in our analysis: although they simply select on the basis of order and do not in themselves specify a quantity of items selected, they can be used to presume quantitative features of the superset.

17. For further information on the study see Bondi (1996).

18. Tadros (1985: 14), adapting Winter, identifies these as “enumerables” in her discussion of enumeration. She calls the two subclasses ‘discourse self-reference nouns’ and ‘sub-technical nouns’.

19. In *A Long-open Question ...*, for example, exact quantifiers represent 61.36% of Quantifiers within the world of hypothesis whereas they represent 66.67% within the world of fact, but most of these (50.79%) are in fact metadiscursive, thus leaving a mere 15.87% to exact Quantifiers with reference to the world of Fact outside the text.

20. In *The Overdue Recovery of Smith's Reputation...*, for example, exact quantifiers represent 38.89% of Quantifiers within the world of hypothesis whereas they represent 36.51% within the world of fact; these can be further subdivided into a 17.46% of metadiscursive references and a 19.05% of references outside the text.

## ABSTRACTS

The paper focuses on language variation across genres within the field of economics discourse. It investigates the relationship between quantifiers and worlds of reference (world of fact vs world of hypothesis) in two small corpora. The first is a corpus of thirty textbook chapters from English and American textbooks; the second is a small corpus of works by Samuelson, which includes textbook chapters, research articles and comments for the press. The textbook corpus allows an analysis of the characteristic language features and the typical structures found in chapters of economics textbooks. The comparative data show both quantitative and functional variation in the use of quantifiers in the various genres. Special attention is drawn to the use of exact quantifiers in hypothetical moves. Conclusions are drawn as to the implications of a genre-based analysis of materials in EAP.

L'étude ici présentée a pour objet les variations linguistiques à travers les genres dans le domaine du discours économique. L'investigation des relations entre quantificateurs et mondes de référence (monde de fait/monde d'hypothèse) est conduite sur deux corpora. Le premier corpus est constitué de trente chapitres extraits de manuels anglais et anglo-américains ; le second corpus, plus limité, regroupe des travaux de Samuelson et comprend des chapitres de manuels, des articles de recherche et des commentaires publiés sur la presse. L'ensemble des textes rend possible une analyse des traits linguistiques caractéristiques ainsi que des structures typiques relevées dans les chapitres des manuels pour l'économique. La comparaison des données met en évidence des variations quantitatives et fonctionnelles dans l'utilisation des quantificateurs à l'intérieur des différents genres. Une particulière attention a été accordée à l'utilisation de quantificateurs exacts dans des actes hypothétiques. Les conclusions considèrent enfin les implications d'une analyse fondée sur le concept de genre, conduite à partir des supports pédagogiques en anglais de spécialité.

## INDEX

**Mots-clés:** analyse de genre, anglais de spécialité, économie, manuel, quantification

**Keywords:** economics, ESP, genre analysis, quantification, textbook

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