Will China Have Serious Inflation?

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There has been much concern about inflation in China recently. The People's Bank in the last few months has raised the reserve requirement several times to control the money supply to slow down inflation. In 1985 when I was organizing a summer workshop on macroeconomics in cooperation with the Ministry of Education, Premier Zhao Ziyang asked me to forecast inflation in 1985-1986 because in 1984 the supply of money in the form of currency in circulation increased by 50 percent. I estimated an equation using data from 1952 to 1984 to explain inflation and used the equation to project forward to forecast an inflation rate for 1985 of no more than 9 percent which turned out to be correct. This equation was published in Chow (1987, equation 18) and updated using data up to 2004 in Chow (2007, pp. 34-5).

Most recently I have updated this equation using data from 1952 to 2009 and found that the same equation fits the data for the entire period. Furthermore I have divided the data into two periods, data up to 1978 when economic reform started and data after 1979. I apply a Chow test to find out whether the coefficients of the regression equation changed in the two periods and found that the data strongly support the assumption that there was no change in these coefficients. Readers may be surprised by this result because in the first period China had a planned economy. The fact is that even in this period inflation followed the same economic law.

This equation is based on the quantity theory of money $Mv=PY$, where M is money supply, P is a price index and Y is real output. PY is GDP in money terms and Y is GDP in real terms. Based on this equation the most important variable to explain P is M/Y. Note that in 1961 there was over 16 percent inflation according to Chinese official data mainly because of the big reduction in Y by 30 percent as a result of the economic collapse of the Great Leap Forward Movement which began in 1958. I have plotted the data of log P against log(M/Y) for the entire period from 1952 to 2009 and found they fall fairly close to a straight line. This shows that the most important variable to explain

logP is indeed log(M/Y). Furthermore the deviations of the values of P from the above straight line show when inflation is above or below normal. If the deviation is positive or the actual value of logP is above the line in the above diagram, P in that year is above normal and there is a tendency for P to return to normal in the following year.

Inflation is the rate of change in P, or the change in log P. It is explained by three variables: the rate of change in (M/Y), inflation of the last year because of inertia, and the deviation in the previous year of logP from the line as explained in the last paragraph. The coefficients of the three variables are respectively 0.149, 0.525 and -0.156 if data from 1952 to 2009 are used to estimate the equation. Here P is the retail price index and M is M2. The average error of this equation in explaining past inflation is 3.4 percent.

In more technical terms, the model used to forecast inflation in 2010 is an Error Correction Model (ECM) estimated as follows:

In the first stage, I have estimated

$\log(P_t) = -0.698\ (0.0277) + 0.367\ (0.0080)\ \log(M2_t/Y_t) + u_t$

R-square = 0.974; S.E. of regression = 0.095

The number in parentheses after each coefficient is its standard error.

The result is plotted in Figure 1 below.

