# Policy Reform, Market Stability, and Food Security

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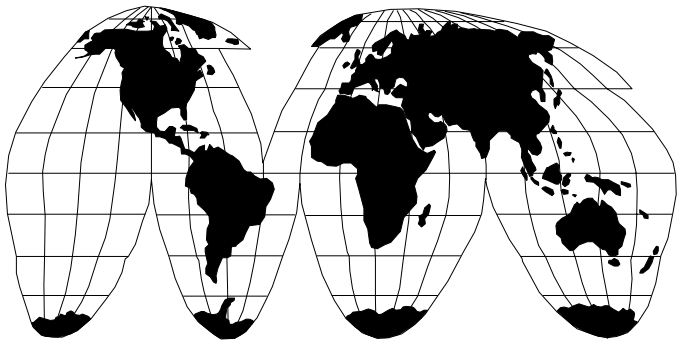

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# On Reform, Food Prices and Poverty in India

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There are understandable concerns about the effects on India's poor of higher food prices stemming from recent or proposed policy reforms. Over 24 rounds of the National Sample Survey, spanning 1959-94, one finds a strong positive correlation between the relative price of food and India's poverty rate. This article questions how reform critics have interpreted this correlation. It is not an income-distribution effect. Rather it appears to be due to covariate fluctuations between average consumption and food prices due to other variables, including food supply; bad agricultural years simultaneously lower rural living standards and increase food prices. The correlation is uninformative about the welfare effect of a sustained increase in the relative price of food.

Advocates of liberalizing economic reforms often argue that there will be net gains to the poor from the higher relative prices of agricultural goods, including food, consequent to devaluation, the removal of restrictions on external trade, and cuts to subsidies on agricultural inputs. It is argued that higher relative prices of agricultural goods will benefit the rural sector, where poverty tends to be concentrated in most developing countries, including India.[1] The extent of the gains will depend on a number of contingencies, including the distribution of land, and access to credit and infrastructure. But gains are normally expected.

However look at Figure 1, which plots survey-based estimates of India's national poverty rate (percent below the poverty line, on the vertical axis) against an index of the relative price of food over the period 1958-94. (I describe the data later). The correlation coefficient is 0.76, and it is highly significant.[2] Advocates of reforms which would entail higher relative prices of food in India must surely be disturbed by Figure 1. There has been strong resistance to liberalizing Indian agriculture, and there has been little progress relative to other countries in the region (Ahmed 1996). A fear of adverse effects on living standards has been one factor in resistance to reform in agriculture, and critics of reform have pointed to evidence similar to Figure 1 to support their case. For example, Abhijit Sen (1996) includes the relative price of cereals in a regression equation of the proportion of the rural population living below the poverty line, and finds a highly significant (positive) coefficient. From this he argues the supposedly pro-poor shifts in the terms of trade in favor of agriculture following reform will hurt the poor by increasing the relative price of food:

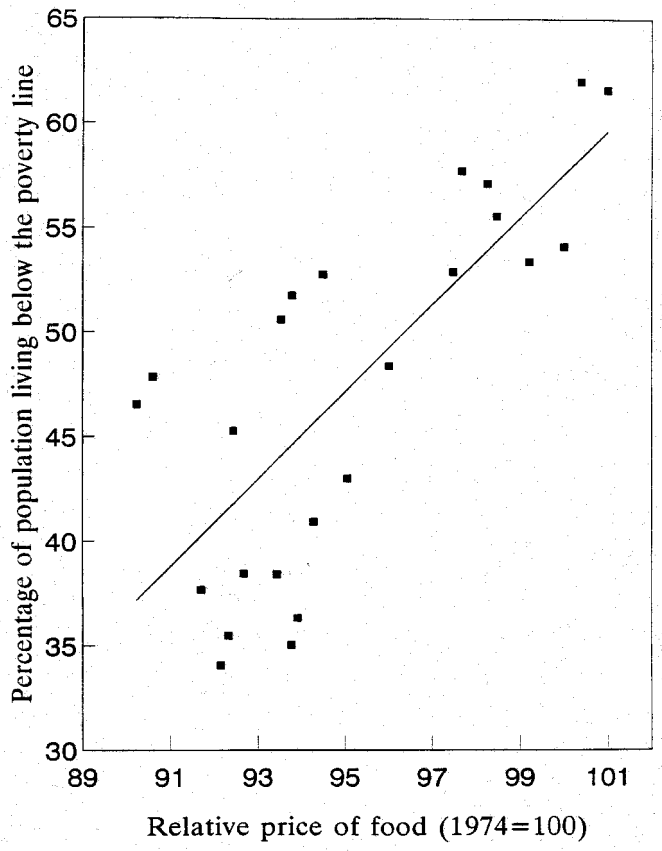
> "..the very mechanism through which agricultural output is expected to increase under structural adjustment involves increasing the price of agricultural goods, notably, food, relative to all other prices in the economy...this essential relative price implication of structural adjustment is permanent by design and so also is its likely

