

An empirical analysis on number and monetary value of ghostwritten papers in China

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In recent years, ghostwriting phenomenon has reached a dangerous level in China, partly due to the great ease of making ghostwriting transactions through the internet. However, there has been little literature trying to answer such questions as how many ghostwritten papers are published each year and how much monetary value is generated in the ghostwriting business. In order to answer these questions, we performed an empirical analysis to find the number and monetary value of ghostwriter papers in China. Our results show that there are nearly 1800 full-time equivalent ghostwriters in China who produced nearly 8000 ghostwritten papers in 2011, which is 0.1% of the total number of papers published in the same year in the country. Furthermore, there was a total monetary value of more than 4.46 million US dollars generated in the ghostwriting business in 2011. Our estimated results will provide firm data support for policy-making related to ghostwriting.

Keywords: Academic misconduct, empirical analysis, ghostwriting phenomenon, number and monetary value.

AUTHORSHIP establishes accountability, responsibility and credit for scientific articles. If authorship is misappropriated, readers may be misled¹. Ghostwriting is a source of misappropriated authorship. Someone who has made substantial contributions to the writing of a book, paper, report, speech or other materials, but for various reasons, never appears as an author of the publication is called a ghost author²⁻⁵. It often occurs simultaneously with its opposite, honorary author (sometimes called guest author or gift author), where the author's contribution is so small, nonexistent, or has not met authorship criteria⁶, but he/she appears as a co-author of a manuscript⁷⁻⁹.

Ghostwriting in this study is limited to academic papers, including journal publications, graduation papers of undergraduates, Master's degree theses and doctoral dissertations. Ghostwriting of academic papers is definitely a harmful practice, which has recently become rampant in China. Scholars, experts, and even politicians have examined and criticized the phenomenon of ghostwriting. However, they mainly focused on how to measure the prevalence of ghostwritten papers in certain fields, the peril of academic ghostwriting, and how to tackle or exorcise them¹⁰⁻¹³. Some scholars have emphasized that the ghostwriting behaviour in medical research and publishing domain causes greater harm on scientific research, academic atmosphere and public health^{14,15}. To mitigate

such dangers ways to control ghostwriting were suggested¹⁶⁻²².

So far, we have not found any reports on the 'service types' and prices of ghostwriting business, the yield of ghostwritten papers, and the estimated number of ghostwriters for the whole country, as well as the total monetary value involved in the business at a national level. Therefore, we decided to take ghostwriting websites as our research samples. In this study, we first compare the 'service types' and price of ghostwriting between China and English-speaking countries. Then, based on the minimal number of employees and the lowest infrastructure cost needed to maintain a ghostwriting website, we figure out the proximal number of ghostwritten papers and ghostwriters in China, and the total monetary value involved in the ghostwriting business. Finally, we propose some measures to control ghostwriting.

Data and methods

Data collection

Selection of 40 Chinese ghostwriting websites and 40 English ghostwriting websites: First, a Chinese Boolean string and an equivalent English Boolean string were respectively used to do a Google search on 1 December 2011. There were more than 1.6 million hits on ghostwriting in the Chinese context and 3.5 million hits on ghostwriting in the English context. We observe that the English ghostwriting websites are mainly located in English countries, such as the United States of America,

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United Kingdom and Australia. Then, a sample of 40 Chinese ghostwriting websites and 40 English ghostwriting websites was selected manually from the respective top-ranked 200 websites within the searched records from Google. In the process of selection, we judged whether they are real ghostwriting websites or not, according to the relevance of website content.

Identification of 127 working 'high-end ghostwriting websites' in China: The 'high-end ghostwriting websites' refer to those that can provide 'high-end' services, such as ghostwriting PhD dissertations or papers that can be accepted and published in so called 'core journals' (top journals). Since ghostwriting companies with such websites can also provide general 'low-end services', such as ghostwriting bachelor's degree papers, we decided to focus only on these high-end companies while making estimations later. For this purpose, a Chinese Boolean string was used in Google search again on 29 December 2011. As a result, we came upon 194,000 hits on 'high-end ghostwriting websites'. As most search engines today, including Google, display top 1000 most relevant websites only, and most web browsers, limited by time, generally have interest only in the top-ranked websites, we could safely assume that ghostwriting websites beyond the top 1000 could be ignored from a sample of 1000 ghostwriting websites, we manually removed the duplicate, inaccessible and invalid websites. Finally, a group of 127 working 'high-end ghostwriting websites' was selected.

Methods

Comparison of the 'service types' and price of ghostwriting between China and English-speaking countries: Information about 'service types', price and delivery time of ghostwriting was collected from the 40 Chinese and 40 English ghostwriting websites. In China, many ghostwriting websites do not release their price and delivery time in order to negotiate a better deal. In such cases, we pretended to be potential customers of their service to obtain information. Our 'spying' was carried out during December 2011 and based on the collected information, we analysed and compared the differences in the 'service types' and price of ghostwriting between China and the English-speaking countries.