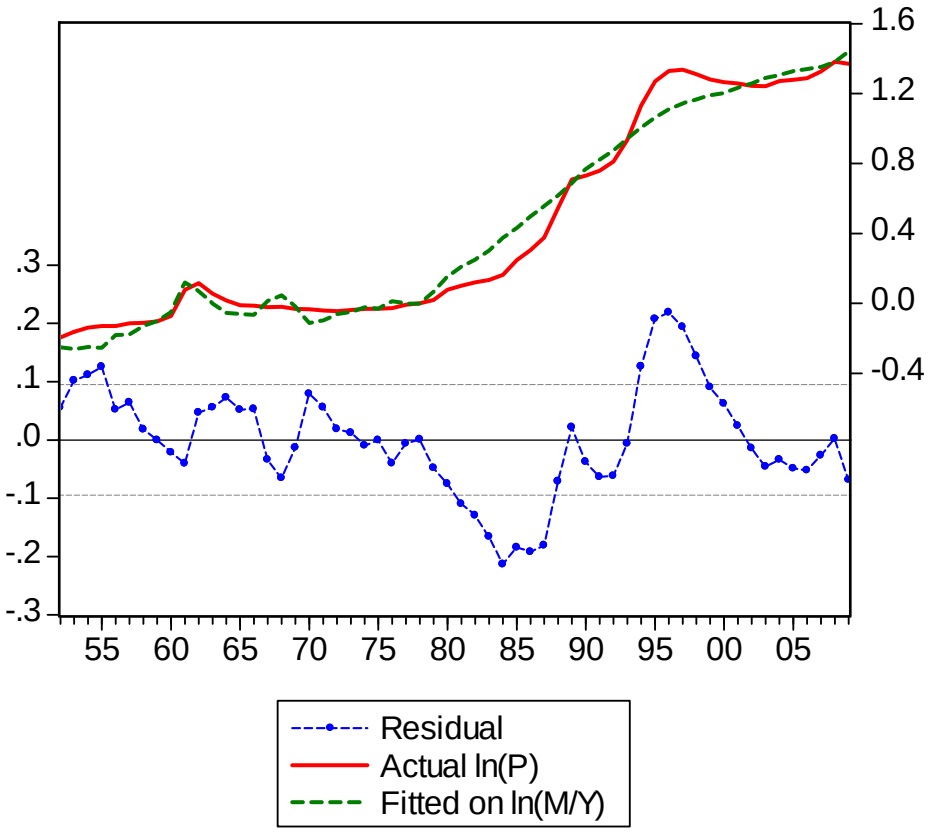

Figure 1.

Let u_t=log(P_t)-log(P_t*) be the estimated deviation of the log P from the above equation. I then regress Δlog(P_t) on dlog($M2_t/Y_t$), dlog(P_{t-1}), and u_{t-1} where dlog(X_t) is defined as log(X_t)-log(X_{t-1}), following the regression of Chow (1987).

$$\text{dlog}(P_t) = 0.0002\ (0.0057) + 0.149\ (0.0407)\ \text{dlog}(M2_t/Y_t) + 0.525(0.0899)\ \text{dlog}(P_{t-1}) - 0.156\ (0.0485)\ u_{t-1}$$

R-square = 0.624; S.E. of regression = 0.034

The data on inflation and its predicted value are shown in Figure 2.

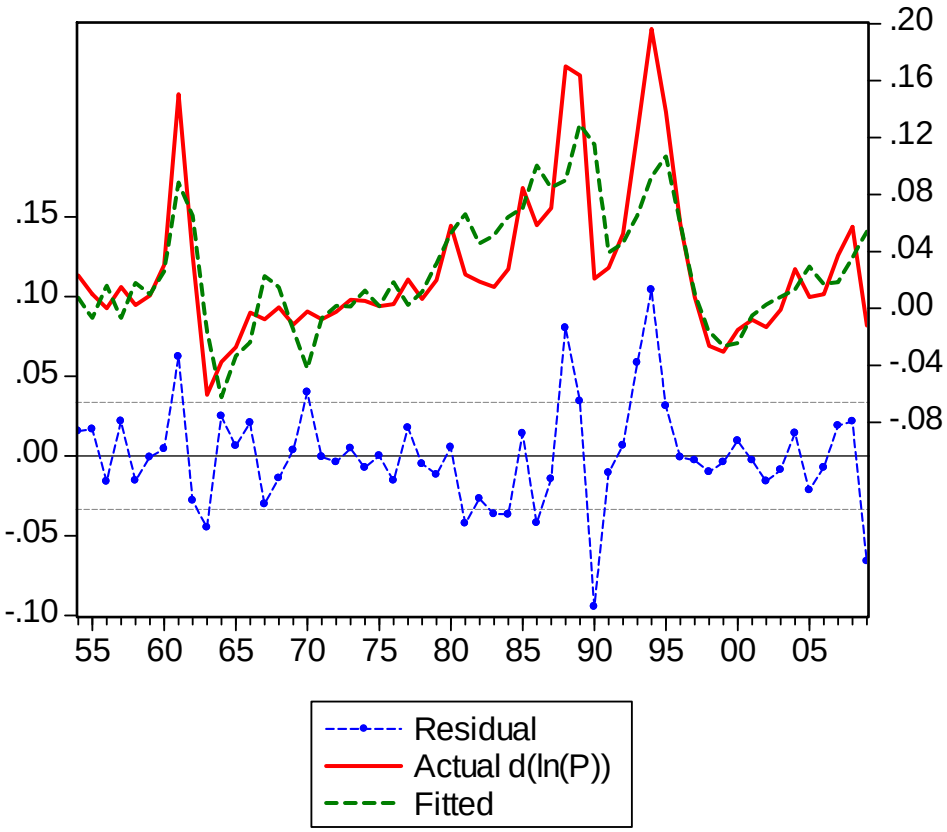

Figure 2.

The following reports the result of the Chow test for parameter stability using t=1979 as the break point. The result provides extremely strong support for parameter stability of this equation.

