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Inflation in China, 1953-1978

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ABSTRACT

This paper reconstructs annual inflation figures for China, for the period 1953–1978, where inflation concerns the Consumer Price Index (CPI). One alternative index and two new models are considered. The models associate CPI based inflation with the GDP inflator and with retail prices, for the years after 1978. A combination of the three 'forecasts' is taken as the reconstructed series. This new inflation series has proper face value and can be used for macroeconomic data analysis in China.

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Introduction and motivation

Usually, forecasts are about the future, but in this paper they are about the past, the past of the national economy of China. Consumer Price Index (CPI) based inflation data are available since 1979 until now, but no reliable data are available for the period 1953 to 1978. Figure 1 presents the CPI inflation rates that are currently available.

Before 1953, inflation in China was high and very volatile, and difficult to compare with today's figures. And, again before 1953, due to civil war and much economic and governmental mishap, economic data for China are difficult to obtain. There are of course interesting studies, like Burdekin (2000) and Campbell and Tullock (1954) that provide estimates of inflation figures in these periods, but it seems difficult to align these with more recent data, in terms of definition and measurement.

A lucid discussion of Chinese Statistics is presented in Chow (1986). He writes (ibid, page 191)

'(…) One important aspect of modernization is the change in the collection, use, and dissemination of statistics. Chinese economics statistics were guarded as secrets for two decades up to the end of the 1970s. The sudden release of many official statistics in 1980 was as surprising to an informed observer as some of aforementioned changes.'

The data on CPI based inflation that were released in those years and in the nineties, are presented in Figure 1. We see that for the overlapping years, that is, 1979–1990, the differences between the 'old' official inflation rates and the currently available inflation rates can be substantial. For example, for 1981 the official quote was 9.1, while today we would have to rely on the quote 2.5. Also, for 1982, the 'old' official quote was −4.6, while currently we must believe it is 2.0.

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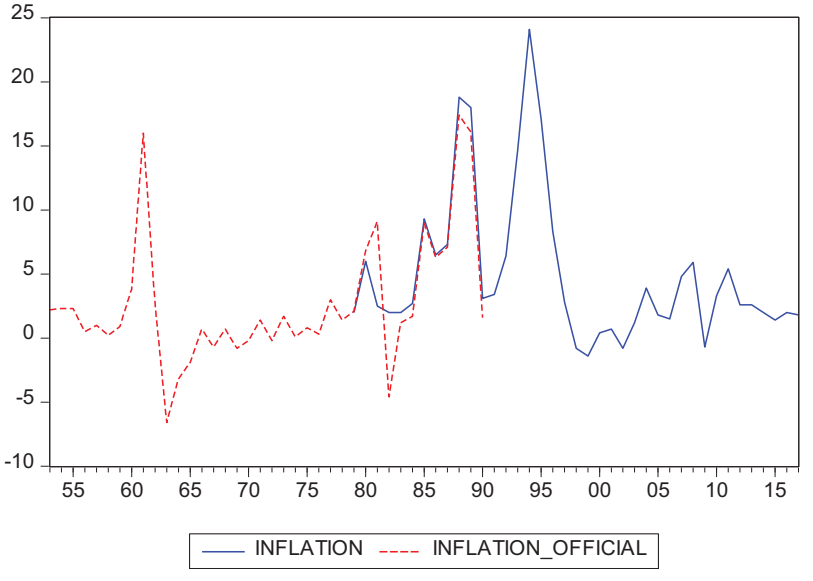

Figure 1. INFLATION refers to currently (August 2018) available CPI inflation rates, 1979–2017. The source for 1981–2017 is https://knoema.com/atlas/China/Inflation-rate. The source for 1979 and 1980 is Burdekin (2000, Table I, page 224). INFLATION_OFFICIAL refers to CPI based inflation figures as published by the National Bureau of Statistics in China, 1953–1990. Source: Imai (1994), Table I on page 134, the column with header CPI_i.

