

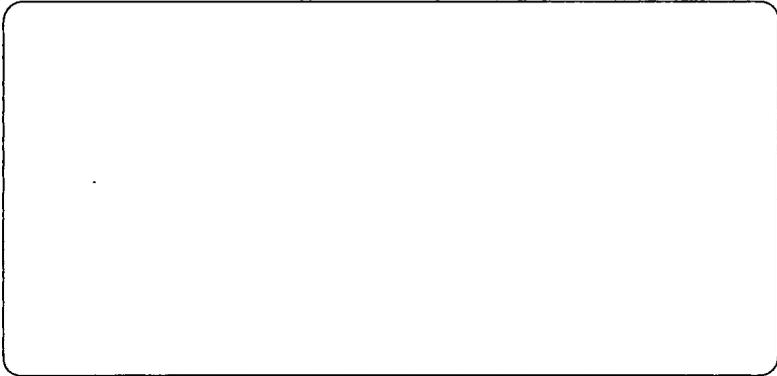
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Private Household Consumption in China

A Study of People's Livelihood

Jacques van der Gaag

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Abstract

Until recently data on the economy of China have been scarce. In this paper we take a first look at private household consumption in China, using data for 1981 and 1982 published in the Statistical Yearbooks of China. We first show current consumption patterns, make some simple extrapolations for the period 1983-2000 based on various growth scenarios, and then estimate the Extended Linear Expenditure System (ELES) for China. Income, own-price and cross-price elasticities are also presented. The analyses are preceded by historical data for the period 1949-1979.

Condensé

Il y a peu de temps encore, les données sur l'économie de la Chine étaient rares. Dans cette étude, nous examinons pour la première fois la consommation privée des ménages à l'aide de données pour 1981 et 1982 qui ont été tirées des Annuaire statistiques de la Chine. Nous décrivons tout d'abord les modes de consommation actuels, avant de procéder à quelques extrapolations simples pour la période 1983-2000 à partir de différents scénarios de croissance, puis à une estimation du Système linéaire de dépenses développé (Extended Linear Expenditure System - ELES) pour la Chine. L'élasticité-revenu, l'élasticité-prix et l'élasticité-prix croisée sont aussi présentées. Les analyses sont précédées de données pour la période 1949-79.

Extracto

Hasta hace poco tiempo, los datos sobre la economía de China han sido escasos. En este documento consideramos el consumo privado de las unidades familiares en China, utilizando datos correspondientes a 1981 y 1982 publicados en los anuarios estadísticos del país. Mostramos primero las pautas actuales del consumo, efectuamos algunas extrapolaciones sencillas para el período de 1983-2000 sobre la base de varias hipótesis de crecimiento y luego estimamos el Sistema Lineal Ampliado de Gasto (SLAG) correspondiente al país. Antes de iniciar los análisis, se presentan los datos del período de 1949-1979.

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1. Introduction

"Under the socialist system, the structure of the people's consumption occupies an important position in the structure of the national economy. This is because raising the level of the people's consumption is an objective of socialist production, and also a final goal of the all economic activities. In expanding production and conducting all kinds of economic activities, our objective is none other than to ensure the highest degree of satisfaction of the growing material and cultural needs of the laboring people. Therefore, in studying the structure of the national economy, we cannot but attach great importance to the structure of the people's consumption."

Yang Shenming
The Structure of People's Consumption

This study of household consumption in China is part of a cooperative research project between staff members of the Chinese Academy of Social Sciences (CASS) and the World Bank. The ultimate aim of this project is to improve our understanding of current household consumption patterns in China and, based on this, to make reliable projections of future developments.^{1/}

Chinese scholars distinguish between three types of household consumption: First there is private household consumption, paid for out of the household's income. Households also consume goods and services free of charge or at reduced prices. Free movies, excursions, and lunches provided by some department are examples, together with subsidies (for the non-farm population) for grains, vegetables and non-staple foods. The direct subsidies

^{1/} This paper analyzes household consumption data that are currently available for China. A comparison paper, partly based on the analysis of the same data, is under preparation by the staff at CASS.

for these food products are estimated at more than 20 billion yuan, or 20 percent of total state expenditures.^{1/} In addition there are large subsidies for, for instance, housing expenditures for various groups of workers, which can be viewed as part of the total employment compensation package, but which do not show up in the expenditure data. Clearly, these subsidies affect a household's well being. In this study, however, we ignore their value.^{2/}

Thirdly there is social collective consumption, i.e., consumption that satisfies "communal needs of the members of society by using social consumption funds" (Shenming, op cit, p. 19). The cost for education, scientific research and health care are examples of this, to the extent that they are paid for by collective funds. All pure public goods (defense, general administration) are also part of social collective consumption.

This study analyzes the first category of consumption only. As such it is part of the large body of economic literature that studies the relationship between household consumption and economic well being. This literature contains more than a century of work on a large variety of theoretical and empirical issues in this area. Up to the point that sophisticated and theoretically elegant consumer demand models are now routinely used by economic researchers interested in such issues as household welfare, the distributional consequences of subsidies and taxation, individual labor market behaviour and, of course, the consequences of future income and price changes on the development of the demand for consumption goods and services.

^{1/} Yang 1981, p. 18.

^{2/} I.e., the value of consumption is evaluated at the subsidized price.

A large part of the empirical research in this area is based on aggregated time-series data, relating developments over time, in total or per capita consumption to price and income changes. Unfortunately, for the current study only sketchy information is available on changes in consumption patterns over time. Instead, this study will analyze various sets of cross-section data. In particular, we will utilize interprovincial differences in per capita consumption for 1981 and 1982 and consumption data by income class for rural and urban areas in selected years.