[1] For overviews of the issues on food pricing policy in developing countries see Timmer et al., (1983) and Streeten (1987). For a survey of evidence on poverty, and the links of policy in this context, see Lipton and Ravallion (1995).

[2] The standard t-test of the null hypothesis that the correlation is zero gives a test statistic of 5.6.

adverse impact on poverty...Under these circumstances...it must be recognized that a 'reform' strategy which aims [amongst other things] to liberalize agricultural trade and thus enrich the rich at the direct cost to the poor...is at its root a fundamentally iniquitous adventure" (Sen, 1996, p. 2470 and 2476).

**Figure 1. Poverty and the Price of Food in India, 1958-94**




Does the evidence justify such claims? This article probes into the reasons why India's poverty rate and the price of food are positively correlated. There are a number of possible explanations. Maybe the correlation is driven by the adverse welfare effects of food price changes in urban areas. The Indian food economy was largely closed to external trade over the period. The rural sector as a whole must then produce more food than it consumes, the urban sector being a net consumer. It follows under seemingly weak assumptions that an increase in the relative price of food must benefit the rural sector as a whole.

Figure 1 is based on the national poverty rate (the population-weighted aggregate of urban and rural poverty rates), so effects on urban living standards may well account for some of the correlation. However, there may also be adverse distributional effects within rural areas, as has been

found elsewhere.[3] There has been a long-standing concern in India about adverse impacts on the rural poor of higher food prices.[4] In rural areas of India, it is plausible that the poorest households tend to be net consumers of food, since in most regions they are unlikely to have sufficient land for their own consumption needs. They may benefit as agricultural workers, depending on the dynamics of wage adjustment and income shares from this source (Ravallion, 1991). But it remains that some of the poorest households in rural areas could lose initially from higher food prices, with the initial gains being concentrated amongst the rural non-poor.

It is also possible that the correlation is spurious. The correlation in Figure 1 may well be driven by rather different processes, with little or nothing to do with the arguments that the critics of reform have made on the basis of evidence such as in Figure 1. Covariate fluctuations over time arising from a common third variable, such as domestic food supply or the rate of inflation, could also produce such a correlation.

The rest of this article will try to determine why we observe the correlation in Figure 1. In doing so I will return to some longstanding concerns in the literature on poverty in India. The main points to be made here only require relatively simple statistical methods, though reference will be made to other papers which go into more depth on some points, often requiring more sophisticated methods.[5] While this article focuses on the relationship between food prices and welfare, richer causal models of poverty in India can be found in the recent research that Gaurav Datt and I have done, which I will refer to when relevant.

**Methods and Data**

In principle, there are two approaches one might take to assessing the welfare impacts of a price change. The first, and most common, method relies on analytic results from economic theory. The farm-household is assumed to be able to buy or sell anything it wants (subject to its endowments) at prevailing prices and wages. It can then be readily shown that the welfare gain to a farm household (who both produces and consumes food) from a small increase in the price of food holding all other prices and wages constant is given by the value of the household's excess supply of food (production minus consumption) times the change in price. A cross-sectional survey collecting both consumption and production data can be used to estimate such first-order welfare effects, and locate them within the distribution of some measure of levels of living. This approach infers the change in welfare, rather

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[3] See, for example, Ravallion (1991), for Bangladesh, Ravallion and van de Walle (1991), for Indonesia, and Barrett and Dorosh (1996), for Madagascar.

