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to Quantify Quantification. An Empirical
Analysis of the Application of Quantitative
Methods in German Historiography

$$\int_{-\infty}^{\infty} \sqrt{\frac{\sqrt{x^n}+1}{\alpha+\beta^{\gamma}}} \, dx$$

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On the Business Cycle of Counting – or How to Quantify Quantification. An Empirical Analysis of the Application of Quantitative Methods in German Historiography[*]

Michael Buchner / Tobias A. Jopp / Mark Spoerer / Lino Wehrheim[+]

Abstract: Historians today can draw on a well-filled methodological toolbox. Since the establishment of social history as a "historical social science" in the 1970s, this has included not only qualitative-hermeneutic approaches but also quantitative-statistical methods. Many sources at least permit a quantitative approach to analysis; others (e.g. mass data) cannot be evaluated profitably at all without the application of appropriate methods. But to what extent is (has been) the use of quantitative methods actually widespread in German-language historical studies? While the use of statistical methods has in principle become much easier since the days of the "Bielefeld School" due to increasingly powerful and at the same time user-friendly software, quantitative approaches seem to be widespread in only a few historical sub-disciplines. One reason could be the skepticism towards quantitative methods on the part of representatives of the "New Cultural History". However, empirical research on this aspect of scientific history is scarce. Our study would like to close this research gap to a certain extent. To this end, we have collected a comprehensive corpus of journals (including *Historische Zeitschrift*), which allows us to determine the extent of quantitative work in German-language history for the period 1951-2016. We argue both quantitatively and qualitatively, combining a simple "counting approach" (counting the tables and graphs in all the journals surveyed) with a more complex lexicographical approach. Overall, our results support the hypothesis that the cultural turn reversed the emerging trend towards more quantification in parts of history. However, the determination of the "business cycle of quantification" also holds some surprises.

Keywords: Cultural turn, Germany, history, quantification, quantitative methods, text mining

JEL classification: C00, N01

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On the Business Cycle of Counting – or How to Quantify Quantification.

An Empirical Analysis of the Application of Quantitative Methods in German History

1. Introduction

The modernization euphoria and planning optimism that prevailed in the Western world in the first three decades after the Second World War led to an increased use of quantitative methods in many social science disciplines. Those who wanted to plan the future had to be able to calculate. The use of pocket calculators and the first microcomputers, as well as punch-card controlled mainframe computers at university computer centers, made it possible to process and evaluate mass data in a way that had previously been considered impossible.[1]

In the 1970s, German history also experienced the advent of quantitative methods. Various impulses worked together. In France, the Annales School had already placed greater emphasis on quantification in the 1930s – the existence or non-existence of a "longue durée" was best proven by applying time series data.[2] In the United States, cliometrics emerged around the turn of the 1960s. The application of economic concepts and with it of mathematical-statistical methods – econometrics – induced new research on slavery and the industrialization of the United States.[3] In Germany, it was above all researchers in the historical social sciences – known simply as the "Bielefeld School" around Hans-Ulrich Wehler and Jürgen Kocka – who propagated the usefulness of quantitative methods.[4] Those who wanted to describe social processes needed mass data and had to be able to assess them. Methods of descriptive statistics (especially mean values and measures of dispersion) were used in many studies. Special textbooks that introduced the application of statistical methods into the historical sciences were first published in English and later also in German.[5] The cliometric revolution found its first advocate in Germany in the US-trained Richard H. Tilly who took over the chair of economic history in Münster in 1966.[6] Apart from publications by Tilly and some of his students, methods of inferential statistics, especially regression analyses,

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[1] Cf. on the digital revolution in historiography Hudson/Ishizu (2017: 263-267).

[2] Cf. Jarausch (1985: 13-18) and Foerster (2011).

[3] Cf. Conrad/Meyer (1958), Fogel (1964), Diebolt/Haupert (2018), and Margo (2018).

[4] Cf. Wehler (1973) and Kocka (1977). On the term „historical social research", cf. Schumacher (2011).

[5] Cf. Floud (1973, 1980) and the literature surveys by Hohorst (1977) and Schuler (1990).

[6] Cf. Tilly (1980), Dumke (1986), and Baten (2005).

were increasingly used in (almost exclusively economic) historical studies only since the 1990s.[7]

At that time, however, historical social science was already on the defensive. Since the 1980s, the cultural turn has been moving into parts of German historiography.[8] If everything was text and had to be deconstructed, then the explanatory power of historical data or the statistical sources of the historian from which data were obtained had to be questioned.[9] After all, statistical sources were collected by people and mostly served the interests of the nobility or economic interests. From this point of view, analyzing such obscure artefacts with sophisticated statistical methods had to look like breaking a butterfly on a wheel. The individual, the dense description was required, not the average, graphically illustrated by the regression line, which was supposed to extract the trend from a fuzzy cloud of points. Although in our opinion cultural historical questions could very well be approached quantitatively, the use of descriptive statistics is rare in studies that understand themselves as cultural historical.

At least, that is how it seems. The extent to which quantitative methods spread in German historiography has not yet been systematically investigated in a long-term perspective. That is even though a lively discussion about the usefulness of a quantifying approach had emerged in the 1970s and 1980s, but quickly faded away after 1990.[10] At best, it can only be reasonably assumed in which historical sub-disciplines quantifying methods are used more or less frequently than in others. The temporal trend is also completely unclear. The fact that, despite the increasing scope of performance, spreadsheet and statistical programs such as Excel, SPSS, Stata, R, EViews, and others are becoming increasingly easier to use suggests that the application of quantifying methods may have increased. But of what use is increasing computing power and easier software handling if the cultural turn simply has not needed it?

In this contribution, we are going to examine the question of which of the two effects has had a stronger impact on the use of quantifying methods in German historiography. We

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[7] Cf. Spoerer (2020) (bibliographical reference updated).

[8] Cf. e.g. Daniel (2006).

[9] By "historical data" we understand masses of uniform observations that have been obtained from statistical sources of the historian in order to be evaluated with the instruments of historical statistics to answer a question of interest; cf. also Section 2 and footnote 14.

[10] Cf. for studies with a short time horizon Kousser (1980), Johnson (1988), and Oberwittler (1993, 1997); cf. also footnote 22.

approach this question from two angles. In the longitudinal view, we are interested in the extent to which the use of quantifying methods has changed over time. There certainly was an increase in the 1970s. But to what extent did the potentially accelerating effect that digitization has had and the potentially retarding effect that the cultural turn presumably has had cancel each other out since the 1980s? In a cross-sectional view, we are interested in the extent to which quantifying methods have been used in individual historical sub-disciplines.

Even if – as our quantifying approach already shows – we cannot conceal a certain affinity to the use of quantitative concepts and methods, we try not to argue in a judgmental way. Just as prominent representatives of the historical social sciences or cultural studies have not been well served by describing their methodological approach, whether pronounced or unspoken, as the historiographical "silver bullet", we would not claim this for quantitative methods; it is always the research question that matters first. However, we like to point out that quantification actually is just a standardized, special form of comparison. Its significance for the interpretation of historical facts does not call into question any common methodological direction.[11]

For the two angles pursued here, a quantifying methodological approach is virtually the right one. However, we have to approach the issue economically as there are time restrictions. As a unit of investigation, we do not, of course, draw on the entirety of the historiographical literature or on a randomly drawn sample, but rather concentrate on articles in ten German-language journals. Criteria for the selection of the journals are, on the one hand, a certain degree of popularity and, on the other hand, the fact that we also want to examine economic and social history journals in particular. This is because the use of quantitative methods is most likely to be suspected in these journals. We consider our selection to be suitable for taking a closer look at four sub-disciplines: economic and business history, social history, cultural history, and, as a residual category, unspecific history. Of course, these sub-disciplines cannot be clearly separated from one another, and this holds for the journals, too. In a few analytical steps, we aggregate the three latter sub-disciplines in order to compare them with economic and business history, which – this we can say at this point – indeed is much more quantifying.[12]

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[11] Cf. on the role of comparison in historiography Haupt/Kocka (1996).

[12] The selection of journals and our focus on research on modern times is explained in the following section.

2. Journal dataset

The corpus of specialist journals shown in Table 1 serves as the starting point for our investigation. The dataset based on this corpus covers the period from 1951 to 2016 and allows us to compare the phase of the introduction of quantification into German-language historiography, which according to the usual view happened in the 1970s and early 1980s, with the situation before and the subsequent phase of the cultural turn in the late 1980s and 1990s.[13]

Table 1: Analyzed journals

Journal	Abbreviation	Founded	Observation period
(1) Archiv für Kulturgeschichte	AKG	1903	1951–2016[c]
(2) Archiv für Sozialgeschichte	AfS	1961	1961–2016
(3) Geschichte und Gesellschaft	GG	1975	1975–2016
(4) Historische Zeitschrift	HZ	1859	1951–2016
(5) Jahrbuch für Regionalgeschichte[a]	JbRG	1965	1991–2016[d]
(6) Jahrbuch für Wirtschaftsgeschichte[a]	JbWG	1960	1991–2016
(7) Vierteljahrshefte für Zeitgeschichte	VfZ	1953	1953–2016
(8) Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte	VSWG	1903	1951–2016
(9) Zeitschrift für Historische Forschung	ZHF	1974	1974–2016
(10) Tradition. Zeitschrift für Firmengeschichte und Unternehmerbiographie/Zeitschrift für Unternehmensgeschichte[b]	ZUG	1956	1956–2016

Notes: [a] Originally published in the GDR; in order exclude system effects, only considered from 1991 on. [b] Relabeled in 1977. [c] Not published in 1980. [d] Not published in nine years thereof.
Sources: Non-lending collection of *Universitätsbibliothek Regensburg* and *Elektronische Zeitschriftenbibliothek (EZB)*.

In accordance with our research question, only those journals that have been institutionally always firmly anchored in Germany and the language of publication of which has exclusively – or at least primarily – been German are short-listed. Given this precondition, our aim was to compile a corpus of articles that included the most important journals for early modern, modern, and contemporary historical research, i.e. for those epochs for which historians have access to a large pool of statistical sources; a pool that has emerged with the establishment and the expansion of systematic administration and a structured archive and statistics system. Due to their characteristics, sources of cross-sectional data (collected at one point in time for one or more observational units) and especially serial statistical sources – those that allow the construction of time series (one observational unit observed at several

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[13] Cf. e.g. on quantification Jarausch (1976: 24), Kocka (1977: 7-10), and Iggers (2007: 32-36). On the cultural turn, cf. Iggers, Geschichtswissenschaft (2007: 61-64).

points in time) and panels (several observational units observed at several points in time each) – are suitable as a basis for a quantifying approach. Consequently, historians of the early modern period and even more so of later periods should have been more inclined to use quantitative methods.[14] This is not to say that ancient and medieval historians have not been able to draw on statistical sources as an indispensable basis for the application of quantitative methods; just not to an extent that would let us expect a significant degree of quantification. This is to say that the additional effort of surveying relevant journals just does not seem justified to us for the time being. We would also like to point out that most of the journals we surveyed have principally been open to works from the field of ancient and medieval history and that such works can actually be found in our corpus (see the following section).

The core of our corpus is certainly the most renowned historical journal in the German-speaking world, the *Historische Zeitschrift* (HZ), which has always been open to submissions laboring over all possible historical subjects or epochs, laboring over all regions, and coming from all special historical disciplines. In addition to the HZ, three other journals already existing in the early 1950s were surveyed: the *Vierteljahrshefte für Zeitgeschichte* (VfZ), the *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte* (VSWG), and the *Archiv für Kulturgeschichte* (AKG). While the VfZ and the *Zeitschrift für Historische Forschung* (ZHF) as the organ for medieval and early modern research – as the only two journals – are primarily distinguished by their epochal focus, the AKG, the *Jahrbuch für Regionalgeschichte* (JbRG), and *Geschichte und Gesellschaft* (GG) stand for specific historiographical concepts. In contrast, the VSWG, the *Archiv für Sozialgeschichte* (AfS), the *Jahrbuch für Wirtschaftsgeschichte* (JbWG), and the *Zeitschrift für Unternehmensgeschichte* (ZUG) are dedicated to three special historical disciplines.[15] Due to the proximity of the contributions published there to economics and, thus, a social science conception of historiography, the VSWG, the ZUG, and the JbWG can also serve as quantitative benchmarks on the basis of which the extent of quanti-

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[14] Cf. Jopp/Spoerer (2017: 11-13) on the term "serial sources"; cf. also Pitz (1976), Schmidt (2005), and Behrisch (2006) for an overview of types of sources and the development of systematic administration and statehood.

[15] Journals on other sub-disciplines are not included for the reasons already mentioned and also because representatives of neighboring disciplines often publish in them. The latter applies, for example, to the *Zeitschrift für Agrargeschichte und Agrarsoziologie (ZAA)*, which did not fit into our sample because it also publishes articles on a sub-discipline of sociology.

fication can be weighed in the other seven journals.[16] For, even without a systematic empirical evaluation, it can be said that economic history certainly has the greatest tendency to quantify because of its proximity to the social sciences. In the following, we will also speak of "general history" in contrast to the economic history sub-corpus consisting of these three journals. We have not surveyed the years up to 1990 of the two journals founded in the GDR – the JbWG and the JbRG .[17]

The fact that the surveyed journals do not have a uniform structure, apart from the basic division into an article and a review section, made the selection of texts considerably more difficult. In many cases, the article's section is even subdivided, and the structure of any given journal may not have been stable over time; sections may have been titled "Abhandlungen/Assätze/Studien", "Miszellen", "Dokumentationen", "Forschungsberichte", "Literaturberichte", or "Diskussion(sforum)". In our opinion, it is by no means the case that original research (as opposed to compilation) can only be found in the first section.[18] As a result, only content that is clearly recognizable as a literature report, review, obituary, or foreword by the editor was excluded. From a formal point of view, this rather generous compiling seems to be less problematic than introducing further restrictions.

As can be seen from Table 2, the dataset originally compiled for this study consists of a total of more than 7,600 articles in the broadest sense, i.e. approx. 203,000 pages and 81.5 million so-called tokens (cf. Section 4), about half of which are accounted for by the HZ, the VfZ, and the AKG alone. Apart from the outlier JbWG, the share of foreign-language articles

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[16] Cf. the common distinction between historical subjects and special disciplines following Goertz (2007).