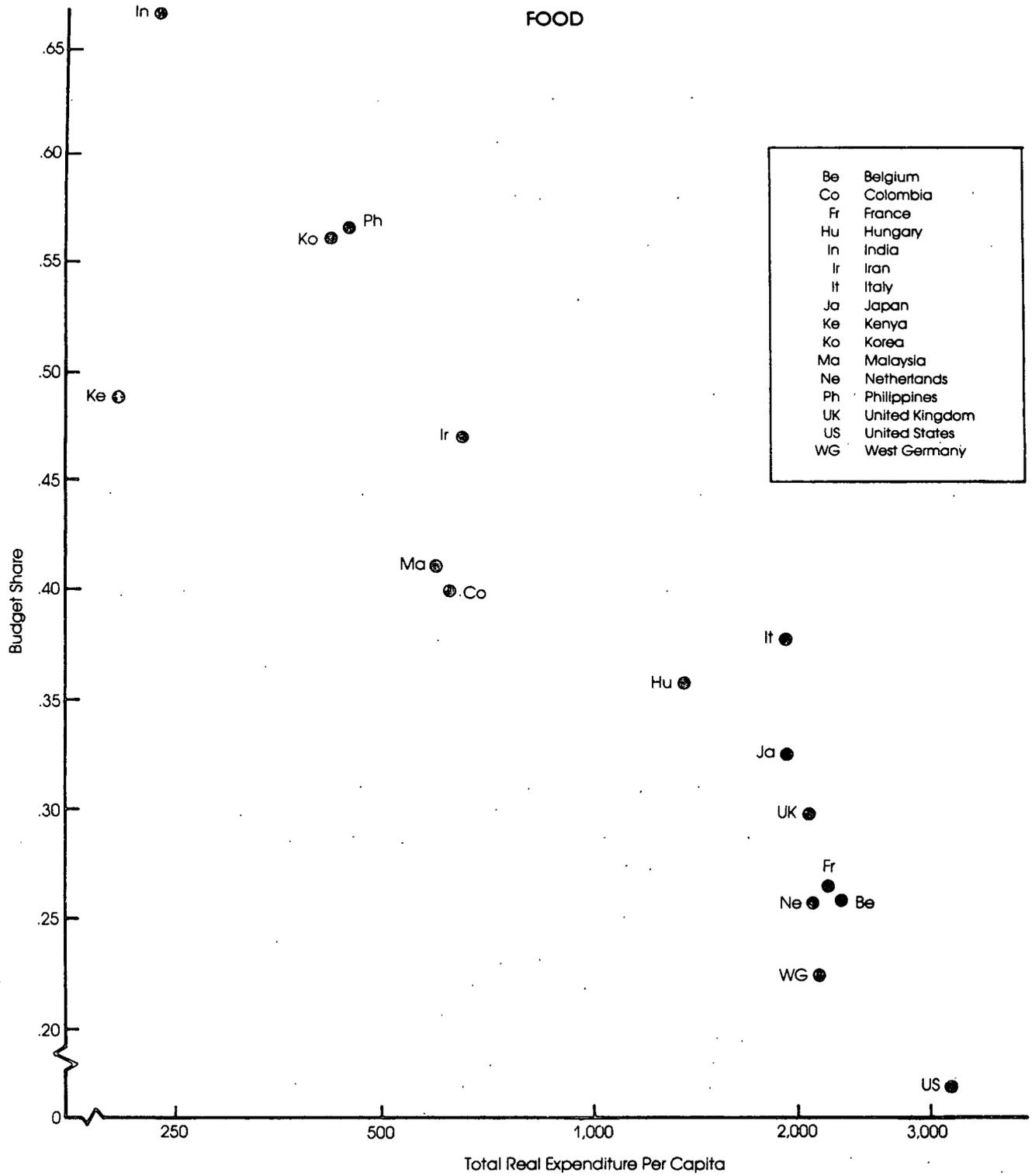
The analysis of cross-section consumption data has a long tradition and, among many other results, has produced what may well be the most robust empirical law in the economic literature, Engel's Law, which states that the proportion of income spent on food declines when income rises. In Figure 1.1 we illustrate this Law using cross-section data from 16 countries. The income effect on the food share is very pronounced. In Figure 1.2 we present a similar picture, using data on China's provinces. The same negative income slope emerges.^{1/}

It is this strong income-consumption relationship that will be utilized in this study to obtain quantitative information about the changes in China's household consumption patterns that are likely to result from further economic growth.

^{1/} Note that Figure 1.1 uses the logarithm of income on the horizontal axis, while Figure 1.2 uses income.

Figure 1.1

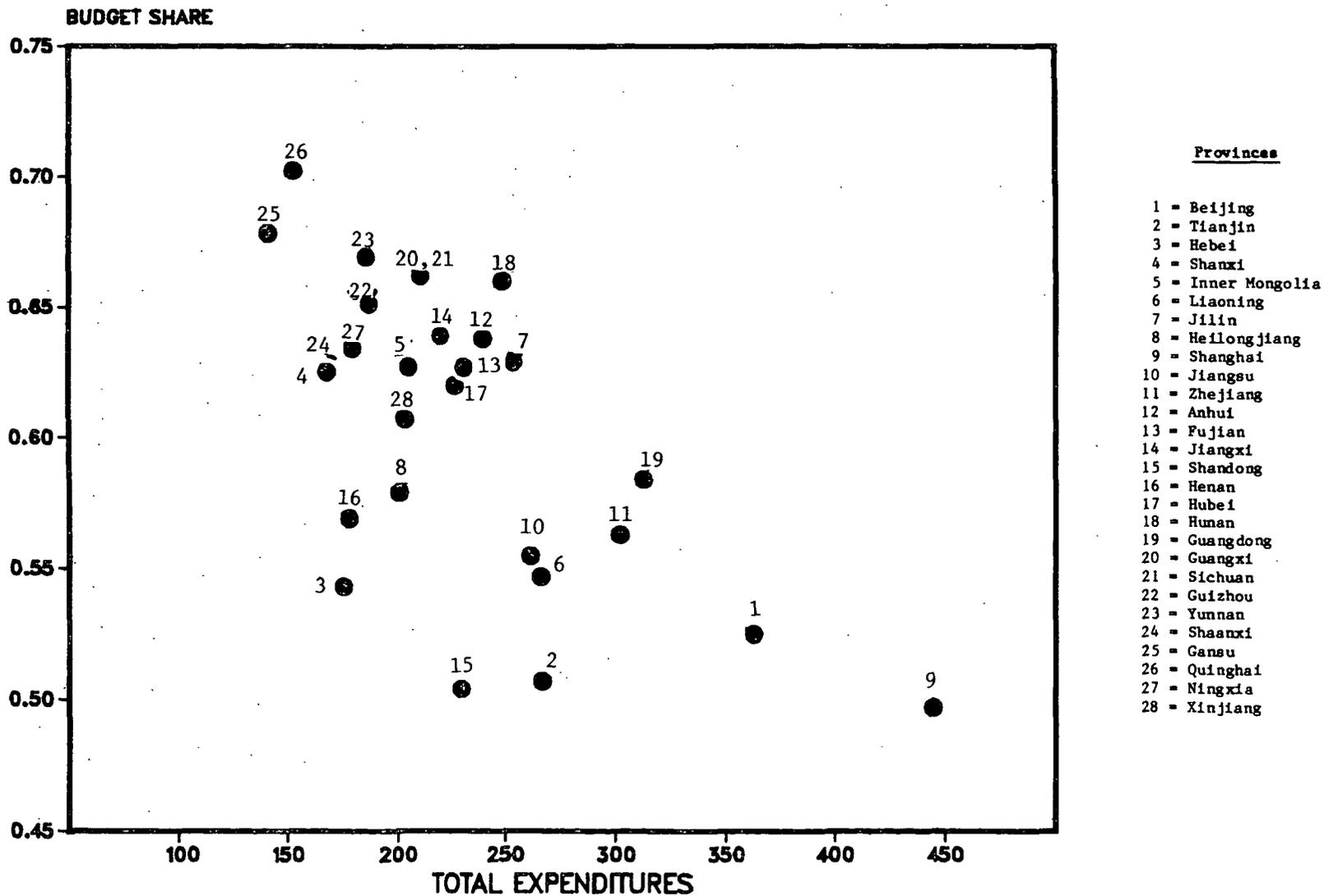
International Consumption Comparisons



Source: "A System of Cross-Country Demand Equations", Chapter 3 of H. Theil, International Consumption Comparisons: A Systemwide Approach, North Holland Publishing Company, 1981.

Figure 1.2

FOOD BUDGET SHARES 1982



In the next section we will present information on the historical development of consumption in China since the liberation. This section is based on a large number of publications and reports that have become available during the course of this project.

