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Between the number and the word: quantitative methods in business history revisited

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Abstract

This article extends our earlier analysis (2010) to gauge, first, to what extent quantitative methods have been used in recent business history research and, second, the impact that quantitative methods may have had on the citations of business history articles. We used data from the two premier journals in the field (*Business History* and *Business History Review*) of the last 20 years. We found that the quantitative content has not increased in relative terms recently in these journals, yet it has in absolute terms. However, at the same time more sophisticated statistical methods have been used more frequently also in business historical research. Contrary to our earlier results, quantitative methods no longer have an easily discernible impact on citation patterns, yet the explicit use of theories seems to have increased the appeal of such scholarship. The unclear impact on citations may be due, at least in part, to a time lag in interdisciplinary knowledge networks. We also argue that the growing impact of economics and economic history, global and comparative history, and digital big data methods will necessitate more use of quantitative methods in the future, with citation impacts becoming observable only in the coming decades.

Keywords: bibliometric, quantitative, business history, economic history, methods, citations.

JEL Codes: B23, N01, M20.

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1. Introduction

There are enduring divides and rivalries between economic and business history, in terms of methods, theory, and subject matter. However, given that the two often overlap in the increasingly global academic marketplace, there are more opportunities and incentives to collaborate among the various journals, books, and conferences. In the past, the differences have been perhaps more difficult to overcome, especially since the cliometric turn in economic history after the 1960s (Whaples 2010, 2002; Diebolt and Haupert 2016b; Diebolt and Haupert 2018). While economic history has become more quantitative, business history has been less enthusiastic in embracing these methods. Economic history has leaned more on economics and political science, whereas business history, in turn, has relied more on sociology, management and organization studies, and history (e.g., Walton 1962). A great deal of economic history scholarship has focused on macroeconomic analyses, yet newer studies have increasingly embraced microeconomic methods and topics. These factors, and the way business historians have become more open to methodological debates since Alfred D. Chandler Jr., have paved the road for potential collaborations and reflections among the two disciplines (see e.g., Scranton 2008, Balleisen 2020). Yet, these two disciplines only seldom cite one another (Ojala et al. 2017). In fact, Andrew Popp (2009) has argued that historians have estranged from economic history due to the technical econometric methods.

Several recent studies have analyzed the historiography of business history, showing especially the intensifying interplay between the discipline and organization studies, "social scientification" of the discipline, and the impact of business history on policy and business practices (see e.g., Hannah 2018; Kipping, Kurosawa, and Wadhwani 2016; Ojala 2017; Wilson et al. 2022; Wilson and Tilba 2023). Moreover, history-oriented research has gained more foothold within organization studies, initiating at least to some degree "historical turn"; that is, emphasizing historical methods in organization studies (Clark and Rowlinson 2004, Kieser 1994, Booth and Rowlinson 2006, Üsdiken and Kieser 2004, Decker et al. 2015, Maclean et al. 2016, Vaara and Lamberg 2016, Lamberg et al. 2022, Rowlinson 2015).

Our goal in this article is to revisit the earlier studies on whether business historians have utilized quantitative methods and what that might have meant for the discipline as a whole. We are particularly interested in whether the use of quantitative methods increased the interdisciplinary appeal of business history articles. Furthermore, are the citations to business history articles driven by other factors, typical of other bibliometric results for the economic and business history literature? Another interesting dimension pertains to the role that theory, in its many forms, might play in citation counts. Our anal-

ysis focuses on analyzing the drivers of citation counts in two journals, *Business History* (BH) and *Business History Review* (BHR), from the past 20 years (2001–2019). The results of the analysis have yielded some general conclusions, namely that: 1) methodological discussions are still relatively rare in the field of business history; 2) the absolute number of articles with more advanced quantitative methods has increased, but the relative share of quantitative content as a whole is decreasing; 3) the use of quantitative methods, at least in this period, do not seem to increase citation counts (i.e., reflecting the problems of effective interdisciplinary scholarship). Nonetheless, there is a trend toward a plurality of methods in these fields (Decker, Kipping and Wadhwani 2015) and areas of focus, which may lead to greater interdisciplinary impact at some point, but that is not yet evident.

Here in this article, we will first provide an overview of some of the debates surrounding the publication trends in economic and business history. Then we will discuss the data and methods used in this study, to be followed by the analytical results and the concluding thoughts. Our review also reinforces the notion that business history has simultaneously become more theoretical and methodologically rigorous, while avoiding certain broader debates on methodology. There is increasing pressure and opportunities in embracing quantitative and also other methods more fully, as digital humanities are crunching "big data" with various new methods (i.e., those using AI), and social sciences at large are offering new publication outlets among various interdisciplinary forums.

2. Economic and business history: theoretical and bibliometric trends

Economic history has long roots in history and economics, whilst business history is more clearly rooted in historical research traditions, with additional roots contained in management research, as we point out below. The cliometric revolution, emerging from the late 1950s to refocus the field around quantitative analysis and theories arising mainly from economics, has become a dominant form of economic history in the last 50 years (Whaples 1991, 2002; Cain and Whaples 2013; Di Vaio et al. 2012). Its impact has even strengthened globally in the 21st century, especially due to the increased interest of economists and other social scientists on certain topics like crises, although the field is globally much more diverse now. In many respects, economic history has given way to historical economics, even though history and economics have had a long common history since the late 19th century (Margo 2021; Cioni, Federico and Vasta 2021). Many of the more recently established journals in the field, like *Cliometrica* and *European Review of Economic History*, are more representative of a strand of historical economics than

fora typically inhabited by historians and social sciences as a whole. There are, of course, some exceptions to this as well, such as *Journal of Global History* as well as *Capitalism: A Journal of History and Economics*. In Europe, cliometrics has made significant inroads, especially in Great Britain, Sweden, and the Netherlands (Ojala 2017, Waldenström 2005, Diebolt and Haupert 2016a). Also, criticism has emerged towards cliometrics, as some quantitative economic history perhaps has not been quite as revolutionary as initially expected or more comparative than other approaches. Moreover, the topics covered have stayed more or less the same. In addition, even though the appeal of cliometrics to other disciplines has increased, the impact in economics has not really increased (Cioni, Federico and Vasta 2020, 2023).