[17] With Claude Diebolt and Michael Haupert, for example, it seems reasonable to explain the economic cycle of quantitative work by the dominating methodological orientation and methodological tolerance prevailing among the editors and scientific advisory boards. It could be argued that the editors (in conjunction with their advisors) had a very decisive influence on the development of the methodological mix via their selection of manuscripts to be reviewed and to be published. However, we have abstained from systematically surveying the persons in the advisory and editorial boards of the ten journals because we see a whole range of methodological problems that we cannot address at this point. For example, the extent to which the editors and advisory boards are involved in the editorial decision-making processes is unknown and has certainly fluctuated over time. To name just one of the many questions that needs answering: did the responsible editor decide alone or was it a collegial decision? A quick look on our part at the responsible editors (if identifiable as such) allows the assumption that at best Toni Pierenkemper – responsible editor of the JbWG from 1992 to 2009 – can be attributed to quantifying approaches. It is also striking that the Richard Tilly mentioned at the beginning, who is certainly the most prominent representative of cliometric approaches in Germany, never appeared as the leading editor of a(n) (economic) history journal. With Hans-Ulrich Wehler, one also comes across a prominent representative of the historical social sciences in the editorships of GG and VSWG; cf. Diebolt/Haupert (2018).

[18] The JbWG can be cited as an example: The booklets consist of an essay section on a main topic ("treatises/essays") and possibly further free sections ("research reports", "discussions") for the submission of non-topic-specific contributions, which would not necessarily be less "original".

varies within narrow limits across the journals and is low overall at less than 5%. Foreign-language content, i.e. primarily articles written in English, has increasingly been published only since the turn of the millennium and above all in economic and social history journals.[19] The analysis in the following section includes these foreign-language articles. For the subsequent lexicographical analysis, however, it makes sense for methodological reasons to consider only the German-language sub-corpus; more on this in Section 4.

Table 2: Extent of the journal database (1951-2016)

Journals	# Articles		# Pages		# Token[a]
	Total	thereof foreign language	Total	thereof foreign language	Total
AKG	1 034	4 (0,4 %)	26 071	75 (0,3 %)	9 556 339
AfS	686	54 (7,9 %)	22 928	1 465 (6,4 %)	10 737 391
GG	931	35 (3,7 %)	22 202	927 (4,2 %)	8 813 404
HZ	1 243	0	39 595	0	13 808 534
JbRG	103	0	1 882	0	861 115
JbWG	523	148 (28,3 %)	10 964	3 064 (27,9 %)	4 864 058
VfZ	1 329	0	36 136	0	15 597 279
VSWG	773	61 (7,9 %)	18 919	1 477 (7,8 %)	7 343 541
ZHF	403	2 (0,5 %)	12 532	53 (0,4 %)	4 990 869
ZUG	639	46 (7,2 %)	11 814	928 (7,8 %)	4 966 213
All journals	*7 664*	*350 (4,6 %)*	*203 043*	*7 989 (3,9%)*	*81 538 743*

Notes: English is by far the most common foreign language; a few articles have been written in French and Italian. The number of tokens corresponds approximately to the number of words (see section 4). [a] Covers non-German language articles, too.
Sources: Authors' own computations.

3. Quantifying quantification – a first approximation

> *"Quantification in historiography – that means the systematic processing of numerically summarizable and thus in larger numbers similarly or identically occurring source information (or data) with the help of various arithmetic and statistical methods for the purpose of describing and analyzing historical reality; these methods range from mere counting and classification in descriptive statistics to the formation and application of statistical indices, to regression analysis and the application of mathematical models".*

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[19] A few articles are available in French and Italian, e.g. in the VSWG.

With these words Jürgen Kocka summarized the essence of quantitative work among histori-ans 40 years ago.[20] Other authors, such as Konrad Jarausch, add that quantification also means, in particular, having at hand a "theoretical framework that attempts to capture causal relationships in models based on generalizations";[21] this could, for example, mean a theoretical framework rooted in the social sciences. However, the mandatory existence of a theoretical framework or, more precisely, of a specific theoretical model, in order to be able to speak of quantitative work at all, seems somewhat too restrictive to us. For this reason, Kocka's definition, which is still up-to-date, will serve as a conceptual starting point for the following. But how can the extent of quantitative work among historians in the sense of this definition be measured?

One approach that has been taken in the literature is to count the tables and graphs appearing in a journal volume per article and to put this in relation to the total number of pages; we will apply this approach here, too.[22] The basic idea here is simple: tables and graphs are an essential outcome of the evaluation of statistical sources or data; this evalua-tion ranges from the illustration of raw data to simple mathematical transformations (e.g. percentages, shares, growth rates) and the calculation of measures of descriptive statistics and to the application of sophisticated analytical instruments of inferential statistics (e.g. regression analysis). Even if the results of the analysis of statistical data could be communi-cated purely verbally, the absence of any visualization via tables and graphs is rare.[23]

As Table 3 shows, half of the 5 800 tables and two-thirds of the almost 1 900 graphs are accounted for by the VSWG, ZUG and JbWG alone – i.e. a quarter of the corpus in terms of the number of articles. In relation to the number of pages, the quantity of quantification in the economic history sub-corpus with 9.6 to 15.2 tables and graphs per one hundred pag-

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[20] Kocka (1977: 4).

[21] Jarausch, Quantifizierung (1976: 12).

[22] Cf. Kousser (1980), Bogue (1981), Johnson (1988), Oberwittler (1997), Reynolds (1998), and, recently, Diebolt/Haupert (2018). Of these, the following studies deal partly or entirely with German language jour-nals: Kousser (1980: 440) evaluates six volumes of the VSWG distributed over the period 1961-1978 in this way. Johnson (1988) discusses figures for five journals (VSWG, HZ, GG, VfZ, and HSR), but only for the short period 1980-85. Oberwittler (1997), likewise looking at those five journals, expands the observation period to 1980-1993.

[23] We counted every graph that, in any form, depicts raw data or transformations thereof (e.g. histograms, time series, network diagrams, maps). Any data preparation in tabular form was counted as a table (i.e., in-cluding those structures that do not have a label like "Table x" or visible horizontal and vertical lines). Tables and graphs consisting of several panels – e.g. a panel (a) on wheat prices in administrative district x and a panel (b) on wheat prices in administrative district y – were counted as one table or graph.

es (the usual standardization in the literature) is, as expected, significantly higher than in the general history sub-corpus (see fourth column); the most quantitative journals from this sub-corpus are the AfS and the JbRG. With 0.5 tables and graphs per hundred pages, the HZ ranks in-between the AKG (0.3) and the ZHF (0.7) at the lower end of the spectrum. The space taken up by quantitative work in the various journals can alternatively be estimated in terms of the proportion of quantitative articles – i.e. articles showing tables and graphs – in all articles. Doing so, however, does not significantly change the ranking and evaluation of the journals (see fifth and sixth column). As a rough guideline we can say that out of five articles randomly selected from the entire corpus, one would contain at least one table or graph; if only the general historical sub-corpus is considered, one out of ten articles can still be expected (and four in the case of economic history).

Table 3: Number of gathered tables and graphs in the dataset (1951-2016)

|	# of tables	# of figures	Tables and figures per 100 pages	# of quantitative articles	Share of quantitative articles in all articles
AKG	52	31	0,3	30	2,9 %
AfS	94	284	5,3	172	25,1 %
GG	576	184	3,4	160	17,2 %
HZ	149	54	0,5	50	4,0 %
JbRG	57	36	4,9	28	27,2 %
JbWG	1 124	539	15,2	251	48,0 %
VfZ	536	40	1,6	137	10,3 %
VSWG	1 372	456	9,7	302	39,1 %
ZHF	74	15	0,7	32	7,9 %
ZUG	913	222	9,6	237	37,1 %
Gesamt	*5 799*	*1 861*	*3,8*	*1 399*	*18,2 %*

Sources: Authors' own computations.

This picture can be sharpened by looking at the development of both measures over time. Figure 1 illustrates the development of the number of tables and graphs per hundred pages (solid line/left axis) as well as the share of quantitative articles (dashed line/right axis) by journal. Note that the axes are normalized to a uniform maximum value for the sake of better comparability and that the time series are presented as three-year centered moving averages to improve readability.
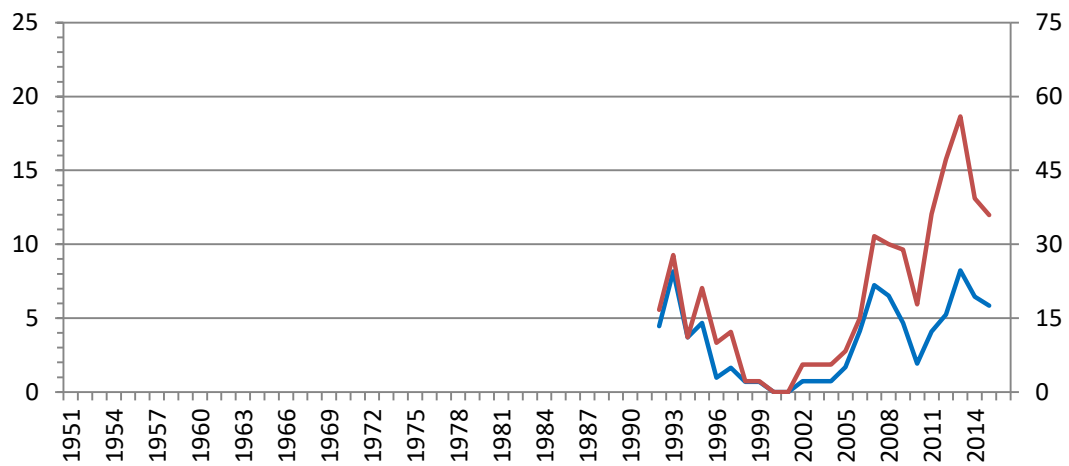
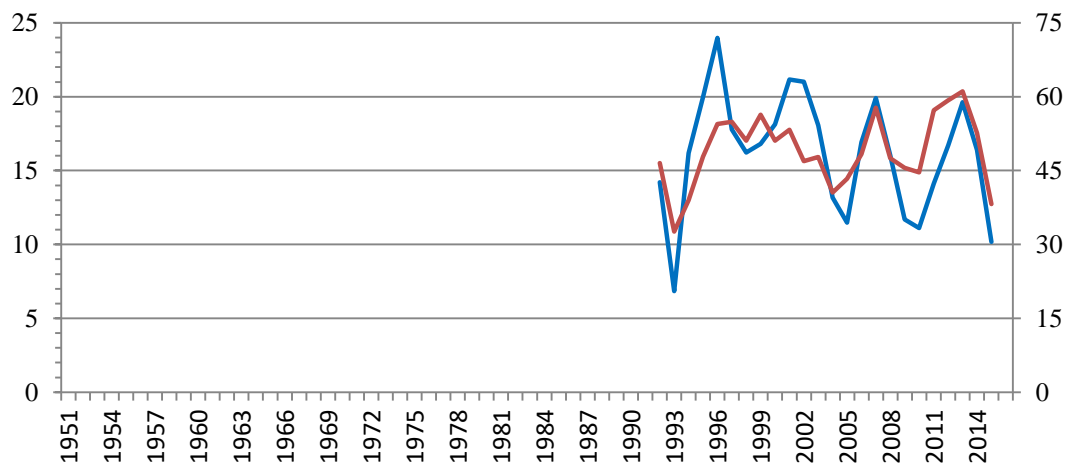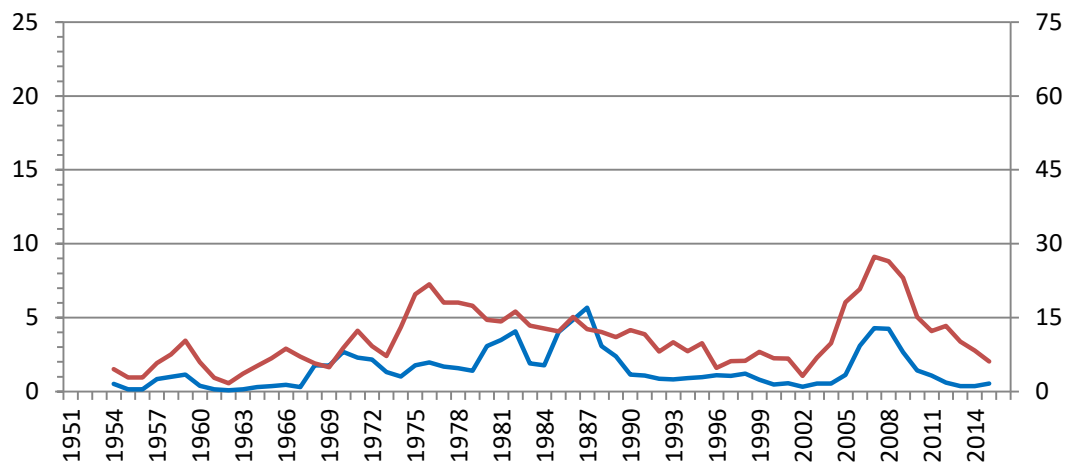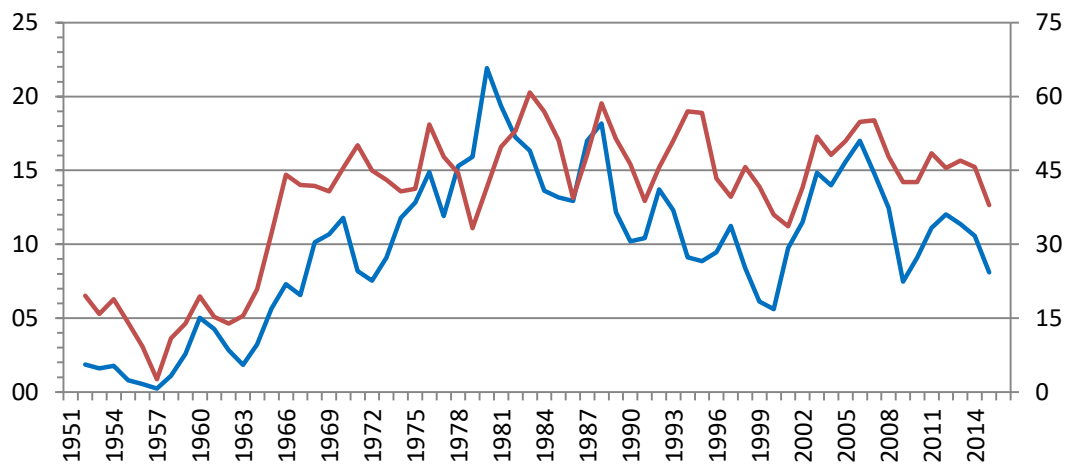Figure 1: The time pattern of quantification per journal