In Section 3 we analyze the provincial cross-section data in detail. We present a first projection of per capita and total demand for consumer goods and services, based on various income growth scenarios, and a "best guess" on population growth. In this section we also discuss various sources of uncertainty that affect our projections.

In Section 4 we present a formal model of household consumption behavior. We estimate the resulting consumer demand equations using the available consumption data grouped by income. The particular form of the model allows us to calculate price elasticities in addition to income elasticities. To illustrate the price effects, we show what impact an increase in the relative price of food will have on food consumption.

In Section 5 we discuss the main results and make suggestions for further research.

2. Historical Perspective: 1949-1979

In the first three decades after liberation, i.e., from 1949-1979, China's population grew at an average rate of just under two percent per year. National income grew at an average annual rate of about six percent. Thus there has been ample room for improvements in the people's level of well being. In this section we will document to what extent this potential for improvement has been materialized in changes in household consumption patterns.

No consistent time-series data of household consumption are available for China. The following tables have been constructed from various sources,^{1/} none of which can be considered to be fully representative for the entire Chinese population. Especially all data prior to 1957 should be interpreted as rough estimates only. Generally the data are more representative for rural areas (about 80 percent of the population) than for urban areas.

Not much is known about consumption patterns in the period of "Recovery", 1949-52. But the period of the first five year plan, 1952-57, is fairly well documented. Over this period the output of the Chinese economy of "subsistence goods", i.e., agriculture and handicraft, increased approximately 46.5 percent (in constant 1952 prices), an annual rate of increase of 7.9 percent. After reduction for export and the State's reserves, subsistence goods available for household consumption grew at an annual rate of 7.2 percent.

^{1/} Tables 2.1-2.3 are based on one source only; see reference (10) in the List of Literature.

Tables 2.1, 2.2 and 2.3 show output figures for 1952 and 1957, for selected food items, clothing and articles of daily use. Assuming that all output is being consumed in this period, there has been some relative development away from such basic, "subsistence", items as grain and cotton cloth and in favor of more "luxury" items, such as meat, dairy products and daily articles. This development implies a substantial improvement in the people's level of living. Nevertheless, by 1957, the budget share for food was still as high as 67 percent (Table 2.4). With the shares for clothing and fuel at 10 and 12 percent, respectively, there was not much room in the budget for housing, daily articles, culture and services, and other consumer goods.

The 1957 annual per capita food basket included of 559 pounds of unprocessed grain, 4.3 liters of vegetable oil, a little over 10 pounds of meat (most of it pork), 291 pounds of vegetables and 3.4 pounds of poultry and eggs (Table 2.5). This is, by all available standards, a quite adequate diet. However, the diet consists mainly of grain and vegetables, with very little meat or other foodstuffs.

It is this same pattern of an adequate, but somewhat spartan diet, with food expenditures taking about two-thirds of the household budget and, consequently, little room for other consumer goods and services, that we find back in China two decades later. In fact, if we compare 1979 with 1957, the food share has not changed (Table 2.4) and food quantities have changed very little (Table 2.5), though meat consumption increased from 10.2 to 15.8 pounds per person.

Table 2.1
Food Production: 11 Categories

Item	Unit	1952 Output	1957 Output	1957 as % of 1952	Average annual rate of increase %
Cereals	100 million jin	3,087.9	3,700.0	119.8	3.7
Vegetable oils	Tons	1,815,944.0	2,314,717.0	127.5	5.0
Pigs	10,000 head	8,976.5	14,470.0	161.2	10.0
Sugar*	Tons	451,141.0	873,804.0	193.7	14.1
Salt	10,000 tons	346.0	689.7	199.3	14.8
Tea	100 dan	16,478.0	26,600.0	161.4	10.0
Alcoholic beverages	10,000 tons	68.2	74.9	128.7	5.1
Aquatic products	Tons	1,666,266.0	2,262,437.0	135.8	6.2
Cigarettes	Boxes	2,649,888.0	4,456,000.0	168.2	11.0
Canned goods	Tons	14,446.0	50,812.0	256.9	21.0
Dairy products	Tons	2,515.0	7,937.0	328.0	26.8

* Includes imports.

Table 2.2

Clothing, Production Data: 10 Categories

Item	Unit	1952 Output	1957 Output	1957 as % of 1952	Average annual rate of increase %
Cotton cloth	10,000 dan	11,163.4	14,619.2	131.0	5.5
Woolen fabric	1,000 m	4,233.0	16,190.0	382.5	30.7
Silks, satins	1,000 m	64,758.0	145,399.0	224.5	17.5
Knitting wool	1,000 kg	1,979.5	5,200.0	262.7	21.3
Undershirts	1,000 dozen	2,875.0	9,566.0	332.7	27.0
Stockings	1,000 dozen	29,930.0	36,463.0	121.8	4.0
Cotton jerseys, trousers	1,000 dozen	800.0	1,926.0	240.7	19.0
Sweatpants, shirts	1,000 dozen	1,898.0	4,091.0	215.5	16.5
Rubber shoes	1,000 pair	61,693.0	116,810.0	189.3	13.6
Cotton wadding	10,000 dan	198.78	499.2	251.0	20.2

Table 2.3

Articles of Everyday Use, Production Data: 17 Categories

Item	Unit	1952 Output	1957 Output	1957 as % of 1952	Average annual rate of increase %
Matches	1,000	9,112.0	10,352.0	107.1	1.5
Bicycles	1	170,000.0	800,000.0	470.5	36.3
Radios	1	17,071.0	295,300.0	1,668.3	75.0
Thermos bottles	1,000	8,208.0	20,944.0	269.4	22.0
Pencils	1,000	193,900.0	484,760.0	250.0	20.0
Quality fountain pens	1,000	5,088.0	10,061.0	197.7	14.5
Fountain pens	1,000	31,699.0	39,978.0	126.1	4.7
Soap	Ton	117,212.0	242,081.0	206.5	15.5
Sulfa drugs	Ton	80.6	1,740.0	2,161.0	80.3
Penicillin	100 million units	459.6	140,000.0	28,910.0	310.0
Enamel cups	1,000	18,000.0	26,237.0	145.7	7.7
Enamel basins	1,000	8,800.0	19,706.0	224.0	17.5
Household coal	10,000 tons	2,374.0	5,575.0	234.8	18.5
Household kerosene	Ton	71,591.0	190,000.0	265.3	21.5
Household electricity	100 million kwh	9.4	17.9	180.5	12.5
Household paper	10,000 tons	11.3	23.4	206.6	15.5
Towels	1,000 dozen	18,640.0	23,375.0	125.4	4.5

Table 2.4

Consumption Budget Shares (%), Selected Years

	1918	1928	1929	1954	1955	1956	1957	1958	1961	1962	1963	1964	1965	1979
Food	72	71	64	55	55	69	67	66	67	58	63	68	68	67
Clothing	19	7	7	16	10	13	10	11	7	8	10	10	12	13
Fuel		11	10	15	24	11	12	11	12	14	12	8	7	6
Housing	7	8	5	2	3	1	2	1	1	6	5	3	4	5
Other	3	3	5	5	7	4	7	9	8	9	8	8	7	7
Cultural and services			9	7	1	2	1	2	4	4	2	2	3	2

