

Research on CPI Reconfiguration in China under Big Data

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Abstract

The arrival of big data era brings opportunities and challenges to CPI compilation. By analyzing the limitations of the original CPI, using Eviews 9 to analyze and compare the OLS of CPI before and after weight adjustment, it is found that there is still room for CPI adjustment. Big data has brought technological breakthroughs. It provides ideas for CPI reconstruction under big data by acquiring e-commerce data through data interaction platform, scanning data and mobile payment. In order to make CPI compilation better serve the national economy and people's livelihood in the era of big data, we should clarify the problems that CPI reconstruction still faces in the era of big data.

Keywords

CPI reconstructing, large data; interactive platform; E-commerce platform.

1. Introduction

With the development of Internet technology, people's life is changing with each passing day[1]. The emergence of e-commerce platform and third-party payment platform has changed the form of consumption. With the progress of the times and the stagnation of economic indicators, the reform of relevant statistical work will become inevitable[2]. Today, the U.S. Bureau of Labor Statistics has begun to use the Internet crawler method to collect information on commodity characteristics; the New Zealand Bureau of Statistics has begun to use the Internet capture data to study the compilation of price indices, so as far as China is concerned, it is also imperative to construct CPI indices that conform to the development of the times[3].

2. Defects of CPI Compilation at Present

2.1. Introduction of CPI Index in China

There are eight categories of CPI in China, namely food, tobacco, alcohol, clothing, daily necessities, medical care, transportation, communication, entertainment, education, habitancy and other supplies.

Table 1. Weight adjustment table of China's CPI in February 2016

Original two points	Original eight main categories	New eight main categories	New two points
Food	Food	Food and tobacco	Food
Non food	Tobacco and alcohol		Clothing
	Clothing	Articles for daily use	
	Family equipment	Medical care	
	Medical care	Traffic communication	
	Traffic communication	Entertainment and Education	
	Entertainment and Education	Habitancy	
	Habitancy	Other supplies.	

CPI data acquisition adopts sampling survey method, and directly dispatches people to survey at fixed survey sites to collect raw data. Because residents' consumption preferences are constantly changing eastward and their living standards are constantly improving, the weights will be adjusted. Generally speaking, China revises the weights every two years.

3. Insufficiency of China's CPI Index

According to the data released by the National Bureau of Statistics, China's CPI index has been at a low level of almost no more than 3% from 2008 to 2017. With CPI greater than 3% as a measure of inflation, China's price level is generally stable and sometimes has a downward trend.

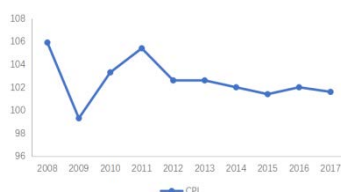


Figure 1. Changes in China's CPI index from 2008 to 2017

In order to make the data more representative, this paper chooses the disposable income per capita from 2013 to 2017. From the following table, it can be seen that the per capita disposable income of residents in China is increasing from 2013 to 2017, and the increase is higher than that of CPI, which corresponds to the CPI index which has been hovering at a low level. Therefore, China's rising prices should not be prominent. However, according to a national survey reported by China Youth Daily, 90.9% of the residents feel deeply about the rising prices of food such as grain, oil, meat and eggs, and 78% of the residents say that the rising prices of food have an impact on their daily lives. From the impact of the food price rise, which accounts for the largest weight of CPI, on the residents, the increase in China's price level is not as gentle as the CPI index shows. The official CPI data are far from the actual situation, so it seems that there are some limitations in the way of CPI index accounting in China.

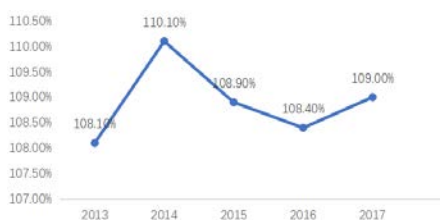


Figure 2. Growth of national per capita disposable income in 2013-2017

4. Current CPI Reconstruction based on Big Data

From the above five limitations of China's CPI, we can see that problems such as low-level price aggregation without weighted average, service product data collection is difficult, and multi-level CPI compilation can be solved directly by using large data collection and processing technology. The problem of sample representativeness caused by fixed base period products, the limitation of Laspeyres price index in application, and the problem of unreasonable weight can also be indirectly improved by the universality and timeliness of large data.

4.1. Expanding and Optimizing CPI Sources by using Data Sources and Enhancing Timeliness

(1) Online Data Acquisition

The Statistical Report on the Development of Internet in China shows that the number of Chinese netizens reached 829 million in 2018, the number of new netizens increased to 56.53 million, and the penetration rate of Internet reached 59.6%, up 3.8% from 2017. With the increasing popularity of the Internet in China and the development and perfection of e-commerce platform, logistics and online payment technology, more and more people choose online shopping, online financial products, online hotel booking, airline tickets and other activities. The impact of online consumption on residents' lives has become an indispensable part of CPI.

A large number of online transactions leave a large amount of data in the major e-commerce platforms, including product prices, models, trading time, and the location of the buyer and other specific details. Incorporating the data of e-commerce platform into CPI compilation will play an important role in improving CPI. Considering the validity of data, there are the following conditions in choosing e-commerce platform:

- (1) Large-scale e-commerce platform with high popularity.
- (2) The quality of products is guaranteed to a certain extent, and it is a power supplier who can supply authentic products and provide electronic invoices.
- (3) For the data of e-commerce platform based on special sale and group purchase, it is not suitable to adopt. For example, the products of Jumei Goods and Pingduoduo e-commerce platforms are mostly out-of-season products, which are not representative.

Considering the above three points, several large e-commerce platforms are available, such as Tianmao, Jingdong, Suning Easy-to-buy, Mei Tuan, Ctrip, where to go, shells and drip trips. It covers everything from living services to food, clothing, shelter and transportation.

However, because online transaction data are scattered in various e-commerce platforms, it is difficult for the National Bureau of Statistics to collect data, and the transaction data belongs to trade secrets for the e-commerce platforms and their businesses, so how to obtain transaction data becomes a big problem. In this regard, the following measures are taken to collect online transaction data in time.

Establishment of Data Sharing and Interaction Platform under Government Guidance.

Platform managers are government departments, platform users and data providers are e-commerce platforms[17]. Each e-commerce platform provides its corresponding transaction data, which is processed by government departments. Because of the huge amount of data, keywords can be used to construct CPI comprehensive search index in data processing. The representative names of commodities or services are selected according to the classification of commodities in the CPI survey conducted by the National Bureau of Statistics. Current CPI survey catalogue defines eight categories and 262 basic sub-categories according to the consumption structure and consumption habits of urban and rural residents in China, and then determines the selection of keywords according to their size classification. Through keyword search, the interference items in the data are eliminated.

(2) Offline Data Acquisition

Scan data

After entering the era of big data, offline data acquisition should be changed from the original manual Market Research to scanning data as the main method of data collection. Scanning data is the detailed product information obtained by the electronic sales terminal equipment of the retailer by scanning the barcode of each product, including the price, quantity and characteristics of the product. Compared with the original manual data survey, the scanned

data has the advantages of objectivity, high efficiency, low cost and comprehensive. In addition, the timeliness of scanning data solves the problem of collecting new product prices. But the scanned data is also scattered among the retail supermarkets, which is difficult to centralize. And there are many problems in the application of scanned data into CPI.

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