(a) AKG

(b) AfS

(c) GG

(d) HZ

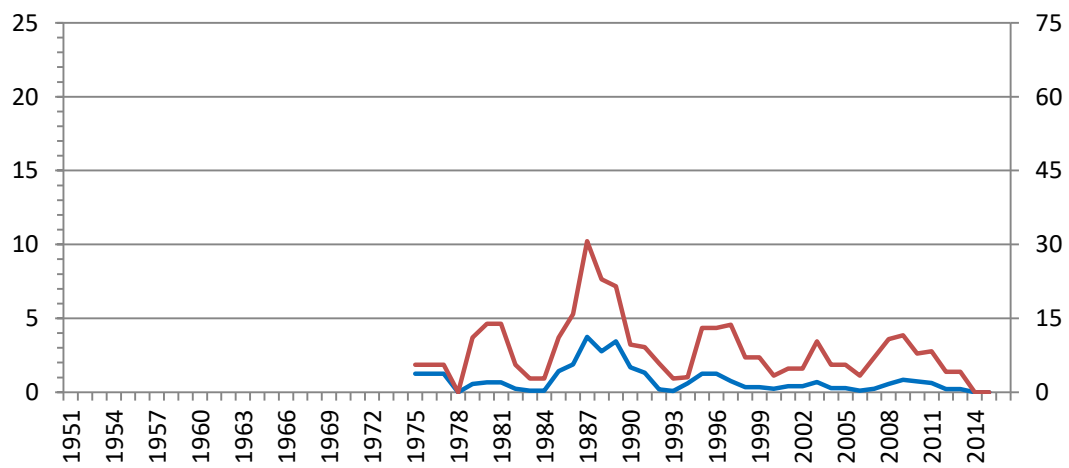
(e) JbRG
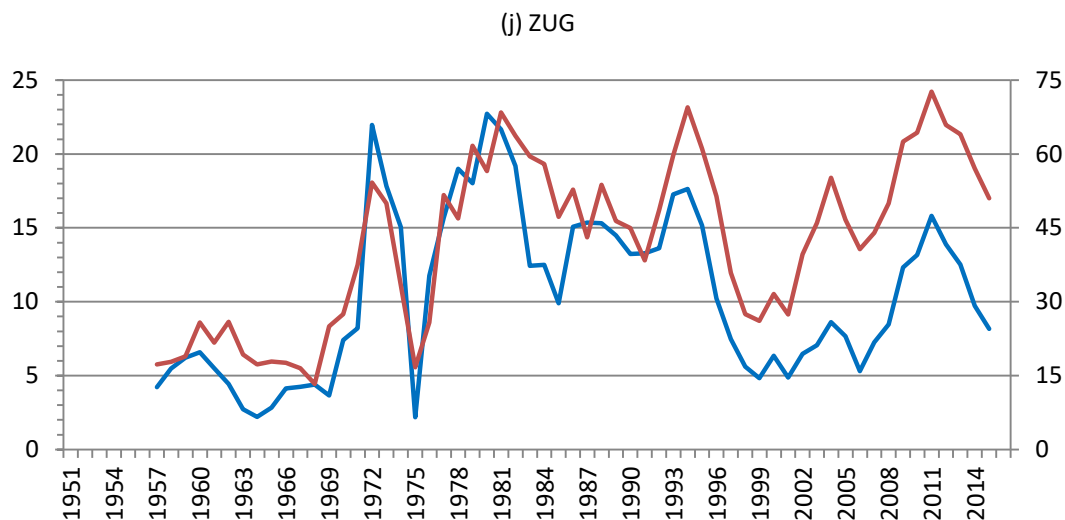

(f) JbWG

(g) VfZ

(h) VSWG

(i) ZHF

12

(j) ZUG
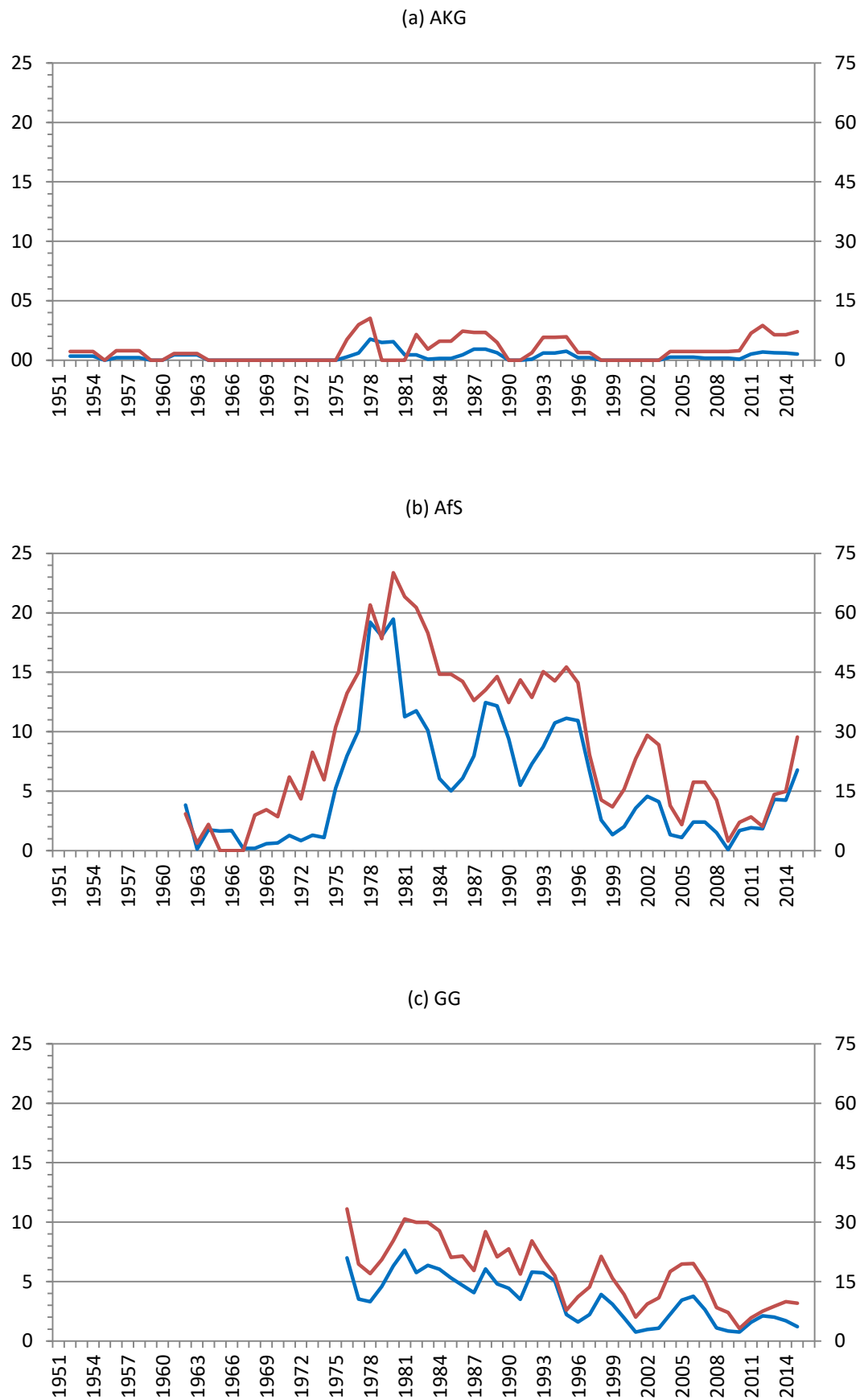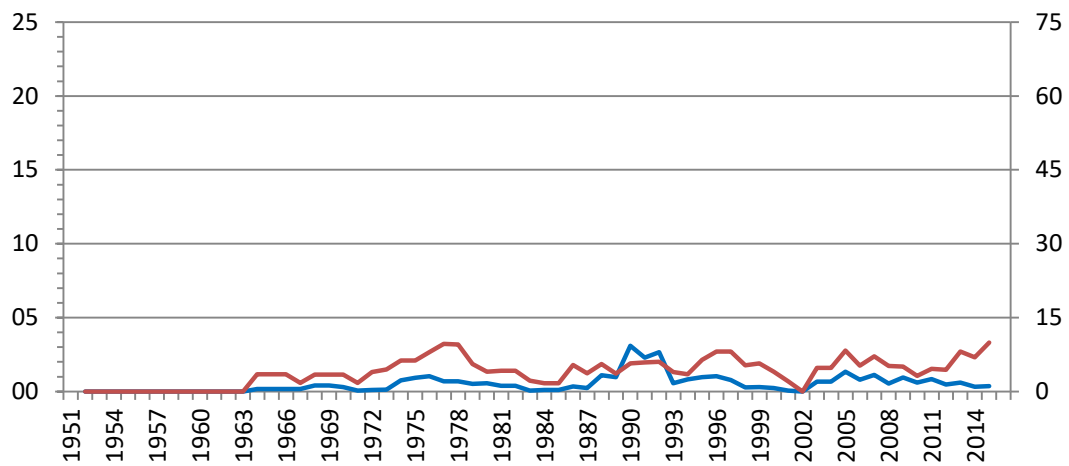
Notes: Tables and graphs per one hundred pages = blue line (left scale); and percentage of quantitative articles in the corpus = red line (right scale). For the purpose of smoothing, three-year centered moving averages are shown.
Sources: Authors' own depiction.

The main findings can be summarized as follows: Firstly, despite the performed smoothing, both measures show considerable fluctuations in all cases. Secondly, leaving volatility aside, a trend towards more quantification can be diagnosed for all journals that go back far enough, starting between 1965 and 1975 and having been very steep in some cases. Thirdly, the maximum extent of quantification was already reached mainly at the beginning of the 1980s (depending on the measure, VfZ is out of the ordinary here). Since then it has declined in stages, but steadily in the end (e.g. GG, ZHF) or flourished again in the meantime, i.e. after 2000/05 (e.g. JbRG, VfZ, VSWG, ZUG). Fourthly, it appears that the AfS and also the HZ have experienced a noticeable boost in quantification; the latter, admittedly, at a much lower level and only if one takes the share of quantitative articles in all articles as reference.

Looking at the development of quantification at the level of aggregation of the sub-sets, as in Figure 2, a clearer picture emerges. The development of the extent of quantitative work in the general historical corpus (solid line) as a whole can be compared with the development of a sinusoidal curve: a phase of increasing quantification is followed by a phase of contraction after reaching the historical maximum around 1980, when there were nine tables and graphs per hundred pages and a share of quantitative articles in the general historical (or in all) articles of about 25% (or 21%). For the economic history sub-corpus, the picture is somewhat different: the number of tables and graphs per hundred pages (or the share of quantitative articles in all economic history articles) also increases up to its historical maximum around 1980, to about 25 (70%), and has since then fluctuated around a long-term

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trend of about 14% (49%); the share of quantitative economic history articles in all articles increased in trend until the early 1970s, then fell abruptly and has been rising again since 1975. When interpreting these results, it should be noted that, due to the incentive structures in the faculties of economics and business administration, especially quantitative economic historians have increasingly submitted their work to English-language journals since the 1990s. The gap between articles in economic history and general history with regard to quantification would therefore actually even wider than shown here if English-language journals were also considered (this naturally applies to the interpretation of the results in Section 4, too).[24]

Figure 2: Time pattern of quantification by sub-corpus

(a) Tables and figures per 100 pages
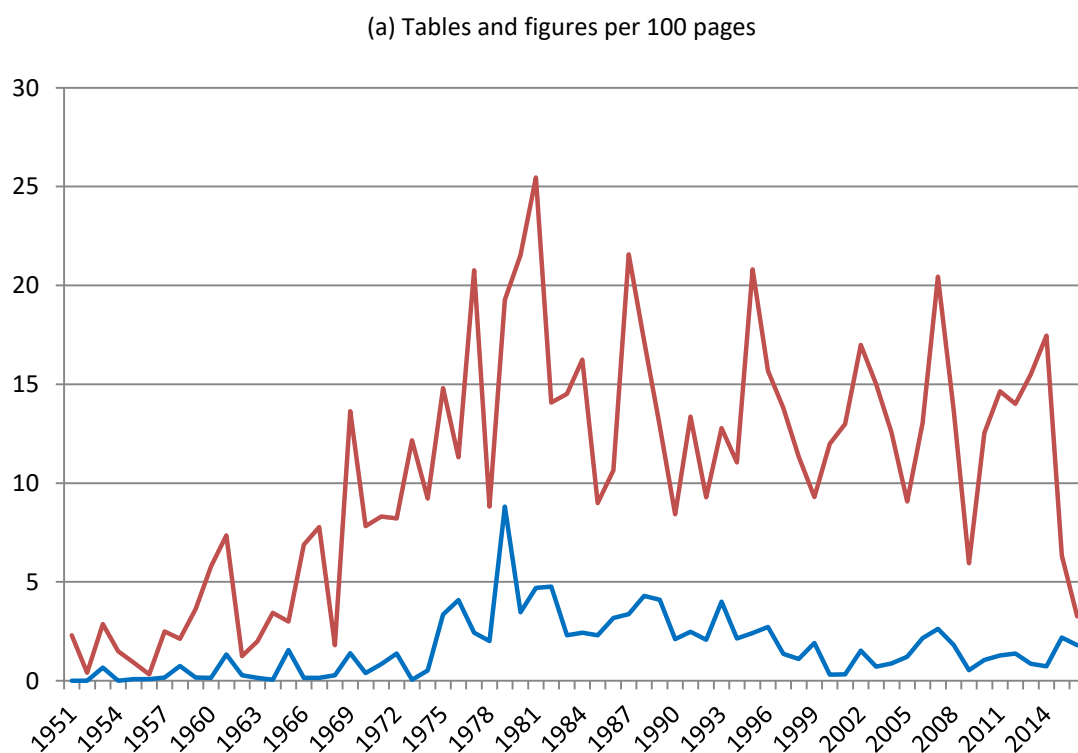
[24] In the German-speaking world, for example, *Cliometrica* (Springer-Verlag); and in the Anglo-Saxon world *The Journal of Economic History*, or *Economic History Review*.