Table 2.5

Household Consumption Selected Items, Quantities Per Capita, Selected Years

	1949	1952	1954	1955	1956	1957	1958	1961	1962	1963	1964	1965	1976	1977	1978	1979
Grain (pounds)	338	554	453	492	597	559	566	360	441	490	510	518	530	552	538	596
Vegetable oil (liters)	2.2	3.2	2.6	3.6	4.7	4.3	4.9	2.8	4.5	6.0	5.2	5.3	4.3	4.0	4.0	5.0
Meat (pounds) of which pork	3.0			6.6 5.5	7.2 6.0	10.2 8.8	8.5 7.1	6.0 3.8	8.6 7.3	10.5 8.5	11.0 9.0	10.1 9.1	8.6	10.3	11.6 10.9	15.8 15.4
Vegetables (pounds)			177.1	180.1	193.0	291.0	325.0	546.0	340.0			296.0	172.6	240.6	243.6	274.0
Poultry and eggs (pounds)	1.4		2.8	1.9	2.8	3.4	0.4	0.8	2.1	3.6	5.3	3.3			1.3	1.9

This does not imply that the period 1957-79 can be characterized as a period of relatively stable, though slow, economic development. On the contrary, China saw some continuous economic growth in the beginning of the second five year plan. But by 1959/60 the economy experienced a major downturn, as is well illustrated by, for instance, the grain consumption data for the early sixties (Table 2.5).

The "Great Leap Forward" was followed by ten years of Cultural Revolution. One of the characteristics of this tumultuous phase in China's history is the almost complete lack of reliable statistics. When in the late seventies reliable statistics of the people's livelihood became available again, it appeared that the average level of well being was only slightly above that achieved at the end of the first five year plan.

As these data reveal, China's economic growth of about four percent per capita annually, has not been used to improve the welfare level of Chinese households. In fact, China's economic policies have emphasized investment in heavy industry with the aim of accelerating growth. Consequently there has not been much room for improvements in household consumption patterns.

The economic reforms of the late seventies and early eighties are quickly changing this stagnant pattern. Not only does the accelerated economic growth increase the total demand for consumer goods, the improved living standards of (in particular) the peasants also substantially change the composition of consumer expenditures. In the next sections we will take a closer look at some recent household consumption data for China.

3. Interprovincial Differences in Consumer Demand

3.1 The Data

In this section we will analyze the per capita consumption data published in the Statistical Yearbooks of China for 1981 and 1982. These yearbooks publish provincial data on total per capita consumption expenditures of peasants, plus a breakdown in expenditures on food, housing, clothing and various other consumption items.^{1/} The data stem from a nationwide survey among peasant households. The survey is conducted yearly and includes data on 18,000 households in 1,700 communes. In Table 3.1 we present summary statistics for both years.

China experienced an increase in per capita consumption from 200.19 yuan in 1981 to 229.58 in 1982.^{2/} For both years by far the largest budget share was for food, which accounts for 60 percent of total expenditures. Food is further divided in three components: staple food, non-staple food and a rest category, "other". Staple food includes food grains and beans. Non-staple food refers to vegetables, pork, beef, mutton, fish, poultry, eggs, edible oils, sugar, salt and spices. The category other foods include fruit, milk, cookies, tobacco, wine, tea and meals consumed in restaurants. Note that this third category increased most, relatively speaking, from 1981 to 1982.

^{1/} See Tables 1 and 2, p. 445-448, in the Statistical Yearbook 1981 and the same Tables in the Statistical Yearbook 1982. Data are given for 28 provinces; no data is available for Tibet.

^{2/} These are the unweighted averages of the reported provincial data. The Statistical Yearbooks present weighted averages equal to 190.81 (US\$98.36) and 220.23 ¥ (US\$113.52), respectively.

Clothing, housing and daily articles show approximately equal budget shares of 10 to 12 percent. Clothing includes the consumption of cotton, wool, silk and chemical fibers. All purchases in one year are counted as consumption for that year.

The housing category mainly includes expenditures for building materials for new houses or house improvements. Rents and payments for utilities are negligible in rural China. This particular definition of housing expenditures should be kept in mind while interpreting the results presented in the next sections.

The category daily articles consists mainly of utensils and small appliances. It also includes bicycles, radios, television sets, wrist watches and furniture.

Fuel takes only five percent of the budget. Fuel is mainly used for cooking purposes. The category consists of firewood, charcoal and plant stalks. We finally see that an average peasant household spends between one and two percent of its budget on culture and services.

Table 3.1: Per Capita Consumption for Peasants in China,
in Yuan, 1981-1982

	Mean		Standard Deviation		Budget Share	
	1981	1982	1981	1982	1981	1982
Food	117.71	136.52	27.14	29.58	0.59	0.60
of which:						
staple food	61.92	71.22	6.05	7.45		
non-staple food	42.94	48.82	16.99	19.10		
other	12.86	16.48	8.36	10.10		
Clothing	24.87	26.50	7.02	7.00	0.13	0.12
Fuel	10.66	12.12	3.34	3.57	0.05	0.05
Housing	20.60	25.10	16.83	22.27	0.10	0.10
Daily articles	21.03	24.28	9.25	10.41	0.11	0.10
Culture, services	1.94	5.06	2.31	1.94	0.01	0.02
Total Expenditures	200.19	229.58	57.66	64.63	1.00	1.00

3.2 Engel Curves 1981, 1982

We will use these data to estimate Engel curves of the form

$$x_i = f(Y) \quad i = 1, \dots, K$$

with

x_i : expenditures on item i

Y : total expenditures ($\sum_{i=1}^K x_i = Y$) .

We employed two functional forms: the linear form $x_i = \alpha_i + \beta_i Y$, and the share log form, i.e., $x_i/Y = \alpha^i + \beta^i \ln Y$. We estimated the Engel curves using the pooled data for 1981 and 1982.^{1/} The results are given in Table 3.2. As expected the effect of total expenditures on consumption of each item is very significant. As measured by the \bar{R}^2 , the regressions are quite successful in explaining interprovincial differences in per capita consumption. Notable exceptions are staple food, for which, in the linear form, we explain only 23 percent of the variation, fuel ($\bar{R}^2 = 0.201$) and culture and services (0.249). It should be noted that a large part of staple food and fuel is distributed in kind, which may in part account for the weak relationship between income and consumption.

^{1/} Earlier estimates, based on the 1981 and 1982 data separately, did not show any significant difference between the two years.

