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Food demand in rural China: evidence from rural household survey

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Abstract

The recent rural reforms in China have had great effects on agricultural production and productivity as well as rural household consumption. While much has been written on production and productivity effects of these reforms, very few Chinese studies have attempted to analyze the changes in rural consumption patterns. This paper uses a dynamic AIDS model to estimate various food demand parameters for Chinese rural households using rural household survey data recently released by the China State Statistical Bureau. The results show that all important food commodities including rice, wheat, coarse grains, vegetables, meat, tobacco and alcohol have positive expenditure elasticities. Rice, wheat and coarse grains are necessities, while meat, vegetables, alcohol and tobacco are luxuries. The expenditure elasticities for rice, coarse grains and tobacco are declining, but those for wheat, meat, vegetables and alcohol are increasing. As per capita income rises and population increases, the demand for these items will continue to increase. Therefore, China must continue to increase its food production by a greater rate in the future in order to avoid food shortages.

After 30 years of socialist revolution, China initiated in 1979 its well known rural reforms, which transformed agricultural production from central planning to a market-driven system. These reforms have had significant effects on agricultural production and productivity as well as rural household food demand in China. While much has been written on the production and productivity effects of the rural reforms, very few Chinese studies have attempted to analyze in detail rural household consumption behavior during this reform period. [1] Following rapid growth of per capita incomes, the importance of grains and low-quality vegetables in the Chinese rural diet diminished substantially and was supplemented with increased meat intake, a diverse array of fruits and high-quality vegetables and a distinct preference for higher-quality alcohol and tobacco. China has 23% of the world's population

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[1] For more details on production and productivity effects of the Chinese rural reforms refer to Lin (1988, 1992), Fan (1991) and Sicular (1988).

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with rural residents accounting for more than 70% of the national total population. Thus, changes in the consumption pattern of China's rural population can have substantial effects on both domestic and international trade, particularly on food and agricultural trade. Knowledge of rural household food demand behavior, and the effects of current and future reforms on food consumption patterns provides important information for policy makers in redesigning and evaluating policy options.

Several studies on Chinese household consumption (including rural households) have been conducted previously. Linear expenditure systems were applied for rural households in Hubei province and urban households in Beijing for 1981 and 1982 (Van der Gaag, 1984; Li, Yang and He, 1985). Lewis and Andrews (1989) also employed a linear expenditure system to estimate urban and rural household demand in China. The small number of observations available for these former studies limited the applicability of the results. This study differs from the previous ones in several aspects. Firstly, we use provincial aggregate time-series data from rural household surveys for a relatively long-term period from 1982 to 1990. These data were collected by the General Organization for Rural Household Surveys of the State Statistical Bureau. This data set provides more observations and more variation for each variable, plus it enables us to observe changes in consumption patterns over time. Secondly, a more flexible demand system, namely the almost ideal demand system (AIDS), is employed to estimate food demand in rural China. Thirdly, the dynamic nature of food consumption for the rural households is considered in the model. During the period of analysis (1982–1990), per capita incomes as well as consumption patterns have changed dramatically. As demand parameters may have changed, the model used to analyze these parameters must be dynamic.

The paper is organized as follows. The first section of the paper reviews general food consumption patterns and their changes over time in rural China. Section 2 introduces a general framework (model) which is suitable for analyzing food consumption patterns in China. The third section discusses the data sources and the methodology in constructing variables for food demand estimation. We empirically estimate the demand system for rural households and discuss estimated expenditure and price elasticities in the fourth section. Finally, we discuss some policy implications of this study.

1. Food consumption patterns in rural China

In this part of the paper, we discuss the general trend of food consumption patterns in rural China. We give special attention to the effects of the rural reforms on the changes in food consumption. However, the rural reforms do not have a significant direct effect on rural consumption. They affect consumption patterns indirectly through income and relative price changes. Per capita income has increased substantially since 1978 due to the reforms. Average per capita income increased only by 2.4% per annum in real terms from 1957 to 1978, but then it accelerated to 7.1% per annum from 1978 to 1990. The relative prices have also changed significantly since the reforms were introduced. The retail price index increased by 0.5% per annum from 1957 to 1978, while it increased by 6.3% per annum from 1978 to 1990. Among all consumption goods, food prices increased the most rapidly since the reforms, at a rate of 8.1% per annum, while clothing prices increased the least, at 3.3% per year. Fuel and other commodity price increases fall between the above two groups, at 5.5% and 3.9% per annum, respectively.