These large differences provide the motivation for the present paper. In this study, I will construct two new sets of (estimated) quotes, and also take aboard the alternative quotes reported in Imai (1994). For the two new sets, I use two different models to independently provide 'forecasts' for CPI based inflation for the period 1953 to 1978. The first forecast draws upon Gross domestic Product (GDP) series. The World Bank provides data on nominal and real GDP growth for the sample 1952 to 2016. This allows for the possibility to construct a GDP inflator, which in itself apparently cannot be found on the internet. With CPI based inflation rates available since 1979, I can connect these observations with the GDP deflator in a simple regression model. The model parameter estimates allow to predict the CPI inflation data for the years 1953 to 1978. The second forecast draws upon the retail prices data as published in Chow and Wang (2010).

Together the two models give two sets of 'forecasts' for CPI based inflation for the period 1953 to 1978. Next, a linear combination is taken of these two forecasts and the quotes of Imai (1994), as it is well known that combined forecasts do well in practice, see Clemen (1989), Timmermann (2006), and many others. The newly constructed CPI based inflation series has face value, in particular relative to historical events such as the Great Leap Forward. It is thus hoped that the reconstructed data will be used in further research on macroeconomic data of China.

This paper proceeds as follows. The next section provides the empirical models. The subsequent section presents the results and the final newly constructed data series. The last section concludes.

Two models and one set of alternative quotes

This section presents three alternative quotes for CPI based inflation for the period 1953 to 1978. The first quotes are presented in Imai (1994), and the next two methods are all based on linking observable inflation form 1979–2017 with variables that are also observable in the first period. Extrapolation is then used to create the forecasts of the past.

Imai (1994)

The first alternative quotes can be obtained from Imai (1994, Table I, page 134, under the header CPI_k). These alternative quotes are based on the unit price-based index. The data appear in Figure 2, together with the officially published data. Inflation is computed as

$$Inflation_t = 100 * \log \frac{Price\ Index_t}{Price\ Index_{t-1}}$$

There are two periods with remarkable differences between the two series in Figure 2. For 1960 the quotes are −0.6 (Imai) and 3.8, respectively. For 1961 the differences are even larger, 8.4 and 16, respectively, that is, the 'old' officially published figure is twice as large as the Imai quote. A contrasting pattern occurs for 1992, where Imai quotes 11 and the official inflation rate is 2.7. The first two years, 1960 and 1961, correspond with a period that is usually called 'The Great Leap Forward.' One could then expect high inflation rates indeed. Whether the slowdown in inflation happened right after that period, that is, in 1962, is open to discussion. For sure, the differences in inflation for 1963 are remarkable, that is, 2.3 for Imai and −6.6 for the official statistics.

The second period with remarkable differences is 1980–1982. For these three years in a row, the Imai quotes are the modest rates of 0.8, 3.7 and 1.1, while the official statistics

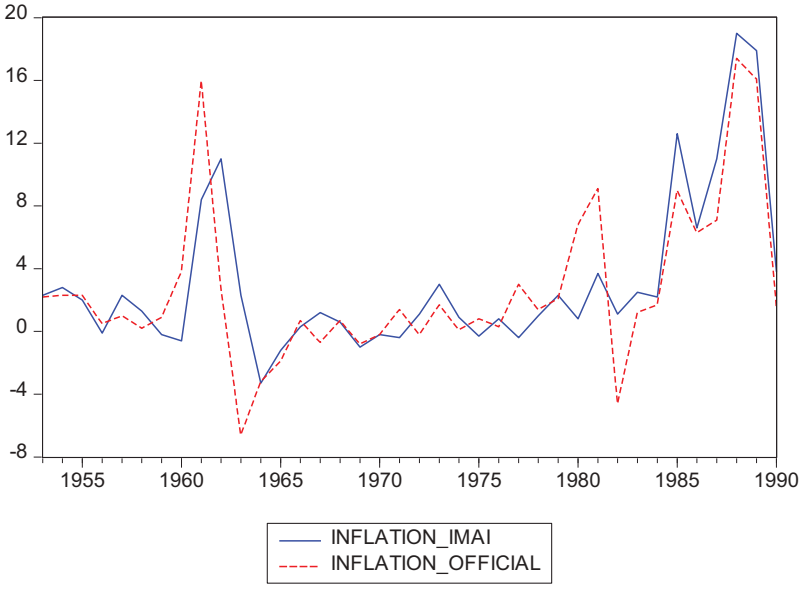

Figure 2. The officially published CPI inflation rates (as available in 1994), and the new estimates of Imai (1994) relying on the unit price-based index.