Table 3.2. Estimation Results Engel Curves; Pooled Data 1981-1982
(standard errors in parentheses)

	Linear Engel Curve			Share-log Engel Curve		
	Constant α_i	Total Expenditure β_i	\bar{R}^2	Constant α_i	Total Expenditure β_i	\bar{R}^2
Food	30.653	0.449 (0.02)	0.892	1.233	-0.119 (0.02)	0.315
of which:						
staple food	52.822	0.064 (0.02)	0.226	1.567	-0.232 (0.02)	0.729
non-staple food	-7.026	0.246 (0.02)	0.717	-0.099	0.058 (0.02)	0.083
other	-15.143	0.139 (0.01)	0.884	-0.234	0.056 (0.01)	0.589
Clothing	8.409	0.081 (0.01)	0.500	0.300	-0.033 (0.01)	0.105
Fuel	5.789	0.026 (0.01)	0.201	0.115	-0.011 (0.01)	0.028
Housing	-38.641	0.286 (0.02)	0.819	-0.633	0.137 (0.02)	0.549
Daily articles	-7.503	0.140 (0.01)	0.781	-0.065	0.031 (0.01)	0.101
Culture, services	1.289	0.017 (0.004)	0.249	0.049	-0.005 (0.004)	0.008

We used the estimation results to calculate income elasticities at the sample mean.^{1/} (Table 3.3.) The income elasticity for food (linear form) is 0.759, with non-staple food and other food items being clear luxuries. Housing shows the highest income elasticity, ranging from 2.370 to 2.692 depending on the functional form chosen. Clothing, fuel and culture and services are necessities, but articles of daily use show an income elasticity that exceeds 1.0. With the exception of fuel, which as we have seen above has a very small budget share, the income elasticities based on both functional forms are very similar.

From these elasticities it becomes apparent that a rise in per capita income will significantly alter current consumption patterns. The shares for non-staple food, other food and housing will increase, while those for staple food, clothing, fuel and culture and services will decrease, with an increase in income. In the next subsections we will take a closer look at possible changes in consumption patterns resulting from three alternative income growth projections. But prior to doing so, we will present the estimation results of two additional functional forms.

^{1/} The income elasticity, ϵ_i , for the linear form equals

$$\epsilon_i = \beta_i Y/x_i .$$

The income elasticity, ϵ_i^i , for the share-log form equals

$$\epsilon_i^i = (\beta^i Y/x^i) + 1 .$$

Table 3.3: Income Elasticities, Pooled Data, 1981-1982

	Linear Form	Share Log Form
Food	0.759	0.802
of which:		
staple food	0.207	0.297
non-staple food	1.152	1.276
other	2.036	1.933
Clothing	0.673	0.725
Fuel	0.491	0.780
Housing	2.692	2.370
Daily articles	1.328	1.310
Culture, services	0.729	0.600

First we will estimate an extension of the linear form:

$$x_i = \alpha_i + \beta_i Y + \gamma_i Y^2 + \delta_i T .$$

Second we will estimate an extension of the share log form:

$$z_i = \alpha^i + \beta^i \ln Y + \gamma^i (\ln Y)^2 + \delta^i T .$$

Thus, by including a squared income term in each regression, we can test whether the original functional forms chosen are too restrictive. We also

included a time dummy variable in the regression, which equals zero for 1981 and is equal to 1.0 for 1982. The estimation results are given in Tables 3.4A and 3.4B.

The results of Table 3.4A indicate that the marginal budget share for non-staple food is falling with income, while the marginal share for other food increases. Also, the marginal share for fuel decreases significantly when income rises, while the housing share increases. For all other items no statistically significant effect of the squared income term is found. In other words, for these items the functional forms with linear terms only seems appropriate, at least within the range of observations. The time dummy variable is only significant for staple food. This reflects the fact that in 1982 the value of distributed grain per capita was 13 percent higher than in 1981. For all other goods no structural shift is being observed. The same pattern is shown in Table 3.4B, based on the share-log form.

Table 3.4A: Engel Curves with Squared Income Term
Pooled Data, 1981-1982; Linear Form
 (standard errors in parentheses)

	Constant α_i	Total Expenditure β_i	Square Total Expenditure/000 γ_i	T82 δ_i	\bar{R}^2
Food	6.830	0.636 (0.112)	-0.378 (0.210)	5.213 (2.604)	0.904
of which:					
staple food	44.830	0.110 (0.075)	-0.116 (0.140)	7.626 (1.741)	0.431
non-staple food	-39.268	0.525 (0.114)	-0.527 (0.214)	-2.434 (2.655)	0.733
other	1.209	0.0007 (0.033)	0.265 (0.062)	0.021 (0.775)	0.911
Clothing	1.425	0.144 (0.061)	-0.116 (0.115)	-1.405 (1.426)	0.498
Fuel	-11.596	0.172 (0.032)	-0.282 (0.061)	0.195 (0.756)	0.420
Housing	13.571	-0.148 (0.079)	0.843 (0.149)	-2.563 (1.844)	0.891
Daily articles	-7.818	0.146 (0.057)	-0.007 (0.107)	-0.931 (1.331)	0.774
Culture, services	-2.272	0.049 (0.022)	-0.059 (0.041)	-0.544 (0.514)	0.259

Table 3.4B: Engel Curves with Squared Income Term
Pooled Data, 1981-1982; Share Log Form
 (standard errors in parentheses)

	Constant	Total Expenditure	Square Total Expenditure/000	T82	R ²
	α^i	β^i	γ^i	δ^i	
Food	0.519	0.153 (0.741)	-0.026 (0.068)	0.025 (0.013)	0.329
of which:					
staple food	4.764	-1.403 (0.517)	-0.106 (0.048)	0.040 (0.009)	0.802
non-staple food	-5.241	1.955 (0.715)	-0.174 (0.066)	-0.016 (0.012)	0.171
other	0.996	-0.399 (0.192)	0.042 (0.018)	0.0008 (0.003)	0.615
Clothing	-0.259	0.172 (0.391)	-0.019 (0.036)	-0.006 (0.007)	0.089
Fuel	-2.034	0.802 (0.201)	-0.075 (0.018)	-0.0007 (0.004)	0.235
Housing	2.843	-1.153 (0.489)	0.119 (0.045)	-0.012 (0.009)	0.610
Daily articles	-0.005	0.008 (0.378)	0.002 (0.035)	-0.004 (0.007)	0.072
Culture, services	0.005	0.011 (0.127)	-0.001 (0.012)	-0.002 (0.002)	-0.014

3.3 Projecting Household Consumption in China, 1983-2000

The following projections are based on three scenarios for per capita income growth in China:

high growth rates:	5 percent per year, 1982-1990
	6 percent per year, 1990-2000
medium growth rates:	4 percent per year, 1982-1990
	5 percent per year, 1990-2000
low growth rates:	3 percent per year, 1982-1990
	4 percent per year, 1990-2000.