Table 1 shows the long-term basic trends in rural household expenditures in China. The proportion of food expenditures to total expenditures declined steadily from 65.9% in 1957 to 54.9% in 1990. Of the 11% decline, only 4% had occurred from 1957 to 1980; only after 1980, did the food expenditure decline sharply. In fact, it dropped almost 7% in the last decade. This decline would have been even larger if the food prices had not increased significantly during the 1980s.

Table 2 shows the trend of food consumption on a per capita basis in rural China. Fine grain

Table 1
Annual per capita income and expenditure: Rural households (yuan)

Year	Total income	Total expenditure	Food	Clothing	Fuel	Housing	Other
1957	72.95	70.86	46.70	9.50	7.09	1.49	6.09
1965	n.a.	95.11	65.15	9.99	7.89	2.66	9.42
1978	133.57	116.06	78.57	14.74	8.24	3.71	10.79
1980	191.33	162.21	100.19	19.99	9.66	12.80	19.57
1981	223.34	190.81	113.91	23.66	10.69	18.70	23.85
1982	270.11	220.23	133.20	24.77	12.36	22.58	27.32
1983	309.77	248.29	147.24	27.65	13.47	27.56	32.37
1984	355.33	273.80	161.52	28.33	15.04	31.49	37.42
1985	397.60	317.42	183.33	30.70	18.16	38.66	46.57
1986	423.76	356.95	201.17	33.74	18.57	51.23	52.24
1987	462.55	398.29	219.67	34.23	19.29	57.76	67.34
1988	544.94	476.66	254.57	40.41	21.69	70.25	89.74
1989	601.51	535.37	289.58	43.35	23.51	76.07	102.86
1990	629.79	538.05	295.16	45.06	24.37	69.23	104.23
Proportion of expenditure (%)							
1957		100.00	65.90	13.40	10.00	2.10	8.60
1965		100.00	68.50	10.50	8.30	2.80	9.90
1978		100.00	67.70	12.70	7.10	3.20	9.30
1980		100.00	61.77	12.32	5.96	7.89	12.06
1981		100.00	59.70	12.40	5.60	9.80	12.50
1982		100.00	60.48	11.25	5.61	10.25	12.41
1983		100.00	59.30	11.14	5.43	11.10	13.04
1984		100.00	58.99	10.35	5.49	11.50	13.67
1985		100.00	57.76	9.67	5.72	12.18	14.67
1986		100.00	56.36	9.45	5.20	14.35	14.64
1987		100.00	55.15	8.59	4.84	14.50	16.91
1988		100.00	53.41	8.48	4.55	14.74	18.83
1989		100.00	54.09	8.10	4.39	14.21	19.21
1990		100.00	54.86	8.37	4.53	12.87	19.37

Source: *China's Statistical Yearbook* (various issues), *China's Agricultural Yearbooks* (various issues).
Note: Total income and expenditures are measured in nominal terms. The consumer price index from 1957 to 1990 is 232.6%. Other expenses include expenses on daily used articles (soaps, detergent, bicycles, washing machines, sewing machines, watches, clocks, electrical fans, refrigerators, motorcycles, sofas, dressing chests, and desks) and cultural related goods (radios, TV sets, recorders, cameras, newspapers, etc.).

consumption increased marginally from 1957 to 1977. [2] It increased significantly from 1978 to 1982; then the growth slowed after 1983. Coarse grain consumption declined very little from 1957 to 1978. It dropped substantially from 1978 to 1985 and became stable after 1986. [3] As a component of total fine grain consumption, rice changed very little from 1982 to 1990, while wheat increased by more than 20 kg per person during the same period. Per capita meat consumption almost doubled over the period from 1978 to 1990. Vegetable consumption changed very little, although it fluctuated across years. Alcohol and tobacco consumption has increased sharply. Alcohol increased fourfold from 1978 to 1990, while tobacco increased by 80% from 1981 to 1990.

In terms of food expenditure shares, rice has declined while wheat increased slightly (Table 3). Coarse grain has declined substantially due to the

[2] Fine grain includes rice and wheat.
[3] Coarse grains include corn, sorghum, millet, sweet potatoes, oats soybeans and other miscellaneous beans.

