

## Appendix B1

### Rural Staples Prices, and the Definition of Staples

The implicit (average) price of staples (grain) depends on the imputed prices used in the rural living expenditure household survey for all individual grains. At old imputation prices, rural per capita living expenditures (including monetary and in-kind) on staples (*zhushi*) in 1990 were 99.14 yuan, and at new imputation prices 135.47 yuan. With per capita rural consumption of grain (*liangshi—yuanliang*) in 1990 of 262.08 kg, and assuming that the two categories in the living expenditure and consumption quantity tables correspond to each other, this implies an implicit price of 0.3783 yuan per kg of staples based on the old imputation prices, and an implicit price of 0.5169 yuan per kg of staples based on the new imputation prices. We adopt the implicit price based on new imputation values.

The calculations come with a number of caveats. If living expenditures on staples were to cover mainly items such as polished rice or refined flour, using the, presumably larger, quantity of *raw* grains (*liangshi—yuanliang*) to obtain unit values (implicit prices), as we do, is inappropriate and yields an underestimate of the implicit price of grain. No concise definitions of the Chinese terms for grains or staples, *zhushi* (staples in the living expenditure survey), and *liangshi-yuanliang* (grain, original volume, in the quantity tables) are available. While a mismatch of quantity and expenditure value would likely result in an underestimate of the implicit prices we calculate, this would not impact on the (rural, urban, total) price level calculations here as long as the mismatch were similar across all provinces, i.e., if a given amount of raw grains translated into the same amount of polished grains in each province. This is likely.

According to an NBS publication, the old imputation prices were simply the state list prices (*guojia paijia*)—i.e., the state-determined procurement prices—for those products where state list prices existed, and a comprehensive average price, weighted by quantities sold, for other products. The new imputation prices, on the other hand, are based on comprehensive average contract prices for those products that are covered by contractual procurement (at a combination of unified purchasing price and above-quota prices), and on the comprehensive average price (as before) for other products.<sup>1</sup>

The *Price Yearbook 1991* lists the state-determined price (*guojia dingjia*), the guidance price (*guojia zhidaojia*), and the market price (*shichang tiaojie jia*) of different grains in a few counties in different provinces, but no nationwide average price across localities, or across pricing regime, or across type of grain, nor prices of a specific grain across all localities. Most types of grains in most counties listed carry a state-determined procurement price of around 0.5 yuan/kg, and state-guidance and market procurement prices of around 1 yuan/kg; these suggest that the implicit price of 0.5169 yuan per kg of staples is an underestimate. The reasons could be, as mentioned, that the quantities we apply (the only ones available) to expenditure values are inappropriately high (which is likely), or that almost

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<sup>1</sup> On the definitions of the imputed prices see Liu Chengxiang, Liu Ke, and Jin Zhaofei (2000), pp. 129f. The comprehensive average price presumably covers all types of prices at which the product is sold, weighted by quantity or value.

no trading occurred at guidance and market prices (quite possible),<sup>2</sup> or that the imputed prices used by the NBS reflect only state-determined prices (contrary to NBS claims, and not likely).<sup>3</sup>

An implicit price below state-determined prices would not seem credible, but an implicit price below the market price is. Since 1999, for example, the NBS applies a 10% or 15% discount (depending on product) to the market prices of various agricultural products in the imputations to rural household income and living expenditures (Liu Chengxiang, Liu Ke, and Jin Zhaofei, 2000, p. 130). This margin is likely to represent an estimate of the marketing or distribution costs of getting goods to the market. Even if one were to favor the use of market prices, use of the (unavailable, here approximated) NBS imputed prices remains more desirable since the NBS imputed prices also underlie the official household income data.

A second approach to the calculation of rural grain prices is to use published agricultural procurement prices of different grains and to make assumptions about the shares of the different grains in total grain consumption in order to derive a composite price of staples. It is assumed here that rural households' grain consumption consists of only wheat, short non-glutinous rice, maize, and soybeans, with relative shares in the total (raw) grain consumption quantity of, assumed, 0.4, 0.4, 0.1, and 0.1. This ignores other types of grains, for which prices are not available across all provinces. It also ignores local substitution towards the locally cheaper grains. A proper price level, unless it is adapted to take into consideration utility aspects, should, indeed, ignore local substitution towards the locally cheaper grains.