The medium growth projections imply an increase in per capita expenditures from 238.76 yuan in 1983, to 314.20 yuan in 1990, to 511.79 yuan in 2000.^{1/}

In Figure 1 we illustrate the development of per capita consumption in China, based on this medium growth income scenario and the estimation results of the linear Engel curves.^{2/}

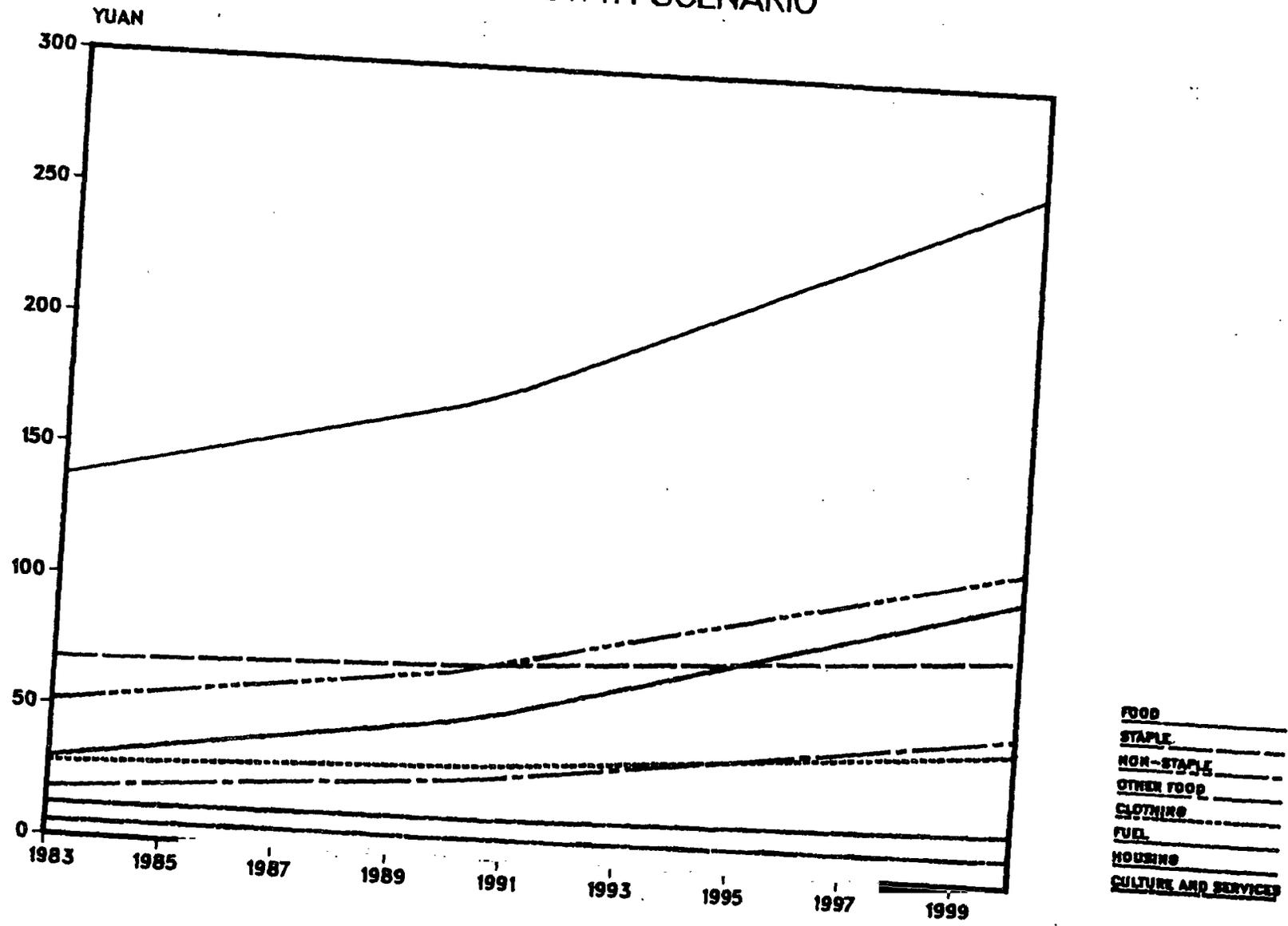
Food expenditure will remain by far the largest budget share. Per capita expenditures will grow from 137.83¥ in 1983 to 171.70¥ in 1990, to 260.40¥ in 2000.

In 1990 expenditures on staple and non-staple food will be about equal. After that, non-staple food will take a larger share of the budget than staple food. Expenditures on other food will growth rapidly, and reach 49.38¥ in 2000, up 174 percent from 1983.

^{1/} The numbers for the high growth rate are 241.06, 339.20 and 607.45, respectively. The low growth rate implies 236.47, 290.83, 430.39. (See Annex 1, for the results based on the high and low growth scenarios.)

^{2/} For the actual year by year predictions, see Annex 2.

FIGURE 1 — PER CAPITA CONSUMPTION: 1983–2000;
MEDIUM-GROWTH SCENARIO



Housing will increase from the fourth largest budget item, after food, clothing and daily articles, to the second largest. Per capita expenditures will grow from 29.64¥ in 1983 to 94.12¥ in 2000, an increase of 218 percent. Recall that the category housing consists mainly of expenditures on building material for new houses and for house improvements. What we may observe is a very fast transition from mud houses to brick houses. This transition may be accelerated by changes in the regulations regarding home and land ownership as well as by income growth. It is also made possible by the relatively large savings amounts currently owned by peasant households. It is therefore quite likely that the demand for housing will flatten out, once the severe shortage in housing of acceptable quality is taken care of.

Clothing expenditures will increase modestly (65 percent); from 1985 on expenditures on daily articles will exceed those on clothing. Fuel expenditures and expenditures on culture and services remain relatively small budget items, with increases of 48 percent and 72 percent, respectively.

The results illustrated in Figure 1 are summarized in Table 3.4. Since our projections are based on the assumption that prices remain constant, the per capita expenditure projections correspond to increases in real consumption. Table 3.5 also includes projections of the total growth of consumer demand in China. These projections are based on a total population growth of 7.976 percent until 1990 and 17.844 percent until 2000.

Our projections imply for the period 1982-2000 an average yearly growth rate of total food consumption of 4.12 percent. The demand for staple food will increase a modest 1.01 percent per year and non-staple food will see a 5.57 percent growth rate. The category other food will increase almost five fold, at an annual rate of 9.30 percent.

Table 3.5: Projections of Household Consumption in China

(Based on linear Engel curves, the medium income growth scenario and a population increase of 7.9% in 1990 and 17.8% in 2000.)

		Per Capita Consumption	Total Consumption	Average
		Increase	Increase	Yearly
				Increase
				1982-2000
Food	1982 (¥)	136.52	--	
	1990		+25.79%	+27.85%
	2000		+90.78%	+106.98%
				4.12%
Staple food	1982 (¥)	71.22	--	
	1990		+2.40%	+2.59%
	2000		+20.16%	+23.76%
				1.01%
Non-staple food	1982 (¥)	48.82	--	
	1990		+43.94%	+47.44%
	2000		+143.49%	+169.14%
				5.57%
Other food	1982 (¥)	12.86	--	
	1990		+121.85%	+131.57%
	2000		+335.46%	+395.32%
				9.30%
Clothes	1982 (¥)	26.50	--	
	1990		+27.77%	+29.98%
	2000		+88.15%	+103.88%
				4.04%
Fuel	1982 (¥)	12.12	--	
	1990		+15.18%	+16.39%
	2000		+57.59%	+67.87%
				2.92%
Housing	1982 (¥)	25.10	--	
	1990		+104.06%	+112.26%
	2000		+329.20%	+387.94%
				9.21%
Daily articles	1982 (¥)	24.28	--	
	1990		+50.25%	+54.26%
	2000		+164.21%	+193.51%
				6.17%
Culture and services	1982 (¥)	5.06	--	
	1990		+31.03%	+33.50%
	2000		+97.23%	+114.58%
				4.34%
Total Expenditure	1982 (¥)	229.58	--	
	1990		+36.86%	+39.80%
	2000		+122.92%	+144.85%
				5.10%

The demand for clothing will double, which implies an annual increase of just over four percent, while fuel consumption will grow less than three percent per year. Housing and daily articles are fast growing budget items, with annual growth rates of 9.21 and 6.17 percent respectively. Expenditures on culture and services will grow about 4.34 percent per year.