Business history, in turn, has its roots in both history and management research. Already in 1927, the first professorship was launched at the Harvard Business School chaired by Norman Scott Brien Gras, even though a tradition of company history writing had existed both in the US and Europe since the 19th century. In Germany, for example, there were plans to establish a business history professorship during the first years of the 1900s, suggested by Professor Richard Ehrenberg at Rostock University. The German initiative was based on the growing tradition of company history writing, Ehrenberg himself being one of the pivotal authors (Redlich 1962, Walton 1962). During the early years, interestingly, business and economic history were still intertwined, as can be seen in early writings of Gras (1927); he was, indeed, among the authors contributing to the very first issue of the *Economic History Review*.

Although business history has since its early emergence used and interacted with theories and topics familiar to economics, the discipline has been fairly critical of using those theories extensively. Thus, the field has traditionally been inhabited mostly by qualitative and source-critical historical research rather than econometric analysis (Lamoreaux, Raff and Temin 2008, p. 43). Orientation of the research around particular case studies has been a typical feature for business history since its early beginnings, and this has been criticized by economic historians on many occasions. However, certain well-known case studies in business history are the most read and cited content of the journals in the field (for example, on IBM, see Cortada 2018, and on Nokia, see Lamberg et al. 2021). Many scholars have emphasized the need for more interdisciplinary discussions, in which theories and social problems are placed at the center of the discourse, not only companies (Álvaro-Moya and Donzé 2016, Kobrak and Schneider 2011, Pechard et al. 2017). The main American business history journals, namely *Business History Review* and *Enterprise and Society*, are perhaps currently more case-study-oriented than the main European journal, *Business History*.

The European research tradition has also been more open to the perspectives arising from economics, as the line between economic and business his-

tory is not as pronounced as in the US or UK (Lamoreaux, Raff and Temin 2008; De Jong, Higgins and van Driel 2015). In fact, the emergence of microeconomic approaches in economic history is an opportunity to (re-)link business and economic history. Business historical case studies might have a lot to give to these kinds of approaches and vice versa (see e.g., Cantoni and Yuchtman 2021). Building bridges between business and economic history would, in our view, strengthen both. Moreover, even though case studies are still at the heart of the business history scholarship, the topics are evaluated based on more critical, theoretical, and methodologically advanced methods, though there is nothing conceptually wrong with case studies as such (Lamoreaux, Raff and Temin 2008). De Jong et al. (2015) and Wilson et al. (2021), for example, call for a "social science" approach or "social scientification" to be adopted in business history, including testable hypotheses, whereas Gelderblom and Trivellato (2019) aim for a combination of various methodologies. "Plurality", "reflexivity", open data, and replicability are also among the issues noted in these discussions (see e.g., Smith and Umemura 2019; Toms and Wilson 2016; Decker, Kipping and Wadhwani 2015).

In 2010, the authors of this essay published two papers upon the topic (Eloranta et al. 2010a-b), followed by a third one in 2017 (Ojala et al. 2017). These papers used bibliometric tools to trace the trends in the discipline in terms of topics and methods by using citation counts as the starting point. We showed that *Business History* was more quantitative overall, with over 65 percent of the articles using at least some quantitative methods (Eloranta et al. 2010a). We concluded that simple quantitative tools were employed quite often, but business historians were not very keen on using more advanced statistical tools in their studies. Furthermore, we also noted that business historians did not often clarify the methods they were using; when doing the analysis for this article, we found out that this is still the situation in most of the current scholarship.

We illustrated that using sophisticated (quantitative) methods as such did not necessarily increase the citation impact, but rather certain topics and discussions that were appealing also with the "neighboring" disciplines. However, we affirmed that the explicit use of theory increased citation counts, as did also some currently topical subjects (especially IT). According to our study, it seemed that quantitative tools alone were not significant in increasing citations, yet when associated with theoretical advances or appealing topics the citation counts increased. We were also keen to know whether the cliometric revolution in economic history had had an impact on the methodological developments in business history. The answer was largely no: economic and business history were already, since decades ago, estranged cousins, and this divide had even widened afterwards. This point can be reinforced, for example, by the fact that business historians rarely cite economic historians and

vice versa (Ojala et al. 2017). Business history was already getting closer to management and organizational studies by the beginning of the 2000s, and this tendency has strengthened ever since (Decker et al. 2018).

This article is a direct continuation of our previous studies, aiming to evaluate whether there have been new developments in the field during the past two decades as the influence of interdisciplinary theories and analytical frameworks has increased, at least to some degree. Also, other scholars had come to the same conclusions: economic modeling, for example, has relatively seldom been used in business history journals, and if it was, even then the authors had "for the most part employed it descriptively" (Lamoreaux et al. 2008). De Jong et al. (2016) argued that most studies in business history are descriptive case histories, not using advanced methods and theories borrowed from other social sciences. Is this indeed the case? Have more advanced quantitative methods infiltrated the field to a greater degree? And, finally, can we discern any impact in terms of citations?

3. Data and Methods

This article is based on the data derived from *Web of Science* database, containing all articles published in *Business History* and *Business History Review* in 2001–2019, combined with our earlier data covering the years from 1990 to 2000. The database does not include the whole text content, only the bibliographical information (including abstract and keywords) and the information about citation counts. Thus, it is relatively easy to calculate basic metrics from the data, such as the number of articles and citations (Tables 1a-c). To find out what kinds of methods were used, we also read through all the articles (available at the publisher data repository with access from our universities) and coded the content of each article with six simple binaries (1-0). The first four binaries were related to the quantitative content of each article, namely: 1) whether the article had any quantitative content at all; 2) whether it employed some basic quantitative tools (charts, tables) and/or descriptive quantitative measures were used; 3) whether it embodied sophisticated (statistical) quantitative techniques.[1] The two other binaries were related to the theoretical orientation of the article, namely: 1) whether the article was purely descriptive with limited theoretical orientation; or 2) whether the article was based on (social scientific) theoretical approaches or was in other ways theoretical by nature.

1. In this article, we utilized a three-level analysis for the level of quantification. In our previous works, however, we applied a four-level analysis that could be construed as confusing.