Estimation of the total monetary value involved in the ghostwriting business in China: As the ghostwriting business in China falls under a 'grey' area, there is no statistics available on the total monetary value generated through it. Our estimate is based on the hypothesis that ghostwriting companies would not do such business unless their gross profit margin meets their basic expectations. Since 127 working 'high-end ghostwriting websites' constitute the 'main force' of ghostwriting business in China, their total income could sufficiently reflect the

whole business at the national level. Through our consultation and 'spying', we found that 30% is the threshold of gross profit margin for Chinese ghostwriting companies. The following formula was used to calculate the gross profit margin²³:

$$\text{Gross profit margin} = (\text{gross income} - \text{gross cost}) / \text{gross income.} \quad (1)$$

The gross cost of a ghostwriting company includes three parts: (i) its basic infrastructure expenditure; (ii) the wages paid to its customer service representatives (CSRs) and (iii) the royalties paid to its ghostwriters. We have excluded taxes from the gross cost, because ghostwriting companies in China do not pay taxes.

Basic infrastructure expenditure of a typical ghostwriting company in 2011: The basic infrastructure expenditure of a company includes the cost for website operation and maintenance, rent paid for office space, utility fees for telecommunication, broadband, water, electricity, etc. The cost for operation and maintenance of websites includes: (1) annual fees of US\$ 15 (based on the average exchange rate of US\$ 1 = RMB6.6027 in January 2011) for registering a domain name and US\$ 151 for purchasing a web-hosting space of 500 M; (2) the annual maintenance fee of US\$ 45. As a result, the total annual expenditure for operation and maintenance of a website is US\$ 212. This information was collected from our investigations on some ghostwriting websites and some service providers for websites maintenance. In addition, monthly expenditure of US\$ 454 and 105 respectively, for renting a minimal office space and for utilities was estimated based on the relevant data source of the respective industries. Adding these costs, US\$ 212 + (US\$ 454 + US\$ 105) × 12, a basic expenditure of US\$ 6937 for a typical ghostwriting company in 2011 was obtained.

Wages paid to CSRs by ghostwriting companies in 2011: We assume that CSRs of ghostwriting companies hold the national average annual wage, which was US\$ 6429 in 2011. In the process of our investigations, we found that most ghostwriting websites have three CSRs, who respectively take charge of the ghostwriting service, paid publishing service, and after-sales service. However, some ghostwriting companies may exaggerate the number of CSRs they actually hire by including their ghostwriters and managers as CSRs. We decided to cap the number of CSRs as three for those companies that claim to own more than three CSRs. Then, with the total number of CSRs in the 127 'high-end ghostwriting websites' (the stated number for those companies claiming three or fewer CSRs, plus the capped number of three CSRs for those claiming more than three) divided by 127, the average number of 2.2 CSRs per company was obtained.

Table 1. Type, price and delivery time for ghostwriting in China

Type	Price (US\$)	Delivery time
Undergraduate dissertation	12–38/1000 characters	1 to 3 weeks
Master's dissertation	19–61/1000 characters	1 to 3 months
Ph D dissertation	90–228/1000 characters	3 to 8 months
Dissertation or term paper for overseas Chinese students (written in English)	75–228/1000 words	1 to 4 weeks
Papers published in low-level journals	121–303/paper	1 to 2 weeks
Papers published in middle-level journals	227–546/paper	2 to 4 weeks
Papers published in good journals	605–909/paper	1 to 2 months
Papers published in high-quality journals	908–2272/paper	1 to 3 months

Further, multiplying the annual wage of US\$ 6429 per CSR with the average number of 2.2 CSRs, a total annual wage of US\$ 14,144 was calculated, which would be the sum that the ghostwriting company paid to its CSRs in 2011.

Royalties paid by ghostwriting companies to their writers in 2011: Since it is difficult to obtain wage data from ghostwriting websites, we pretended to be ghostwriters to consult the CSRs of the 127 'high-end ghostwriting websites' about the remuneration they are willing to pay. The CSRs of 40 ghostwriting websites responded to our queries, with a responding rate of 31.5%. We found that most companies would put 10–20% of the gross income for ghostwriting a paper as reward to ghostwriters. So we decided to use the lower percentage (10%), to calculate the royalties paid to ghostwriters.

Results

Comparison of the 'service types' and price of ghostwriting between China and English-speaking countries

Information about 'service types' and price for ghostwriting different types of documents in both China and the English-speaking countries is shown in Tables 1 and 2 respectively.

By comparing the 'service types' and price in the two tables, the following facts can be noted:

- Most of ghostwriting websites (more than 90%) in China mainly offer to ghostwrite different types of academic papers. While ghostwriting companies in the English-speaking countries not only provide services in the academic category, but also for many other categories.
- The general price of ghostwriting service in China is lower than that in the English-speaking countries. For instance, the lowest prices for ghostwriting undergraduate dissertation and Master's dissertation in English-speaking countries is US\$ 60 and 90 respectively, much higher than the highest price of US\$ 38 and 61 respectively in China.