Total expenditures are predicted to grow at an annual rate of 5.10 percent which, of course, is the direct result of our medium income growth scenario and our assumptions regarding population growth.

In the next section we will address several factors that affect the reliability of the projections.

3.4 Sources of Uncertainty

In the previous subsections we presented estimates of consumption in China for the period 1983-2000, based on income growth projections, population growth projections and point estimates of income effects on consumption. Clearly, our projections are riddled with uncertainties, some of which will be discussed in this subsection.

First of all there are the uncertainties regarding the income projections. We presented results based on three alternative income growth patterns. Evaluation of the likelihood of each of these patterns, however, is beyond the scope of this paper. We also accept, without discussion, the population growth scenario used in section 3.4 to obtain expectations regarding total consumption.^{1/}

^{1/} For a discussion of population projections see Timothy King, Population Policy in China since 1950 and its Demographic and Economic Implications, Health Sector Issues in China, Supplementary Paper No. 2, August 19, 1983. (This is an internal document with restricted circulation only.)

That still leaves ample room for uncertainty in our projections. At least two sources of uncertainty are of a statistical/methodological nature: the "fit" of the data to the model chosen and the choice of the model. We will discuss these issues in some detail in subsections 3.4.1 and 3.4.2, respectively. We will conclude this subsection with a brief discussion of various other sources of uncertainty.

3.4.1 Statistical Uncertainty

We will discuss uncertainty issues regarding our projections using per capita food consumption as an example.

The estimation results for the linear Engel curve for food showed the following results

$$\begin{aligned}x_{\text{food}} &= 30.653 + 0.449 Y \\ &\quad (0.02) \\ \bar{R}^2 &= 0.892.\end{aligned}$$

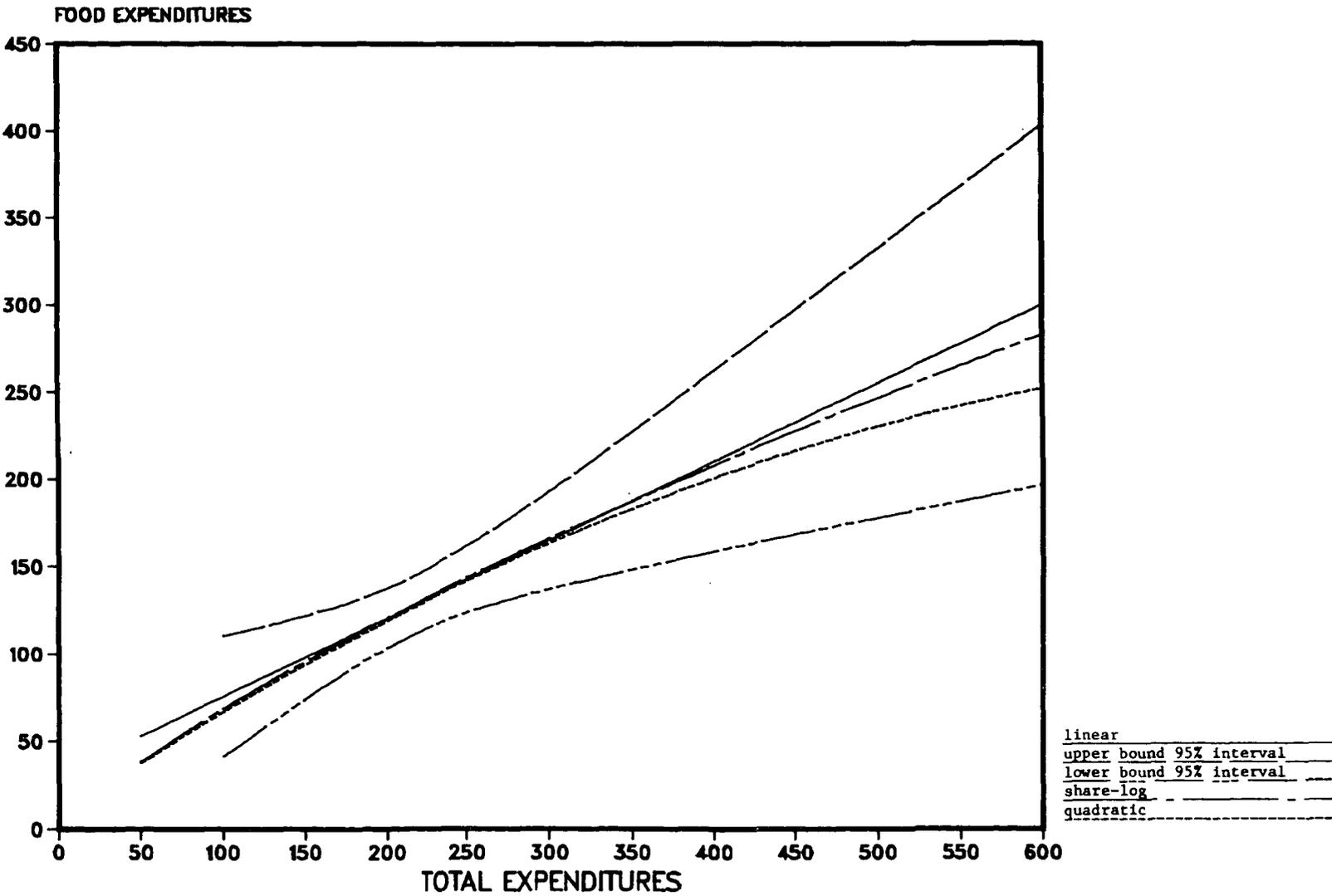
(Table 3.4, p. 24.)

This equation was estimated using income data ranging from 135 yuan to 444 yuan. The "fit" of the line through the data is quite good. Nevertheless, the \bar{R}^2 of 0.892 shows that there is some unexplained variance in the data. Perhaps more importantly, some of our income projections exceed the maximum observed value: the high growth projection shows 607.45 yuan per capita in year 2000.

In Figure 2 we drew the linear Engel curve for food, together with a 95 percent confidence interval.^{1/} The Figure shows that the size of this interval grows rapidly when income increases.

^{1/} See Annex 3 for the calculation of this confidence interval.

FIGURE 2— FOOD CONSUMPTION



Based on the regression results we can make the following three formal statements:

- A. For 1983,^{1/} there is a 95 percent chance that food consumption will lie between 120.03 yuan and 155.64 yuan per capita.
- B. For 1990, there is a 95 percent chance that food consumption will lie between 140.62 yuan and 202.78 yuan per capita.
- C. For 2000, there is a 95 percent chance that food consumption will lie between 180.18 yuan and 340.61 yuan per capita.

Obviously, the uncertainty in our projections for the latter years, e.g., a range of 160 yuan for the year 2000, is disturbingly large. Note that this is solely due to a less than perfect fit of the data (though a \bar{R}^2 of 0.892 is generally considered to be quite good) and the fact that the medium growth scenario predicts a per capita income that is a factor of 2.3 larger than the mean income value for 1981/82. Fortunately this kind of uncertainty is easy to quantify, and realistic scenarios for future developments can be based on precisely specified probability statements. Other sources of uncertainty are less easy to assess. We will discuss some of them in the next sub-sections.