Based on these codings we formed six different article categories:

1. No quantitative measures or methods applied – the analysis is descriptive, and the structure of the article is often narrative.
2. No quantitative measures or methods applied – the point of departure is theoretical and in some cases the focus is on hypothesis testing, the structure of the article can be narrative.
3. Only few rudimentary or basic quantitative measures are applied – descriptive.
4. Only few rudimentary or basic quantitative measures are applied – theoretical.
5. Sophisticated quantitative methods – descriptive.
6. Sophisticated quantitative methods – theoretical.

To illustrate the differences between the six article types, we want to highlight one article from each category type in more detail here as cases in point. We would like to stress that each category includes high quality articles; thus, our categorization is not meant to be ranking order, but just a way to see the differences in the contents of articles. The overall trends in the number of articles and citations can only give us a glimpse of the differences in the content here; thus, these illustrative cases provide more depth behind these categories.

For example, in her article Janet Abbate (2001) described and analyzed the development of the Internet from non-commercial beginnings to a technological system dominated by commercial ownership. This article, representing Category 1, was written in the form of a narrative and Abbate did not apply any quantitative measures or methods in it. Moreover, there was little theoretical discussion, and Abbate broadly linked her article within the earlier narrative traditions of business history and history of technology. Another example of an article without any quantitative measures or methods applied is Behlül Üsdiken, Alfred Kieser and Peter Kjaer's (2004) article (Category 2). It differs from Abbate's publication at its theoretical level, since it contains neo-institutional analysis on how the development of management theories, practices, and educational models have influenced the evolution of business education. Üsdiken et al., in fact, compared three different national contexts. The article can be described as a case study. Methodologically, the article is descriptive and narrative, yet the prominent role of theory is obvious here.

Categories 3 and 4 are the most varied, as they contain a wide range of articles, both methodological and theoretical. The use of quantitative methods varies widely in these two categories, since they cover publications that include articles with only few rudimentary and with basic quantitative meas-

ures. We will therefore analyze several articles from this category. It also allows us to present the challenges to the categorization in more detail.

One end of the spectrum of Categories 3 and 4 contain articles with only rudimentary quantitative measures. The first example is a Ann-Kristin Bergquist and Kristina Söderholm (2015) article in which they studied the environmentally significant transition to low-chlorine and chlorine-free pulp in the Swedish paper and pulp industry, as well as the Swedish firms' transition-related strategic actions compared to the US P&P firms. This article (Category 4) was a theoretically-focused application of the technological path dependence scholarship, with the Varieties of Capitalism (VOC) perspective and the environmental economics literature in focus. The analysis itself was quite descriptive, however, and Bergquist and Söderholm only applied rudimentary quantitative measures, mainly to provide contextual background information on quantities and relative proportions. If their article was more theoretical by nature, Shakila Yacob's (Category 3) article represented a less theoretically driven study. Yacob focused on describing how Ford started investing in Colonial Malaya from the 1920s to the 1950s. Yacob applied only a couple of rudimentary tables and numbers in the analysis. Thus, both articles were narratively written, with varying degrees of theoretical applications.

Articles that include some quantitative measures and methods may have lots of figures and tables, but the methods are often more basic compared to articles with sophisticated quantitative methods. For example, in Bradley A. Hansen's article (Category 4) on the Panic of 1907, he used tables and figures for, among other things, the numbers and average sizes of deposits and changes in them. He aimed to argue that to properly understand the institutional framework in which trust companies operated and made strategic decisions, it is essential to explore the evolution of the trust companies from the historical perspective. Theoretically Hansen contributed to the discussion on what kind of opportunities business history can offer to the scholarship of management and business studies, in this case especially for the study of financial crises. Compared to Hansen's article, Ioanna Minoglu's study (Category 3) on informal networks and formal contracts' importance in gaining international investments for business in 1920s Greece was somewhat less quantitatively oriented, even though Minoglu did apply some quantitative measures and methods (shares). Also, the point of departure was less theoretically driven than Hansen's.

Methodologically advanced articles include, in addition to basic quantitative measures and methods, more complex quantitative methods, such as regression analysis. In their article (Category 6) on the US patent market, Naomi R. Lamoreaux, Kenneth L. Sokoloff and Dhanoos Sutthiphisal tested their hypothesis about the role of patent attorneys as information brokers in technology markets. By using regression analysis, they sought to find out

whether the services of patent attorneys increased the number of patents obtained by inventors and the speed of patent assignments, and they strengthened their analyses by looking at the shares of different variables in the data (for example, the share of patents in certain situations). The article promoted a theoretical discussion about transactions in the technology market. Unlike this article, Stephen B. Adams, Dustin Chambers, and Michael Schultz's article (Category 5) on the geographical development of the Silicon Valley technology community included a sophisticated methodology, but the article was not overtly theoretical, as the authors had not included a broader review of the literature from theoretical standpoints. Nevertheless, they used different methods such as nearest neighbor mean tests based on Monte Carlo simulations, spatial clustering test (quadrat-count chi-square test), bootstrapped techniques/procedures (bootstrapped mean centers), and some other methods to test their hypotheses. As such, they wanted to demonstrate how the geographic center of business clusters moved over time, and how, through the development of Silicon Valley and its clusters, the development of companies was connected to spatial changes. All in all, this brief review already suggests that the categorizations can be problematic and that qualitative analysis of the contents is useful in contextualizing any statistical results, and vice versa.

As for the classification of the theoretical level of the articles into descriptive and theoretical articles, this was even more problematic than assessing the methodological level. The articles do not always explicitly indicate the theoretical orientation of the researcher. However, the classification had to be based mainly on the information provided by the title and the abstract, and although the articles were also examined to some extent in other respects, the large number of articles did not allow them to be read as a whole. It is therefore possible that the classification has been overly weighted towards the descriptive category. For example, Mark Harvey's (2016) article has been given a descriptive rating for the very reason mentioned above. The article described the growth of the LP industry, and this growth was examined in depth using advanced quantitative methods. There was no clear reference or mention of theory in the article, so we classified it as descriptive. However, a close reading of the article revealed that Harvey wrote about the social system and its impact on innovation, among other things, and on that basis the article could be defined as theoretical. On the other hand, Lan Peng and Alistair M. Brown's (2016) article 'A decade of hybrid reporting and accountabilities of the Hanyeping Company (1909–1919)' can be classified as theoretical, as the Introduction section mentioned that the study tests the theories of "hybrid reporting" and "alternative reporting models". We have therefore considered the following to be key indicators of the theoretical level: if the abstract of the article refers to a theory or if there is a separate theory section, we have concluded that the article has tested or examined a particular theory. In this

case, the article has been assigned as theoretical. Otherwise, we have classified it as descriptive.