[4] An important compilation of papers on the topic can be found in Mellor and Desai (1985), building on the work of Dharm Narain. This literature focused on the relationship between rural poverty measures and the nominal level of the consumer price index rather than the relative price of food. For further discussion of the distinction, and also the link with the effects of inflation on poverty see Datt and Ravallion (1997a), where we argue that the relevant variables are the relative price of food and the inflation rate, not the level of the price index as such.

[5] A non-technical summary of results from that research can be found in Ravallion and Datt (1996a). Copies of the papers are available from me, as is the data set.

than measuring it directly, which clearly requires far more data. Needless to say, the inference may be wrong if the assumptions do not hold.

The second approach is more direct, but has been far less popular, probably due to its data requirements. This method looks ex post at how a measure of welfare varies over time or space, and compares this to differences in food prices. If data are ideal (notably a fully comparable and exact welfare metric) then this second method will be preferable, as it requires far fewer assumptions. But data are rarely ideal and assumptions will be needed (which are likely to be of a different nature to those made by the first method). Even then, this second method may at least offer a cross-check on the first.

This investigation relies on the second method, though not losing sight of some insights from the first. I will use the same data set as Datt and Ravallion (1997a) to explore the relationship between India's poverty rate and the relative price of food. This is one of the questions that Datt and Ravallion look into, though in the context of a more fully developed econometric model of the joint determination of various consumption-poverty measures (including measures which are more sensitive to distribution below the poverty line), and focusing more on the relationship with average farm productivity.

The key features of the data are as follows. The measures of poverty and distribution I will use were all estimated on the distribution of total consumption of goods and services from India's National Sample Surveys. This entails 24 observations spanning 1958-94.[6] This is one of the longest time series of reasonably comparable household surveys available (in developed or developing countries). However, it is still only 24 observations, which limits our confidence in assessments of (for example) trends over time, or other time series properties of the data. To add to the difficulty, the observations are unevenly spaced, depending on survey dates; the time between surveys ranges from just under one year to five years.

Consumption is deflated by the Consumer Price Index for Agricultural Laborers (CPIAL).[7] This is a standard fixed-weight price index. (I will return to the problems with such an index.) The poverty line recommended by the Planning Commissions' (1993) Expert Group is used, namely a per capita monthly expenditure of Rs. 49 at 1973-74 all-India rural prices.

The index of the relative price of food was obtained by dividing the food component of the CPIAL by the value of the general index (the same deflator as used for consumption). The relative price index for food was quite stable; using the annual data over the period 1958-94, the coefficient of variation was 2.9%; the largest year-to-year fall was 3.8% while the largest rise was 2.9%. (Non-food prices were more variable; the CV of the implicit relative price index for non-food goods was

[6] The data are described more fully in Datt (1997) and Özler, Datt and Ravallion (1996), and are available on disc. The series of poverty measures are also given in World Bank (1997).

[7] The index has been corrected from the problem that the standard CPIAL ignored increases in firewood prices after 1960-61. See Datt and Ravallion (1977a, Appendix) for details.

8.3%). This stability in the relative price of food probably reflects governmental efforts at food price stabilization, through foodgrain procurement and storage.

These data yield Figure 1. What explains it?

**Is the Correlation Found Solely in Urban Areas?**

One possible explanation can be readily dismissed. Naturally almost all urban households are net consumers of food, since very little food is produced there. However, the relationship in Figure 1 is not being driven by adverse effects of higher food prices on living standards in the urban sector. Indeed, the correlation is even stronger if one focuses solely on rural consumption. The figure for rural areas looks very similar to Figure 1. The correlation coefficient with the rural poverty rate is 0.79.

The rest of this article will focus on this positive correlation between the rural poverty rate and the relative price of food. That, as we shall see, is the real mystery underlying Figure 1.

**Is the Correlation a Distributional Effect Within Rural Areas?**

One might follow Sen (1996) and others and surmise that the correlation is due to adverse distributional effects of higher food prices. However, one must immediately confront the fact that the proportion of people living below the poverty line, the popular "headcount index," will be unaffected by distributional changes below the line; a loss to the poorest, for example, with have no effect on the index. Alas, given the data publicly available, we do not know whether people living at India's poverty line are on average net consumers or net producers of food.[8] Even if one agrees that there may well be adverse distributional effects within rural areas from higher food prices, it is far from obvious that the headcount index of poverty will reflect them.