Table 2
Annual per capita food consumption in rural China

Year	Total grain (kg)	Fine grain (kg)	Rice (kg)	Wheat (kg)	Coarse grain (kg)	Meat (kg)	Vegetable (kg)	Alcohol (kg)	Tobacco (packs)
1957	227.00	110.06	–	–	116.94	–	–	–	–
1963	207.95	94.35	–	–	113.60	–	–	–	–
1964	212.68	106.01	–	–	106.67	–	–	–	–
1965	226.50	113.00	–	–	113.50	–	–	–	–
1977	234.71	113.40	–	–	121.31	–	–	–	–
1978	248.00	122.50	–	–	125.50	5.76	141.50	1.22	–
1980	257.00	163.00	–	–	94.00	7.75	127.00	1.89	–
1981	256.00	172.50	–	–	83.50	8.71	124.00	2.32	15.43
1982	260.00	192.00	132.82	59.02	68.00	9.06	132.04	2.73	18.87
1983	260.00	196.50	130.19	66.07	63.50	9.97	130.95	3.20	19.89
1984	266.50	209.00	135.30	73.75	57.50	10.62	140.03	3.48	21.70
1985	257.00	209.00	135.67	73.16	48.00	10.97	131.13	4.37	23.72
1986	259.00	212.00	135.80	76.43	47.00	11.79	133.65	4.96	25.99
1987	259.00	211.00	135.00	76.47	48.00	11.65	130.42	5.48	26.42
1988	260.00	211.00	134.19	76.51	49.00	10.71	130.08	5.93	26.43
1989	262.00	213.00	134.84	78.61	49.00	11.00	133.38	5.95	27.38
1990	262.00	215.00	134.99	80.03	47.00	11.34	134.00	6.14	27.98

Source: *China's Statistical Yearbook* (various issues), *China's Agricultural Yearbook* (various issues), and State Statistical Bureau (1982–1992).
Notes: Rice is measured in paddy-rice terms. To convert these data to the more standard milled rice equivalent would require multiplying by the milling rate conversion factor of 0.7.

fast growth of per capita income, implying that farmers have reduced consumption of corn, sorghum and sweet potatoes. Alcohol and tobacco expenditures have increased only slightly although quantity consumed increased significantly, since their prices have changed very little compared to other commodities. Other food expenditures including tea, sugar, fruit and fish have increased substantially.

2. Dynamic AIDS model

As mentioned, as a result of substantial increase in per capita income in rural China, the consumption patterns have changed dramatically for some food products in the last decade. The theoretical model to be employed for this study has to take into account these changes. Thus, the model has to be able to capture the dynamic

Table 3
Rural household food consumption structure, 1982–1990

Year	Rice (%)	Wheat (%)	Coarse grain (%)	Meat (%)	Vegetable (%)	Alcohol (%)	Tobacco (%)	Other (%)
1982	35.99	15.94	17.15	8.84	9.02	3.12	3.32	6.62
1983	33.71	16.71	15.32	9.83	9.72	3.59	3.61	7.50
1984	30.67	17.69	12.72	11.03	11.20	3.93	4.06	8.68
1985	27.93	16.05	10.10	13.17	13.37	4.60	5.18	9.60
1986	28.07	15.97	9.80	13.73	12.39	5.10	5.19	9.75
1987	28.84	15.56	9.72	13.94	12.61	5.11	4.66	9.56
1988	29.42	15.21	9.25	14.56	13.28	4.90	4.13	9.25
1989	33.13	16.68	9.71	13.22	10.55	4.29	3.59	8.83
1990	30.77	16.90	9.81	13.83	10.52	4.74	3.80	9.63

Source: Compiled by the authors using price and consumption data.
Note: Other includes tea, sugar, fruit, fish, cake, candy, and bean by-products.

nature of the consumption parameters for Chinese rural households. In other words, the model should have the ability to reflect the changes in consumption patterns of the rural population. However, due to data limitations and the aggregate nature of the data set, we cannot use formal or conventional dynamic demand models. Therefore, the model should not only consider the dynamic nature of the consumption patterns, but also take into account the data limitations.

The advantages of the AIDS model have been discussed by Deaton and Muellbauer (1980) and Alston et al. (1990) among others. The dynamic AIDS cost function has the following form:

$$\ln C[t, u(t), \boldsymbol{p}(t)] = \ln a[t, \boldsymbol{p}(t)] + u(t)\, b[t, \boldsymbol{p}(t)] \quad (1)$$

where

$$\ln a[t, \boldsymbol{p}(t)] = \alpha_0(t) + \sum_{i=1}^{I} \alpha_i(t) \ln p_i(t) + \tfrac{1}{2} \sum_{i=1}^{I} \sum_{j=1}^{I} \gamma_{ij}(t) \ln p_i(t) \ln p_j(t) \quad (2)$$

and

$$b[t, \boldsymbol{p}(t)] = \beta_0 \prod_{i=0}^{I} p_i(t)^{\beta_i(t)} \quad (3)$$