(b) Share of quantitative articles in the respective sub-corpus (in %)
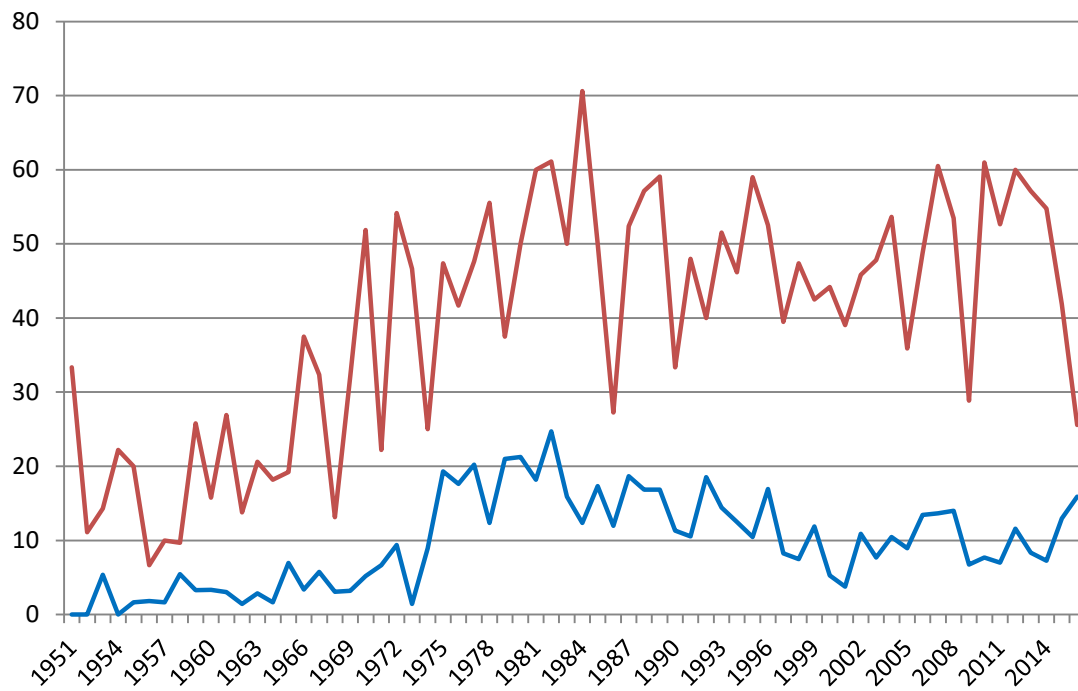
(c) Share of quantitative articles in all articles (in %)
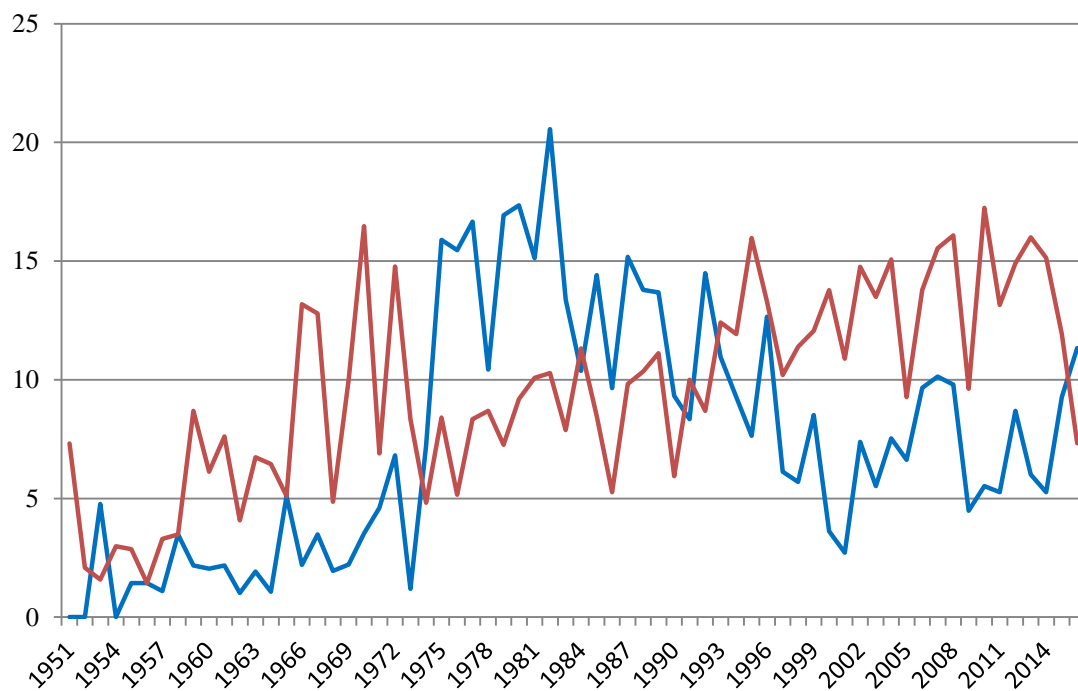
Notes: General historical corpus = blue line; and economic historical corpus = red line. For the purpose of smoothing, three-year centered moving averages are shown.
Sources: Authors' own depiction.

Figure 3: Three international benchmarks – Tables and figures per 100 pages
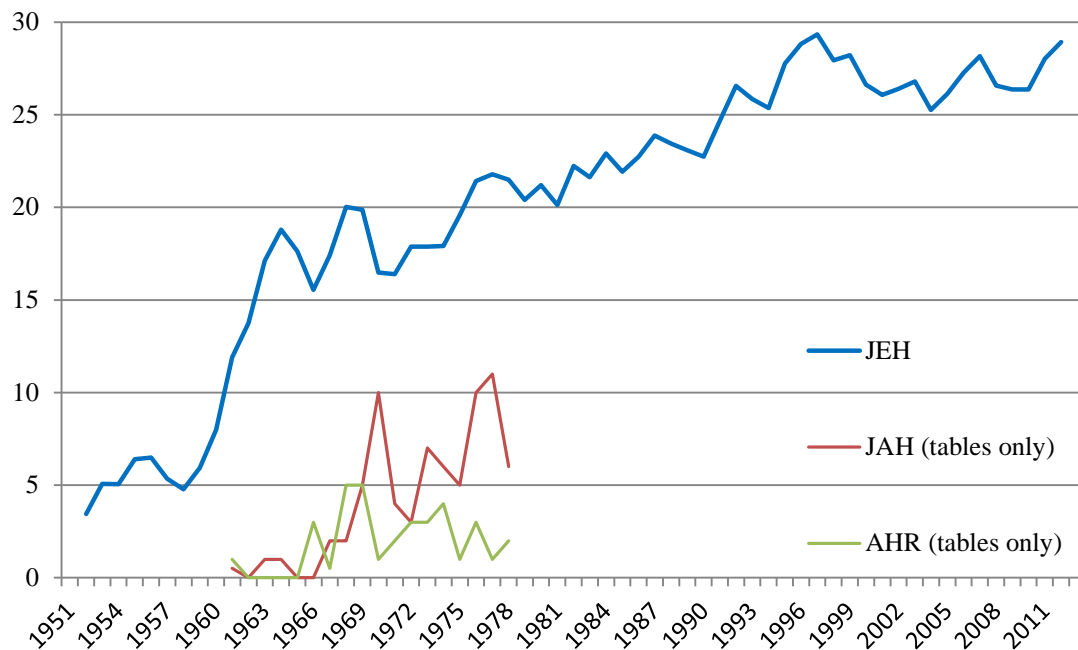
Anmerkungen: JEH = Journal of Economic History. JAH = Journal of American History (only tables). AHR = American Historical Review (only tables). A three-year moving centered average is given for the YEH, but not for the other two journals.
Sources: JEH: Diebolt/Haupert (2018). JAH/AHR: Kousser (1980: 438).

How quantitative is German historiography in international comparison? To our knowledge, there are figures comparable to our long series only for the *Journal of Economic History* (JEH), the world's leading economic history journal. As Figure 3 shows, the extent of quantitative work in the JEH has increased in the long term, due to the counting method, from four tables and graphs per hundred pages in the 1950s to between 25 and 30 since the late 1990s. In other words: compared to the JEH, the VSWG, ZUG, and JbWG are about a third less quantitative. For the general historical corpus, the *Journal of American History* (JAH) and *the American Historical Review* (AHR) are certainly more suitable benchmarks, but only data up to 1978 are available for these journals, which on the whole were also somewhat more quantitatively oriented than the journals in the German general historical corpus.

In our view, quantification as a method starts where historians extract or compile statistical data from historical sources and discuss them for the purpose of gaining knowledge. The measurement of quantitative work on the basis of the standardized number of tables and graphs can only be the beginning of an investigation into the quantity of quantification, especially since the qualitative aspects of the graphical and statistical instruments are not

yet touched on.[25] In the following section, we address this problem by way of a lexicographical approach.

4. Dictionary approach

The use of a particular method always reflects in the language of the respective work by using relevant technical terms. While it is possible to dispense with tables and graphs in a quantitative analysis and to convey content purely verbally, it seems difficult or even impossible to dispense with certain terms such as "percent" or "average". The use of language as an indicator for the application of quantitative methods can be found, for example, in Robert A. Margo's study of the distribution of econometric terms in various economic and economic history journals.[26] This approach provides a finer measure of the spread of quantitative methods than the collection of tables and graphs because the extent of applied quantitative methods is not necessarily proportional to the number of tables and graphs. Furthermore, it is relatively easy to differentiate applied methods linguistically according to their level of technical sophistication. For example, an essay that does not only involve descriptive statistics but also methods of inductive statistics will most likely contain expressions such as "regression" or "level of significance". The respective advantages and disadvantages of the two approaches, which will be discussed in more detail at the end of this section, make combining them seem like an obvious solution. In the following, we therefore make additional use of the "linguistic footprint" of quantitative methods by recording the distribution of statistical vocabulary over the articles in our corpus; we will be taking both the cross-sectional and the longitudinal angle again.

The procedure is comparatively simple: we count the frequency of certain search terms appearing in all articles in our corpus, relate this frequency to the length of the respective article (measured by the number of words) and determine the change in this proportion over time. For this purpose, all articles were converted into searchable text files. The original PDF files were treated with OCR (Optical Character Recognition).[27] Text components

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[25] One way to measure the quality of quantitative work is to classify the tables and graphs and, based on this, the articles according to the degree of difficulty, i.e. according to the special knowledge required on the part of the author to construct them and the reader to understand them; cf. e.g. Johnson (1988) and Reynolds (1998).

[26] Cf. Margo (2018).

[27] Of course, the use of OCR is associated with errors in text recognition. Since the scans are usually of very good quality, the rate of unrecognized characters averages around 5%. A certain error rate seems to us to be

not belonging to the actual article, such as download signatures and headers, were removed; for technical reasons and reasons of standardization, capitalization, vowel mutations, and the German letter "ß" were removed, too.[28] Furthermore, the texts were broken down into individual words, or tokens, with the help of a tokenizer.[29] The search for terms was automated with the help of the software "Rapidminer", which enables not only the search but also the tokenization as well as the recording of the number of tokens per article.[30]

Due to the length of the study period and the technical diversity of the corpus, a broad definition of the term "statistical term" is necessary based on the use of a high number of search terms or a whole dictionary. The use of dictionaries is a widely used approach in the field of text mining. For example, the mood of a text can be measured with the help of a so-called sentiment dictionary. In this case, the dictionary contains search terms with positive and negative connotations.[31] In order to create a "quantification dictionary", it is important to include only unambiguous technical terms, if possible, in order to avoid misinterpretations. Furthermore, the selection of search terms requires a high degree of objectivity. To meet these requirements, we use the glossaries and indices of various statistical textbooks as the basis of our dictionary. On the one hand, we rely on introductory and advanced textbooks in order to take into account different levels of technical knowledge; and, on the other hand, we use textbooks from different periods of time in order to detect possible changes in terminology.[32] Since some terms from the glossaries also have a non-statistical meaning (e.g. "test"), and including them would distort our results, all terms we identified as ambigu-

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justifiable, and it can be assumed that errors in text recognition affect quantitative and non-quantitative expressions equally, so that no systematic distortion of the results is to be feared.

[28] Vowel mutations and the letter "ß" are obstacles for certain word processing programs. In order to not run into problems, they have been converted to ae, ue, oe, and ss.

[29] Tokenization means that texts are broken down into individual components, so-called tokens, at predefined positions. This step is necessary to enable an exact comparison of search term and text. In the present case, the texts were split at all non-letter characters, whereby numbers were removed. Thus, the number of words and the number of tokens differ marginally.

[30] Rapidminer is free software for university employees which can be used to apply various text mining methods. See https://rapidminer.com.

[31] This approach to measuring sentiment is mainly used in the finance sector; cf. e.g. Tetlock (2007).

[32] We used the following textbooks: Assenmacher (1990), Backhaus et al. (2011), Backhaus/Erichson/Weiber (2013), Bortz (1985), Bosch (1998), Fahrmeir et al. (2010), Floud (1973), Gebelein (1949), Holling/Gediga (2011), Kellerer (1979), Klezl-Norberg (1946), Kuckartz et al. (2013), von der Lippe (1974), Mosler/Schmid (2006), Ohler (1980), Poddig/Dichtl/Petersmeier (2000), Schlittgen (2000), Schmetterer (1966), Schorer (1946), Schwarz (1952), and Tinbergen (1952).

ous have been excluded. This also applies to some key statistical terms such as "regression" (engl. *regression*), "gleichung" (engl. *equation)* or "signifikant" (engl. *significant*), so that our results can be considered rather conservative.[33] Finally, our dictionary contains 1 081 terms in their basic form; including inflections, it totals 2 928 search terms.[34]

Figure 4: Frequency of statistical terms in the total corpus

Notes: All search terms with at least 10 observations. The size of the terms corresponds to their absolute frequency in the total corpus.
Sources: Authors' own depiction.

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[33] Ambiguous terms were taken into account in compound variants if they in turn have a clear statistical connotation, e.g. "regressionsgleichung" (engl. *regression equation*).

[34] Alternatively, the words in the corpus could also have been converted into their respective basic form by so-called lemmatization. The dictionary is available on request.