One can instead calculate "higher-order" measures of poverty which will reflect changes in distribution below the poverty line. I also tested the correlation of food price with the squared poverty gap index.[9] The correlation was 0.67, somewhat lower than for the headcount index, but still highly significant.

However, this still does not directly test for distributional effects; indeed, the squared poverty gap is still (heavily) dependent on the level of mean consumption. (The elasticity of the squared

[8] Standard tabulations from the NSS data give budget shares of total expenditure, but not production data, which is not usually covered in the survey.

[9] This is given by the sample mean of the squared values of the distance below the poverty line expressed as a proportion of the line, where the distance below the line is set to zero for those who are not poor. The measure is due to Foster et al., (1984).

poverty gap to the mean in India is even higher than that of the headcount index; see Ravallion and Datt, 1996b).

To test for distributional effects, a better approach might be to use a measure of inequality. So I tested the correlation of food price with the most widely used measure of overall inequality, namely the well known Gini index.[10] Over the 24 NSS rounds, the Gini index of consumption for rural areas is uncorrelated with the price of food; the correlation coefficient is -0.12 and is not significantly different from zero. Clearly this is not consistent with the view that there is an adverse distributional effect of higher food prices.

Another test is to look at the underlying distributional components of the poverty measures (Datt and Ravallion, 1992). This can be done by setting the poverty line at a constant proportion of the survey mean for each data.[11] Thus the poverty measure is entirely purged of the effect of mean consumption, leaving only the effect of distribution (as embodied in the Lorenz curve).[12] The result can be thought of as a measure of "relative poverty."

One finds a negative correlation between the distributional component of the headcount index and the relative price of food, and it is not significant at the 5% level (nor the 10% level, but it is almost so; the correlation coefficient is -0.34). A better test for pro-poor distributional effects is the correlation with the distribution component of the squared poverty gap; this correlation is virtually zero (a coefficient of 0.09).

So the positive correlation with food price vanishes in measures of relative poverty,[13] consistent with what we have seen happens when one uses the Gini index of overall inequality. These tests cannot be deemed conclusive since the underlying welfare indicator does not embody the substitution effects and differences in budget shares which could be important to a full reckoning of the welfare-distributional effects. The tests (for both inequality and relative poverty) should

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[10] The Gini index takes the value zero when there is perfect equality, and the value one when the richest person consumes everything; my estimate from the NSS data of the Gini index of consumption in rural India in 1993/94 is 0.29.

[11] This is of course equivalent to keeping the real value of the poverty line fixed, but also fixing the means for all dates at a common real value. Datt and Ravallion fix the mean at the average value over all survey rounds, which is equivalent to setting the poverty line at 84% of the current survey mean. For further details on construction of this measure see Datt and Ravallion (1997a).

[12] The measure is essentially the same as that used in Ravallion and Datt (1996a) to decompose changes over time in India's poverty rate into components due to growth in mean consumption versus changes in distribution.

[13] Datt and Ravallion (1997a) test this further, in the context of a structural model of the determination of the poverty measures which also controlled for the effects of changes in the real agricultural wage rate and average farm productivity. They also find that the relative price effect vanishes.

nonetheless pick up any adverse distributional effects amongst the rural poor via incomes, or over the whole rural distribution. There is no sign of such effects.

So it appears that the positive effect of higher food prices on the incidence of absolute poverty is transmitted through average consumption, not via worsening distribution of consumption. The correlation coefficient between mean rural consumption (food plus non-food) and the relative price of food is -0.81. Regressing log mean rural consumption on the log of the food price gives an elasticity of -2.81 with a standard error of 0.42. However, this is a potentially spurious regression (in the sense of Granger and Newbold, 1974) since there is significant serial dependence in the residuals; the Durbin-Watson test is 0.40. If one adds a linear trend then the residuals are much better behaved (the Durbin-Watson test is 1.45), and the least squares elasticity is -2.41, with a standard error of 0.21.

Let us now focus on the correlation between food price and average consumption in rural areas.

**Is the Correlation Due to the Method of Deflation?**

One reason to be suspicious of the correlation between food price and mean consumption lies in the methods of deflation used in these data (though they are perfectly standard methods). The CPIAL has an above average weight on food; its weight of 78% is above the average rural food share in all years for which the data are available. This means that even if there are no real effects of the relative price of food, it will be negatively correlated with mean consumption (deflated by the CPIAL).