With adding up, homogeneity and symmetry:

$$\sum_{i=1}^{I} \alpha_i(t) = 1 \quad \text{and} \quad \sum_{i=1}^{I} \beta_i(t) = 0$$

$$\sum_{i=1}^{I} \gamma_{ij}(t) = \sum_{j=1}^{I} \gamma_{ij}(t) = 0$$

and $\gamma_{ij}(t) = \gamma_{ji}(t)$

where the indices i and j indicate goods; $u(t)$ and $\boldsymbol{p}(t) = [p_1(t), \ldots, p_I(t)]$ denote the utility level at time t and the vector of prices at time t, respectively. The demand functions corresponding to (1) are:

$$w_i(t) = \alpha_i(t) + \sum_{j=1}^{I} \gamma_{ij}(t) \ln p_j(t) + \beta_i(t)\{\ln x(t) - \ln a[t, \boldsymbol{p}(t)]\} \quad (4)$$

where $w_i(t)$ and $x(t)$ denote the budget share of good i and total expenditure, respectively.

Now, we formulate the habit behavior of consumers over time. Considering the data availability (only 9 years data), we consider the following simplified habit formation:

$$\begin{aligned} \alpha_i(t) &= \alpha_i^0 + \zeta_i t \\ \gamma_{ij}(t) &= \gamma_{ij}^0 + \theta_{ij} t \\ \beta_i(t) &= \beta_i^0 + \rho_i t \end{aligned} \quad (5)$$

where t is time trend and $t = 1, 2, \ldots, T$.

In this formation, the parameters in the demand functions change over time with the assumption of continuous change in consumers' tastes and preferences. Therefore, the demand function can be written as:

$$w_{it} = \alpha_i^0 + \zeta_i t + \sum_{j=1}^{I} \left[\gamma_{ij}^0 + \theta_{ij} t\right] \ln p_j t + \left[\beta_i^0 + \rho_i t\right](\ln x(t) - \ln a[t, \boldsymbol{p}(t)]) \quad (6)$$

Following Green and Alston (1990), the dynamic uncompensated price elasticities can be calculated as:

$$E_{ij}(t) = \delta_{ij} + \frac{\gamma_{ij}(t)}{w_i(t)} - \frac{\beta_i(t)\, \alpha_j(t)}{w_i(t)} - \frac{\beta_i(t)}{w_i(t)} \sum \gamma_{kj}(t) \ln p_k(t) \quad (7)$$

where $\delta_{ij} = -1$ if $i = j$, and $\delta_{ij} = 0$ otherwise; and expenditure elasticity as:

$$\varepsilon_i(t) = 1 + \frac{\beta_i(t)}{w_i(t)} \quad (8)$$

Under the habit formation of (5), they can be calculated as:

$$E_{ij}(t) = \delta_{ij} + \frac{\gamma_{ij}^0 + \theta_{ij} t}{w_i(t)} - \frac{\left[\beta_i^0 + \rho_i t\right]\left[\alpha_j^0 + \zeta_i t\right]}{w_i(t)} - \frac{\beta_i^0 + \rho_i t}{w_i(t)} \sum_k \left[\gamma_{kj}^0 + \theta_{kj} t\right] \ln p_k(t) \quad (9)$$

and

$$\varepsilon_i(t) = 1 + \frac{\beta_i^0 + \rho_i t}{w_i(t)} \quad (10)$$

3. Data sources and explanations

This study makes use of the greater availability of suitable data since the earlier studies were published. The income, expenditure and consumption data used in this study are from sample surveys conducted by the General Organization for Rural Household Survey of the State Statistical Bureau. The survey started in 1955, was suspended during the Cultural Revolution, and was resumed in 1978. China began to publish provincial aggregate data from the surveys in 1982. Households are selected using a three-stage stratified and systemic sampling method. Counties are selected from each province, sub-village groups (production teams) are selected from counties, and households are selected from sub-village groups. [4] All households are ranked using a major indicator, such as income in the previous year. Using cumulative population figures and the desired sample size, the sample interval can be determined, and units falling in the midpoints of each interval are selected for inclusion in the survey (Taylor and Hardee, 1986; Tuan and Crook, 1983; Lewis and Andrews, 1989). Chinese officials recognize that this procedure is not strictly in accordance with the principles of random sampling but claim that the impact is not significant (Lewis and Andrews, 1989). The number of rural households surveyed has increased each year since 1978, and in 1990 the sample included 66 960 households.