are 6.8, 9.1 and −4.6. Interestingly, the Imai (1994) quotes are much closer to those available now (as in Figure 1), which suggests some additional validity of these quotes.

CPI inflation and GDP deflator

Figure 3 displays the differences between Nominal Gross Domestic Product (GDP) growth and Real GDP growth. These differences constitute the GDP deflator. These data are available for 1953 to 2017.

Figure 4 presents the GDP deflator with the currently available CPI inflation rate series (1979–2017), and it is clear that the GDP deflator is much more moderate in the extremes, and that there are less peak values. This holds in particular for the period halfway the nineteen eighties.

A regression of inflation on the annual GDP deflator, with the inclusion of a first order autoregressive term, gives for the effective sample 1980–2017 the estimation results:

$$Inflation_t = -0.065 + 1.168\, GDP\, Deflator_t + u_t$$

$$u_t = 0.458 u_{t-1} + \varepsilon_t$$

with HAC standard errors 0.898, 0.119, and 0.152, respectively. The R^2 is 0.842. With this equation we can predict the inflation rates for 1953 to 1978, where the autoregressive error term is disregarded to make sure that the predicted values also have autocorrelation. The thus obtained forecasts are presented in Figure 5, together with the 'old' officially published CPI inflation rates of Figure 1. The forecasts seem to associate

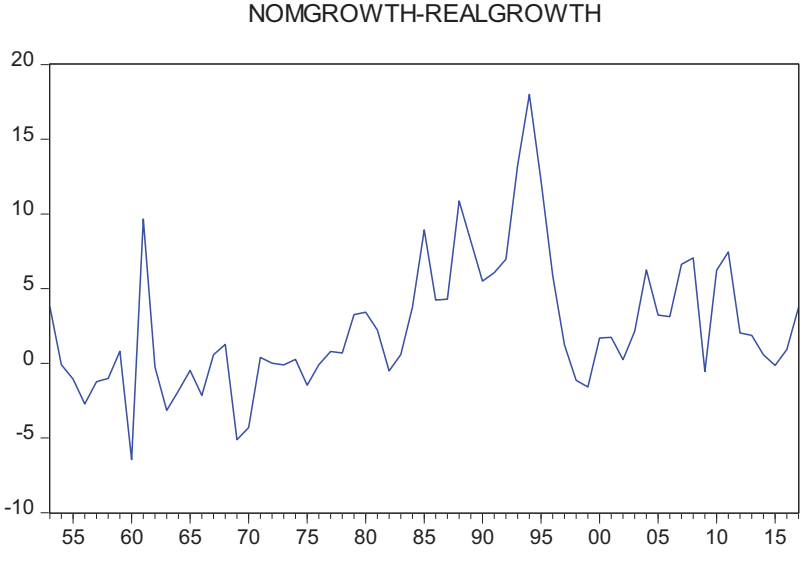

Figure 3. Nominal GDP growth minus Real GDP growth, 1953–2017. Source: https://en.m.wikipedia.org/wiki/Historical_GDP_of_China.