Of these 2 928 entries, we find 685 in our corpus, distributed over a total of just over 58 000 search hits which corresponds to a value of 0.71 per 1 000 tokens (cf. Table 4). In other words, there is one statistical term for approximately 1 400 tokens in the total corpus. By far the most common term, with over 18 000 hits, is "prozent" (engl. *percent*), followed by "tabelle" (engl. *table*) (7 002), "statistik" (engl. *statistics*) (5 054), "index" (engl. *index*) (2 665), and "erhebung" (engl. *survey*) (2 567). Figure 4 shows all terms occurring with an absolute frequency greater than ten, and Figure 5 shows the 50 most frequent search terms per journal. With the exception of AKG, "prozent" is the most frequently occurring term in all journals; this term is not included in the word clouds for visual reasons. The fact that the word "erhebung" is the most prominent term after "prozent" for AKG, HZ, and ZHF could be explained by the ambiguity of the term. Obviously, in this case it is not the statistical survey that is meant, but rather ennoblement. This becomes clear when looking at the example of Heinrich Schnee's article on "The ennoblement of the First Court Factors" the 26 search hits on which are entirely distributed over "erhebung" or its plural form.[35] This artifact shows the limits of the dictionary-based approach: even after thorough examination of the search terms, misinterpretations due to different word meanings cannot be avoided.

Looking at the temporal distribution of the search results among the individual journals, the results from Section 3 are confirmed. In absolute terms, more than half (57%) of the 58 000 terms found are from AfS, JbWG, and VSWG. With a value of 2.35 terms per 1 000 tokens, the JbWG is the most quantitative journal in our corpus. On the other hand, only 0.77 statistical terms per 1 000 tokens are found for the HZ, which is quite close to the value for the whole corpus. The AKG is the least quantitative journal with a value of 0.16, while the article by Hans Krawarik on "New methods for the study of denominational structures of the early modern period" is a lonely outlier with 54 terms.[36]

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[35] Cf. Schnee (1961).

[36] Cf. Krawarik (1988). The 54 hits in this essay are divided into the words "stichprobe" (engl. *sample*) (25), "korrelation" (engl. *korrelation*) (13), "stichproben" (engl. *samples*) (7), "statistik" (engl. *statistics*) (4), "streuung" (engl. *dispersion*) (3) and "diagramm" (engl. *diagram*) (2). The author did not include a table, but several figures. Eichberg (1974) follows with 32 terms.

Figure 5: Frequency of statistical terms per journal

(a) AKG

(b) AFS

(c) GG

(d) HZ

(e) JbRG

(f) JbWG

(g) VfZ

(h) VSWG

(i) ZHF

(j) ZUG

Notes: The 50 most frequent search terms per journal are shown, whereby the most frequent term ("prozent"; engl. *percent*) was not taken into account in all but the AKG for reasons of presentation. The size of the terms corresponds to their absolute frequency in the respective sub-corpus.
Sources: Authors' own depiction.

The proportion of statistical concepts may be seen as a defining feature of those articles that take a quantitative approach. If an article is defined as quantitative as soon as the related share of statistical terms reaches at least the mean value for the whole corpus, this results in 1 463 quantitative articles representing 19.1% of the whole corpus. Compared with the 1 399 quantitative articles (18.2%) in Section 3, the mean thus seems justified as a reference.[37] From this point of view, too, the JbWG is the most quantitative journal as half of the articles are quantitative, whereas only 3.5 % of the articles in the AKG can be considered quantitative. An overview of the dissemination of statistical vocabulary and quantitative articles in the studied journals is given in Table 4. Compared to the first approach, the discrepancy is striking in the case of the JbRG and ZUG: both times, the dictionary approach provides a much lower proportion of quantitative articles than counting graphs and tables (the difference is 12.6 and 7.4 percentage points, respectively). Apparently, a number of articles can be found in these journals in which graphs and/or tables are not accompanied by a correspondingly high proportion of statistical vocabulary.

Table 4: Statistical terms and quantitative articles based on the dictionary approach

	# of terms, absolute	Maximum	Mean	Median	# of terms, relative[a]	# of quantitative articles[b]	Share in the respective journal
AKG	1 574	54	1,52	1	0,16	36	3,5 %
AfS	11 171	390	16,26	4	1,04	193	28,1 %
GG	6 813	209	7,23	2	0,77	214	23,0 %
HZ	3 460	254	2,79	1	0,25	66	5,4 %
JbRG	477	119	4,63	1	0,55	15	14,6 %
JbWG	11 448	338	21,81	6	2,35	262	50,1 %
VfZ	6 043	173	4,55	1	0,39	162	12,2 %
VSWG	10 469	292	13,54	4	1,43	300	38,8 %
ZHF	1 229	84	3,06	1	0,25	25	6,2 %
ZUG	5 358	141	8,41	2	1,08	190	29,7 %
In total	*58 042*	*390*	*7,57*	*2*	*0,71*	*1 463*	*19,1 %*

Notes: Maximum, mean, and median refer to the absolute number of statistical terms per article. [a] Statistical terms per 1 000 tokens. [b] An article was considered quantitative if it showed a proportion of statistical terms greater than or equal to the average for the total corpus (0.75).
Sources: Authors' own computations.

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[37] If, on the other hand, the median (0.17) is taken as the limit, the number of quantitative essays increases to 3 804, but because of the high number of very low shares, the median would distort the results upwards.

With regard to the temporal distribution of statistical terms over the sub-periods, it turns out that the results of the dictionary approach are likewise very similar to those of Section 3 (cf. Figure 6). The general picture of an increase in quantitative articles in the 1970s, followed by a downward trend in the 1980s, can be confirmed. There, indeed, seems to have been a renewed increase in the number of quantitative articles in the early 1990s. However, looking at the developments journal by journal suggests that this increase is due solely to the economic history journals. There also are some minor differences when directly comparing the results on individual journals. For example, as goes for the AfS, in the mid-1990s there was an increase in the use of dictionary terms so large that the proportion of quantitative articles as per the dictionary approach increased much more than as per the counting approach discussed in Section 3. A much more constant upward trend in the proportion of quantitative articles since the 1970s can also be observed for the ZUG. The same applies to the significant increase in VfZ, which has continued (in waves) since the late 1990s. This may indicate a greater reliance by contemporary historians on socio-economic data that are now well prepared for the post-war period and are increasingly in demand.[38] At the same time, however, contemporary historians quite rightly emphasize that these data and the way they came about are, or should be, the subject of historiographical analysis themselves.[39] This could explain the discrepancy that is striking in the case of the VfZ with regard to the results for the 2010s from Section 3.
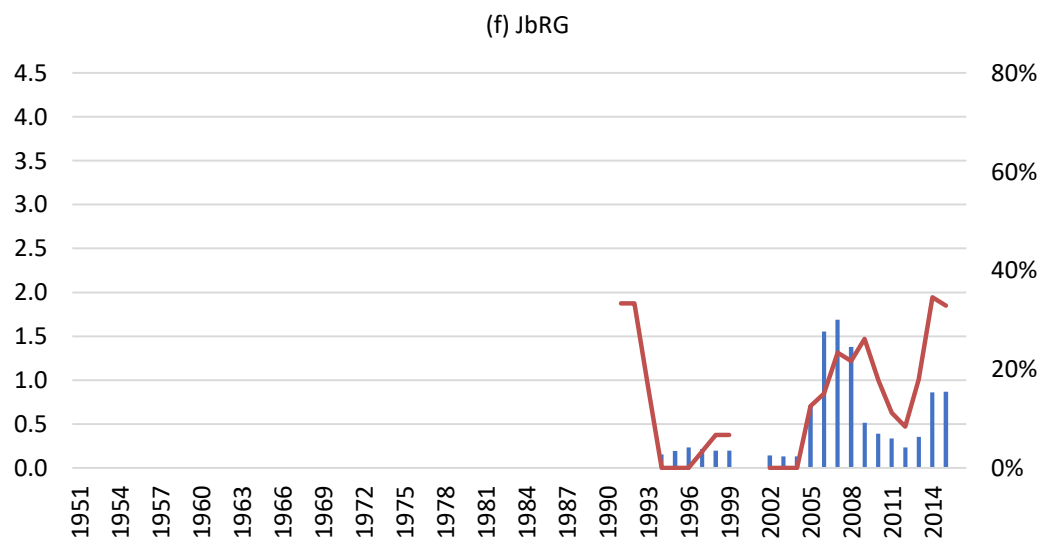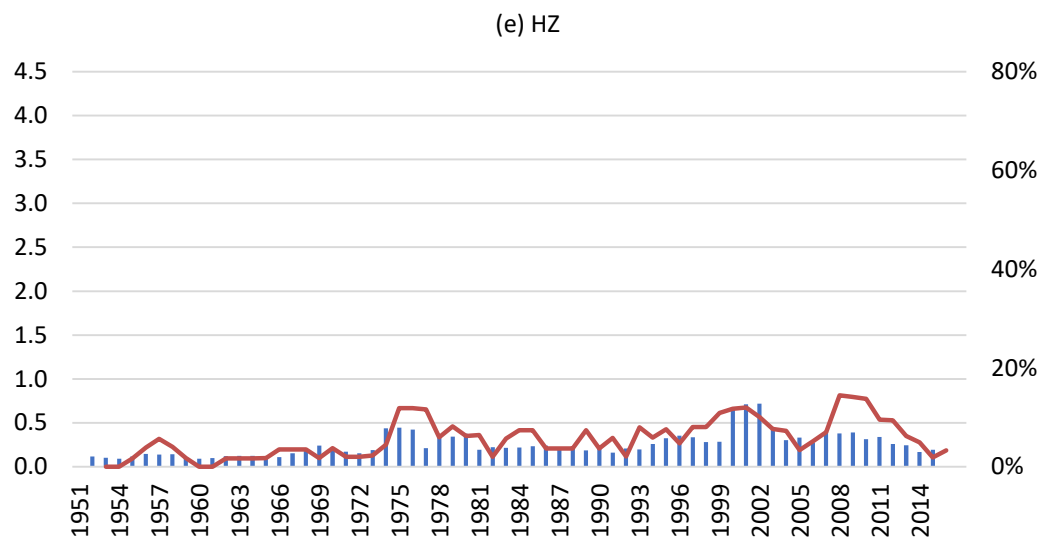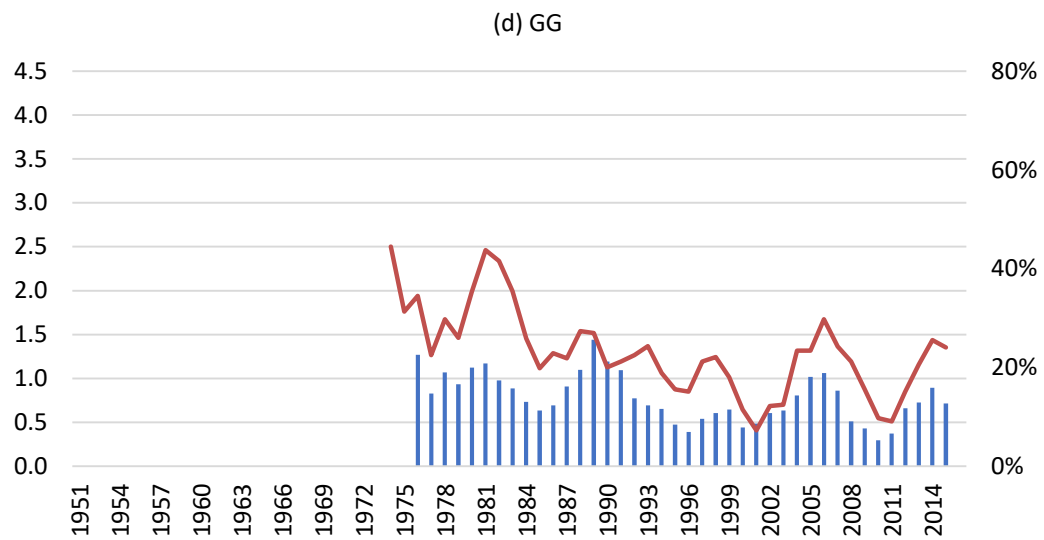
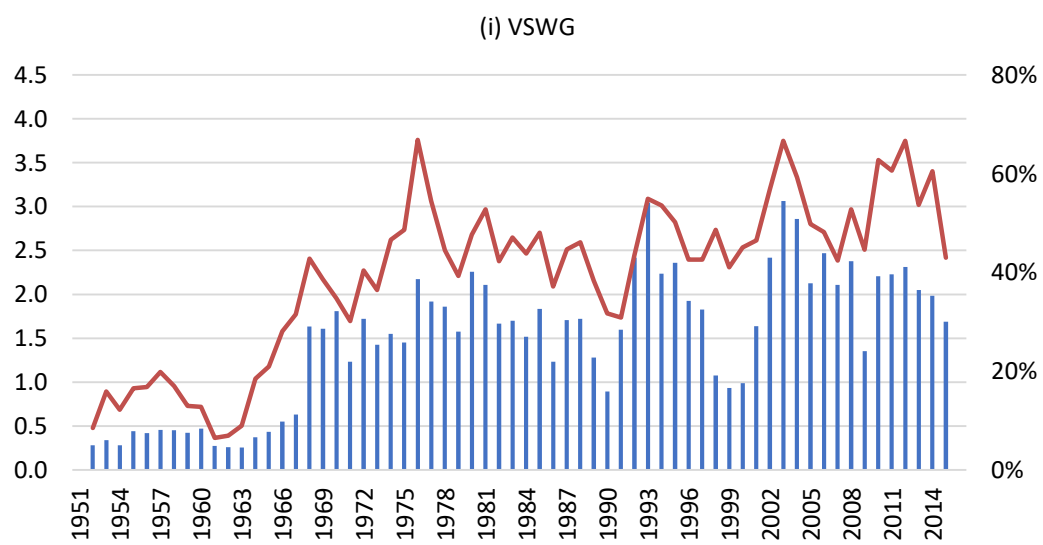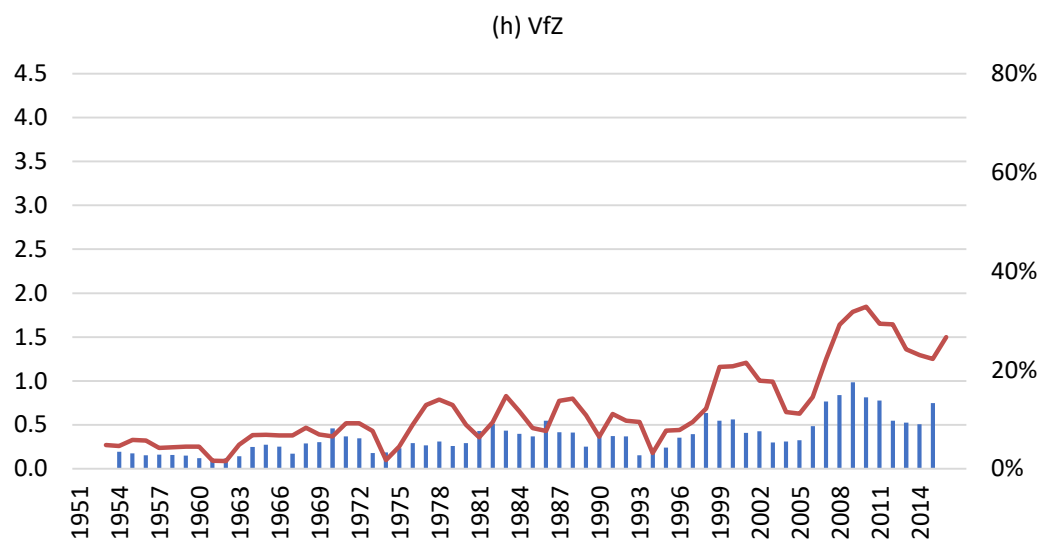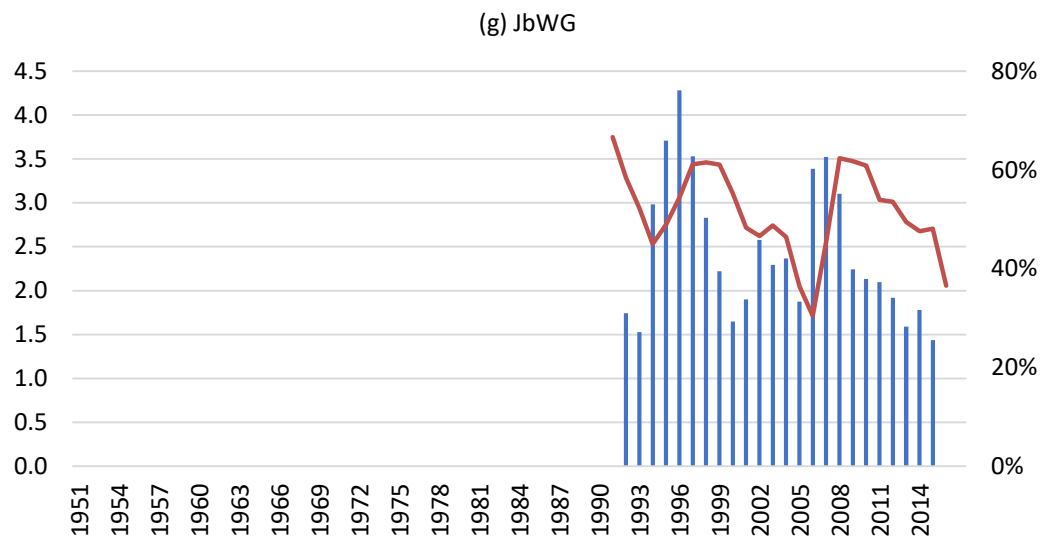---