The derived composite price of 0.6812 yuan/kg of staples is almost one-third larger than the implicit price of 0.5169 yuan per kg of staples. Multiplying this composite price by the quantity of staples consumed yields a consumption value that exceeds the rural living expenditures on staples. An adjustment factor of 0.7584 is needed to make the 0.6812 yuan/kg times 262.08 kg of rural per capita grain consumption equal to the rural living expenditures on staples of 135.47 yuan.

A third grain pricing method would be to use the mixed average price of grain (in the aggregate). In the two nationwide "mixed average" price tables (*hunhe pingjun jiage*) on retail prices and agricultural procurement prices published in the price section of the *Statistical Yearbook*, in 1990, the mixed average retail price of grain (*liangshi—maoyiliang*) was 0.5281 yuan/kg and the mixed average procurement price of grain 0.7160 yuan/kg. "Average" presumably refers to the average across localities; if each type of staple/ grain were of uniform quality, which is plausible, and if "mixed" then only referred to a comprehensive price across different pricing regimes, not to quality differences, these mixed average prices should be comparable to the implicit price we use. It would seem that the mixed average retail price of grain of 0.5281 yuan/kg matches our implicit price of 0.5169

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<sup>2</sup> According to the *Price Yearbook 1991*, p. 466, in 1990 31% of all agricultural procurement occurred at state-determined prices, 27% at state guidance prices, and 42% at "market-adjusted" (*shichang tiaojie*) prices. Within all agricultural procurement, staples are the most likely to be procured at state-determined prices. Furthermore, these shares of guidance and market prices are likely to be exaggerated. Transactions at prices set at lowest-level government tiers are likely to be regarded as market prices in a classification in which state-determined prices only cover prices determined by either provincial (and possibly municipal) governments and above.

<sup>3</sup> In this latter case, the implicit price based on old imputation prices of 0.3783 yuan per kg of staples is even lower than the state-determined price of staples of, generally (with small differences depending on type of staple) around 0.5 yuan per kg. For the data see *Statistical Yearbook 1991*, pp. 262, 263, 298; 1992, pp. 310, 315; *Price Yearbook 1991*, pp. 471f.

yuan/kg almost perfectly, but the definitions do not allow for a direct correspondence between implicit procurement prices and mixed average retail prices. (The mixed average procurement price also happens to be very close to the composite price constructed based on the agricultural procurement prices of different kinds of staples.)

In the end, it does not matter much which price is used—and we use, as mentioned, the implicit price—as long as the relative difference between the implicit price and any other type of potentially eligible price is relatively constant across provinces. Provincial-level mixed average prices also have the clear disadvantage that they are not available for all provinces; they are published in individual provincial statistical yearbooks for the corresponding province, and a number of yearbooks do not report these data.

Implicit prices for staples would be well justified if state, guidance, and market prices are similar across provinces—we know that they are across the specific localities for which they are reported—and if the shares of grain procurement occurring at the different pricing regimes (state-determined, guidance, market) are the same across provinces (on which no information is available for 1990); the implicit price could then be off by some percentage, but it would be equally so across all provinces. One argument clearly in favor of implicit prices for staples is that the income data are based on the implicit prices. In order for the spatial deflators to match the official household income measures, we need to use implicit prices.

A final complication in grain pricing, which we can rule out, is potentially differing coverage of staples (*zhushi*) in living expenditures and grains (*liangshi*) in the quantity tables in terms of the underlying type of food (rather than form of the food, such as raw vs. polished, as already discussed above). For example, staples could include beans, while grains may not. Two pieces of evidence suggest that these two terms are synonymous in their coverage of different types of foods, and that they include beans. A table on (average, nationwide) 1990 plan prices, state guidance prices, enterprise prices, country fair prices, and comprehensive prices for 100 retail goods in 35 large and medium cities includes a category “grain” (*liangshi*), with data on six sub-categories, namely (wheat) flour, polished round-grained non-glutinous rice, polished long-grained non-glutinous rice, vermicelli, corn flour, and *soybeans* (*Price Yearbook 1991*, p. 467). The urban household survey living expenditure data, furthermore, break down the category foods into grains (*liangshi*, not staples as in the rural household survey), non-staple foods (*fushi*, as in the rural household survey), tobacco plus alcohol plus tea, and other foods (*qita shipin*) (*Urban Household Survey Yearbook 1990*, p. 20). Since beans are supposedly not included in non-staple foods, tobacco, alcohol, tea, and other foods, they can only have been included with grains.

### ***References relevant to this appendix and not listed in the paper***

*Price Yearbook. Zhongguo wujia nianjian* (China Price Yearbook). Beijing: Zhongguo wujia chubanshe. Various years.