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Attention to social stratification in the public discourse: An empirical study based on big data of books (1949–2008)

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Abstract

Using the Chinese corpus of Google Books Ngram in line with other macro-level socioeconomic data, this paper examines and analyzes the trend of change in public discourse about social structure in China from 1949 to 2008, as well as the mechanism that influences this trend. We find that since the reform and opening-up, the official discourse on "class," as constructed by the official ideology, has gradually declined, while the importance of a "stratum" discourse oriented toward the mass population has increased. Using principal component analysis, we generate an index for public attention on social strata and run it through a Granger causality test along with time-series data such as macro-level economic and political indicators. The results show that since the reform and opening-up, public attention to stratum has been influenced by the general trend of the economy, income disparity, and level of political participation. Income disparity influences public attention on stratum-related topics more than macro-level economic indicators do. Official intervention on public opinions does not affect public attention on the stratum, but the former is affected by the latter.

Keywords: Big data, Class consciousness, Stratum consciousness, Social stratification

Introduction

Since the reform and opening-up, rapid changes in the social structure in China have brought about various new changes and new issues, driving the development of research on social stratification. Early studies focused on descriptive analysis of the composition, structural characteristics, and mobility mechanisms of objective classes (Li 1993, 1995; Sun 1996). Since the late 1990s, however, class consciousness has become an important topic in this research area. Scholars have examined the microlevel effect of macro-level transformations of social structure using data on self-evaluation of individuals or groups on their own socioeconomic status (Lu 1996; Liu 2001; Li and Zhang 2008; Fan and Chen 2015). These studies discuss the path of transformation and the evolution of interest relations around the reform and opening-up, as well as the structural logic behind those. They have opened a new research dimension that investigates sociostructural transformation from the individual cognitive perspective.

However, the current class stratification research from the subjective dimension still has much to improve. First, existing studies are limited by the availability of temporal and spatial data. Therefore, they overwhelmingly discuss individuals' subjective class evaluation in the market transition in recent years but failed to fully describe class consciousness in the larger society in history. Second, the explanation of the formation and mechanism of change of class consciousness centers on individual factors such as objective status, relative status, and status change. Despite recent analyses discussing the relationship between subjective class status and income disparity (Chen and Fan 2016), investigation on macro-level indicators remains incomplete. Moreover, existing studies strive to understand how members of society interpret the socioeconomic status of themselves or others but overlook the root and formative process of such interpretation. That is, they have not discussed the issue of discourse on social structure. In fact, around the reform and opening-up, the nature of China's social structure experienced a radical transformation from "class" to "stratum." This change is tightly connected with the adjustment of the Chinese political and economic system, but it also highlights the change of the discourse power of the will of the state and that of public attitude.

The present article departs from these shortcomings and seeks to expand existing research on stratum consciousness. This article poses two fundamental questions. First, from a macrohistory perspective, has the public discourse seen a transformation from a class definition to a stratum definition of social stratification? If so, what has been the role of the state and the public in this discourse changed? Second, is there any internal connection between the macro politico-economic effects of institutional reforms and the discourse change on social structure? To answer these questions, researchers need to ensure the scope, representativeness, and spatial coverage of the data used for analysis. The explanatory framework needs to take into account China's unique experience with social transformation. In the most recent international research, Chen and Yan (2016) used big data on published manuscripts in a time-series analysis of the American class discourse in the twentieth century and indicators such as inflation, employment, and the Gini Index. They discovered a close statistical correlation between macroeconomic indicators and public attention on class. Borrowing from this big data-based analytical logic, we make empirical responses and explanations based on the Chinese context and provide a macro-level Chinese case study for the stratification literature.

Literature review

In the early stage of academic study on class consciousness, researchers sought to understand the general characteristics of class structure based on individual actors' interpretation of their class status. Empirical studies on Western developed countries and East European and East Asian countries almost unitarily demonstrate that most people have a rather clear understanding of the "class" concept (Jackman and Jackman 1983; Shirahase 2010). Considering the potential effect of socioeconomic status, most people tend to see themselves as middle-class members (Evans et al. 1992). However, in studies of the class consciousness of the Chinese public, scholars have found that Chinese people often put themselves in a lower class than their European and American counterparts (Liu 2001; Li et al. 2005; Chen and Fan 2016). Moreover, there is a considerable deviation

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between people's subjective interpretation of their position in the strata and their objective socioeconomic status (Fan and Chen 2015).

Regarding the formation mechanism of subjective class consciousness, researchers provide empirical explanations from three dimensions. First, the amount of socioeconomic resources that an individual possesses has a decisive influence on the cognition of their class position. In reality, it is reflected by variations in people's objective status indicators, such as education, income, and occupation (Hodge and Treiman 1968). Second, subjective factors also influence individuals' understanding of their stratum. For example, studies on urban China show that other than objective socioeconomic factors such as Party membership, years of education, income, homeownership, feelings about social justice, survival anxiety, and social mobility can also influence stratum consciousness (Wong 2010; Chen 2013; Fan and Chen 2015). Finally, macro-level factors such as income inequality have also negatively influenced individuals' stratum consciousness (Chen and Fan 2016).

The abovementioned studies paint a rather comprehensive picture of the basic structural features of class identity in both China and abroad and provide some insights into its theoretical explanations. Despite being valuably heuristic, this line of research has apparent shortcomings. First, existing studies on the class or stratum consciousness center on the individual level. Even if the empirical data are gathered through national surveys, issues with the sampling methods could have undermined the generalizability of their conclusions. Chinese scholars tend to focus on the post-reform era of timespan and use relatively short-term data with approximately 1–10 years. We, therefore, lack a historical picture of either individual or collective class consciousness of the pre-reform period. Second, concerning the class or stratum consciousness changes, Chinese scholars often use a sociological, micro theoretical paradigm that emphasizes the effects of individuals' socioeconomic status, psychological attitudes, and interpersonal relations. Macrostructural factors have been largely ignored (Chen and Fan 2016). However, recent empirical studies in other countries show that class or stratum consciousness formation has a deep socioeconomic root. Macroeconomic indicators (such as GDP and unemployment rate), social inequality, and public opinion could all produce a significant influence on individuals' class or stratum consciousness (Andersen and Curtis 2012).

Other than shortcomings on level of analysis, timespan, and explanatory mechanisms, another key issue that has not received enough scholarly attention is that previous discussion on class consciousness focuses on "facts," which analyzes how individuals assess themselves and others structural position within a society, instead of how these assessments on class structure are formed in the first place. This has to do with the practical nature of discourse about class structure that might seem objective but shaped by external forces in reality. The discourse nature of the social structure is specifically reflected in the vastly different historical stages formed from China's systemic reform. Since 1978, as China's developmental path gradually breaks away from intensively politicized features, public discourse regarding social structure has also been "declassed" (Zhang 2001). Under such a background, a more neutral "stratum" discourse constitutes the official and academic discourse system in defining the structure of transitional Chinese society (Lu 2002). The considerable difference in the discourse expression about the Chinese social structure before and after the reform shows the important influence of institutional

transformation in changing the system of the public discourse, thus revealing the necessity of expanding the level of analysis and extending the timespan of analysis.

Based on the review and comments of research on the class or stratum consciousness, the present study attempts to restart social stratification research from the subjective dimension through a discourse-building perspective. Specifically, we overview the history of change in the public discourse definition of social structure since founding the People's Republic of China. We pay attention especially to the critical function of state will and public attitude in constructing social stratification discourse against the backdrop of institutional reform to demonstrate the unique value of the reform and opening-up on China's development.