[38] Cf. especially Rahlf (2015).

[39] Cf. Graf/Priemel (2011) and Raphael/Wagner (2015). Cf. as examples for the latter mentioned aspect Lepenies (2013) and Speich Chassé (2013).

Figure 6: Use of quantitative language over time

(a) Total corpus

(b) AKG

(c) AfS

(d) GG

(e) HZ

(f) JbRG

(g) JbWG

(h) VfZ

(i) VSWG

30

(j) ZHF

(k) ZUG
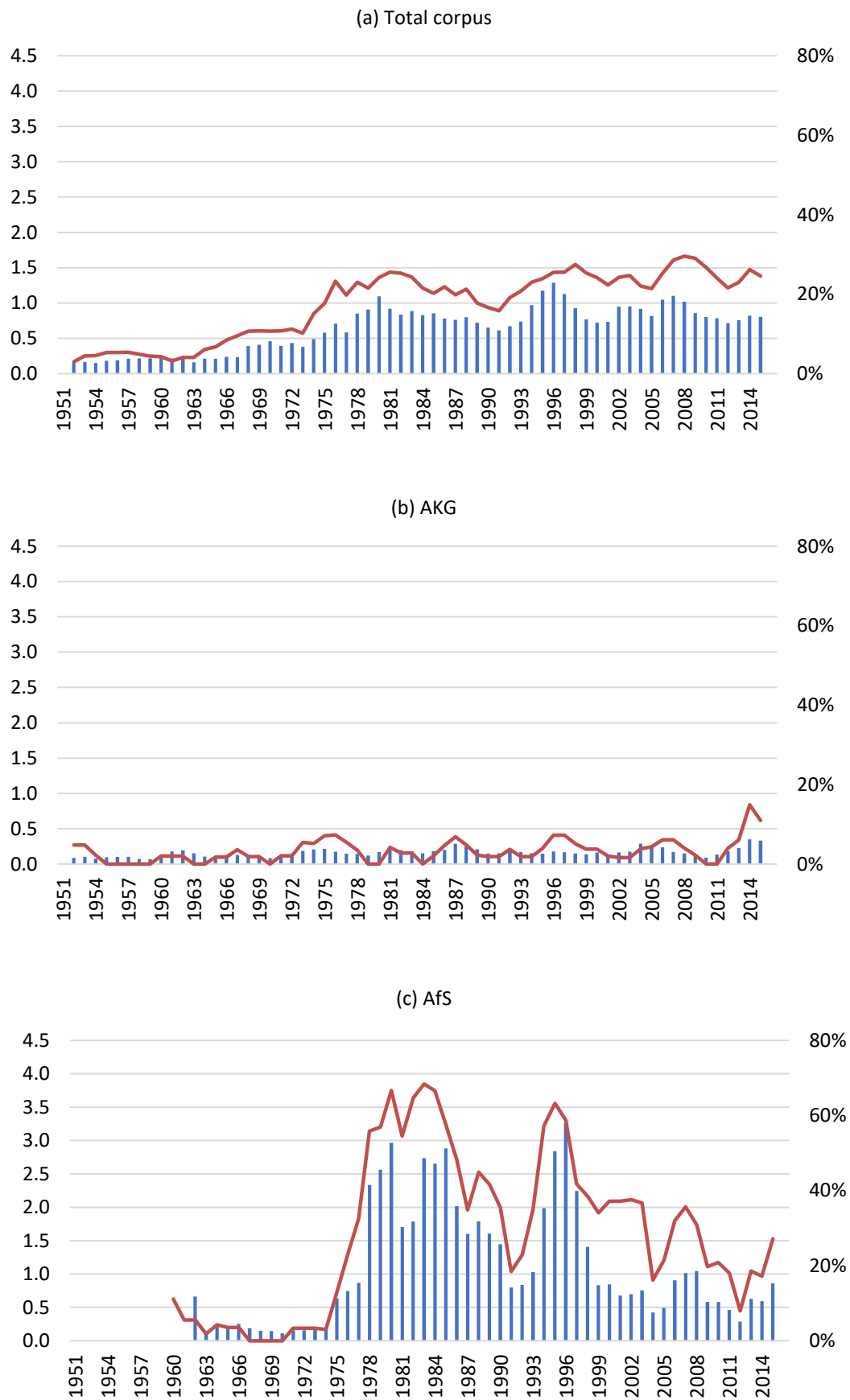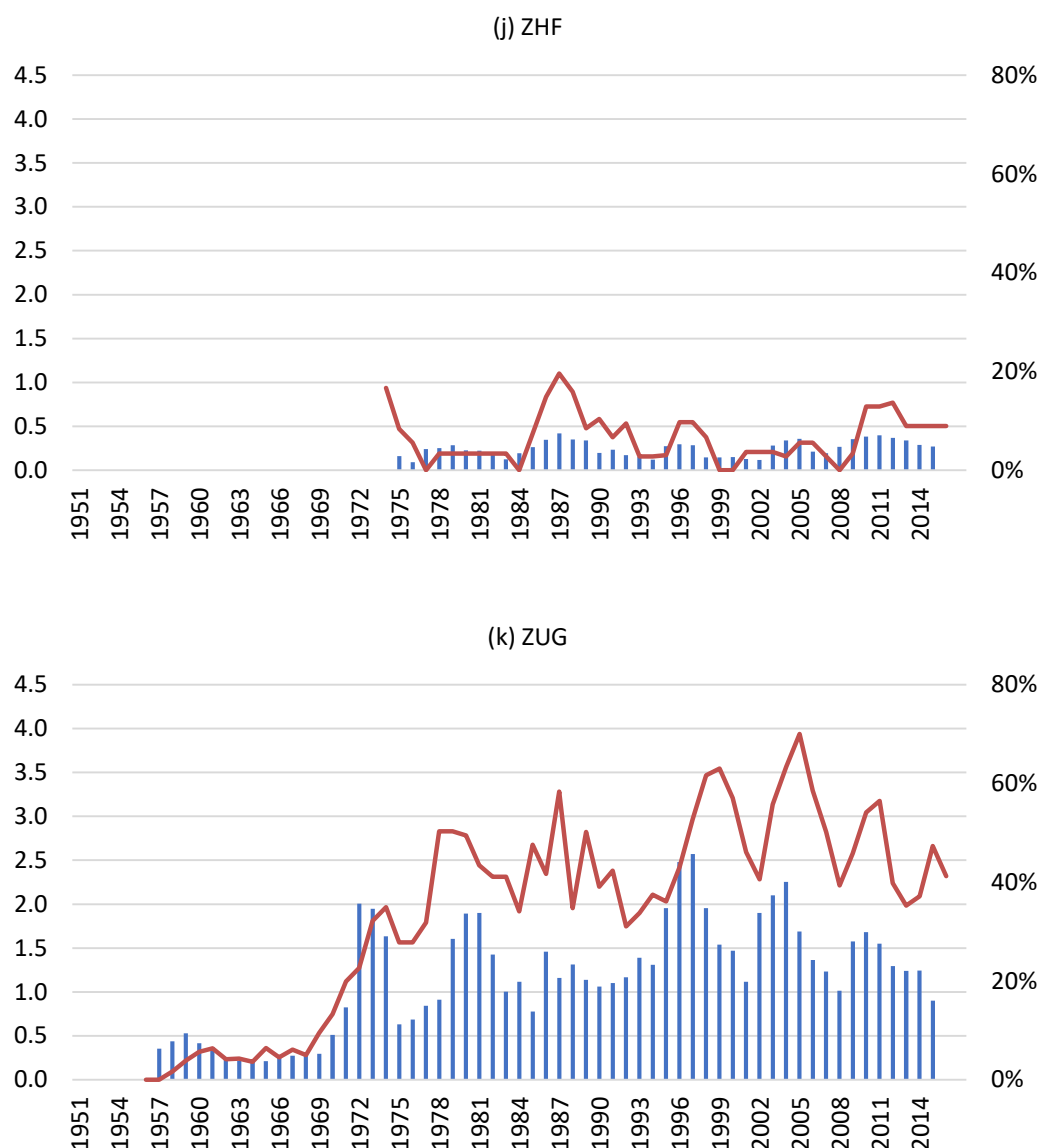
Notes: Bars (left axis) indicate the number of statistical terms per 1 000 tokens; and lines (right scale) the share of quantitative articles in the annual total number of the respective journal. An article was considered quantitative if it showed a number of statistical terms per 1 000 tokens greater than or equal to the average for the total corpus (0.75). For smoothing purposes, three-year centered moving averages are shown.
Sources: Authors' own depiction.

Table 5 lists the ten most quantitative articles in both absolute and relative terms.[40] In a micro-view, Jürgen Fijalkowski's article is the most quantitative in the corpus with 390 statistical terms in absolute terms;[41] if one also takes into account the length of the article, Alexan-

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[40] Cf. Burhop (2007), Falter/Hänisch (1986), Fijalkowski (1984), Kassel (1998), Kopsidis (1995), Lichter (2003), Rahlf (2014), Ritschl (1990, 1992), Schularick (2011), Steiner (2005, 2007), Uebele (2011), von Hippel (1979), Wagner (2003), Wolf (2001), and Zschocke (1984). With two female authors out of a total of 16 different authors, the proportion of women is probably not smaller than it is for all articles in the journals examined during the period under study.

[41] Cf. Fijalkowski (1984).

der Zschockes article is in first place.[42] However, the example of Hubert Wolf's article shows that incorrect classifications can also occur. This article only appears in one of the top places because it contains the word "index" 238 times without actually referring to an index in the statistical sense.[43] The methodological problems will be discussed shortly.

Table 5: The ten most quantitative articles

	Articles absolute			Articles relative		
	Article	# of terms	Journal	Article	# of terms	Journal
1.	Fijalkowski (1984)	390	AfS	Zschocke (1984)	52	VSWG
2.	Steiner (2005)	338	JbWG	Burhop (2007)	33	VSWG
3.	Rahlf (2014)	292	VSWG	Steiner (2005)	31	JbWG
4.	von Hippel (1979)	289	AfS	Ritschl (1992)	25	VSWG
5.	Falter/Hänisch (1986)	281	AfS	Kassel (1998)	22	JbWG
6.	Wolf (2001)	254	HZ	Steiner (2007)	22	JbWG
7.	Lichter (2003)	245	JbWG	Wagner (2003)	21	JbWG
8.	Kopsidis (1995)	244	JbWG	Ritschl (1990)	21	GG
9.	Wagner (2003)	234	JbWG	Uebele (2011)	21	JbWG
10.	Ritschl (1990)	209	GG	Schularick (2011)	21	VSWG

Notes: The frequency of the search terms refers to the whole corpus. Relative search terms per 1 000 tokens.
Sources: Authors' own computations.

As already mentioned, the lexicographical approach has the advantage that by selecting the search terms it is possible to differentiate according to the type of method used. Thus, the use of a regression approach will be linked to a more specific vocabulary than a purely descriptive approach. In order to distinguish between the use of purely descriptive statistics and advanced statistical methods in the following, the dictionary has been reduced to those terms which we believe are associated with the latter (recall that all terms are taken from the glossaries of statistical textbooks). Besides differentiating between different technical application levels, this step also serves as a conservative robustness check, since the specificity of the search terms reduces the probability of integrating ambiguous terms with non-statistical fields of meaning.

Of the 87 entries in our "advanced" dictionary, each is found at least once in the total corpus (cf. Figure 7). In total, the number of search hits amounts to 666, which are distribut-

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[42] Cf. Zschocke (1984).

[43] Cf. Wolf (2001). Rather, it is the Roman "Index librorum prohibitorum".

ed among 157 articles. Disregarding the 74 articles containing only one single search hit, 83 articles are "advanced". Only one hit occurs for each the HZ and JbRG, and two for VfZ.[44] Ten such quantitative articles result for GG, whereby after manual review four of them are to be classified as non-quantitative because they contain search terms that were used in a non-statistical sense.[45] With 31 articles the JbWG is the most quantitative journal, followed by VSWG (19), AfS (12) and ZUG (7). AKG and ZHF do not contain "advanced" quantitative articles.