The data was coded by the authors of this article. However, we did not engage in double-coding (namely, two or more researchers coding the same data simultaneously to avoid coding errors) due to time limitations. This might indicate some quality concerns with the reading of the data, as the coding is always at least to a certain degree subjective. However, as the database is relatively large (over one thousand articles, with more than 5,570 coded categories), possible sporadic errors would not make much of a difference. However, as the examples above show, it is always possible that there might have been some more systematic errors in the coding. We also included our previous study covering the years 1990–2000 in the analysis, which enabled us to analyze altogether a 30-year period (1990–2019) in some of the figures and tables; however, the databases were not compatible enough for the regression analyses. The data was compiled in February 2023; thus, the number of citations was counted at that point in time. Finally, the database shrunk slightly once we double-checked the accuracy of some of the variables and the availability of the citation data. The coding, however, could be lengthened only up to the end of 2019 due to time limitations in making this study.

4. Descriptive article analysis

Tables 1a–c provides descriptive statistics of the data we used in both journals together (1a), and in *Business History Review* (BHR, 1b) and *Business History* (BH, 1c) separately. A couple of quick reflections can be made on the basis of this table. First, the number of articles has increased substantially over the past 30 years. This pattern is also displayed in Table 2 below. Second, the citations tended to increase over this time period, which is underscored by the fact that the last decade has not (yet) gained as many citations per article as the previous ones. This phenomenon, i.e., varying time lags in citations, was noted also by Ojala et al. (2017). Third, a vast majority of the articles did not have any quantitative content at all, and if they did, the content was merely descriptive. However, the number of articles containing more sophisticated statistical methods (Category 3) has increased in volume and also in relative terms, but they still count for only merely ten per cent of the content of business historical articles. Fourth, the theoretical depth of the articles has increased significantly: whereas in the 1990s roughly one fifth of the articles were theoretical based on our criteria, this share was already one third by the first decade of the 2000s, and over 40 per cent by the 2010s.

TABLE 1A ▪ *Descriptive statistics: number of articles, citations, and coded content in Business History and Business History Review (number of articles/citations)*

	1990–2000	2001–2010	2011–2019	Total
Articles total	390	451	655	1,496
Citations total	5,344	5,953	6,201	17,498
No quantification	38 %	38 %	40 %	39 %
Charts and tables and/or descriptive statistic	56 %	36 %	48 %	46 %
More sophisticated methods	7 %	9 %	12 %	10 %
Descriptive content	63 %	45 %	60 %	56 %
Theoretical content	20 %	35 %	38 %	32 %

Sources: BH and BHR issues, 1990–2019; Web of Science (retrieved 12 February 2023).

TABLE 1B ▪ *Quantitative content in Business History Review (per cent share of all articles)*

	1990–2000	2001–2010	2011–2019	Total
No quantification	43 %	44 %	48 %	45 %
Charts and tables and/or descriptive statistic	51 %	53 %	44 %	65 %
More sophisticated methods	6 %	2 %	8 %	5 %
Descriptive content	23 %	31 %	33 %	29 %
Theoretical content	77 %	69 %	67 %	71 %

Sources: BH and BHR issues, 1990–2019; Web of Science (retrieved 12 February 2023).

TABLE 1C ▪ *Quantitative content in Business History (per cent share of all articles)*

	1990–2000	2001–2010	2011–2019	Total
No quantification	34 %	35 %	36 %	35 %
Charts and tables and/or descriptive statistic	59 %	27 %	50 %	56 %
More sophisticated methods	7 %	13 %	14 %	12 %
Descriptive content	18 %	37 %	40 %	34 %
Theoretical content	82 %	63 %	60 %	66 %

Sources: BH and BHR issues, 1990–2019; Web of Science (retrieved 12 February 2023).

As seen in Tables 1b–c, in BH the quantitative content decreased in the early 2000s, then it bounced back in the second decade. Respectively, in BHR there was less change, and then some increase in the last decade. The role of theory appeared to decrease somewhat for BH, and there was only a temporary decrease in BHR, with the latter developing a more theoretical focus recently than BH. Tables 1b–c show that in both journals the qualitative content was dominating, though BHR was clearly more qualitative by nature. However, the most sophisticated statistical methods have been gaining popularity in both journals, even though the share is only roughly ten per cent in both journals during the 2010s respectively. Still, the relative share of quantitative content has increased clearly more in BH than in BHR, with the latter seemingly publishing more qualitative content.

As already noted in Tables 1a–c above, business history as a discipline has grown substantially, especially during the last two decades. This is mainly due to the fact that *Business History* has published, since 2013, already eight issues per year, whereas this number was only four per year at the turn of the millennium (six issues since 2007 and seven since 2010). At the same time, the content of this particular journal has changed to more a business studies orientation: in 2017, less than 14 per cent of content published was written by scholars working in history departments, while those operating in business schools made up over half of the content (Decker et al. 2018). This does not, however, necessarily mean that trained historians that previously comprised the bulk of the content in both journals have totally exited the scene; rather that they have moved at least to a certain extent to business schools. Moreover, due to the overall increase in volume, the number of authors working in history departments has not necessarily declined (Ojala 2017).

TABLE 2 ▪ *Total number of articles and citations per decade in Business History Review (BHR) and Business History (BH)*

	BHR No. of articles	BH No. of articles	BHR Citations per year	BH Citations per year
1960–1969	239	83	135	21
1970–1979	147	98	192	55
1980–1989	184	178	216	129
1990–1999	135	214	286	210
2000–2009	160	262	223	331
2010–2019	203	522	208	492
In total	**1,068**	**1,357**	**211**	**206**

Sources: Web of Science (retrieved 12 February 2023). Note: years 1972 and 1973 for BHR are missing from the WoS data; this is noted in the calculation in above.