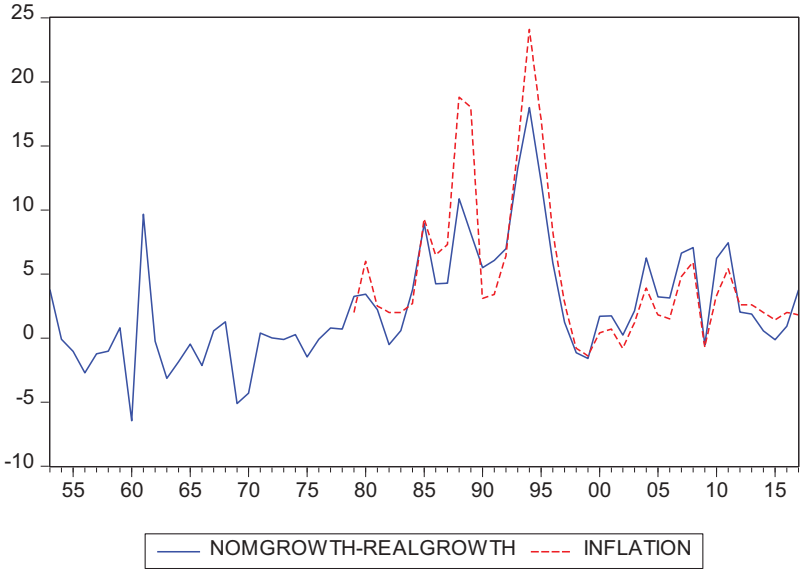

Figure 4. GDP deflator and CPI based inflation rate (currently available).

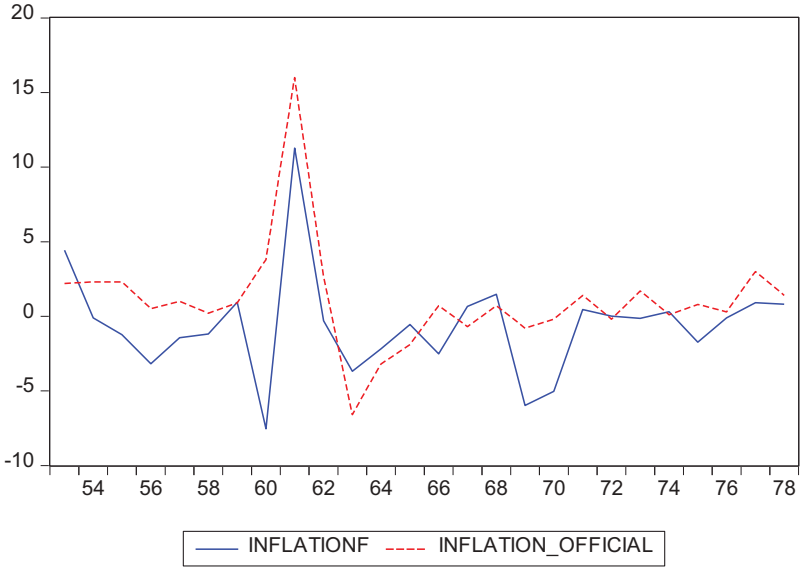

Figure 5. Forecasted CPI based inflation rates using the model including the GDP deflator, 1953–1978.

reasonably well with the official data, although there are also some remarkable differences, particularly in 1960 and 1961 and for 1969 and 1970, where the latter two years are in the midst of the Cultural Revolution.