Theoretical background

For a long time before the economic reform, the planned economic system, mandatory political mobilization, and revolutionary public opinion made a class discourse, and various kinds of political movements were a large part of Chinese people's daily lives (Guo 2003). Institutional reform started in 1978 and pushed China into an era of intensive change in political and economic systems, resulting in rapid social structure differentiation. At the same time, the public responded actively to the fast-changing social circumstances, constantly updating their understanding of the two sociostructural concepts—class and stratum. Specifically, the influence of China's institutional transition on the public's understanding of social structure is mainly reflected in two aspects: the market reform in the economic field and the development of participatory democracy in the political field, and a dynamic adjustment of public opinion direction.

First, the most significant achievement of the market transition is continuous rapid and stable economic growth over 30 years. Encouraged by an optimistic economic outlook and increasing economic diversification, a meritocratic employment mechanism gradually becomes the new mechanism for social differentiation. Diversifying ways to access socioeconomic resources pushed the stratum structure into a stage of rapid differentiation in the post-reform period (Lu 2003). Such a change has differentiated social strata regarding the standard of living and lifestyle and made people's values and emotions increasingly "stratified" (Ma 2011). A typical example is the middle class that rapidly emerged after the reform and opening-up. This group not only showed consumption preferences that are very different from the traditional strata but also had unique mental attitudes toward political affairs (Zhou 2002). Although the connection between changes in stratum consciousness and economic development since the reform has not been empirically established, international comparative studies in other countries show that continuous economic growth helps relieve tense emotions in society and pushes people to attend more to social discussions related to their class or stratum interests (Evans and Kelley 2004). Moreover, as the Chinese economic reform is making a larger "cake," equality regarding interest distribution has not received timely attention and response. As a result, wealth inequality continues to accumulate, making the current stratum structure increasingly disproportionate between the high, the middle, and the low. The lower-middle group becomes the majority in the social structure (Li 2016). The effect of income disparity spreads to the socio-psychological level, producing collective envy and antagonism, which becomes the basic characteristic of contemporary social sentiment. In

reality, it is reflected in low-income groups' "rich-hating" sentiment toward high-income strata or the grassroots stratum's "official-hating" sentiment toward public office holders (Cheng 2009).

Second, institutional reforms that complement the market reform aim at reviving and perfecting "socialist democratic politics" that were severely disrupted before the reform. In practice, this is reflected in pushing for the development of participatory democracy and adjusting the relationship between public opinion directions and institutional transformation. In one aspect, pre-reform national political life operated through a political mobilization system constructed around a class discourse. Under such a background, the mode of the political practice of most social actors was passive involvement. The economy, culture, and knowledge fields were also influenced by political guidance centered around a "class struggle" (Guo 2003; Liang and Qiu 2004). However, as rural and urban communities started introducing villagers' election systems and community autonomous governance systems, the public initiative to participate in political life significantly increased (Hu 2005; Li and Zhao 2012). This new political participation practice has two key features. First, participants are highly homogenous in educational attainment, income level, and occupational status (Li 2009). Second, participants gradually develop a convergent sense of political efficacy, political awareness, and public responsibility (Sun 2008). In another aspect, the influence of political system reform on people's thinking and awareness is more directly reflected in changes in mainstream public opinion. Before the economic reform, social discussions about class had a firm central position in the general public's daily life (Zhang 2004). Even though China has seen a new era after the traditional system was reformed after 1978, transformations of the ideological system still retained previous authoritative institutional, cultural resources. Public opinion directions at this time exhibited timely features—that is, dynamic adjustments based on concrete changes in politico-economic conditions. Specifically, it is reflected in constant transitions between two developmental directions—"reform" and "stability" (Chen 2012). At the same time, the interactive relationship between the state's public opinion direction and the general public was adjected. Despite official acquiescence or even encouragement of autonomous public opinion expression during the stage of radical reform, in the stage of "stability maintenance," public opinion is pulled back to the track of official discourse (Murata 2002). This means that what drives the change in the Chinese public's stratum consciousness may be implicated in the changes of state public opinion directions. The two elements may change in opposite directions at the same time.

Based on the above review of China's social transformation, we can assume that institutional transformation likely leads to a fundamental change in the ways in which public opinion defines social structure. This change is also closely related to macro-level mechanisms such as economic growth, income inequality, political participation, and changes in public opinion directions. The present study tests these ideas empirically. We use big historical data of published manuscripts to show how the definitions of a "class discourse" and a "stratum discourse" regarding social stratification in China changed between 1949 and 2008 to form a general understanding of the changes in power between the influence of state will and public attitude. Building on that, we further discuss macrostructural factors that influence attention

on social stratification based on multiple influential mechanisms of China's institutional transformation and time-series causal analysis of long-term macro-level data. This study fulfills the gap in traditional research on stratum consciousness. Moreover, it is the first econometric regression model that uses big data in the Chinese social science field.

Data, variables, and analytical strategy

Sources of data on social attention to class and stratum

Public class or stratum consciousness is a macrosocial phenomenon that differs considerably from individual attitudes. This fact puts limitations on existing research in terms of the operationalization and measurement of the concept. For example, Janmaat (2013) argues that, due to data and methodological limitations, studies on how certain cultural or structural factors influence public opinion about income equality are challenged by difficulties in delineating the macro-level influential mechanism. In recent years, "big data," with its huge scope of information volume and widespread time–space dimensions, has brought a methodological revolution to traditional quantitative research (Chen et al. 2016). As the largest book digitization project that human history has ever seen, Google Books contributed great support with its big data text corpus. This paper uses Google Books corpus data to analyze the structural definition in public discourse for its advantages in scope and representativeness.

Before digital media, books were the primary channel of cultural inheritance and accumulation. The vast majority of human society's experiences, ideas, and values are covered in books, making them the most formal and authoritative medium of knowledge in human history. Moreover, book language reflects not only the author's own opinion and attitude but also the value and ideology of the public and general society at the time. Words that repeatedly appear in various kinds of books illustrate not only the core concern of contemporary authors but also the trend of public attitude—those words, to put it differently, have greater "cultural influence" in the social mainstream consensus. Generally, to the extent that the corpus has a certain reliable scope, timespan, and representativeness, we can reasonably assume that the relative frequency of a word in the corpus shows public opinion about that word (Chen 2015).

The newest version of Google Books contains over eight million digitized books in seven major languages worldwide, making up 6% of all books ever printed in 1500 years of history, with 861.3 billion words in total. Among them, 300 thousand books and 26.9 billion words are in Simplified Chinese. To date, Chinese scholars have used these data exploratively in research on a variety of social-scientific topics, including the history of science, the spread of urban influence, cultural history, and changes in social attitude, to discover the developmental paths and patterns of change of long-span historical phenomena (Chen 2015; Chen and Yan 2016; Chen et al. 2015; Gong and Luo 2015; Liu et al. 2016; Zhang and Liu 2017; Zhang et al. 2016). As such, the present study uses the Simplified Chinese Corpus of Google Books to analyze changes in social attention on stratification from 1949 to 2008.