The citation counts, in turn, displayed an interesting phenomenon over the years (Table 2). Namely, from the 1960s until the 1990s, BHR gained far more citations than BH, but this changed dramatically during the 2000s: the number of citations to BHR grew only modestly, whilst the number of citations to BH increased significantly. This can, again, be explained at least partly by the increase of articles published in BH and the tendency of the authors to cite the journal they are publishing in. However, this trend might have some foundations in the different orientation of articles published in these two journals, as shown below.

In general, we can observe that the use of more sophisticated quantitative methods increased along with the overall numbers of articles in these journals, especially in the case of BH. It is quite possible that the larger number of issues per year has also induced the editors of the journal to accept more quantitative content. As the editors Harvey and Wilson (2007) noted, business history has been becoming more integrated with social sciences, and in fact they emphasized the need for openness toward different methodologies, while explicitly touting the focus on strong evidentiary basis and exact research design, "including quantitative evidence whenever necessary and feasible". Moreover, the more explicit use of qualitative methods in articles has also increased simultaneously, indicating a greater emphasis on rigor, especially in BHR. However, it is harder to discern if the growing number of especially quantitative articles has had an impact on citation counts in BH.

5. Statistical analysis of the determinants of citation counts

There is a plethora of bibliometric studies that have emerged in the past 25 years, in many different fields of social sciences. That also applies to economics and history, as well as economic and business history (Liang and Liu 2018, Rousseau and Rousseau 2021, Eloranta et al. 2020). These studies provide some rudimentary ideas about a potential "model" for testing the various research trends. Most of them focus on citation patterns in some way, to gauge how those citation patterns have evolved over time and across disciplinary boundaries (see also Hamermesh 2018).

There have been some previous studies that can serve as guideposts for the study we aim to carry out here, in addition to our own previous work (for examples of examination of long-run trends in sociology literature, see Moody et. al 2022). As such, Di Vaio et al. (2012) illustrated that certain types of variables like gender, length of article, country of origin, topics, discipline, etc., are keys to understanding citation patterns in economic history, which should also translate to analysis of business history outputs. Our dataset is not quite as detailed and rich as theirs, however. They also discussed the model selec-

tion extensively, which is what we do as well. Thus, we have tested the following model in this article:

$$cited = f(quantlevel1\text{-}3 \text{ or } quantlevel, theory, length, citeothers, controls) \quad (1)$$

The source of the data was the Web of Science database, as explained before. The dependent variable, CITED, was the total citations an article has received at the time of our data compilation.[2] QUANTLEVEL1-3 (i.e., level of quantification from none, 1, to advanced statistical methods, 3, a dummy) or QUANTLEVEL (i.e., cumulative quantitative levels, dummy, if 2 o r 3 were present) was the first independent variable, aimed at testing the idea of whether the inclusion of quantitative methods increases citations, due to intra- and interdisciplinary appeal. However, in the testing of the various models, we ended up using QUANTLEVEL3 as the main explanatory variable, so we could gauge the impact of advanced methods on citations. THEORY was a dummy, with a value of 1 if a theory has been explicitly indicated in the article. LENGTH denoted the number of pages for the article. CITEOTHERS comprised the number of citations to other articles, as a measure of impact and citation network effects. Moreover, we used DATE (number of years since 2022), and AUTHORS (number of authors) as control variables in the regressions. In some of the statistical testing, we also explored the possible impact project funding might have had on citations, but only for BH, due to lack of other data. We used both OLS and Poisson count models, due to the nature of the data and the fact that this made the results more comparable to our earlier work. Similar to Di Vaio et al. (2012), we additionally ran negative binomial regressions as robustness checks, but they did not yield different results. In general, our model, as are most bibliometric models, is a fairly inductive one, which of course is a weakness in any quantitative analysis. A deeper theoretical basis for the variable selection, model types, and robustness testing would be more advantageous, which is something we want to acknowledge here. Tables 3 and 5 below outline the statistical characteristics of the variables in question.

2. Note that we, first, wanted to keep the dependent variable similar to our earlier studies of citations in the business history scholarship. Moreover, for example, imposing citations on an annual basis would have necessitated a reconfiguration of the database. Second, we compared the results of the Poisson regressions for citations since 2013, to further evaluate the time-dependent nature of the results. However, the results were by and large the same.

TABLE 3 ▪ *Statistical characteristics of the variables for BH, 2001–2019*

Variable	Cited	Quant level 3	Quant level	Theory	Length	Cite others	Date	Authors
Mean	9.49	0.13	0.64	0.61	22.38	60.84	10.34	0.45
Median	6.00	0.00	1.00	1.00	22.00	55.00	10.00	0.00
Maximum	232.00	1.00	1.00	1.00	46.00	218.00	21.00	1.00
Minimum	0.00	0.00	0.00	0.00	4.00	0.00	3.00	0.00
Observations	773	773	773	773	773	773	773	773

Sources: Business History, 2001–2019.

TABLE 4 ▪ *Determinants of citations in BH, 2001–2019*

Variable	Spec 1 (OLS)	Spec 2 (OLS)	Spec 3 (OLS)	Spec 4 (Poisson)	Spec 5 (Poisson)	Spec 6 (Poisson)
Constant	2.79	5.69**	2.60	1.55***	0.62***	0.52**
Quantlevel	–0.84	–1.10	–	–0.07	–0.10	–
Quantlevel3	–	–	–1.58*	–	–	–0.26***
Theory	2.83***	2.26***	2.98***	0.33***	0.28***	0.30***
Length	0.00	–0.04	–0.01	0.00	–0.00	–
Citeothers	0.09***	0.10***	0.09***	0.01***	0.01***	0.01***
Date	–	0.67***	–	–	0.07***	0.07***
Authors	–	5.63***	–	–	0.61***	0.62***
N	773	773	773	773	773	773
Adj. R^2	0.05	0.14	0.05	0.06	0.18	0.18
SE	13.36	12.73	13.35	13.34	12.46	12.45
Durbin-Watson	1.82	1.93	1.82	–	–	–

Note: Specifications 1-3, OLS utilizes Newey-West HAC standard errors and covariances; specifications 4-6, QML Poisson Count Regressions, employing Huber/White standard errors and covariances. * null hypothesis of no correlation rejected at 10 per cent level; ** null rejected at 5 per cent level; *** null rejected at 1 per cent level.