However, this does not explain the negative correlation between mean rural consumption and the price of food. If the consumer price index is re-weighted using the average food share for the 1980s in rural India (65%), then the correlation coefficient between mean consumption and the relative price of food drops only slightly, to 0.76, while the least squares elasticity of mean consumption to the price of food drops to -1.45 with a standard error of 0.27.[14] The elasticity of real consumption to the relative price of food is no lower in absolute value, as one would expect. But it is still negative, and highly significant.

So we now seem to have a real puzzle: how it is possible that higher prices for the main agricultural output in India lead to lower average rural living standards?

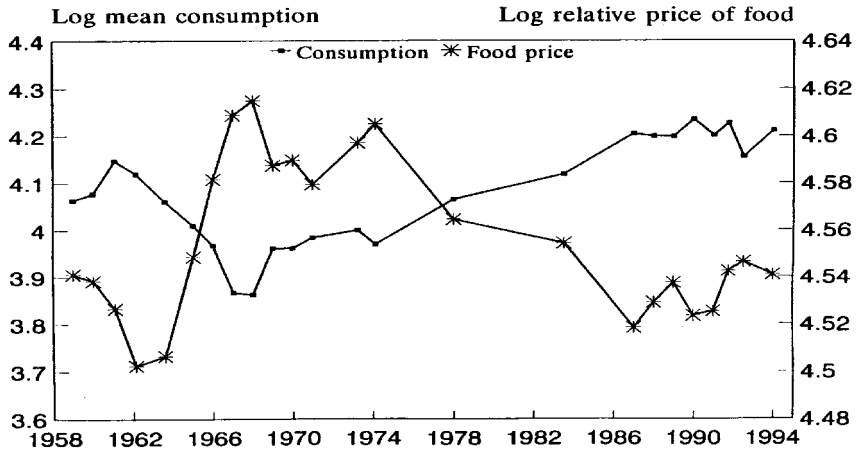
**Is the Correlation Due to a Common Trend?**

Maybe a clue can be found in the time series properties of these two variables. Figure 2 plots both variables over time. There was no trend increase or decrease in the relative price of food in

[14] Again the residuals are autocorrelated; allowing for the trend in consumption, the elasticity drops to -1.19, with a standard error of 0.13, and the signs of serial correlation in the residuals vanish.

India over this period. The regression coefficient of the log of the relative price of food on time is -0.06 percent per year, with a standard error of 0.06. However, there was a trend increase in mean consumption; the corresponding coefficient for consumption per capita was 0.64 percent per year, with a standard error of 0.15. (The corresponding trend for the rural poverty rate is -1.21, with a standard error of 0.21; the trend is almost identical for the national poverty rate as used in Figure 1.) Figure 2 suggests strongly that the correlation in Figure 1 is driven by covariate fluctuations over time rather than a common trend.

**Figure 2. Rural Consumption and the Price of Food by Year**




Since one variable has a trend and the other does not, there cannot be a stable long run relationship between the two variables; real consumption will inevitably drift from the relative price of food. So the policy interpretations of these data which assume such a relationship are dubious to say the least. The only long run relationship evident in Figure 2 is that between the fluctuation. In the terminology of modern time series analysis, these two variables are only cointegrated if one allows for a time trend in the cointegrating regression; otherwise there is no long run relationship.[15] So these data cannot be used to support the view that a sustained increase in the relative price of food will hurt the rural poor.

[15] Although the test is not strictly valid with unevenly spaced data, this conclusion is confirmed by the Likelihood Ratio test of Johansen (1991) which firmly rejects cointegration; the test statistic is 10.11 with a 5% critical value of 15.41. (Augmented Dickey-Fuller tests indicate that both variables are integrated of order one.) However, this changes if one allows an independent deterministic trend in the cointegrating equation. Then the Johansen test (narrowly) accepts that the series are cointegrated; the test statistic is 26.21 for which the 5% critical value is 25.32. The test statistics are very similar when the price index is re-weighted. On "cointegration" see, for example, Granger (1986) or Hendry (1995).