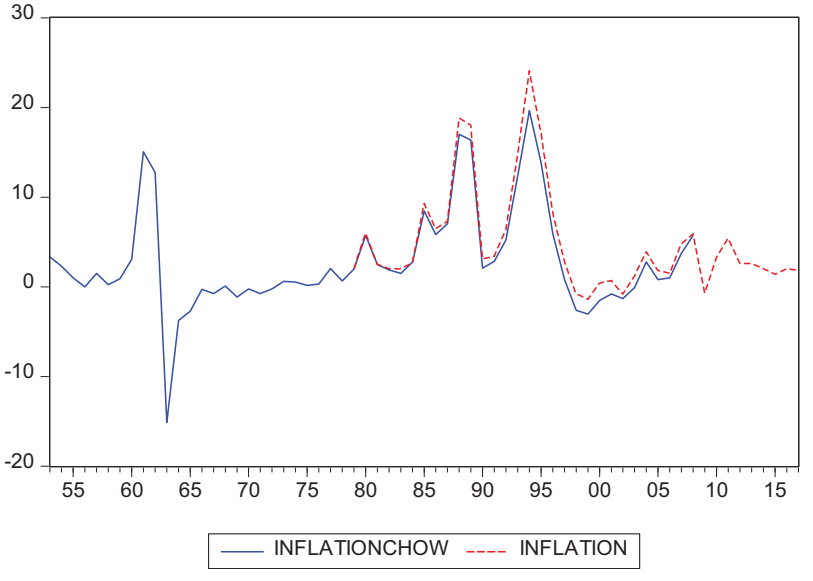

Figure 6. The retail prices based inflation (1953–2008) and the CPI based inflation. Source: Chow and Wang (2010, page 29, Table 1).

Table 1. Newly constructed CPI based inflation rates (created in 2018) versus the officially published quotes (in 1994) for 1953–1978.

Year	New	Officially published
1953	3.5	2.2
1954	1.8	2.3
1955	0.6	2.3
1956	−1.1	0.5
1957	0.8	1.0
1958	0.1	0.2
1959	0.6	0.9
1960	−1.6	3.8
1961	12.1	16.0
1962	8.3	2.7
1963	−6.1	−6.6
1964	−3.2	−3.2
1965	−1.6	−1.9
1966	−0.8	0.7
1967	0.3	−0.7
1968	0.7	0.7
1969	−2.7	−0.8
1970	−1.8	−0.2
1971	−0.3	1.4
1972	0.3	−0.2
1973	1.2	1.7
1974	0.6	0.1
1975	−0.6	0.8
1976	0.3	0.3
1977	0.9	3.0
1978	0.8	1.4

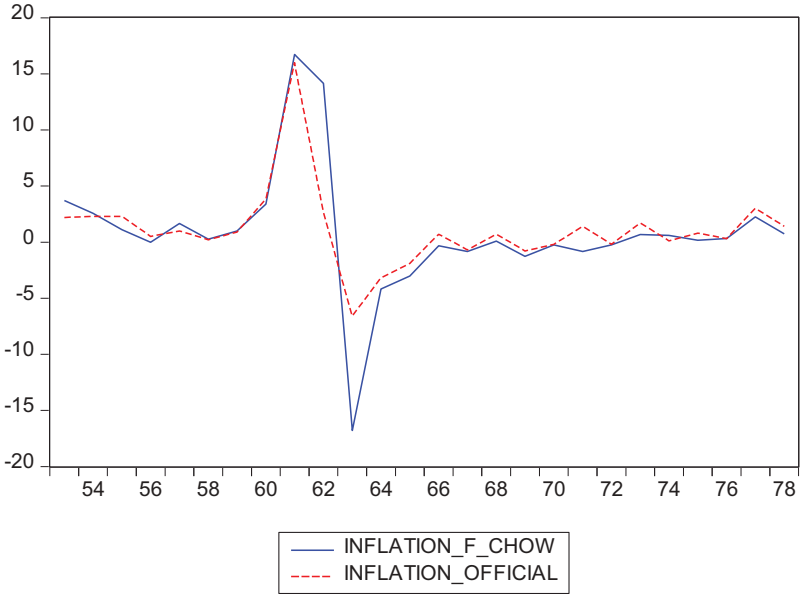

Figure 7. Forecasted CPI based inflation rates using the model including Retail Prices inflation, 1953–1978.

CPI inflation and retail prices

Chow and Wang (2010) consider consumer products prices, but then observed by the retail sector. Figure 6 presents the inflation rates based on the retail prices with the currently available CPI inflation rate series (1979–2017), and it is clear that the match for the sample 1979–2017 is quite accurate. For the period after 1990, retail prices based inflation is always larger than CPI inflation.

Considering the same type of model as for the GDP deflator, the estimation results are

$$Inflation_t = 0.670 + 1.111\, Inflation\, Retail\, Prices_t + u_t$$

$$u_t = 0.826 u_{t-1} + \varepsilon_t$$

with HAC standard errors 0.592, 0.024, and 0.120, respectively. The R^2 is 0.994.