Sources: Business History, 2000–2019.

Both the OLS and Poisson model results for BH, with the number of citations as the dependent variable, were similar. First, the use of quantitative methods in general did not seem to be statistically significant for this period. Also note that we tried testing for various interaction impacts between the variables, but the results were not statistically significant. Moreover, we tried using the advanced quantitative methods dummy as one of the independent variables, but it yielded similar results. The theory dummy was consistently significant with a large, positive coefficient. The length of the article did not

seem to matter, whereas more citations to other scholars increased the citation count slightly. The longer the time delay, as one would expect and as noted above, the more citations there were. Moreover, the more authors an article had, perhaps indicating network effects, the more citations it received. Finally, the fit of the regressions was not very high, so we are likely missing other key variables in the analyses. Furthermore, one should not put too much emphasis on the p-values, as that can be misleading in any quantitative exercise (see e.g., McCloskey 1992, Ziliak and McCloskey 2008, Hahn et al. 2017).

In testing for the various correlation patterns between the variables, for example the dependent variable (number of citations) and one of the independent variables, citations to other authors were highly correlated, implying possible multidirectional causality. We also wanted to explore other potential problems in the analysis, thus we found no evidence of unit roots for the individual time series or the group. Finally, we explored negative binomial count regressions, which yielded similar results to the Poisson models, confirming our initial results.

TABLE 5 ▪ *Statistical characteristics of the variables in BHR, 2001–2019*

Variable	Cited	Quant level 3	Quant level	Theory	Length	Cite others	Date	Authors
Mean	10.61	0.06	0.54	0.68	26.26	76.79	11.35	0.26
Median	6.00	0.00	1.00	1.00	26.00	74.00	11.00	0.00
Maximum	112.00	1.00	1.00	1.00	80.00	226.00	21.00	1.00
Minimum	0.00	0.00	0.00	0.00	3.00	0.00	3.00	0.00
Observations	341	341	341	341	341	341	341	341

Sources: Business History Review, 2001–2019.

The results of the regressions for BHR were similar to what we discovered for BH. The overall quantitative methodological level did not seem to have an impact on citation counts. Similarly, using the advanced quantitative methods dummy instead, the results were statistically insignificant. The use of theory increased citations, as did the length of the article, multiple authors, and more time having passed since publication. Citing others did not seem to have much of an impact in this case. Finally, again, the overall fits of the regressions were relatively poor.

As in the previous results, the dependent variable (number of citations) and citation to other authors were highly correlated, which should be taken into account when interpreting the results. To examine the results further, we also tested for unit roots for the various variables, both individually and as a

TABLE 6 ▪ *Determinants of citations in BHR, 2001–2019*

Variable	Spec 1 (OLS)	Spec 2 (OLS)	Spec 3 (OLS)	Spec 4 (Poisson)	Spec 5 (Poisson)	Spec 6 (Poisson)
Constant	–3.78	–8.29***	–4.04	1.08***	0.63**	0.69**
Quantlevel	–0.92	–1.10	–	–0.03	–0.06	–
Quantlevel3	–	–	–3.45	–	–	–0.28
Theory	3.67***	3.48***	3.65***	0.37***	0.34***	0.34***
Length	0.40***	0.31**	0.40***	0.03***	0.02**	0.03***
Citeothers	0.02	0.03	0.02	0.00*	0.00*	–
Date	–	0.54***	–	–	0.05***	0.05***
Authors	–	3.72**	–	–	0.36***	0.36***
N	341	341	341	341	341	341
Adj. R^2	0.08	0.13	0.08	0.04	0.10	0.09
SE	12.65	12.34	12.63	12.92	12.53	12.57
Durbin-Watson	1.78	1.84	1.77	–	–	–

Note: Specifications 1–3, OLS utilizes Newey-West HAC standard errors and covariances; specifications 4–6, QML Poisson Count Regressions, employing Huber/White standard errors and covariances. * null hypothesis of no correlation rejected at 10 per cent level; ** null rejected at 5 per cent level; *** null rejected at 1 per cent level.

Sources: Business History Review, 2000–2019.

common group. None of the tests employed indicated the presence of a unit root; however, cointegration tests indicated strong evidence of cointegration among some of the variables, suggesting that some further analysis is warranted. And, as before, we also tested binomial negative count regressions, and the results were very similar to the ones presented here. All in all, our results should be considered as indicative, rather than conclusive.

6. Discussion

This article contains data from the first two decades of the 21st century, and it gives us a new snapshot of some of the trends in the field. Namely, we were interested in examining whether quantitative methods have become a mainstay in business history studies, and what that might mean. In general, somewhat surprisingly, bibliometric and methodological discussions including quantitative methods are still quite rare in business history. This also reflects the paucity of large methodological and theoretical debates in the field. Therefore, studies like those in this special issue provide important insights about the state and future of the field.

This article is a continuation and update of our earlier work, in which we were looking into the determinants of citation patterns in business history in

the 1990s. Moreover, we explored in another article as to why top articles were so well received. The results suggested some opportunities and challenges for the emerging business history scholarship. First, it appeared that quantitative methods were not widely used in the business history scholarship, which may have formed some boundaries for its interdisciplinary appeal at least to a certain extent. However, the increasing use of qualitative historical methods in social sciences has presumably paved the way for business history to make inroads towards organization studies. Second, the use of theory along with more complex quantitative methods increased the number of citations. Third, the most cited business history articles reflected the changing nature of the field at the time, with certain prominent scholars and overarching topics dominating the discussions in the shadow of Chandler's impact.

The results here expand our initial ideas and earlier findings in the following ways: 1) BH has increased its volume greatly, thus outpacing BHR in total number of citations; 2) the role of theory is now even stronger in increasing citations; 3) quantitative methods do not seem to have a clear impact on citations, or the impact may even be negative; 4) more citations to other articles increased citations in BH; 5) the more authors there are, the more citations, implying a possible network effect. What does this tell us about the use and usefulness of quantitative methods in the business history scholarship of the last few decades?