Figure 7: Frequency of advanced statistical terms

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[44] These articles are: Torp (2004), Ewert (2007), Ritschl (1985), and Fischer (1991). The latter essay is obviously an artifact. A classification of the articles with regard to the average percentage as done above is not appropriate in this case, since the percentage of statistical terms per 1 000 words is so low that articles with only one hit would already be rated as quantitative. In view of the fact that the dictionary still contains ambiguous terms, this would lead to considerable misjudgments.

[45] For example, the term "dummy" was not used in the econometric sense of a dummy variable, but in the sense of a dummy doll.

Figure 8 shows the development and distribution of the vocabulary of the advanced dictionary over time. It becomes clear that concepts of advanced statistics are hardly represented in the general historical sub-corpus, although the trends described above can be observed here as well. The first two peaks in the economic-historical sub-corpus around 1976 and 1985 can be traced back completely to the developments tied to the VSWG. The third increase, which led to a preliminary peak of just over one statistical term per 10 000 tokens at the end of the 1990s, covers all three economic history journals. However, since then a sharp downward trend can be observed, especially in the case of ZUG. Assuming that the terms of the second dictionary represent an undistorted or, at least, only slightly distorted mirror of advanced statistical methods, it can be stated that these are represented in only a very small part of the articles examined.

Figure 8: The use of advanced terms over time

(a) Advanced statistical terms according to the second dictionary per 10 000 token

(b) Advanced statistical terms according to the second dictionary per 10 000 token

(c) Number of articles with at least two search hits in the total corpus.
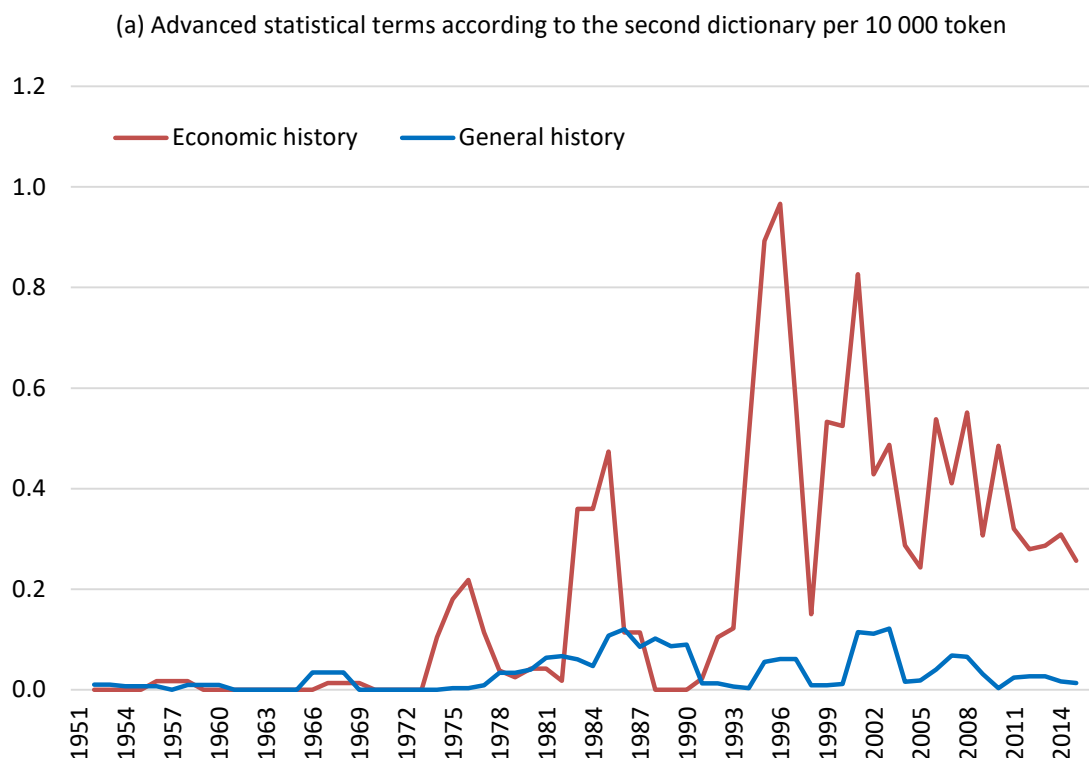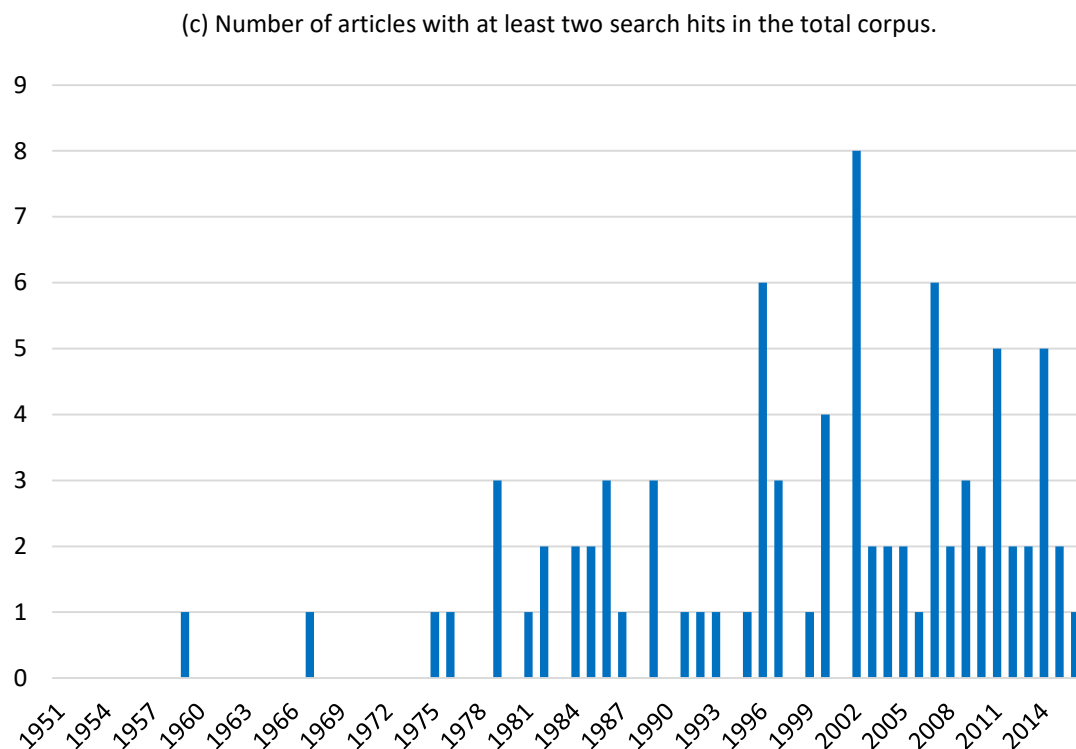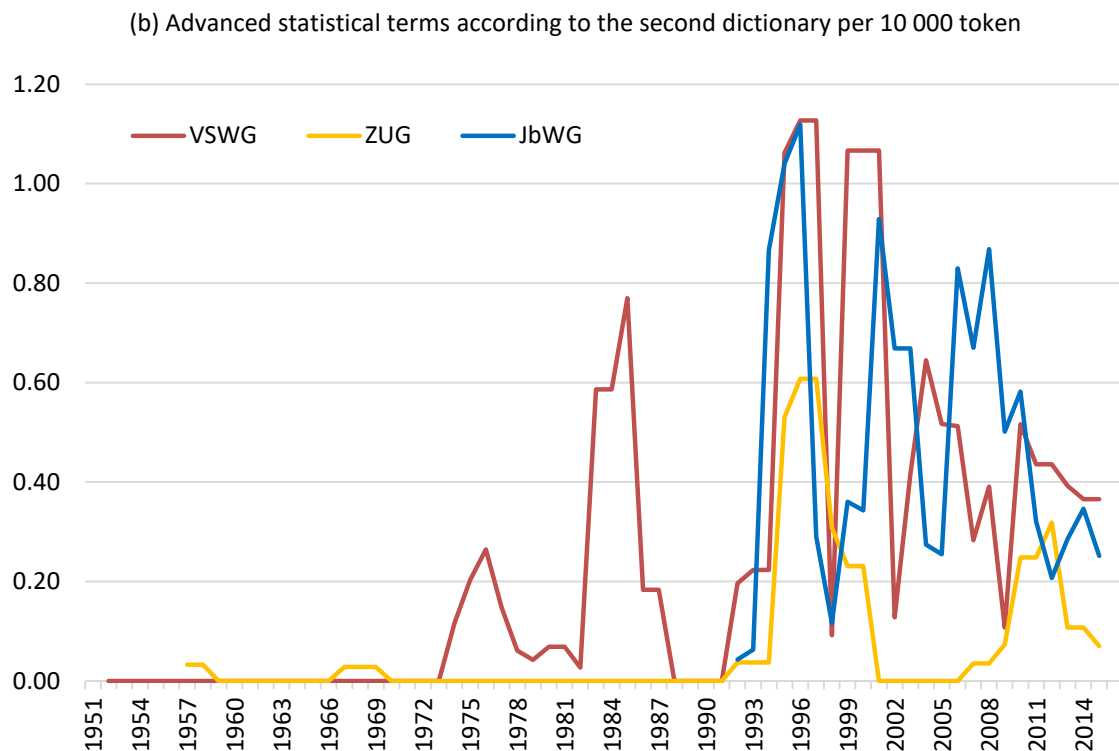
Notes: For the purpose of smoothing, three-year moving centered averages are shown in panels (a) and (b).
Sources: Authors' own depiction.

As mentioned above, the approach that we followed in Section 3 and the broad dictionary approach discussed in this section lead to a rather similar number of quantitative articles (1 399 vs. 1 463). This match result, which at first sight appears fitting, must however be put

into perspective on closer examination. Comparing the intersection of the two approaches, only 848 articles were simultaneously rated as quantitative. This discrepancy leads us to some basic methodological considerations. Regarding the automated evaluation of an article for its quantitative stance, there are basically four evaluations possible: an article can either be correctly or incorrectly evaluated as quantitative or non-quantitative. If an article is incorrectly evaluated as quantitative, this can be compared to an error of the first or second kind of statistical hypothesis testing: an item that is incorrectly rated as non-quantitative when it is actually using quantitative methods can be considered an error of the first kind, while incorrectly assigning the attribute "quantitative" would be an error of the second kind.[46]

The dictionary approach is particularly susceptible to an error of the second kind, the erroneous assignment of the attribute "quantitative", because the vocabulary may also have a non-statistical meaning in certain cases. A good example is the word "dummy", which can stand for a binary variable as well as for a model replication of a human body. This problem has been countered by letting an article exceed a threshold of statistical vocabulary for it to be quantitative. However, if an article contains a single search word to a large extent, as in the above example of Hubert Wolf's article, a misallocation inevitably occurs.[47]

Furthermore, the linguistic approach does not take into account that statistical terms can also be mentioned on a meta-level. For example, in an article that reflects the use of quantitative methods from an epistemological or historiographical perspective, a large number of statistical terms will most likely be found without these methods actually being used.[48] Moreover, for technical reasons, it is not possible to distinguish between search results in the actual text and those in footnotes or bibliographical references.[49] For example, 28 English-language articles that were not included under the first approach were rated as quantitative by the second, either because they contained German-language source references ("statistik"; engl. *statistics*) or because some search terms are identical in English and German (like "interpolation").

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[46] The underlying null hypothesis would then be: "The article under consideration is quantitative".

[47] Cf. Wolf (2001).

[48] Eichberg's (1974) essay provides an example; it contains 31 statistical terms, but the author does not work quantitatively.

[49] Due to the different and changing layout of the articles, an automated separation of the text part is not possible, whereas a manual separation would have been too time-consuming.

On the other hand, an article that contains neither tables nor graphs but that argues quantitatively would be assessed as non-quantitative by the first approach. Yet, the linguistic approach would capture if, for example, the word "prozent" were used. As an example, we refer to Gerold Ambrosius's article. Although it does not contain any tables or graphs, it does contain the word "prozent" (engl. *percent*) 101 times suggesting a quantitative argumentation.[50] Accordingly, the article was judged to be quantitative by the second, but not by the first approach. Consequently, the count approach tends to be more susceptible to the error of the first type, although of course, an erroneous assessment as quantitative is also possible here, since the content of the table or graph may not have been taken into account.[51]

In the following, as a result of these considerations, we pay special attention to those 848 articles that were assessed as quantitative by both approaches. This double evaluation can be interpreted as another robustness check. The ranking of the journals in terms of their share of quantitative articles changes only marginally; GG and JbRG swap places (cf. Table 6).

Table 6: Dissemination of articles that are quantitative as per both approaches

Journal	# of quantitative articles	Share in the respective sub-corpus
AKG	7	0,7 %
AfS	114	16,6 %
GG	107	11,4 %
HZ	22	1,8 %
JbRG	13	12,6 %
JbWG	191	36,4 %
VfZ	60	4,5 %
VSWG	197	25,5 %
ZHF	11	2,7 %
ZUG	126	19,8 %
All articles	*848*	*11,1 %*

Notes: Authors' own computations.

