

## Research On The Development Trend Of Books' Publishing In China

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**Abstract.** First of all, we understood the present challenges and competitions which the development of the publishing industry is facing. Then we analyzed the indicators which affect the development of the publishing industry. After that, we collected the indicators of the three major publications of our country published in the past 25 years, and by using the main factor analysis method, the primary indicator of China publishing industry is considered to be the number of total printed sheets. Finally, the authors made models through methods like AHP, Regression Analysis, Trend Equation Model Analysis, Exponential Growth Model Analysis, to analyze and predict the number of total printed sheets of the books in 1987–2011 year. In order to provide useful data for the relevant research departments, and promote development of the publishing industry in China.

### Introduction

Nowadays, the publishing industry of our country has become industrialized and large-scaled, and has more regularity in its development. However, as a particular industry, the publishing industry has its own feature in the development. One is that the trend of developing and changing is complicated. Another is that a lot of indicators are needed during the quantitative analysis. And the other is that there are nonlinear relationships between different data. Therefore, how to create a suitable mathematical model, and providing necessary and valuable analyzed data for the publishing industry of our country by the quantitative analysis of it and the searching of the regular information in the developing process, has become a significant issue of the growth of the publishing industry.

In China, the publishing industry belongs to a special kind of industry which produces and sales cultural products. On one hand, it has a sacred mission of culture accumulation and heritage of civilization. On the other hand, the product of the publishing industry has the general attributes of merchandise, which must be exchanged to implement its value and achieve its political and cultural mission, is for filling the growing spiritual and cultural need of people.

### Prediction of Books Publishing

There are many kinds of publications, which contains traditional publications, like books, newspapers and periodicals; electronic publications, like floppy disk, CD-ROM, interactive CD-ROM, and Photo CD, etc. Due to the short developing period of electronic publications, the regularity of its data is weak, so we the authors mainly analyze and research the indicators of traditional publications. In order to research the growth trend of books publishing, we investigate the indicator data in the publishing industry of books in our country from 1987 to 2011 (Table 1), nearly 25 years in the past, and we draw the data curve of it ( Fig. 1).

From Fig. 1, we can say that the trend of books publishing in our country is rising up, and has less volatility. So we use Trend Equation Fitting Method to predict the data of books publishing.

Table 1 Statistics of publishing data  
(Unit: hundred million sheets)

Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Books	261. 3	269. 0	243. 6	232. 1	266. 1	280. 0	282. 3	297. 2	316. 8	360. 5	364. 0	373. 6	391. 4
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
Books	376. 2	406. 1	456. 4	462. 2	465. 6	493. 3	512. 0	486. 5	561. 1	565. 5	604. 7	634. 5	

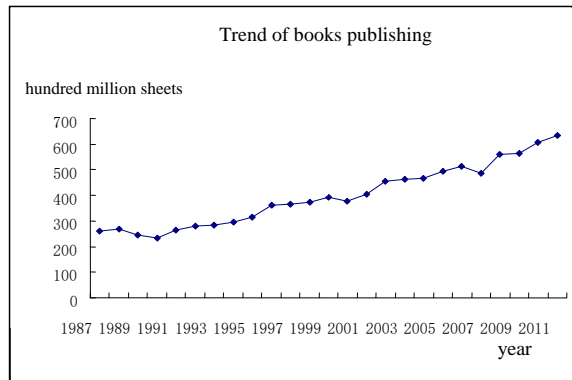


Figure 1 Trend of books publishing

**Brief Introduction of Trend Equation Fitting Method.** Trend equation fitting method is a long-term trend to determine the phenomenon by fitting a time  $t$  as the explanatory variate, the investigated indicators are explanatory variables regression equation. The best advantage is: it can not only determine the time series trend value each period, and the trend of the fitting equation also has extended extrapolation function, you can direct prediction equations based on trends. Long-term trends can be divided into linear and nonlinear trend trends. Trend shape different shapes, the fitting trend equation will have different forms.

Due to the time series by approximately the same amount of growth, the long-term trends can be approximated by a straight line to describe, with linear time series trend, you can use the following form of the linear trend equation to describe

$$\hat{y}_t = a + bt. \quad (1)$$

$\hat{y}_t$  for time-series trends in value;  $t$  for the time (take  $t = 1, 2, \dots, n$ );  $a$  is the intercept of the trend lines and trends to represent  $t = 0$  values (that is, set initial value for long-term trends in time-series),  $b$  is the slope of the trend line,  $t$  represents time, each change  $a$  flat trend changes in the value of average weight.