Table 1 Descriptive statistics of class- and stratum-related words in Google Books (simplified Chinese), 1949–2008

Key words of "Class"	Statistics			Key words of "Stratum"	Statistics		
	Mean	Standard deviation	Coefficient of variation		Mean	Standard deviation	Coefficient of variation
Class struggle	9.465	12.220	1.291	Social status	0.965	0.433	0.449
Class oppression	0.320	0.334	1.041	Stratum consciousness	0.000	0.001	.1.308
Class status	0.199	0.208	1.045	Social stratification	0.000	0.001	1.956
Class line	0.160	0.156	9.76×10^7	Stratum cognition	0.002	0.004	2.521
Class Dictatorship	6.947	11.120	1.601	Stratum identify	0.001	0.001	1.331
Anti-revolution	86.380	46.260	0.535	Stratum isolation	0.000	0.000	1.894
Revolution	6.220	6.373	1.025	Stratum conflict	0.001	0.002	2.238
Rectification	7.027	6.308	0.898	Elite class	0.012	0.022	1.835
Left deviation	141.700	103.300	0.7288	Middle class	0.035	0.067	1.907
Right deviation	1.154	0.558	0.484	Poverty class	0.015	0.020	1.321
Proletariat	0.533	0.237	0.445	Executive	0.018	0.022	1.212
Working class	0.153	0.152	0.994	Blue collar	0.009	0.011	1.136
Themasses	0.497	0.428	0.862	White collar	0.065	0.083	1.269
Leader	0.585	0.411	0.703	Manager	4.325	3.648	0.843
Right wing	60.330	34.280	0.568	Public servant	1.419	1.620	1.142
Capitalist	3.552	2.418	0.681	Scholar	8.338	5.875	0.705
Landlord	4.328	3.730	0.862	Peasant worker	0.678	1.590	2.346
Rich peasant	0.113	0.057	0.502	Entrepreneur	0.000	0.000	1.654
Poor peasant	0.533	0.408	0.765	Private entrepreneur	0.584	1.152	1.974
Middle peasant	0.276	0.168	0.608	Clerk	1.207	0.585	0.485

To make it more legible, we multiply the means and standard deviations for all word frequency shares by 10,000

Identification of class- and stratum-related words

Table 1 shows 20 class-related and 20 stratum-related search keywords. The identification of concrete words must be based on two considerations. First, do these keywords extracted from the Google Books corpus represent public attention on class- or stratum-related topics or do they only reflect the salience of those topics in social science works? Second, regarding the representativeness of the words, can a minority of occupations reflect the full picture of social structural changes since reform and opening-up?

To address these two issues, we pay close attention to words and their sources. In terms of word selection, we consider not only professional encyclopedia and textbooks (Scott and Marshall 2005; Xie 2007; Jia 2008; Giddens 2009) but also public-oriented survey reports (e.g., *Research Report on Social Strata in Contemporary China* by Xueyi Lu)[1] and official news media (e.g., *People's Daily*). Table 1 also shows the descriptive statistics of each class- or stratum-related word. Words that have a local Chinese characteristic

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[1] The report, *Research Report on Social Strata in Contemporary*, was published by Chinese Academy of Social Sciences, an authoritative academic institution, in 2002. The core finding of the report is the social structure has been gradually divided into ten strata in China since 1978. The ten strata are identified by occupations, including cadres, managers, private entrepreneurs, professionals, clerks, individual businessmen, business service workers, industrial workers, farmers, and the unemployed. We exactly select 10 words to match these occupations.

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Table 2 Result of principal component analysis for stratum-related words

	Component 1	Component 2		
Eigenvalue	16.82089	2.03105		
Cumulative variance contribution	0.841	0.9426		
Class-related vocabulary [in Chinese]			**KMO**	**SMC**
Social status	0.6763	0.5129	0.8009	0.9968
Class Consciousness	0.29867	0.0289	0.8353	0.9992
Social Stratification	0.9288	− 0.3595	0.7885	0.9994
Class cognition	0.9136	− 0.38	0.8315	0.9997
Class identity	0.9825	0.0197	0.8953	0.9988
Class isolation	0.9121	− 0.3615	0.8474	0.9985
Class conflict	0.911	− 0.3728	0.7991	0.9998
Elite class	0.98	− 0.1888	0.8464	0.9999
Middle class	0.9361	− 0.3417	0.8614	0.9993
Poverty class	0.9385	0.1363	0.9048	0.9997
Executive	0.9232	0.3391	0.8211	0.9997
Blue collar	0.9427	0.2645	0.8796	0.9989
White collar	0.9497	0.0421	0.8808	0.9999
Manager	0.8264	0.5191	0.8699	0.9991
Public servant	0.8594	0.4329	0.8975	0.9967
Scholar	0.9898	0.1163	0.8981	0.9998
Peasant worker	0.8858	− 0.4202	0.8655	0.9998
Entrepreneur	0.9783	0.0436	0.9342	0.9997
Private Entrepreneur	0.9528	− 0.1939	0.89	0.9997
clerk	0.7728	0.4234	0.8648	0.9982

(such as "farmer-worker") have a much higher share than professional words (such as "stratum consciousness"), showing the representativeness of selected words in this study.

Second, it should be clarified that this article focuses only on the difference between trends in class and stratum discourse before and after reform and opening-up. Therefore, we pay special attention to words that imply significant changes in stratum structure before and after the reform. For example, it is only under the backdrop of rural economic reform and urbanization that farmer workers, as a historical phenomenon, appeared in post-reform Chinese society. These stratum-related words are also highly representative. These words are frequently used and highly repeated in the four sources of words this article uses (encyclopedia, textbook, professional survey report, and news media). They generally summarize essential characteristics of the occupational structure in all fields since reform and opening-up. Furthermore, principal component analysis of stratum-related words, as shown in Table 2, exhibits a relatively high KMO value, meaning that the inclusion of additional words will not essentially influence the conclusion made in this study.

Measurement and variable construction

Measuring word frequency

Considering differences in the total number of words used in books published from year to year, we borrow the practice of similar previous works, which use "word frequency share" to make the data comparable across time. For each year in 1949–2008, we calculate the share of appearances of class- or stratum-related keywords over all words in the sample books. That is, the higher the frequency share of a keyword, the more attention it receives from the public discourse. Table 1 shows the measures of frequency.

The dependent variable: stratum attention index

We use principal component analysis to construct a "stratum attention index" (LC) as our dependent variable to undertake a Granger causal test. Table 2 shows the results of the analysis. The Kaiser–Meyer–Olkin (KMO) and squared multiple correlation (SMC) tests show that tested words are suitable for principal component analysis.[2] Based on the factor loadings, eigenvalues, and cumulative contribution of explained variation, we extract two major components from the 20 stratum-related words and further integrate them.
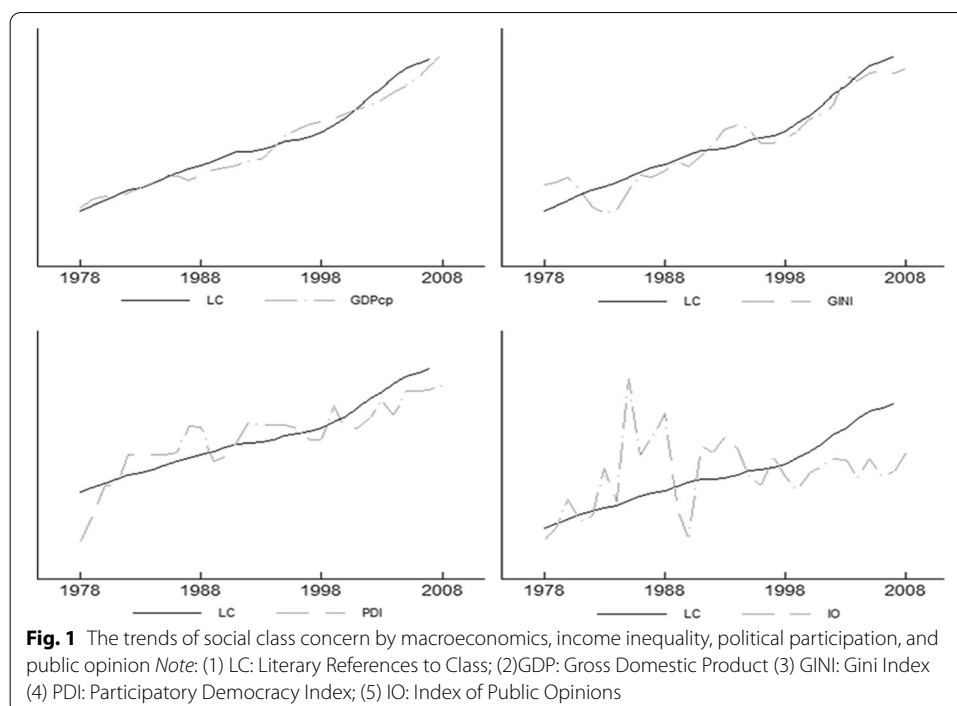
Independent variables

Building on the above discussion on the history of China's institutional transformation and the theoretical relationship between the transformation and the definition of social structural discourse, the present article sets up an explanatory framework, measures variables, and constructs indexes on the empirical level from three dimensions—market reform, political participation, and public opinion.