**Is the Correlation Due to a Third Variable?**

To summarize the findings so far, a closer inspection of the data offers no support for the interpretations which critics of reform have given to evidence such as Figure 1. Though the use of a fixed weight price index will no doubt hide some of the welfare-distributional effects, the data that have been used in recent debates on this issue do not suggest that higher food prices lead to a worsening of relative inequalities in incomes, either over the whole distribution, or from the point of view of the poor. The correlation in Figure 1 is largely driven by a negative correlation with mean consumption, which leaves the puzzle as to how the rural sector as a whole could lose from higher food prices in a closed economy. The tests in the last section suggest that over the period 1959-94, the correlation between the poverty rate and food prices is driven mainly by covariate fluctuations between mean rural consumption and the relative price of food. Indeed, the only long run relationship which can be detected in the data is that between the fluctuations over time in these two variables.

Could there be one or more other variables which might account for these covariate fluctuations? There is one obvious candidate: aggregate farm output.

Let us assume that rural households cannot fully buffer their consumption in the face of income shocks stemming from farm output fluctuations due to the vagaries of the weather. This will affect both farmers and workers (the latter through demand for labor.) In good agricultural years, rural living standards will tend to rise, and they will fall in bad years. At the same time the price of food will tend to be higher in bad agricultural years, and fall in good years.[16] A negative correlation between consumption and the price of food will emerge; but it is spurious, being attributable to a common third variable, namely farm output.

Are the data consistent with the interpretation? There are two links in the argument. The first says that rural consumption depends on agricultural output, allowing for an independent time trend. To test this link, I regressed the log of mean rural consumption on the (price-weighted) real value of agricultural output per capita; the fit improved if I used the two period moving average (suggesting that consumption is more vulnerable to two bad years in a row than one).[17] The least squares elasticity was 0.451, with a standard error of 0.062. However, strong serial correlation in the error term was evident. I allowed the error term to be serially correlated, using non-linear least squares

[16] In a competitive market this holds as long as food has a downward sloping aggregate demand function. The government of India attempts to buffer food prices from such shocks to output, through its procurement and storage decisions. The correlation between food price and farm output will still arise as long as a government cannot fully fix the food price, which seems a plausible assumption.

[17] This is crude as a causal model, but adequate for the present purpose; for a fuller discussion of the determinants of rural poverty see Datt and Ravallion (1997a); for an analysis at the state level see Datt and Ravallion (1997b).

to deal with the uneven spacing, and I added a time trend in mean consumption.[18] The estimate of the elasticity of rural consumption to agricultural output was then 0.512, with a standard error of 0.203.[19] The first link in the argument seems firm.

To test the second link (between the relative price of food and agricultural output), I regressed the price of food on current agricultural output and its two lags.[20] Since this does not require the survey data, the regression can be run on annual data, with 34 observations spanning 1960-93. This regression also called for a correction for serial correlation in the error term,[21] and the coefficients on current and lagged output were strongly indicative of a three year moving average with double weight on the first year's lagged value.[22] With this specification, the regression coefficient of log relative price of food on the moving average of log agricultural output was -0.254 with a standard error of 0.053.[23]

So both links are strong. An elasticity of rural consumption to agricultural output of 0.512 and an elasticity of food price to agricultural output of -0.254 together imply a food price elasticity for rural consumption of -2.02, not too far off the value obtained in the last section. So this alternative interpretation can account reasonably well for the correlation between mean rural consumption and the price of food. It seems Figure 1 is explained.

However, there appears to be other common influences on both variables. I compared the residuals of the above regressions on agricultural output. Figure 3 plots the residuals from both regressions. Comparing the residuals is complicated by the fact that the food price regression has

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[18] The autoregression coefficient is raised to the power of the time period between observations. The use of a ARE correction to the error term can be interpreted as a parsimonious method of estimating a more general dynamic model (with a lagged dependent variable and both current and lagged explanatory variables) under Sagan's (1980) common factor restriction (Henry, 1995). The latter restriction allows one to consistently estimate a dynamic model with unevenly spaced data. However, the restriction is not testable with unevenly spaced data.

[19] The estimate of the autoregression coefficient was 0.806, with a standard error of 0.105, while the estimate of the time trend was 0.0067, with a standard error of 0.0047; the $R^2$ was 0.894.