Method of estimating parameters  $a$ ,  $b$  in the linear trend equation is typically the least square method, the formula with parameters in the linear regression equation formula of the same, that is calculated as

$$\begin{cases} b = \frac{n \sum ty_t - \sum t \sum y_t}{n \sum t^2 - (\sum t)^2} \\ a = \bar{y} - b\bar{t} \end{cases} \quad (2)$$

**Building and Solving in Trend Equation Fitting Method.** We can see from the curve of the printed sheets of books that the annually change of the printed sheets data is like a straight line. So it could be fitted in linear trend equation. Take the  $t = 1, 2, \dots, 25$ , according to Eq. 1, we can calculate the estimated value of the parameter  $a = 190.43$ ,  $b = 16.003$ , which demands a linear trend equation

$$\hat{y}_t = 190.43 + 16.003t. \quad (3)$$

According to Eq. 2, we calculated the estimated value  $\hat{y}_t$  (Table 2) and got the fitting curve graph of the total printed sheets for books publishing (Fig. 2).

Table 2 Trend of total printed sheets for books publishing in year 1987-2011  
(Unit: hundred million sheets)

year	t/time	Observed values	Trend values	Residuals	year	t/time	Observed values	Trend values	Residuals
1987	1	261.247	206.433	54.814	2000	14	376.200	414.472	-38.272
1988	2	269.027	222.436	46.591	2001	15	406.100	430.475	-24.375
1989	3	243.618	238.439	5.179	2002	16	456.400	446.478	9.922
1990	4	232.055	254.442	-22.387	2003	17	462.200	462.481	-0.281
1991	5	266.107	270.445	-4.338	2004	18	465.600	478.484	-12.884
1992	6	280.037	286.448	-6.411	2005	19	493.300	494.487	-1.187
1993	7	282.261	302.451	-20.19	2006	20	512.020	510.490	1.530
1994	8	297.160	318.454	-21.294	2007	21	486.510	526.493	-39.983
1995	9	316.782	334.457	-17.675	2008	22	561.130	542.496	18.634
1996	10	360.451	350.460	9.991	2009	23	565.500	558.499	7.001
1997	11	364.002	366.463	-2.461	2010	24	604.740	574.502	30.238
1998	12	373.617	382.466	-8.849	2011	25	634.500	590.505	43.995
1999	13	391.353	398.469	-7.116					

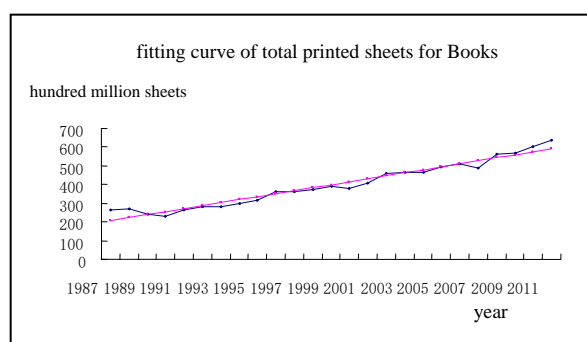


Figure 2 Fitting curve of total printed sheets for books publishing

**Prediction of Books Publishing.** According to the comparison of values based on actual data and trend value, we tested the trend formula, and it fits the growth. Seen from the fitting function, with the growth over time, the total number of published copies of books increased year by year and it's in linear relationship with time. On one hand, from the micro-economic point of view, goods are divided into essential goods and exceeding necessities. As its name implies, the former is indispensable to maintaining daily life, such as clothing, food, shelter and so on; the latter is relatively dispensable in everyday life, such as reading, traveling, listening to music, and so on. Books as exceeding necessities, with the growth of the national economy and people's income, consumption levels are rising, the consumption of books every year is in an increasing trend. Moreover, with the advent of globalization, our country applied "bringing in and going out" policy, introduced a number of foreign-language books in recent years, and then translated and published, liked by the majority of people, resulting in the increasing of the published books.

Based on Eq. 2, we can predict from 2012 to 2016 (late 12th 5-year and early 13th 5-year) for the next five years, the total number of published books, as shown in Table 3. Which actual data in 2012 is 66.699 billion copies, compared with the forecast data, the difference is very small, only 9.06%. This indicates that the predicted data of this model is accurate.

Table 3 The predicted data of books publishing from 2012 to 2016

(Unit: hundred million sheets)

Year	2012	2013	2014	2015	2016
Sheets of published books (hundred million)	606.508	622.511	638.514	654.517	670.52

## Summary

Two fast-rising GDP growth phase in China is the earlier 1980s of the 20th century and the middle 90s, the top speed was in 1984 and 1992. The speed of the growth of total printed copies in China reached a top for the first time in 1985, but since 1990 the continuous growth of the total copies stayed in the same direction as the growth of the GDP after the 1990s of the 20th century. This indicates that the development of publications made a certain contribution to China's GDP growth.

For nearly 30 years, China's publishing industry have gradually achieved the transformation from "bringing in" to "going out", and the international competitiveness increases. But with the advent of the information age, China's publishing industry also faces a lot of competition and challenges. From the perspective of the statistical analysis, we analyzed the indicators data of books publishing in 1987-2011, and forecasted the data of books publishing in the late Twelve-Five and early Thirteen-Five for the next five years. I hope to help the future development of the publishing industry.

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