First, for the positive achievements of the market reform, we use the World Bank's GDP data from 1978 to 2008 to measure the general economic trend during this period. Considering the influence of price fluctuations, we translate GDP into comparable prices (using CPI adjustment) to compare economic aggregates of different times. We note this index with GDP_{cp}. Following standard practice, we use its log in later graphs and analyses.

Second, we use the Gini Index as the indicator for income inequality resulting from market reform. However, China does not currently have complete data on this indicator. Other than official data released by the Bureau of Statistics from 2003 to 2015, data on other years are scattered in the *Statistical Yearbooks*. Therefore, this study uses World Income Inequality Database Version 3.3 to complement the missing data. This variable is termed *GINI*.

Third, public political participation in China from 1978 to 2008 was measured with the Varieties of Democracy database, co-founded and co-managed by the University of Gothenburg and Notre Dame University. We use the Participatory Democracy Index in the database's newest version, Version 6.2. This variable is termed *PDI* and takes a value from 0 to 1, with 1 meaning the highest political participation and 0 meaning the lowest.

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[2] The higher the KMO, the more homogeneous the variables. Normally, a KMO over 0.6 is seen as an indicator permitting principal component analysis. SMC is the square value of the multiple correlation index of one variable with all the others – that is, the coefficient of determination for a multiple regression function. The higher the SMC, the stronger the linear correlation between variables, and the more suitable the principal component analysis.

Fig. 1 The trends of social class concern by macroeconomics, income inequality, political participation, and public opinion *Note*: (1) LC: Literary References to Class; (2)GDP: Gross Domestic Product (3) GINI: Gini Index (4) PDI: Participatory Democracy Index; (5) IO: Index of Public Opinions

Fourth, as described above, public opinion directions since the reform and opening-up have alternated between a "reform" path and a "stability" path. Therefore, we use the Full-Text Search System of People's Daily to count the number of news articles that contain "reform" or "stability" in their titles each year between 1978 and 2008. The difference between the two was then used as the indicator of change in public opinion in each year, termed *IO*. A positive value of this variable means that the official public opinion direction leaned toward "reform" in that year and toward "stability" otherwise.

Figure 1 shows preliminary findings regarding the time change trend between the abovementioned macro-level indicators and the stratum attention index from 1978 to 2008.[3] Generally, stratum attention, economic growth, and the Gini Index have increased steadily, and the public opinion curve fluctuates rather acutely. Throughout the 1980s, news reports about the reform made up the core of official news. In the 1990s, however, the difference between the reform and stability directions significantly shrank, and the two started to alternate frequently. Into the twenty-first century, the reform direction gradually gained a higher status in the discourse system.

Analytical steps
The statistical analysis in this article consists of two main parts. The first is to visualize the frequency share of each class- or stratum-related word in each year between 1949 and 2008, as well as their total. We specifically focus on the changes of these two categories of words before and after the key historical juncture of the reform and opening-up in 1978 to show the trend of change of two concepts of social stratification with different

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[3] Each time series curve is based on the standardized form of the *LC, GDP$_{cp}$, GINI, PDI,* and *IO* variables.
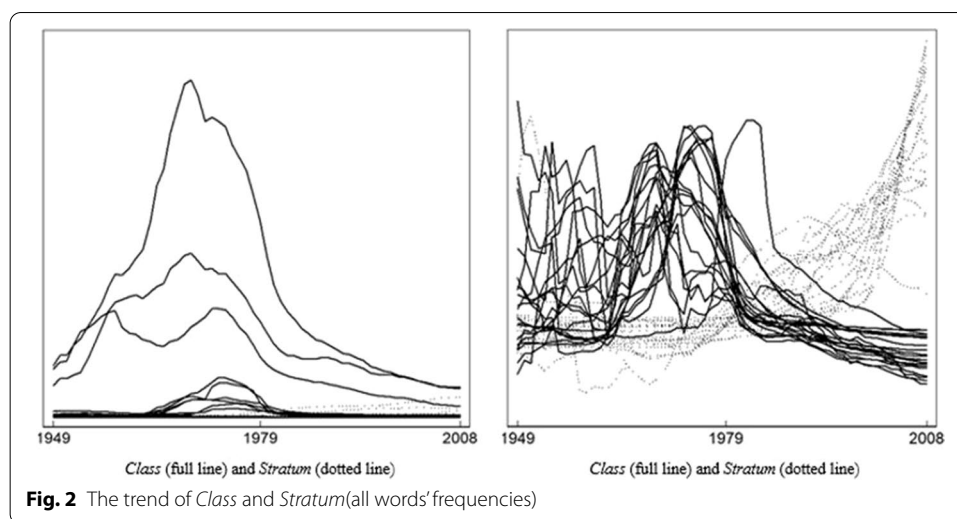
Fig. 2 The trend of *Class* and *Stratum*(all words' frequencies)

meanings since 1949. The second part of the analysis explores the influential mechanism of changes in stratum attention in the public discourse since the reform using time-series regression. Specifically, this research uses conditional Granger regression to conduct the Granger causality test. In econometrics, the Granger causality between two-time series X and Y is defined as follows: When variable X helps explain future changes of variable Y, then variable X is said to "Granger-cause" variable Y (Granger 1969). As such, we use this method to identify the internal connections between the *LC* and *GDPcp, GINI, PDI, and IO* from the time-series perspective. Moreover, a standard Granger causality test with an F-test and a Wald test would lead to bias when the time series is unstable. We, therefore, need to examine each time series' stability through a unit root test. If the time series has no unit root, we directly fit a vector autoregression (VAR) model and perform a Granger causality test. If a unit root exists, we difference the mean value of the time series until we have a stable time series and then conduct the Granger test.

Analytical results
Historical changes of "class" and "stratum" in the public discourse (1949–2008)
Figure 2 shows the time-series curve of the original word frequency (Fig. 2-1) and the share of standardized Z-values (Fig. 2-2). Both trends show a significant alternation of the two categories of topics regarding their position in public opinion before and after 1978. Original word frequency shows that the two categories differ significantly in terms of level—that is, class-related words have always had a higher share than stratum-related words in book language over the 60 years. Looking at the staging of the curve, we see this difference has existed since the founding of the PRC. Additionally, the share of class-related words has decreased since 1976, stratum-related words have not seen corresponding increases, and the gap between the two lasted until 2008. A potential explanation for this phenomenon is twofold. First, before the reform and opening-up, economic and social life in China had long been dominated by political concerns. Cultural promotion work, including book publication, was entirely the responsibility of state agencies. The state controlled the spread and reception of information in society.