First, business history as a field has become more diverse in terms of methods, and quantitative methods have played a limited role in this diversification. Moreover, it is not clear how quantitative methods are shaping citation patterns within and outside the discipline. There may be a time lag effect in play for interdisciplinary scholarship to emerge in this type of analysis, as observed by others too (Rinia et al. 2001, cf. Bögenhold 2018). Second, there is no particular consensus among scholars of what the most proximate drivers of citation patterns in journals are. Here we would argue that a proper model must also be specified theoretically in bibliometric analyses, which is more difficult to achieve in these types of rather empirical exercises (see also González-Alcaide 2021, Di Vaio et al. 2012). Standard practices in social science research would necessitate this, also to increase the appeal and impact of these types of study, which should be extended to variable selection. Our approach is thus similarly limited in its scope and variable selection. Moreover, given the different approaches to data gathering, we were unable to link the data samples comprehensively to our earlier efforts, so that is something that could be improved upon, particularly to properly gauge the long-run time lag patterns in citations.

Third, good quantitative analysis can be complemented with qualitative evidence, which we have attempted here only in limited, illustrative terms. We could, for example, expand the analysis to examine links to top cited research,

as well as interdisciplinary network impacts. Moreover, qualitative and quantitative analysis of prominent business history monographs and edited volumes could provide further insights about knowledge dissemination patterns, as well as the use of quantitative methods. The use of quantitative models and terminology can be a hindrance to the appeal of a book, especially if it is intended for larger audiences. Open access can only increase the importance of book chapters too, which might change their orientation towards a similar format as journal articles (on OA publication impacts in Finland, see Pölönen et al. 2020). Therefore, it is difficult to gauge the impact of the methods amidst such a profound change in the academic markets.

Fourth, what do our results tell us about the current interaction between economic and business history, those two estranged cousins? Generally, there has always been a tension between business history – often featuring detailed case studies – and economic history that has been focused on generalizations and testing theories with quantitative methods. However, in historical economics (or cliometrics), quantitative methods have often replaced more nuanced criticism of sources, which has been one of the keys to historical analysis (see also Cioni, Federico and Vasta 2021). This has created some distance between quantitative economic history and its more traditional forms, let alone business history or other historical fields (Cioni, Federico and Vasta 2023). Similarly, business historians teaching in business schools have overemphasized particular managerial perspectives and theory at the expense of time and context in which the phenomena have taken place (Kobrak and Schneider 2011). So, the tensions are persisting, also in terms of the use of quantitative methods. Yet, there are two avenues of discourse that have created opportunities for collaboration between economic and business historians too, namely the strong emergence of overarching histories such as global history and social science history, as well as the massive data and digital revolution that we have experienced in recent years.

The first of these avenues has created inroads for broader methodological discussions and also emphasized possible new methodological avenues, related to big data analysis in digital humanities and social sciences (large textual data and natural language processing and massive use of register data with micro(economic) orientation). For example, the expansion of social science history as an inclusive and nearly boundless field of inquiry – focusing especially on the application of ideas and methods from various social sciences, both in terms of conferences and publication arenas – has brought forth opportunities for applications of quantitative tools in the analysis, or a revival of sorts (Ruggles 2021, cf. Floud 1984). Richard Steckel (2007) called this "big social science history", operating with large datasets and long time periods, emphasizing the value added of large, interdisciplinary, and collaborative projects. Global history, in turn, is a reimagining of the older versions of

world history, with greater global coverage of peoples, places, and sources. It embodies studies of connectedness and opportunity, exploitation and adaptation. Thus, it has once again unified the economic and other historians of larger development patterns, for example around topics like globalization events and trade patterns. In this type of literature, quantification in some form is quite natural, although the analysis of deeper local or national complexities, or even industry and business level phenomena are also present in the literature (Mazlish 1998, O'Brien 2006, Middell and Naumann 2010, Drayton and Moradell 2018, Federico and Tena 2017).

These emergent, more open and interdisciplinary scholarly arenas have opened up new discourses on the uses of quantification to study societal patterns, which may have an impact on business history scholars as well (Buckley 2021; see also Colli and Larsson 2014). As argued by Perchard et al. (2017), business history as a field is at a crossroads, due to the disciplinary challenges listed above, as well as other competing influences (such as history of capitalism, variety of economic theories and schools of thought, and management and organizational perspectives), both from social sciences and humanities. Yet the field has become more established and mature, and methodological debates are becoming more cogent. In these debates, quantification, rigorous data collection and assessment, and theoretical openness are keys to greater academic impact.

Both economic and business history cannot succeed as disciplines purely as "histories", which can lead to isolation from other disciplines, as pointed out by Leslie Hannah already in 1983. Interdisciplinary discussions and connections require methodological and theoretical perspectives that are not necessarily natural in most historical research, which has as a strength contextualization in terms of time and place as well as careful reading of sources. In economics, in turn, the focus remains on theoretical discussions, modeling, hypothesis testing, and methodological introspection (Lamoreaux, Raff and Temin 2008; Eloranta, Ojala and Valtonen 2010; De Jong, Higgins and van Driel 2015). The combination of different theoretical and methodological skillsets and perspectives can bring added value to business history as a discipline, although this does not always happen. This is a common problem for many fields of history that aspire to increase interdisciplinary impact (Clark and Rowlinson 2004, Kieser 1994, Üsdiken and Kieser 2004). Furthermore, at times the quantitative perspectives and the attempt to follow the latest methodological (statistical) trends in economics pose some problems for economic historians as well, raising the bar for getting research published in similar arenas as other social sciences (see e.g., Calafat and Monnet 2017, p. 5-6; Reckendrees 2017). We would like to stress that seldom if ever are these different skillsets embodied in one person. Therefore, fruitful collaboration is the best possibility also for business history scholarship. Questions and top-

ics are what matters; to get right answers to right questions, we definitely need both qualitative and quantitative approaches.