Pooled time-series and cross-section data for rural China were used in this study. The analysis covers the period from 1982 to 1990. Ideally, the analysis should cover some years before 1978, but this may not be a serious problem to analyze changes in consumption behavior since most rural price and marketing reforms were undertaken after 1982. Even the production responsibility system was not fully implemented by 1983, [5] and the effects of the system were not fully released until 1984. [6] Twenty-eight provinces (autonomous regions or municipalities) were included in the analysis. Tibet and Hainan are excluded due to data unavailability. Consumption data were available from the survey for individual food items including rice, wheat, coarse grain, meat (including pork, beef and mutton), vegetables, fruit, tea, sugar, alcohol, fish, cooking oil and tobacco. Price data for these food items were taken from various issues of *China's Commodity Price Statistical Yearbooks* (China State Statistical Bureau, 1986–1991) and *China's Price Yearbooks* (China Ministry of Commerce, 1987–1991). These data were collected from rural markets and trade posts in various provinces. The expenditure data on these items were derived from consumption and price data.

4. Estimation and empirical results

First, we estimate equation (4), using iterative SUR techniques with symmetry and homogeneity restrictions applied. Then, we test whether the price and expenditure elasticities have changed over time. The test of whether or not price and expenditure elasticities have changed is equivalent to the test of whether the parameters of time trend in habit formation (5) are equal to zero (i.e., $\zeta_i = 0$, $\theta_{ij} = 0$, and $\rho_i = 0$). The WALD statistics are employed in the test. The test results are presented in Table 4. We reject the hypothesis that the constant term and price parameters have changed over time except for tobacco. However, we cannot reject the hypothesis that expenditure elasticities have changed. There-

[4] The administrative system in rural China before the reform was state, province, county, commune, production brigade, and production team. After the reform, the sub-county level has been changed to township (commune), village (production brigade), and sub-village group (production team).

[5] The percentages of production teams that adopted the household responsibility system are 14% in 1980, 45% in 1981, 80% in 1982, 98% in 1983, respectively (Lin, 1992).

[6] According to Fan's estimation, the production efficiency effects of the reforms were released through a period of time (0.753 in 1980, 0.768 in 1981, 0.788 in 1982, 0.791 in 1983, 0.831 in 1984, and 0.843 in 1985). Only after 1984 and 1985 did the efficiency start to improve greatly.

Table 4
Tests on restrictions on dynamic specifications

Parameters	χ^2 (9)
Constant	13.26
Price parameters	
Rice	7.56
Wheat	8.23
Coarse grain	4.22
Meat	9.86
Vegetable	6.78
Alcohol	6.99
Tobacco	18.71 *
Expenditure parameter	22.65 *

Note: The critical value of χ^2 distribution for $p = 0.05$ is 16.92 (d.f. = 9). The symbol * indicates that we can not reject, at the 5% level, the hypothesis that demand parameters have changed over the time.

fore, we re-estimate the equations in which the price parameters do not change while expenditure parameters change.

The estimated food demand parameters are presented in Table 5. Most of the estimates for price coefficients are significant at the 5% level except for some cross price parameters. Expenditure parameters are significant while three of four of the time trend parameters of expenditures are significant at the 5% level. The estimated price and expenditure elasticities are presented in Table 6. The price elasticities for grains including rice, wheat and coarse grains are similar, ranging from −0.455 for wheat to −0.547 for rice. The price elasticity for meat is higher than for both grains and vegetables. Alcohol has the highest price elasticity. Tobacco has a positive price elasticity which indicates that Chinese farmers increase tobacco consumption even when tobacco prices rise. In fact, per capita consumption of tobacco in rural China has risen dramatically even though tobacco prices have increased slightly. Most of the cross price elasticities have positive signs which mean that they are substitutes. However, both tobacco and alcohol have three negative signs of cross price elasticities. Expenditure elasticities of demand for grains are inelastic which indicate that grains are necessary goods. The expenditure elasticities for rice and coarse grains are declining, while the wheat expenditure elasticity is increasing. The demand for meat and vegetables is elastic in total food expenditure, and this demand is increasing over time. Thus, meat and vegetables are considered luxury goods. The demands for tobacco and alcohol are elastic with respect to food expenditures, which implies that Chinese farmers will spend more on these items as their incomes rise.