[20] Again, I do not claim this to be a good causal model, although one could interpret it as the inverse demand function for food, allowing for smoothing of the impacts of production shifts on food prices. For a full analysis of the link between the relative price of food and farm yields in India see Datt and Ravallion (1997a).

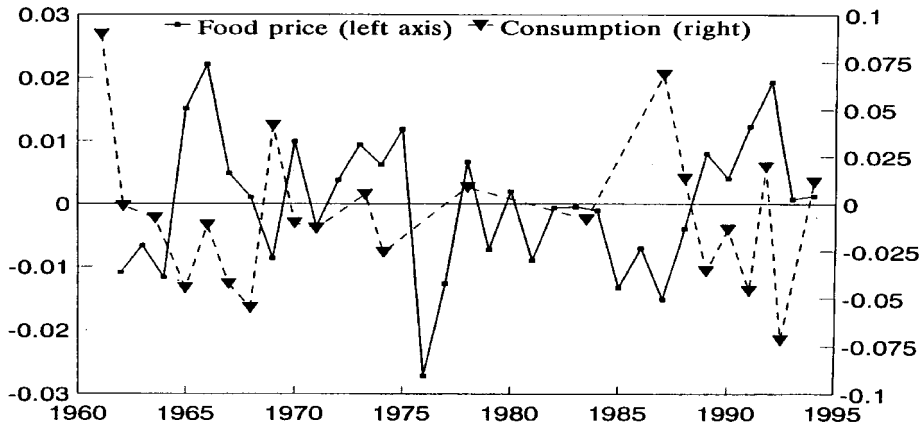
[21] This specification was tested against a first-order distributed lag model; Sargan's (1980) common factor restriction was easily accepted. (A Wald test gave F=0.56.)

[22] The coefficient on current agricultural output per capita was -0.075 (with a standard error of 0.026), the coefficient on the first lag was -0.127 (0.028), and the second lag -0.049 (0.026).

[23] The coefficient on the lagged error term was 0.835, with a standard error of 0.088. The $R^2$ was 0.863.

evenly spaced data, while the consumption regression does not. So the residuals do not always line up in time. Nonetheless, there is a sign of negative co-movement in the residuals, suggesting that there is another common determinant of both variables. For most of the cases in Figure 3 in which there is a reasonably close visual matching of observations in time the residuals have opposite signs. Putting the same point somewhat differently, there is an indication of a partial correlation between mean rural consumption and the price of food controlling for agricultural output, and further statistical analysis confirms this conclusion.[24]

**Figure 3. Residuals from Regressing Consumption and Food Price on Farm Output Per Capita**




Possibly a better measurement of domestic food availability would be able to account fully for the correlation between average rural consumption and the relative price of food. Average agricultural output is a rather crude measure for this purpose.

There may also be other common factors which account in part for the covariate fluctuations. For example, another variable which can help explain the negative correlation between mean rural consumption and relative price of food is the inflation rate. Inflationary periods in India have led to lower real consumption in rural areas; this could be a wealth effect, or it may involve savings behavior. The regression coefficient of the proportionate change (difference in logs) in mean real consumption between NSS rounds and the rate of inflation between the rounds, controlling for the length of time between surveys, is -0.409, with a standard error of 0.091.[25] At the same time, higher rates of inflation in India have been associated with higher relative prices of food; the initial

[24] Datt and Ravallion (1997a) estimate a structural model of rural poverty in India in which the relative price of food is significant, controlling for a moving average of agricultural output per acre and the real agricultural wage rate.

[25] The residuals appear to be well behaved; the Durbin-Watson test gives 2.01. The coefficient of the length of time between surveys is 0.38, with a standard error of 0.007. The $R^2$ is 0.56.

inflationary shock has often come from the food markets. Using the annual data, the regression coefficient of the log difference of the relative price of food on the rate of inflation is 0.147, with the standard error of 0.015.[26] Together, the joint effect of inflation implies as elasticity of mean consumption with respect of food prices of -2.8, again quite close to what we observe.

So it is not difficult to account for the correlation in Figure 1 in terms of variables which have little or nothing to do with the way that critics of reform have interpreted that correlation.