Fig. 3 The trend of *Class* and *Stratum*(aggregate words' frequencies)
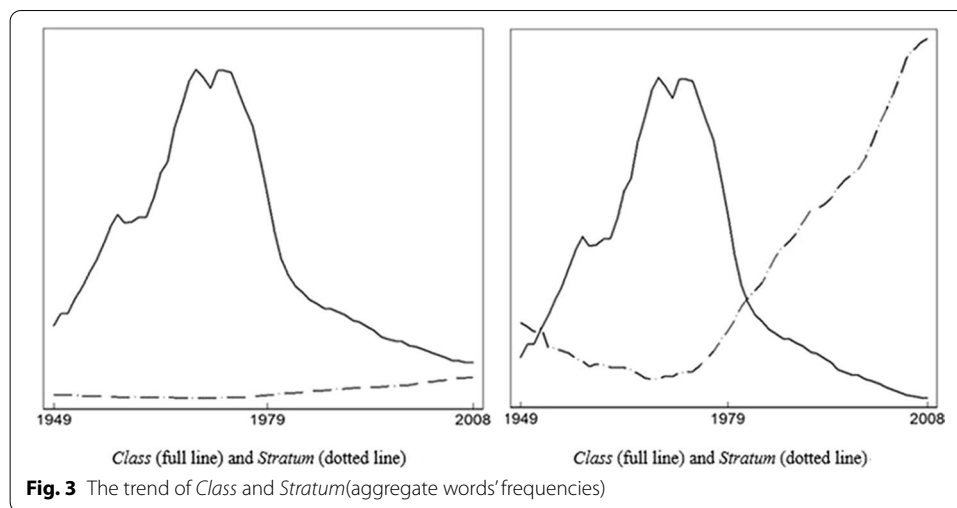
Therefore, public discourse during this time reflected state ideology. Public opinion and official ideology highly overlapped. On the other hand, as the market reform started, non-official publisher groups that operate around business rules appeared in the information industry. As publications were increasingly commercialized and popularized and became entertainment, topics and contents greatly expanded. Moreover, to meet popular demands, content that is distant from daily life and political, such as class topics, were constantly diluted by a large volume of other information. This dilution effect desalinated class-related words and kept the share of stratum-related words down despite their continuous increase in absolute number (Chen 2015).

Furthermore, we calculated the total frequency share of class- and stratum-related words in each year. The original word frequency (Fig. 3-1) and its standardized value (Fig. 3-2) show a continuous and rapid increase in class-related words during 1949–1976 and then a sharp drop. Stratum-related words steadily increased after 1978. Figure 3-2 shows that since the late 1950s, the total share of class-related words has started to rapidly increase in book language, reaching a climax in the mid-1970s. However, since the 1980s, the two have reversed their positions. Noticeably, going into the twenty-first century, especially since 2002, attention on stratum-related topics shows a significant jump from the previous period.[4] Stratum definitions of certain social groups, such as scholars, farmer workers, managers, white-collar workers, and civil servants, have shown more significant increases.

The stratum discourse not only gained a general advantage over the class discourse during the reform but also saw an explosive increase in phrases. We infer that this phenomenon is closely linked to the *Research Report on Social Strata in Contemporary*

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[4] Using 2002, the year when *Research Report on Social Strata in Contemporary China* was published, as the cutoff, we first compared the visualized image of changes in total word frequency share of the 20 stratum-related words in the previous 6 years and subsequent 6 years (1996–2008), and then measured slopes of the curve to show the actual increase amount. The latter is achieved with the first difference of the time series. The result shows that from 1996 to 2002, the annual increase in the total word frequency share is 0.000007, 0.000008, 0.000018, 0.000021, 0.000025, and 0.000022, respectively. From 2002 to 2008, the increasing trend continued, getting to 0.000022, 0.000025, 0.000025, 0.000012, 0.000009, and 0.000006, respectively. The increase in stratum discourse in the public opinion after 2002 is clear. Due to limitation on space, this paper does not show detailed numbers.

China, written by the "Social Structural Changes in Contemporary China" research team in the lead of renowned sociologist Xueyi Lu. An important contribution of this report is to propose the idea that Chinese society has gradually formed into "ten major strata" since the reform and opening-up. State agencies, theorists, and the public all responded positively immediately after the idea was published. We, therefore, believe that the "ten strata" theory has a critical influence on stratification discourse's movement to a stratum definition.

The graphs above provide preliminary answers to the first question proposed in this article. We find that during 1949–2008, the mode of the definition of social stratification in the Chinese public discourse indeed experienced a major transformation from "class" to "stratum." This transformation reflected the weakening of state control in molding the discourse system. Simply put, the definition of social structure in the Chinese public discourse since 1949 is divided into two periods—a pre-reform period in which the class nature reflected the strong power of state ideology and a post-reform period in which the turn to stratum means that public attitude has become the main body of discourse construction. Moreover, this transformation is closely connected with the key historical juncture of the economic reform. However, these intuitive descriptions have no empirical substance. In what follows, we test the macro-level patterns of change implicated here.

Causal correlations between stratum attention and macrostructural factors

This study uses the augmented Dickey–Fuller test and the Phillips–Perron (PP) test to test the unit root of all variables. The results show that *LC, GDP$_{cp}$, GINI,* and *IO* are all-time series with one order of integration, while *PDI* is a stable time series.[5] To help interpret the result of the Granger causality test, we make the first difference of *PDI* as well. In other words, we discuss changes in *GDP$_{cp}$, GINI, PDI*, and *IO* and the correlation between these changes. To ensure the stability of the conclusion under multivariate conditions, we conduct the conditional Granger test. That is, when analyzing the causal relation of one variable and stratum attention, the other variables are included in the analysis as controls.

Table 3 shows the results of the Granger causal test. Five major findings are discovered. (1) Changes in *GDP$_{cp}$, GINI,* and *PDI* are all explainable in terms of the time series ($p < 0.05$). Since these variables are all included in the model in their first difference format, a more accurate interpretation is the following: GDP increase in the previous year, intensification of income disparity, and increase in public political participation, all explain the increase in stratum attention in the subsequent year. (2) In terms of statistical significance, income disparity (*GINI*) has a significantly stronger influence than economic growth (*GDPcp*) ($p < 0.01$ versus $p < 0.05$). (3) *fd_IO* is not a Granger cause of *fd_LC* ($p > 0.1$). We fail to reject the null hypothesis, meaning that the government's public opinion direction cannot explain changes in public stratum attention. (4) *fd_LC* turns out to be the Granger cause of *fd_IO* ($p < 0.01$). That is stratum attention changes with mainstream public opinion directions. In other words, the government increasingly

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[5] Due to limitation on space, we remitted the detail report. Please contact the author to request the detailed result.

Table 3 Results of conditional Granger causality test (1978–2008)

Null hypothesis	N	Chi^2	*p* value
fd_GDP$_{cp}$ is not the Granger cause of *fd_LC*	31	11.382**	0.023
fd_GINI is not the Granger cause of *fd_LC*	31	34.596***	0.000
fd_PDI is not the Granger cause of *fd_LC*	31	26.347***	0.000
fd_IO is not the Granger cause of *fd_LC*	31	1.790	0.774
fd_LC is not the Granger cause of *fd_GDP$_{cp}$*	31	36.731***	0.000
fd_LC is not the Granger cause of *fd_GINI*	31	20.26***	0.000
fd_LC is not the Granger cause of *fd_PDI*	31	41.042***	0.000
fd_LC is not the Granger cause of *fd_IO*	31	13.182***	0.000

(1) "fd" means first difference. (2) According to the information criteria AIC, SBIC, and HQIC, we select a four-order lag. (3) *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

takes the public's idea about stratum-related issues to guide public opinion. (5) Other than *fd_IO*, *fd_GDP$_{cp}$*, *fd_GINI*, and *fd_PDI* can all be explained in terms of time series by *fd_LC* ($p < 0.01$ for all).

Further explanation

The statistical results shown above provide preliminary support for the logical connection between the increased salience of the stratum discourse in the reform and macrostructural factors. However, it should be noted that China's institutional transformation has been gradual in its strategies, making the general trend of the reform subjected to changes in the concrete circumstances and, therefore, noticeably different in each period. Specifically, since the reform and opening-up was formally announced as a national decision, reform attempts were well reflected in central and local policy implementation until the late 1980s. However, as economic and political conditions intensified domestically and internationally in the 1990s, reform progress in various fields was adjusted by "stability maintenance" policies. After 2000, reform received new momentum from globalization and an increasingly comprehensive market economy (Qu et al. 2009). As such, we divide China's reform progress into three periods: 1978–1990, 1991–1999, and 2000–2008. Table 4 illustrates the result of the Granger test on stratum attention and macrostructural mechanisms in each period.[6] New findings here can help improve the whole model.