These estimates can be compared with those of other studies. Since very few studies (except Lewis and Andrew, 1989) have reported expenditure and price elasticities for Chinese rural households, we only compare our estimates with Lewis and Andrews. All of our estimates of both expenditure and price elasticities are higher than theirs (the expenditure elasticities of grain, pork, poultry and fish are 0.22, 1.02, 1.95 and 3.56, respectively, and the price elasticities of those commodities are −0.14, −0.23, −0.09 and

Table 5
Estimated parameters for broad group commodities

	Share	Constant	Food	Clothing	Housing	Fuel	Expenditure	Expenditure *t
Food	0.537	0.269	0.251	−0.002	−0.084	−0.083	−0.117	−0.002
		(0.782)	(2.047)	(−0.023)	(−1.946)	(−1.391)	(−2.787)	(−0.361)
Clothing	0.096	−0.075	0.009	0.070	0.009	−0.047	0.015	−0.004
		(−0.938)	(0.316)	(4.098)	(0.928)	(−3.363)	(1.482)	(−2.712)
Housing	0.119	−0.868	0.031	0.088	0.071	−0.018	0.229	−0.015
		(−6.098)	(0.61)	(2.904)	(3.978)	(−0.75)	(13.149)	(−5.561)
Fuel	0.041	0.409	−0.118	0.022	−0.012	0.038	−0.009	−0.002
		(6.804)	(−5.428)	(1.694)	(−1.591)	(3.643)	(−5.596)	(4.529)

Note: Numbers in parentheses are t test values.

Table 6
Estimated price and expenditure elasticities for major food items

	Rice	Wheat	Meat	Coarse grain	Vegetable	Tobacco	Alcohol
Price elasticity							
Rice	−0.547	0.135	0.102	0.545	0.060	−0.027	−0.186
Wheat	0.155	−0.455	0.110	0.443	0.272	0.089	0.141
Meat	0.113	0.098	−0.604	0.120	0.089	0.001	−0.040
Coarse Grain	0.334	0.221	0.065	−0.458	0.141	−0.175	0.841
Vegetable	0.034	0.133	0.079	0.110	−0.472	−0.190	−0.378
Tobacco	−0.413	0.089	0.131	−0.183	−0.231	0.223	0.132
Alcohol	−0.584	0.074	−0.023	0.124	−0.320	0.341	−0.796
Expenditure elasticity							
1982	0.380	0.260	1.592	0.250	0.994	1.889	3.617
1990	0.313	0.589	1.783	0.026	1.199	1.733	3.391

−0.69, respectively). This may be partly explained by the fact that this study covers a much longer period, and that prices and marketing mechanisms have improved recently. Farmers may have become more responsive to the price changes. The Lewis and Andrews' study only covered the period from 1982 to 1985.

5. Conclusions

This study shows that rural reforms in China have had a significant impact on the food consumption patterns of Chinese rural households. Per capita consumption of grains increased in the early-reform period but has stabilized recently. Rice consumption has been stagnant, while wheat consumption continues to increase. Coarse grain consumption has declined almost by half since 1982. Meat consumption increased sharply during the beginning of the reform, but the growth has slowed down recently. Vegetable consumption is stagnant, while alcohol and tobacco consumption has increased substantially. In terms of the cost structure in food consumption, Chinese farmers have reduced their expenditures on grain consumption while they have increased their expenditure shares on meat, vegetables, alcohol, tobacco and other food items.

The rural reforms have affected consumption behavior through both price and income changes. We empirically tested whether the price and expenditure elasticities have changed over this reforming period. Our results showed that price elasticities have not changed while expenditure elasticities have changed.

These results may have important policy implications for China as well as agricultural and trade policies of other countries. The expenditure elasticities for all food items are positive, implying that Chinese rural households will continue to increase their consumption on all these food items as their incomes rise. The expenditure elasticities for rice and coarse grains are declining, and that for coarse grains dropped to almost zero. The expenditure elasticities for meat, vegetables, tobacco and alcohol are all elastic and increasing over time. The demand for these luxury food items will accelerate as incomes rise. Therefore, China will likely face increasing pressure to import food in the future as its economy expands and per capita incomes rise.

The decline of rice expenditure elasticity and increase of wheat expenditure elasticity imply that China will continue to export rice and import wheat. The high expenditure elasticity for meat and low demand for direct coarse grain consumption means that China may reduce its direct coarse grain consumption and increase the use of coarse grains as animal feed. Due to the limited land resources, China may import substantial amounts of feed grains from the international market and

use its relatively cheap labor force to develop its livestock industry.

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