Also from this model we can predict the inflation rates for 1953 to 1978. The thus obtained forecasts are presented in Figure 7, together with the officially published CPI inflation rates of Figure 1. For 1962 to 1964, Figure 7 shows remarkable differences across the two series. The forecasts are 14.2, 16.8 and 4.2, respectively, whereas the officially published quotes were 2.7, −6.6 and −3.2.

Reconstructed CPI based inflation in China

Now we have three alternative quotes for CPI based inflation for 1953 to 1978. Two of the three are based on two highly accurate models. The third quote is based on an alternative products basket, see Imai (1994).

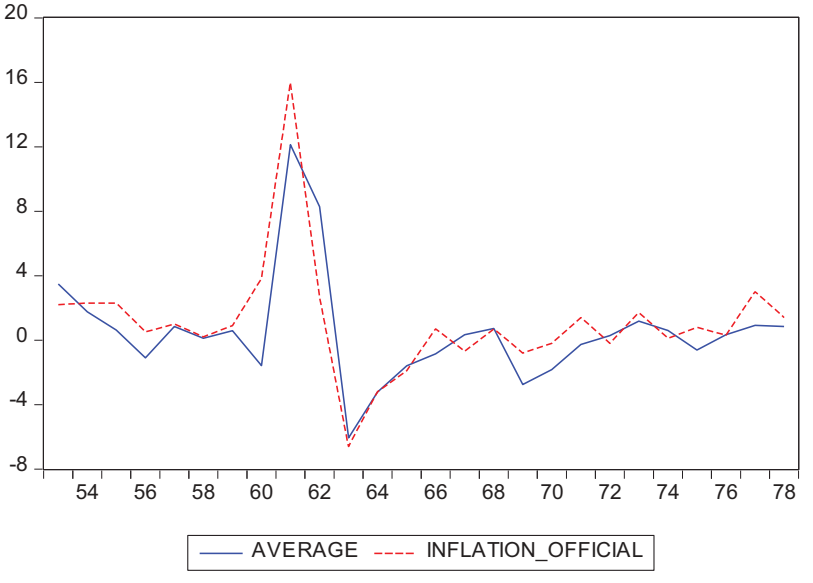

Figure 8. Newly created CPI based inflation series (created in 2018) versus the officially published rates (which were published in 1994).

The simple average of these three quotes gives the numbers in the second column of Table 1, and the graph appears in Figure 8. It is clear that the new CPI based inflation series cuts the raw edges from the 'old' data. The new data seem to have strong face validity, in particular in the period around the Great Leap Forward. Also, the worldwide recession of 1974 and 1975 is now also reflected more in the new data.

The reliability of the new data is amplified by the results in Table 2. If the average of the three available quotes for the years 1979–1990 is compared with the currently available ones and the 'old' official quotes, we see that the average is very close to the

Table 2. Newly constructed CPI based inflation rates using the average of three quotes versus the 'old' officially published quotes (in 1994) for 1979–1990.

Year	Old quotes	Current quotes	Average
1979	2.1	2.0	2.6
1980	6.8	6.0	3.4
1981	9.1	2.5	2.9
1982	−4.6	2.0	1.7
1983	1.2	2.0	2.0
1984	1.7	2.7	2.6
1985	9.0	9.3	10.1
1986	6.3	6.5	6.3
1987	7.1	7.3	8.4
1988	17.4	18.8	18.3
1989	16.1	18.0	17.4
1990	1.6	3.1	3.0

currently available data. In particular, the exceptional 'old' values in 1981 and 1982 are not present in the average.

Conclusion

This paper presented new quotes for CPI based inflation rates for the period 1953 to 1978. Official quotes (1994) do exist but may be viewed as unreliable. Using three sets of alternative quotes and taking the average of these, resulted in a newly created CPI based inflation rate.

The methods in this paper might also usefully be implemented for other countries where there is a lack of data in certain periods, think of North Korea, Vietnam and various African countries. Further research is needed.

Disclosure statement

No potential conflict of interest was reported by the author.

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