The longitudinal analysis (cf. Figure 9) again shows a strong increase in the share of quantitative articles for both the general and the economic history sub-corpus, whereby the increase for the latter is starting much earlier and is also stronger overall. In 1975, the 30% mark was exceeded for the first time, and since then the figure has only fallen below it in 1981. In the general historical sub-corpus, the share of quantitative articles has been falling continuously
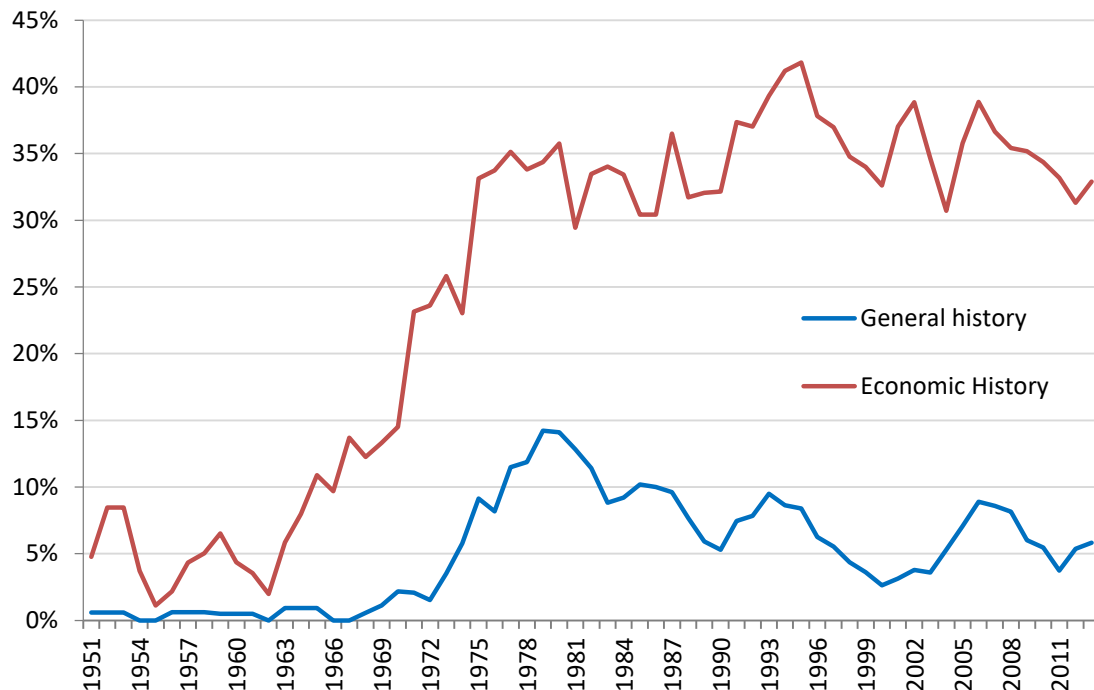
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[50] Cf. Ambrosius (1996).

[51] Cf. our comments in footnote 23: tables and graphs were counted if they were based on historical data.

since 1980, with the exception of two slight increases at the beginning of the 1990s and the 2000s.[52]

Figure 9: Share of quantitative articles by sub-corpus

Notes: Percentage of the articles evaluated as quantitative according to both approaches in the respective sub-corpus.
Sources: Authors' own depiction.

5. Discussion

How can the quantitative findings from the previous sections now be explained conclusively – i.e., qualitatively – and how can they be integrated into our knowledge of the development of the historiographical landscape? First, and in general, our study suggests that the displacement effect of the cultural turn outlined above clearly outweighs the potential expansion of quantitative methods, which would have been equally conceivable due to steadily increasing computing power and improved user-friendliness. The turning of historians to new topics and questions since the 1980s, which we subsume under the collective term "new cultural history" in the following, was accompanied by a significant reduction in quantifying approaches. On closer examination, this central result is far less inevitable than it may appear in retrospect. For proponents of New Cultural History have never been tired of emphasizing that this research program is neither exclusively committed to a specific object of

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[52] The time series of the individual journals are available on request from the authors.

investigation nor to a specific method. On the contrary: cultural historical work should be characterized precisely by an explicit pluralism of methods.[53] If one assumes, however, that the cultural turn is also reflected in the articles contained in our sample, then it can at least be stated that quantitative approaches have apparently found less and less room in this mix of methods since the 1980s. Thus, our results reinforce the impression of other observers who attest the New Cultural History per se a certain rejection of quantitative methods.[54]

If we follow prominent representatives of New Cultural History, this research approach is not characterized by an exclusive methodological approach, but essentially by a certain perspective on history. Accordingly, it is primarily a matter of reconstructing "forms of meaning and networks of meaning" with which "societies of the past have equipped their realities".[55] The question that inevitably follows from our perspective is why these forms of giving and attributing meaning should not also – but of course by no means exclusively – be analyzed quantitatively. For example, the younger Annales historians in the 1970s and 1980s tried to trace the development of collective mentalities with quantifying approaches. Likewise, in France, so-called lexicometry developed as early as the 1960s, which carried out word frequency analyses with the help of the first computers. Both movements, in turn, also influenced the emergence of cultural-historical movements in a broader sense, such as the German form of conceptual history.[56] Even the representatives of micro-history and the history of everyday life were often not hostile to quantitative methods per se, but rather tried to combine them with qualitative approaches, which usually also meant combining a macro- and micro-perspective. This was most comprehensively and convincingly achieved in research on so-called proto-industrialization.[57] Apparently, however, quantifying research approaches lost much of their attractiveness for the following generations of historians.

But our study also allows a more detailed look at the business cycle of quantitative methods within German-language historiography. Comparing the development of quantitative articles in GG and HZ, as shown in Figure 6, illustrates two further key findings of our study. On the one hand, the significant expansion of quantitative methods at the beginning

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[53] Cf. e.g. Daniel (2006: 9).

[54] Cf. Iggers (2007: 62). Only a few pages later, however, the author emphasizes the efforts made of cultural historians towards combining hermeneutical and analytical approaches.

[55] Landwehr (2013).

[56] Cf. Daniel (2006: 351-352).

[57] Cf. Iggers (2007: 98-105).

of the 1970s affected only a part of historiography, especially economic and social history. On the other hand, the bulk of historiography, for which the development of HZ is representative in this case, continued to rely primarily on traditional qualitative-hermeneutic methods. This result therefore does not quite match with the assumption of Lutz Raphael, for example, according to which "quantifying methods and social science theories" have become "new objects of specialist education" on a broad front since the 1960s.[58] In order to trace this phenomenon even more closely, a look at the development of university curricula could prove worthwhile in the future.

Yet, even in the periodicals once gripped by the "quantification euphoria", such as GG or AfS, there have been sharp declines since the late 1980s. Since then, quantifying approaches have been found primarily in the journals dedicated to economic history such as JbWG and VSWG. Like the famous *Annales* in France or *Past and Present* in Great Britain, GG in the 1970s stood for a very specific movement within historiography.[59] It was about distinguishing the "historical social science", as the prominent representatives from Bielefeld called the German movement of social and economic history at the time, from traditional historicism and event-driven political history. Instead, the major structural changes in economy and society were now the focus of historical research. In doing so, theories from neighboring disciplines in the social sciences, above all sociology, were used deliberately. In this renunciation of the legacy of historicism, recourse to different methodological instruments played a decisive role. In this reading, the use of quantitative methods was considered a characteristic of "modern" historical research.

However, very soon after historical social science had established itself as a research direction within the historical sciences, many representatives were somewhat disillusioned with regard to the knowledge gained through the application of social science theories and methods.[60] Thus, the next generation of historians pointed to the limits of an approach influenced by modernization theory, which often sought to evaluate the course of history on the basis of a few selected universal indicators, and which lost sight of the aforementioned "attributions of meaning" of historical actors. What is decisive for the question of our study

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[58] Raphael (2010: 176).

[59] Cf. Raphael (2010: 39).

[60] This is the assessment of Ziemann (2012: 147-148) regarding the relationship between historical studies and empirical social research; cf., similarly, Raphael (2010: 178-179). Qualitative approaches have experienced a clear renaissance since the 1980s in sociology itself, too; this is also reflected in the development of social history.

is the fact that this confrontation between social and cultural historians simultaneously took the form of a methodological dispute over the choice of the "right" research approach. Thus, the juxtaposition of qualitative and quantitative research methods was, along with the "macro versus micro perspective, structure versus event, society versus individual, practice versus discourse", one of the "scientific pairs of opposites" that repeatedly provided "grounds for polemics and delimitation".[61] This methodological dispute is also indirectly reflected in our sample of articles. As a consequence, the share of quantitative articles in social history journals such as GG and AfS decreased significantly. Instead, quantitative methods have since then found widespread use especially in economic history, which is also following an international trend and is increasingly oriented towards econometric models.[62] As a by-product of this development, the ability for dialogue between social historians on the one hand and some economic historians on the other hand has also declined.

It goes without saying that the transition from social to cultural history is not a phenomenon limited to German-language historical studies, but one that can also be observed in other (Western) societies.[63] However, our investigation suggests that the associated dispute over methods was particularly intense in Germany and led to a gap between representatives of qualitative and quantitative research approaches. In any case, the above-mentioned fact that a significantly higher proportion of quantitative articles are to be found in American general history journals can be interpreted as an important proof of this view. In order to test this thesis systematically, however, more in-depth comparative studies are required in the future, which is what our study aims to encourage. The collection of bibliometric (e.g. citation frequencies or citation interrelationships) and biographical data (on editors, advisory boards and authors) as well as, if necessary, articles in English-language journals could expand the quality of our examined journal corpus to such an extent that a look could be taken at the national and international scientific networks behind the developments described above. This in turn could provide interesting transfer-historical information on the development of the application of quantitative methods.

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[61] Raphael (2010: 178).

[62] Cf. also Margo (2018).

[63] A prominent example is the American historian William H. Sewell (2005) who switched from a dedicated quantifying social historian to a resolute representative of New Cultural History. In his "manifesto" of 2005, however, Sewell (2005: 369-370) makes a final plea for a combination of quantitative and hermeneutical approaches.

In addition to the expansion of our data set in the aforementioned manner, other text mining methods could be applied to our corpus. Here, the application of so-called topic models is obvious, which can be used to automatically capture the topics of large amounts of text.[64] With this approach, which has become very popular in the digital humanities, it would be possible on the one hand to check whether and to what extent the use of quantitative methods and their modification was linked to certain research topics or epochal focal points and to evaluate the extent to which quantitative methods were actually used by ancient and medieval historians even without an additional survey of relevant journals (cf. our comments in Section 2). On the other hand, this would enable a more fundamental, quantitatively sound investigation of publication trends and thematic cycles within German-language histo-riography, as is already available for other branches of scholarship.[65]

It is possible that in the course of a stronger shift towards the so-called digital humani-ties in the coming years, a renewed dissemination of quantitative methods, including text mining methods, will take place among historians. The slight increase of quantitative articles in our sample since the beginning of the new millennium may be interpreted as a first sign in this direction. As early as 2011, historian Peter Haber predicted a "possible strengthening of data-oriented historiography" – and thus also of a quantifying research access – if only be-cause "with digital change, far more computerized evaluable data is available today than a few years ago".[66] With the digitization of extensive source collections, the incentive to apply quantitative methods has thus increased significantly once again. For until recently, although computing power has increased enormously since the beginnings of quantitative historiog-raphy, the data to be evaluated had to be transferred manually into spreadsheet programs in a time-consuming process. The costs involved often did not justify the expected benefits. With the digital provision of historical sources and the simultaneous development of appro-priate software for their evaluation, however, this is changing fundamentally. In addition, according to Rüdiger Hohls, there is a "weariness of postmodern arbitrariness and construc-tivist discourses", which can be observed especially among "students and younger scien-tists".[67] A successful example of the use of the new digital source compilations is provided by

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[64] Cf. Blei (2012) and Wehrheim (2019).

[65] Cf. e.g. Ambrosino et al. (2018) and Riddell (2014).

[66] Cited after Hohls (2018: A.1-1–B.1-34).

[67] Hohls (2018: A.1-24).

Philipp Sarasin who undoubtedly is closer to cultural history. With the help of the Google Books Ngram Viewer, he has attempted – similar to this study – to quantitatively illustrate the replacement of social history as a research guiding paradigm by cultural historical approaches, which he subsumes under the keyword "Foucault".[68] Sarasin's particular punchline is to assert that recourse to the Google Books Ngram Viewer would also correspond to Foucault's discourse analysis, which was ultimately concerned precisely with tracing the business cycles of certain terms in use. In other words: Foucault would also have used the Ngram Viewer if this tool had been available to him.[69]

6. Conclusion

The marked decline in the use of quantitative methods in German historical studies since the 1980s is regrettable from the point of view of the universally desired (or at least claimed) pluralism of methods. If, as stated above, the most recent data do indeed reflect a renewed turn towards quantifying forms of historical research, it is to be hoped that this will not be accompanied by renewed methodological trench warfare between cultural historians and "digital historians". It is to be assumed, however, that the old controversies between representatives of quantifying and hermeneutic research methods will be reopened in the context of the debate on the benefits and limits of digital humanities.[70] In terms of a lived pluralism of methods, we would like to advocate a creative combination of qualitative and quantitative approaches. However, in order for future generations of historians to be able to "draw from the full", statistical methods must be much more firmly anchored in university education. For only those who rely on a broadly equipped methodological toolbox can actually choose the method they consider most suitable for their research questions – and are not already limited in the conception of these questions because of their limited knowledge of methods. Moreover, this increases the ability to engage in dialogue with the international research community and other scientific disciplines, especially from the social sciences. Internationality and interdisciplinarity are, after all, common key concerns of almost every program aimed at expanding or strengthening university and non-university research locations.

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[68] Cf. Sarasin (2012).

[69] From a source-critical perspective, the scientific use of the Ngram Viewer must be assessed with caution because of its low transparency; cf. e.g. Pechenick/Danforth/Dodds (2015: 10).

[70] Cf. Hohls (2018: A.1-21).

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On the Business Cycle of Counting – or How to Quantify Quantification. An Empirical Analysis of the Application of Quantitative Methods in German Historiography[*]

Michael Buchner / Tobias A. Jopp / Mark Spoerer / Lino Wehrheim[+]

Abstract: Historians today can draw on a well-filled methodological toolbox. Since the establishment of social history as a "historical social science" in the 1970s, this has included not only qualitative-hermeneutic approaches but also quantitative-statistical methods. Many sources at least permit a quantitative approach to analysis; others (e.g. mass data) cannot be evaluated profitably at all without the application of appropriate methods. But to what extent is (has been) the use of quantitative methods actually widespread in German-language historical studies? While the use of statistical methods has in principle become much easier since the days of the "Bielefeld School" due to increasingly powerful and at the same time user-friendly software, quantitative approaches seem to be widespread in only a few historical sub-disciplines. One reason could be the skepticism towards quantitative methods on the part of representatives of the "New Cultural History". However, empirical research on this aspect of scientific history is scarce. Our study would like to close this research gap to a certain extent. To this end, we have collected a comprehensive corpus of journals (including *Historische Zeitschrift*), which allows us to determine the extent of quantitative work in German-language history for the period 1951-2016. We argue both quantitatively and qualitatively, combining a simple "counting approach" (counting the tables and graphs in all the journals surveyed) with a more complex lexicographical approach. Overall, our results support the hypothesis that the cultural turn reversed the emerging trend towards more quantification in parts of history. However, the determination of the "business cycle of quantification" also holds some surprises.

Keywords: Cultural turn, Germany, history, quantification, quantitative methods, text mining

JEL classification: C00, N01

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