Chow Breakpoint Test: 1979

F-statistic	0.938525	Probability	0.449788
Log likelihood ratio	4.216950	Probability	0.377440

The last estimated equation can be used to estimate inflation for 2010 if we assume a range of values for the rate of change of (M/Y) since the value of inflation in 2009 and the deviation of logP from the line for 2009 are known. The range of the six rates of change of (M2/Y) from 2003 to 2008 are between 3.27 % and 8.68% and the rate of

change in 2009 is 17.4 percent. The following table gives the prediction of inflation for different reasonable values of the rate of change of (M2/Y).

△ log(M2/gdp)	3.00%	6.00%	9.00%	12.00%	15.00%	18.00%
△ log(p)	0.91%	1.35%	1.80%	2.25%	2.69%	3.14%

Since the rate of increase in (M2/Y) in 2009 was an outlier it is reasonable to predict from the above table that the rate of inflation itself would range from 0.91% to 2.69 percent as measured by the increase in the general retail price index. The rate of inflation for 2010 will be moderate mainly because of the inertia imbedded in the inflation process as given by our equation to explain inflation. This is the same reason why in 1985 inflation was no more than 9 percent when money supply increased by 50 percent in 1984. Before 1984 inflation rates in China was small. However, if M/Y is to keep on increasing fairly rapidly for several years from now, more serious inflation will result, just as continued rapid increases in M during the years 1985 to 1988 caused the serious inflation in 1989. The People's Bank is correct in tightening the supply of money now. The effort to restrict the increase of M/Y needs to be continued to maintain price stability in China.

The 17.4 percent increase in the ratio (M2/Y) in 2009 is partly the result of large export surpluses in recent years leading to large inflows of foreign exchange which were converted to RMB beyond the control of the People's Bank. I have recommended using substantial amounts of China's foreign reserves to the project of developing Western China. This would increase the supply of foreign exchange and lower its price relative to the RMB. The natural increase in the value of RMB should be permitted to occur, and the pressure from a large export to increase the supply of money in China will be eased and price stability can be maintained.

Table 1: Price Level and its Determinants (1952 – 2009)

Year	Index of retail price (P)	M2	Real GDP index (Y)

1952	0.8227	74.50314	22
1953	0.8506	82.00875	25.1
1954	0.8705	90.20963	26.6
1955	0.8793	94.85521	28.3
1956	0.8793	132.3043	32.3
1957	0.8926	139.0515	33.7
1958	0.8947	194.0242	41.2
1959	0.9028	226.401	44.6
1960	0.9308	256.6131	43.9
1961	1.082	286.1142	30.9
1962	1.1229	233.48	28.9
1963	1.0567	214.0444	32
1964	1.0177	214.5185	37.2
1965	0.9904	246.5319	43.5
1966	0.9875	285.2925	50.9
1967	0.9801	309.5001	44.5
1968	0.9809	335.6512	44.2
1969	0.9698	336.8679	52.7
1970	0.9676	320.8612	65
1971	0.9603	357.9469	69.5
1972	0.9581	404.8609	71.5
1973	0.9639	454.3348	77.5
1974	0.9691	494.3595	78.3
1975	0.9706	525.0772	84.9
1976	0.9735	573.4608	82.6
1977	0.9934	595.6617	89
1978	1	668.1896	100
1979	1.02	867.0332	107.6
1980	1.081	1178.303	116
1981	1.107	1453.783	122.1
1982	1.128	1761.087	133.1
1983	1.145	2247.387	147.6
1984	1.177	3171.021	170
1985	1.281	4188.024	192.9
1986	1.358	5460.866	210
1987	1.457	7154.482	234.3
1988	1.727	9378.91	260.7
1989	2.034	11836.63	271.3
1990	2.077	15293.4	281.7
1991	2.137	19349.9	307.6
1992	2.252	25402.2	351.4
1993	2.549	34879.8	400.4
1994	3.102	46923.5	452.8

1995	3.561	60750.5	502.3
1996	3.778	76094.9	552.6
1997	3.808	90995.3	603.9
1998	3.709	104498.5	651.2
1999	3.598	119897.9	700.9
2000	3.544	134610.3	759.9
2001	3.516	158301.9	823
2002	3.47	185007	897.8
2003	3.467	221222.8	987.8
2004	3.564	254107	1087.4
2005	3.593	298755.7	1200.8
2006	3.629	345603.6	1340.7
2007	3.767	403442.2	1515.5
2008	3.989	475166.6	1651.2
2009	3.940	606224	1794.9

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