The total monetary value generated in the ghostwriting business in China in 2011

The threshold of gross profit margin for a ghostwriting company has been estimated as 30% in the above section. The gross cost per ghostwriting company consists of the basic infrastructure expenditure and the wages for CSRs and ghostwriters. They are US\$ 6937 and 14,144 respectively calculated using the above-mentioned 10% assumption, namely 10% of the gross income of a company goes to ghostwriters. With these values replacing two variables, eq. (1), becomes

$$30\% = (\text{gross income} - 6937 - 14144 - 10\% \times \text{gross income}) / \text{gross income}. \quad (2)$$

Solving (2), the annual gross income of US\$ 35,135 for a typical ghostwriting company in 2011 is obtained. Then, with the annual gross income of US\$ 35,135 multiplied by 127 major ghostwriting companies, the total monetary value of more than the US\$ 4.46 million is estimated, which is a conservative scale for ghostwriting in China in 2011.

The annual yield of ghostwritten papers in China in 2011

Before estimating the annual yield of ghostwritten papers, the average price for ghostwriting a typical paper needs to be found out. According to the price interval of ghostwriting various kinds of papers (Table 1), we list only the lowest price for ghostwriting seven types of Chinese papers in Table 3. We decided to quote the mid-value of US\$ 570 in Table 3 as the average price for ghostwriting any category of papers. With the total monetary value of US\$ 4,462,145 involved in the ghostwriting business in China in 2011 divided by US\$ 570, the annual yield of 7828 ghostwritten papers is estimated.

The total number of full-time equivalent ghostwriters in China in 2011

An annual yield of 62 ghostwritten papers per ghostwriting company can be estimated with the annual total yield of

Table 2. Type and price of ghostwriting in English-speaking countries

Type	Price (US\$)
Undergraduate dissertation	60–150/1000 words
Master’s dissertation	90–200/1000 words
Ph D dissertation	120–200/1000 words
Review of search engine optimization (SEO)	900 for a simple website
SEO articles for improving website ranking in search engine	15–30/500 words
Editing and proof-reading of papers	20–100/1100 words
News release or press releases	100–200//1000 words
Business book or manuscript	18,000–250,000 for 200–300 pages (or about 60,000 words)
Book or manuscript review	90–300/1000 words
Business report	800–1000/1000 words
Marketing article	100–250/1000 words
Advertisement article	200/500 words
Articles published in trade magazines or journals	500/500 words
Technology document	300/500 words
Proposal for publishing a book or manuscript	6,000–35,000 for 30–50 pages
Screenplay	16,000–22,000/2 h
Sales pages	4000–5000/5000 words
Cover letter	20–60/250 words
Resume	60–100/250 words

Table 3. The lowest price for ghostwriting seven types of Chinese papers

Undergraduate dissertation	Papers published in low-level journals	Papers published in middle-level journals	Master’s dissertation	Papers published in good journals	Papers published in high-quality journals	Ph D dissertation
US\$ 96/paper (assuming every dissertation has at least 8000 characters)	US\$ 121/paper	US\$ 227/paper	US\$ 570/paper (assuming every dissertation has at least 30,000 characters)	US\$ 605/paper	US\$ 908/paper	US\$ 7200/paper (assuming every dissertation has at least 80,000 characters)

7828 ghostwritten papers divided by 127. If the mid-value of the maximal delivery time (2 months, as shown in Table 1) for seven types of papers in Table 3 is adopted as the average time for finishing any category of ghostwritten papers, then a full-time equivalent (FTE) ghostwriter would complete at least 4.5 papers per year under the condition of working at least 9 months each year. With 62 divided by 4.5, there are nearly 14 FTE ghostwriters per ghostwriting company. And multiplying 14 with 127, there were nearly 1800 FTE ghostwriters in China in 2011.

Discussion

How many scientists fabricate and falsify research? Fanelli²⁴ used an approach of systematic review and meta-analysis of the survey data. However, there have been very few attempts so far to answer the following questions:

- How many ghostwriters are there in a country?
- How many ghostwritten papers are produced per year?
- How much monetary value is generated through the ghostwriting business in a country?

Our study attempts to answer these questions, at least partly. During the study, we faced some problems that might distort our overall conclusions. First, we only examined the 127 ‘high-end ghostwriting websites’ while ignoring the other small ghostwriting websites. But we really do not know the cumulative effect of all those seemingly insignificant small ghostwriting websites. Second, there are some hidden deals between the customers and the providers of ghostwritten papers without relying on web promotion, which we could not take into account. Considering these ignored or hidden activities, our estimated results are rather conservative. Furthermore, our estimated results are based on some important assumptions, such as the threshold gross profit margin of 30% for ghostwriting companies. If the real margin is different, the ultimate estimation will also change. We believe that our measurement and estimation might shed some light on the study of ghostwriting phenomenon in other countries.

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