The second avenue for interdisciplinary discourses to take place in is one area where economic historians and social science historians have been particularly active, perhaps due to their quantitative orientation, namely digital humanities and social sciences, and digital history in the last 30 years or so (Eloranta et al. 2020, Guttman et al. 2018, Zeng and Tao 2023). These changes open possible new methodological avenues related to big data analysis in digital humanities and social sciences, including both large textual (qualitative) data and natural language processing and massive use of (quantitative) register data with micro(economic) orientation. We are living through an era of information revolution, which is evident in all areas of data collection and preservation in modern societies, especially archives and various public organizations. Certain well-known massive data repositories such as the Maddison Project, Clio-infra, and Sound Toll Data project have already been "game changers" in economic and maritime history (see e.g., Veluwenkamp et al. 2021, https://clio-infra.eu/, Bolt et al. 2020). The register data based on microdata (e.g., individual persons or companies) opens a lot of possibilities to combine economic and business historical research, a trend that is already prevalent in other social sciences. However, massive register-based data comparisons also come with their own challenges (van der Weld et al. 2019).

Moreover, there are several interesting research projects taking place around the world in the realm of business history research to compile open access databases on firms, industries and entrepreneurs, though mainly operating on the national level. Thus, transnational, comparative datasets are desperately needed also in business history. Certainly, data produced by international organizations such as OECD or World Bank are of great value, but they do not necessarily contain firm-level information, especially for longer-run comparisons – though they do include a lot of interesting industry-level data. Besides the data, digitalization has indeed changed publishing patterns, enabling scholars to publish much more research than ever before, also in various forums. Even more importantly, open access content enables a wider readership for business history content than previously. This has and will undoubtedly have an impact on citation counts as well. However, we will not be able to discern many of those impacts quite yet, perhaps not for decades. And therein lies one of the important limitations of this study: the time lags involved in citations. Another concerns the overlapping and complimentary debates occurring in books, which could offer further insights into the theoretical and methodological debates. Here we can only note those constraints and opportunities, to be explored in future studies. During the era in which digitalized big data is becoming more available both in qualitative and quantitative formats, we do need a variety of

methods to tackle our research questions. In this, we argue, economic and business historians can learn from one another.

7. Conclusions

This article is part of an already relatively large body of research on citation patterns and trend developments in the fields of business and economic history that has been carried out since the 2010s. Our main objective was therefore to reassess the results of previous research on the use of quantitative methods in business history. Our results of the analysis of the last two decades suggest an important update of the methodological developments. The number of articles using more rudimentary and more advanced quantitative tools have increased, but not in relative terms. Quantitative methodology is typically part of the toolkit of those business historians that are closer to economic history as a field, some who are employed in Departments of Economics. Moreover, the use of quantitative methods does not result in increased citation counts anymore, as results on previous decades suggested, perhaps reflecting the more complicated publication arenas and broader theoretical as well as interdisciplinary debates. It also seems quite likely that business historians are making a bigger impact theoretically, in historical fields, and additionally in organization and management studies. Interdisciplinary boundaries are also difficult to overcome, and business historians have a lot of work ahead to stay relevant in certain key debates. For example, during an era in which digitalized big data is more available both in qualitative and quantitative formats, we do need different kinds of methods to tackle our research questions. Quantitative and qualitative methods should not be seen as substitutes, rather as complements. In this, we argue, economic and business historians should learn from one another.

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Author contribution statement

All authors have contributed equally.

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Entre el nombre i la paraula: mètodes quantitatius a la història empresarial revisitada

RESUM

Aquest article amplia la nostra anàlisi anterior (2010) amb un doble objectiu. En primer lloc, pretén avaluar fins a quin punt s'han utilitzat mètodes quantitatius en la recerca recent sobre història de l'empresa. I, en segon lloc, vol mesurar l'impacte que els mètodes quantitatius poden haver tingut en les citacions d'articles d'aquesta disciplina. Utilitzem dades de les dues revistes més importants d'història de l'empresa (*Business History* i *Business History Review*) en els darrers vint anys. Observem que, en aquestes revistes, el contingut quantitatiu no ha augmentat en termes relatius durant aquests anys, encara que sí que ho ha fet en termes absoluts. Contràriament als nostres resultats anteriors, els mètodes quantitatius ja no tenen un impacte fàcilment perceptible en les citacions, tot i que sembla que l'ús explícit de teories ha augmentat l'atractiu d'aquest tipus d'estudis. L'impacte poc clar sobre les citacions pot ser degut, almenys en part, a un desfasament temporal en les xarxes de coneixement interdisciplinari. A més, sostenim que la influència creixent de l'economia i la història econòmica, la global i la comparada, i dels mètodes digitals per a dades massives requeriran en el futur un ús més elevat de mètodes quantitatius, i que l'impacte sobre les citacions només serà observable en les properes dècades.

PARAULES CLAU: bibliomètric, quantitatiu, història empresarial, història econòmica, mètodes, cites

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Entre el número y la palabra: métodos cuantitativos en la historia empresarial revisitada

RESUMEN

Este artículo amplía nuestro anterior análisis de 2010 con un doble objetivo. En primer lugar, evaluar hasta qué punto se han utilizado métodos cuantitativos en la investigación reciente sobre historia de la empresa. Y, en segundo lugar, medir el impacto que los métodos cuantitativos pueden haber tenido en las citas de artículos de esta disciplina. Utilizamos datos de las dos revistas más importantes de historia de la empresa (*Business History* y *Business History Review*) en los últimos veinte años. Observamos que, en ellas, el contenido cuantitativo no ha aumentado en términos relativos durante estos años, aunque sí que lo ha hecho en términos absolutos. Al contrario que en nuestros resultados anteriores, los métodos cuantitativos ya no tienen un impacto fácilmente perceptible en los de citas, aunque el uso explícito de teorías parece haber aumentado el atractivo de este tipo de estudios. El impacto poco claro sobre las citas puede deberse, al menos en parte, a un desfase temporal en las redes de conocimiento interdisciplinar. Asimismo, sostenemos que la creciente influencia de la economía y la historia

económica, la global y la comparada, y de los métodos digitales para datos masivos requerirán en el futuro de un mayor uso de métodos cuantitativos, y que el impacto sobre las citas solo será observable en las próximas décadas.

Palabras Clave: bibliométrico, cuantitativo, historia empresarial, historia económica, métodos, citas.

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