First, the results in Table 4 also show that finding (1) above generally supports that institutional transformation significantly influences changes in the public's stratum consciousness; this relationship differs considerably in different periods of the reform. From 1978 to 1990, only changes in public opinion (*fd_IO*) Granger caused changes in stratum attention ($p < 0.001$). In 1991–1999, economic growth (*fd_GDP$_{cp}$*) became the most significant factor influencing stratum consciousness ($p < 0.001$). The influence of these mechanisms started to fade away in 2000, but the public's political participation (*fd_PDI*) and income inequality (*fd_GINI*) became new influential factors ($p < 0.05$ for both). This new finding can be interpreted with the concrete path of the reform. Normally, institutional innovations could be implemented in large strokes at

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[6] Due to limitation on space, we remitted results of the unit root test. Please contact the author to request the detailed result.

Table 4 Granger test of stratum attention and macro-level economic and political factors in different stages of the reform

Period	Null hypothesis	Observation	Chi^2	*p* value
1978–1990	*fd_GDPcp* is not a Granger cause of *fd_LC*	13	0.11	0.742
	fd_GINI is not a Granger cause of *fd_LC*	13	0.85	0.356
	fd_PDI is not a Granger cause of *fd_LC*	13	3.39*	0.066
	fd_IO is not a Granger cause of *fd_LC*	13	12.13***	0.000
	fd_LC is not a Granger cause of fd_GDPcp	13	0.78	0.377
	fd_LC is not a Granger cause of *fd_GINI*	13	0.18	0.676
	fd_LC is not a Granger cause of *fd_PDI*	13	4'4.90**	0.027
	fd_LC is not a Granger cause of *fd_IO*	13	4.60**	0.032
1991–1999	*fd_GDPcp* is not a Granger cause of *fd_LC*	9	15.49***	0.000
	fd_GINI is not a Granger cause of *fd_LC*	9	8.88***	0.003
	fd_PDI is not a Granger cause of *fd_LC*	9	4.93**	0.026
	fd_IO is not a Granger cause of *fd_LC*	9	17.11***	0.000
	fd_LC is not a Granger cause of fd_GDPcp	9	1.28	0.258
	fd_LC is not a Granger cause of *fd_GINI*	9	5.89**	0.015
	fd_LC is not a Granger cause of *fd_PDI*	9	2.48	0.115
	fd_LC is not a Granger cause of *fd_IO*	9	1.1	0.294
2000–2008	*fd_GDPcp* is not a Granger cause of *fd_LC*	9	0.01	0.927
	fd_GINI is not a Granger cause of *fd_LC*	9	9.55**	0.002
	fd_PDI is not a Granger cause of *fd_LC*	9	14.06***	0.000
	fd_IO is not a Granger cause of *fd_LC*	9	0.21	0.65
	fd_LC is not a Granger cause of fd_GDPcp	9	210.24***	0.000
	fd_LC is not a Granger cause of *fd_GINI*	9	147.66***	0.000
	fd_LC is not a Granger cause of *fd_PDI*	9	115.83***	0.000
	fd_LC is not a Granger cause of *fd_IO*	9	55.55***	0.000

(1) "fd_" denotes the first difference. (2) Based on the information criteria AIC, SBIC, and HQIC, we chose lags of 2, 2, and 1 for each period, respectively. (3) *p < 0.1, **p < 0.05, ***p < 0.01

the beginning of a reform, but the spread of new ideas and values (such as those about property rights, market, competition, and the rule of law) often confronts a "cultural lag." It takes time for most members of society to accept them. Furthermore, institutional transformations are affected by path dependency. The central government had to direct the mass through public opinion to push the reform along. A representative example is the widespread discussion on the standard of truth in 1978, which helped liberate expressions and thoughts and set up an ideological foundation for the reform.

In the 1990s, however, difficult political and economic conditions led to suppressing sensitive topics related to stratum in public opinion. At the same time, building and perfecting the socialist market economy were formally established as the core theme of the reform. Economic topics took over the core position of the public's stratum attention due to optimistic economic development. After 2000, issues of wealth inequality that came along with rapid economic growth gradually became the focus of society and the key influence of the public's subjective stratum consciousness (Chen and Fan 2016). Moreover, collective interest conflicts continuously intensified at the beginning of the twenty-first century, giving birth to a large number of social movements. Relevant empirical studies show that grassroots political participation increased the organization and cohesion among urban and rural residents, giving

them a cognitive consensus regarding their collective interests and ways to achieve their goals, thus strengthening intra-stratum identity but intensifying inter-stratum conflicts (Liu and Li 2005; Lu 2010).

Second, finding (2) shows that the effect of income inequality on the public's stratum consciousness is more significant than that of continuous economic growth. This conclusion is supported by Andersen and Curtis' (2012) study of 44 country samples. However, in Table 2, this phenomenon only exists in the reform phase after 2000. Before that, economic growth was the major economic mechanism that increased the public's stratum attention. A renowned study by Easterlin et al. (2012) found that although the GDP per capita in China was continuously rising between 1990 and 2010, the public's satisfaction with life did not see a corresponding increase. They believe the best explanation for this is the income inequality issue that comes with rapid economic growth. Subsequently, Wu and Li (2017) provided further support with their study on the subjective feeling of happiness of the Chinese public in recent years.

Third, findings (3) and (4), taken together, reflect the substantive change in the relationship between the state direction of public opinion and the general public after the reform. On the one hand, the "failure" of mainstream opinion in guiding the public's attitude is explained by two arguments. First, as the highly centralized planned economy disintegrated, individuals who obtained economic autonomy began to distance from the highly integrated social structure. Individualization tendencies gradually spread in people's lifestyle, values, choice of action, and cultural ideology. This is cognitively disconnected from certain opinion directions that still maintain authoritative and dominative features (Li 2005). Second, driven by market reform, technological development, and globalization, channels for the public to obtain information and express opinion increasingly diversify, considerably strengthening the independence of social opinion (Tan 2003).

On the other hand, public discussions on stratum-related topics have influenced mainstream opinion direction since the reform began, but the shape and form of this influence differ in different periods. At the beginning of the reform, major reform policies were often issued after the social discussion on a certain topic. For example, the central government's reform direction in ideology and policy design only became clear after the discussion on standards of truth in 1978. However, as reform strategies tightened in the late 1980s, the general progress of reform started revolving around the main task of building the market economic system. Policies became increasingly inflexible. At the same time, as the public representation system, the political coordination system, the social supervision system, and the public opinion expression system were established, public opinion expression was normalized and institutionalized, and its social influence strengthened. However, these all happened inside existing political, institutional frameworks and therefore hardly pose any strong challenge to official opinion direction.

Fourth, finding (5) shows that the stratum consciousness of the public would, in turn, affect political-economic trends and opinion directions. We infer that the reason for this is that the general public cares the most about social topics regarding economic growth and wealth disparity. People tend to take their opinion into mainstream opinion directions by expanding their political participation in practice and finally turn it into real

economic and political decisions. In this interactive relationship reconstructed between the public and the state, two formation mechanisms of decision-making deserve special attention. First, pushing for scientificity and democracy in political decisions is one of China's political system reform goals. Today, the public hearing for political decisions has been widely implemented, covering various fields, including price adjustment, regulation-making, and administrative sanctions (Peng and Xue 2000). Second, the emergence of the internet space has accelerated the trend of medium power structures moving to grassroots areas. At times, the general public can set certain agendas for online mobilization, creating tremendous public opinion pressure on the government and pushing it to respond and handle the issue (Yang 2015).