**An Aside on Wages and Prices**

To this point, I have relied entirely on household survey data for the welfare indicators. An alternative indicator often used in discussions of rural poverty in India is the real agricultural wage rate. It is of interest to see what relationship this has with the relative price of food over this period. Although the real agricultural wage is a far less comprehensive welfare indicator than real total consumption, it has the advantage that one can switch to annual observations; I will use the 35 annual observations available for 1958-93.[27]

One also finds a negative correlation between the real agricultural wage rate and the relative price of food; the coefficient is -0.59, which is significantly different from zero (a t-test gives 4.29). The least squares elasticity is also high, at -4.61, with a standard error of 1.03. However, this correlation is very likely to be spurious; indeed, the Durbin-Watson test on the regression of log real wage on log food price is a remarkable low 0.08, indicating considerable autocorrelation in the residuals. The main reason is probably that the real wage rate in Indian agriculture, like that in other sectors and countries, does not adjust instantaneously to changes in its determinants; there is strong serial dependence in wages, interpretable as wage "stickiness." There is also a strong positive trend in real wages. (The least squares growth rate over 1958-93 is 1.8% per year, with a standard error of 0.16%.) Furthermore, as Datt and Ravallion (1997a) argue, the rate of inflation also matters, since nominal wages do not adjust instantaneously to an increase in all prices.[28]

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[26] This time an ARI correction to the error term was needed. The coefficient on the lagged residual was 0.440, with a standard error of 0.161. The $R^2$ was 0.79.

[27] Again deflated by the CPIAL. On the sources and how the series was constructed see Datt and Ravallion (1997a).

[28] This is not the same as saying that the level of prices matters, as has been debated in the literature on rural poverty in India (see, for example, Saith, 1981, and Mellor and Desai, 1985). By one view in this debate, real variables (such as a poverty measure) cannot depend on monetary variables, such as a consumer price index. But there is still a correlation between the poverty rate and the level of the price index; how can it be explained? Datt and Ravallion (1997a) argue that the correlation is spurious, and that the missing variable is the lagged price index. With both current and lagged (log) price levels, they find that one cannot reject the null that the coefficients on these two variables are of equal size with opposite sign. So it is rate of inflation, not the price level per se, which matters to the living standards of India's poor. Furthermore, Datt and Ravallion argue that the effect of inflation on rural poverty measures is transmitted largely through the real agricultural wage rate.

As soon as the lagged real wage rate, the rate of inflation (change in the log of the CPIAL[29]) and a time trend are added to the regression of the real wage rate on the relative food price, the latter becomes insignificant; its coefficient changes from -4.61 in the bivariate regression to -0.39, with a standard error of 0.31 (and the residuals become well behaved by standard tests). The supposedly adverse effect of a higher relative price of food on real wages in agriculture also appears to be spurious.

**Conclusions**

The strong positive correlation between the poverty rate in India and the relative price of food over a 35 year period appears to be due mainly to negatively covariate fluctuations between average rural consumption and food prices from year to year, rather than a common trend in poverty and food price, or income-distributional effects. The covariate fluctuations are consistent with the effect of shocks to food supply associated with the vagaries of the weather; a good harvest affect both farm incomes (positively) and food prices (negatively). A moving average of farm output can account well for the correlation between mean consumption and food prices. However, there is evidence that another factor is at work, possibly involving savings behavior in inflationary periods, which tend also to be periods of high food prices. The strong negative correlation between the real agricultural wage rate and the relative price of food also appears to be spurious; it vanishes when one allows for the stickiness of real wages and the adverse short term effects of inflation.

These results would appear to cast considerable doubt on some of the policy implications that have been drawn in the past from the correlation between the price of food in India and the country's poverty rate and the level of real agricultural wages. It is clearly specious to conclude from these data that policy reforms which entail a sustained increase in food prices are a threat to India's poor in the longer-term. Yes, there could well be adverse short-term welfare impacts of higher food prices for many of India's poor, in both urban and rural areas; this must be taken seriously, and can have important implications for both the timing of reforms and public spending priorities. But that is a very different proposition to the claims that some critics of liberalizing economic reform in India have made on the basis of such data.

[29] The fact that it is the rate of inflation rather than the level of prices that matters is easily tested by including instead both the current and lagged log of the price index and testing if their coefficients add up to zero; the test passed easily (the F-test on the restriction was 1.53).

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