Robust test

Although we controlled for various macro-level factors in the conditional Granger analysis, some confounding variables might still exist. In particular, changes in word frequency could be influenced by social science publications. Under this logic, our findings may not reflect public attention to social stratification issues, but just the continuous expansion of academic publication, especially in social science disciplines, as the economy rapidly grew. To test this possibility, we borrowed from Chen and Yan's (2016) method: we included disciplinary word frequency and show that it is unrelated to the level of economic growth. We choose words of four subjects—"sociology" and "economics" to represent the social sciences and "physics" and "biology" to represent the natural sciences. We then standardized the word frequency share in the Google Books Simplified Chinese corpus of each subject (*LC/Sociology, LC/Economy, LC/Physics,* and *LC/Biology*, respectively) and compared them with the trend of economic development (*GDPcp*). Moreover, we conducted principal component analysis on the word frequency share of the four subjects and integrated them into a general index *Discipline*. We conducted a bivariate Granger test of *discipline* and *GDPcp*. The analysis found that graphs of subject word frequency and economic growth are incompatible and that statistical results do not find economic growth Granger-causes expansion in subject word frequency ($p > 0.1$).[7] As such, we reject the idea that the prosperity of social science disciplines mediates the effect of economic growth on stratum attention.

Another issue of the analysis is that when broken into periods, each period has a relatively small sample, which could have affected the stability of the models. However, this analysis aims further to interpret the results of the preceding Granger causality test. Staged analyses and the general analysis show consistent results, indirectly showing that the models are reasonably stable. Furthermore, we redid the staged regression with the conditional Granger test based on the t test. The presumption of this test—the Anderson–Darling Test—needs a minimum sample size of 6 to test for normal distribution, which is smaller than the minimum of 9 required for the staged test. The regression result is consistent with the staged analysis in our conditional Granger test. As such, we conclude that the models are robust.[8]

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[7] Due to limitation on space, we remitted the visualization and results of the Granger test. Please contact the author to request the detailed result.

[8] Due to limitation on space, we remitted the concrete results. Please contact the author to request them.

Conclusion and discussion

Based on 40 class- or stratum-related words in the Google Book Simplified Chinese corpus, this article examined the definition of social structure in the Chinese public discourse between 1949 and 2008. We found that a class discourse dominated in the 30 years prior to the reform and opening-up but was gradually replaced by stratum-related topics since 1978. This change reveals a critical transformation in the construction of discourse on social stratification, which turned from state ideology into public attitude. Granger causality tests based on time-series data provide empirical explanations for this transformation. Generally, the rapid growth of the economy, expansion of income inequality, and rising political participation all help explain the increase in the public's stratum consciousness since the reform. However, the positive effects of economic growth are far from offsetting the negative effect of income inequality, despite both being consequences of market reform. Changes in the public's stratum consciousness, in turn, influence these institutional transformations to various extents, the strongest influence being in economic growth and political participation. Moreover, we found that the effect of mainstream opinion direction on the general public decreased during the reform, and the latter influenced the former. Thus, the second question we proposed at the beginning of this article could be answered definitively—after the reform and opening-up, institutional transformations had an important effect on increasing the Chinese public's stratum consciousness. This influence mainly comes from forces of market reform and political system reform. At the same time, the dominance of mainstream ideology over the public's ideas and thoughts weakens gradually, while grassroots society increasingly influences the direction of official discourse through various channels.

In fact, not only does stratum consciousness concern the individual's interpretation of their own objective status, but it is also an important standard to measure "sense of achievement." Since 2015, President Xi has repeatedly emphasized the need to bring more "sense of achievement" to the public through reform and measure reform success by whether it has brought a sense of achievement for the public.[9] The 19th National Congress further points out that "the major contradiction in Chinese society has transformed into a contradiction between the people's increasing need for a flourishing life and unbalanced, incomprehensive development."[10] As such, the policy implication of this research is as follows. In the key stage of the economic reform, bridging the income gap and raising the public's initiative and the ability for political participation—instead of simply striving for a rapid increase in the economy aggregate—would be the primary measure to take in order to relieve stratum conflicts, promote social mobility, and avoid falling into the "transformation trap." In its future development, China needs to keep perfecting the system of interest distribution, expanding space and channels for social mobility, safeguarding Chinese citizens' legal and political rights, and improving the system of interest expression and

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[9] See President Xi's speech in the meeting of the Central Comprehensively Deepening Reforms Commission on February 27th, 2015, April 18th, 2016, and July 22nd, 2016 (http://china.chinadaily.com.cn/2016-09/25/content_26887181.htm). Last time access date?

[10] See President Xi's report in the 19th National Congress on October 18th, 2017 (http://cpc.people.com.cn/n1/2017/1028/c64094_29613660.html). Last time access date?

protection. At the same time, the interactive relationship between the state and the public needs revision and adjustment so that the mechanism for guiding public opinion can integrate it into the mainstream discourse and major political decisions and help strengthen state capacity and social modernization.

This study has some limitations in terms of data and methodology. First, since the beginning of the twenty-first century, internet and social media data could represent public attitudes in China as books can. Second, there are some issues with summarizing public attention with words. For example, occupation-related words cannot fully reflect that since the reform, the occupation structure in China has experienced volatile differentiation, with occupational categories rapidly increasing. Third, the Granger causality tests affirmed the connection between stratum attention and macrostructural factors but cannot fully affirm causality under a counterfactual framework. Fourth, although all the digitized books in the Google Books project come from libraries of top universities and publish houses worldwide, and although user agreements show that suppliers of the books did not pick and choose books before sending them to the project, we could still not completely rule out the risk of ideological bias in the corpus. This risk should not be overestimated, given the principle and practice of book collection by international universities. Essentially speaking, academic institutes collect and study books of all ideological orientations.

Availability of data and materials
We based our study data from the Chinese corpus of Google Books Ngram, the World Bank's GDP data, the World Income Inequality Database, the Varieties of Democracy database, and *People's Daily*.

Declarations

Competing interests
The authors declare that they have no competing interests.

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References
Andersen, Robertand, and Josh Curtis. 2012. The polarizing effect of economic inequality on class identification: Evidence from 44 countries. *Research in Social Stratification and Mobility* 30: 129–141.

Chen, Guangjin. 2013. Not only 'Relative Deprivation', but also 'Survival Anxiety': An empirical analysis of the distribution of subjective stratum identity in China over ten years, 2001–2011. *Heilongjiang Social Sciences* 5: 76–88.

Chen, Si. 2012. 'Stability' and 'Reform' awareness of the Chinese government during social transformation. *Academic Journal of Zhongzhou* 6: 110–112.

Chen, Yunsong. 2015. The trajectory of sociology over two centuries: A cultural study using millions of books. *Sociological Studies* 30 (1): 23–48.

Chen, Yunsong, and Xiaoguang Fan. 2016. Social class self-positioning, income inequality and subjective perceptions of mobility (2003–2013). *Social Sciences in China* 12: 109–126.

Chen, Yunsong, and Fei Yan. 2016. Economic performance and public concerns about social class in twentieth-century books. *Social Science Research* 59: 37–51.

Chen, Yunsong, Qingxi Wu, and Yi Zhang. 2015. International visibility of Chinese cities in the last three centuries: A big-data based description and regression analysis. *Chinese Journal of Sociology* 35 (5): 60–77.

Chen, Yunsong, Liangliang Zhang, Zuntao Min, and Boyang Zhang. 2016. The opportunity of big data and the restart of macro quantitative sociology. *Journal of Guizhou Normal University (Social Science)* 6: 35–39.

Cheng, Boqing. 2009. From envy to hatred: A facet of social emotions in China. *Exploration and Free Views* 10: 49–52.

Easterlin, Richard, Robson Morgan, Malgorzata Swite, and Fei Wang. 2012. China's life satisfaction, 1990–2010. *Proceedings of the National Academy of Sciences* 109 (25): 9775–9780.

Evans, Mariah D.R., Jonathan Kelley, and Tamas Kolosi. 1992. Images of class: Public perceptions in Hungary and Australia. *American Sociological Review* 57 (4): 461–482.

Evans, Mariah D.R., and Jonathan Kelley. 2004. Subjective social location: Data from 21 nations. *International Journal of Public Opinion Research* 16 (1): 3–38.

Fan, Xiaoguang, and Yunsong Chen. 2015. Social status discordance in China (2003–2012). *Sociological Studies* 30 (4): 143–168.

Giddens, Anthony. 2009. *Sociology*. Trans. Kang Li. Beijing: Peking University Press.

Gong, Weigang, and Jiaojiang Luo. 2015. The maritime silk road of the 19th century from a big data perspective. *Academic Forum* 38 (12): 82–91.

Granger, C.W.J. 1969. Investigating Causal Relations by Econometric Models and Cross-spectral Methods. *Econometrica* 37 (3): 424–438.

Guo, Zhenglin. 2003. Level, motivation, and social effect of political participation of contemporary Chinese farmers. *Sociological Studies* 3: 77–86.

Hodge, Robert, and Donald Treiman. 1968. Class identification in the United States. *American Journal of Sociology* 73 (5): 535–547.

Hu, Rong. 2005. Social capital and political participation of urban residents. *Sociological Studies* 5: 142–159.

Jackman, Mary R., and Robert W. Jackman. 1983. *Class Awareness in the United States*. Berkeley: University of California Press.

Janmaat, Jan Germen. 2013. Subjective inequality: A review of international comparative studies on people's views about inequality. *European Journal of Sociology* 54 (3): 357–389.

Jia, Chunzeng. 2008. *History of Foreign Sociology*, 3rd ed. Beijing: Renmin University Press.

Li, Peilin. 2005. Social conflict and class consciousness: A research on social contradictions in contemporary China. *Chinese Journal of Sociology* 1: 7–27.

Li, Qiang. 2016. How far is China away from an olive-shaped society? A sociological analysis of middle-class development. *Exploration and Free Views* 8: 4–11.

Li, Chenlu, and Xudong Zhao. 2012. The primitive resistance in group events. *Chinese Journal of Sociology* 5: 179–193.

Li, Jun. 2009. Property rights of home and political participation: Grassroot community democracy in Chinese cities. *Sociological Studies* 24 (5): 57–82.

Li, Qiang. 1993. *Social Stratification and Mobilization in Contemporary Chinese Society*. Beijing: Economic Press China.

Li, Peilin. 1995. Changes in class, stratum, and interest patterns in the new era. *Social Sciences in China* 3: 47–63.

Li, Peilin, and Yi Zhang. 2008. The scope, identity, and social attitudes of the middle class in China. *Chinese Journal of Sociology 2*.

Li, Peilin, Yi. Zhang, Yandong Zhao, and Dong Liang. 2005. *Social Conflict and Class Consciousness: A Research on Contradictions in China Today*. Beijing: Social Sciences Literature Press.

Liang, Liping, and Shangqi Qiu. 2004. An analysis of the political participation mode of Chinese citizens since the founding of the PRC. *Academic Forum* 5: 81–87.

Liu, Jingming, and Lulu Li. 2005. Becoming stratified: Residential spaces, lifestyles, social networks and class identity: An empirical study of social stratums in urban China. *Sociological Studies* 3: 52–81.

Liu, Jiankun, Yuxiao Wu, and Weifeng Liu. 2016. Changes and mechanisms of Chinese cities' domestic visibility: A big data analysis based on a large volume of books and internet search engine. *Academic Forum* 39 (6): 113–121.

Liu, Xin. 2001. Stratum conscious of Chinese urban residents during the transition period. *Sociological Studies* 3: 8–17.

Lu, Xueyi. 2003. Differentiation and mobility of social strata in contemporary China. *Jiangsu Social Sciences* 4: 1–9.

Lu, Hanlong. 1996. A study of urban residents' social status identity. In Chinese Academy of Social Sciences Institute of Sociology ed. *Yearbook of Chinese Sociology 1992.7–1995.6*. Beijing: Encyclopedia of China Publishing House.

Lu, Xueyi. 2002. *Research Report on Social Strata in Contemporary China*. Beijing: Social Sciences Literature Press.

Lu, Yilong. 2010. Class consciousness and stratum identity of rural residents: structure or construction? An empirical analysis based on the 2006 CGSS. *Jiangsu Social Sciences* 1: 114–124.

Ma, Guanghai. 2011. Existence, identity, and conflict: A review of stratum conscious in Chinese society during the transition period. *Shandong Social Sciences* 5: 64–72.

Murata, Tadayoshi. 2002. Looking at the history of People's Republic of China from the new year's commentary in people's daily. *CPC History Studies* 3: 80–86.

Peng, Zongchao, and Lan Xue. 2000. Public participation in policy-making: using the public hearing system on price decisions in China as an example. *Journal of Chinese Academy of Governance* 5: 30–36.

Qu, Jingdong, Feizhou Zhou, and Xing Ying. 2009. From macro-management to skill management: A sociological reflections on 30 years of reform experience in China. *Social Sciences in China* 6: 104–127.

Scott, John, and Gordon Marshall. 2005. *Oxford Dictionary of Sociology*. Oxford: Oxford University Press.

Shirahase, Sawako. 2010. Japan as a stratified society: With a focus on class identification. *Social Science Japan Journal* 13 (1): 31–52.

Sun, Liping. 1996. 'Guanxi', social network, and social structure. *Sociological Studies* 5: 22–32.

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Sun, Yongfen. 2008. An empirical analysis on the relationship between political attitude and influential factors. *CASS Journal of Political Science* 1: 62–67.

Tan, Wei. 2003. Conceptualization and characteristics of online public opinion. *Human Social Sciences* 5: 188–190.

Weng, Dingjun. 2010. Individual's feeling of fairness and personality orientation in consciousness of class. *Sociological Studies* 1: 85–110.

Wu, Xiaogang, and Jun Li. 2017. Income inequality, economic growth, and subjective well-being: Evidence from China. *Research in Social Stratification and Mobility* 52: 49–58.

Xie, Lizhong. 2007. *The Summary of the Famous Works on Western Sociology*. Nanchang: Jiangxi People's Publishing House.

Yang, Rongjun. 2015. On the reciprocal effect and governance of grassroots democracy in cyberspace, power supervision and policy making. *CASS Journal of Political Science* 3: 110–122.

Zhang, Hongyan, and Jiankun Liu. 2017. A big data analysis of historical transformations and change mechanisms of domestic visibility of Chinese cities: Using cities in southern Jiangsu as an example. *Journal of Xinjiang Normal University (Edition of Philosophy and Social Sciences)* 38 (1): 38–47.

Zhang, Liangliang, Hong Zhang, Shuanglong Li, and Kaiwen Wu. 2016. Chinese cultural celebrities and classics in big data: An analysis of 500 years of international visibility. *Academic Forum* 39 (6): 97–105.

Zhang, Jishun. 2004. 'Linong' in Shanghai: Grassroot political mobilization and trend of state-society unification. *Social Science in China* 2: 178–188.

Zhang, Letian. 2001. The incept and disintegration of state discourses: 'Class' and 'Class Struggle' in the perspective of the people's commune. *Sociological Studies* 6: 73–85.

Zhou, Xiaohong. 2002. The middleclass: What is possible and what is viable? *Jiangsu Social Sciences* 6: 37–46.

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