3.4.2 The Choice of the Model

Two other projections are sketched in Figure 2. The first one is based on regression results using the share-log form:

$$z = x/Y = \alpha + \beta \ln Y$$

^{1/} We use the medium growth income projection.

which can be rewritten as

$$x = (\alpha + \beta \ln Y) Y$$

to project per capita food expenditures rather than the budget share.

Within the range of actual observations, this functional form is very close to the linear one. For instance, for 400 yuan total per capita expenditures, the difference in predicted food consumption is only 2 yuan. For 500 yuan, the difference in per capita food consumption is almost 9 yuan, i.e., in this case the projection based on the share-log forms lies 3.4 percent below the linear projection.

The second alternative to the linear Engel curve that is sketched in Figure 2 is the quadratic function:

$$x = \alpha + \beta Y + \beta Y^2 .$$

Again, the difference with the linear form is small within the range of observations, but widens with growing income. For 500 yuan total expenditures, the linear form predicts 255.15 yuan, the quadratic form yields 230.33 yuan, 10 percent less.

Note that both alternative projections fall well within the 95 percent confidence interval calculated for the linear form. The statistical uncertainty (uncertainty due to unexplained variance in the data) seems to dominate the uncertainty due to our choice of a particular functional form. This should not come as a surprise given that our estimation results showed very little curvature in the data. There were some exceptions however, notably for non-staple and other food and fuel and housing.

Starting with the latter two commodities, recall that we found

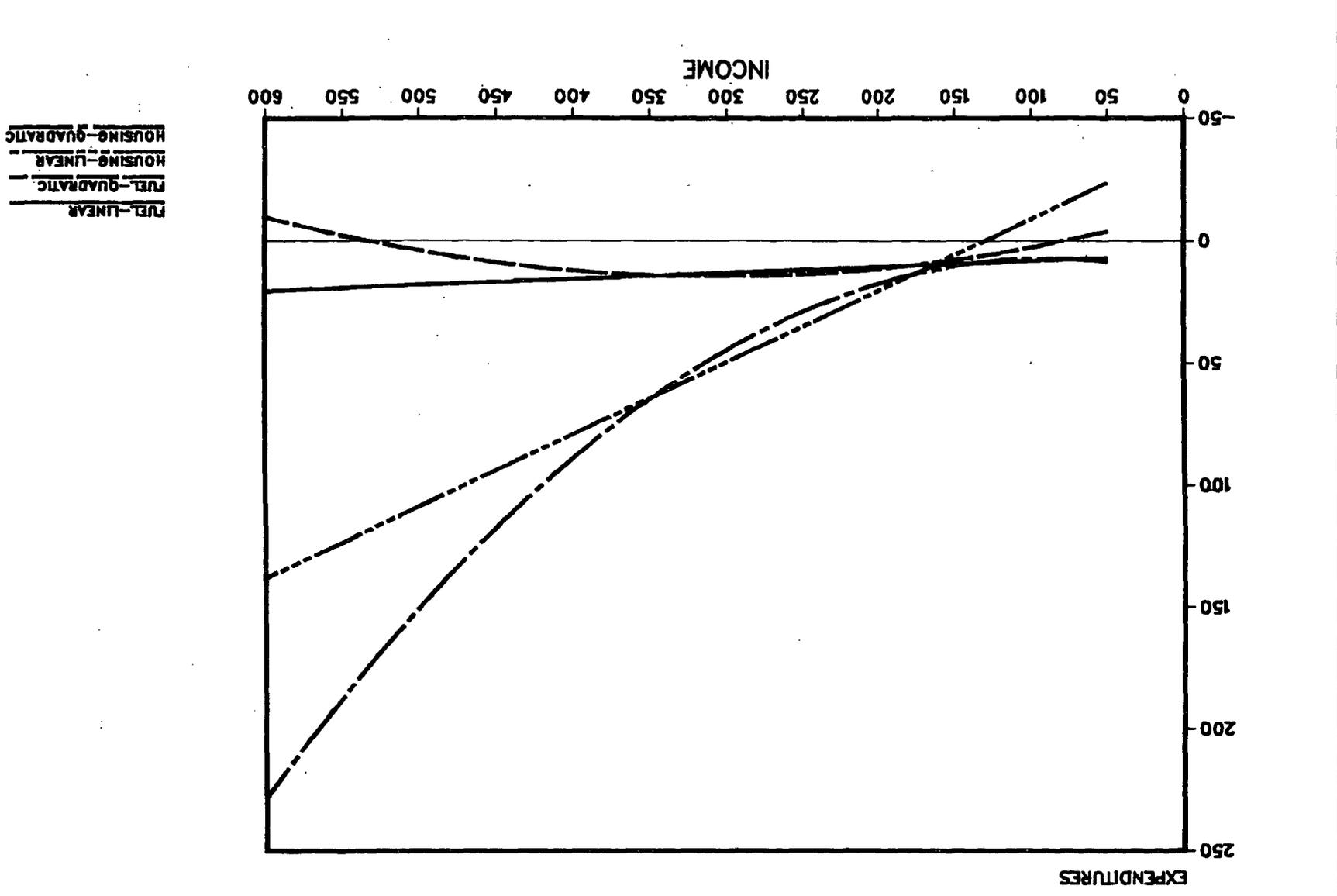
statistically significant results when we added the quadratic income term to the linear Engel curves. These results imply for housing an increase in the marginal share and for fuel a decrease in the marginal share of consumption, when income rises. This is illustrated in Figure 3.

We see that both for housing and fuel the difference between the quadratic and the linear functional form is small, as long as we stay within the range of observations. The differences quickly become fairly large when we predict expenditure based on income levels outside the range of observations. For housing the linear curve seems to underestimate expenditures at high income levels, while the linear curve for fuel seems to predict levels of expenditures that are too high.

These results seem counter-intuitive on various counts. As mentioned in Section 3.4, one may expect a sharp rise in housing expenditures at modest income levels followed by a tapering off once relatively high expenditure levels are reached. On the other hand, we should mention that LLuch et al. do find a slight tendency for the marginal propensity to consume to rise with income. And perhaps the current expenditure levels, and even those projected at a per capita income level of 450 or 500 yuan are still too low to expect a slower increase. Nevertheless, a continuing growth in housing expenditures, at an accelerating growth rate, seems to be an implausible scenario.

The extrapolation for fuel is quite unlikely. Recall the the current fuel category consists mainly of wood and plant stalks used for cooking purposes. It is perhaps plausible that the consumption of these fuel items flattens out after an income level of approximately 300 yuan, as our results indicate. However, an increase in living space, as suggested by our housing

FIGURE 3-LINEAR AND QUADRATIC EXTRAPOLATIONS OF FUEL AND HOUSING EXPENDITURES



projections, is likely to be accompanied by an increase in the demand for fuel to be used for heating and light, in addition to cooking. This development, resulting in an increase in the demand for coal and electricity, is not captured in our data. But if our projections on housing are correct, changes in the demand for coal and electricity may be large.

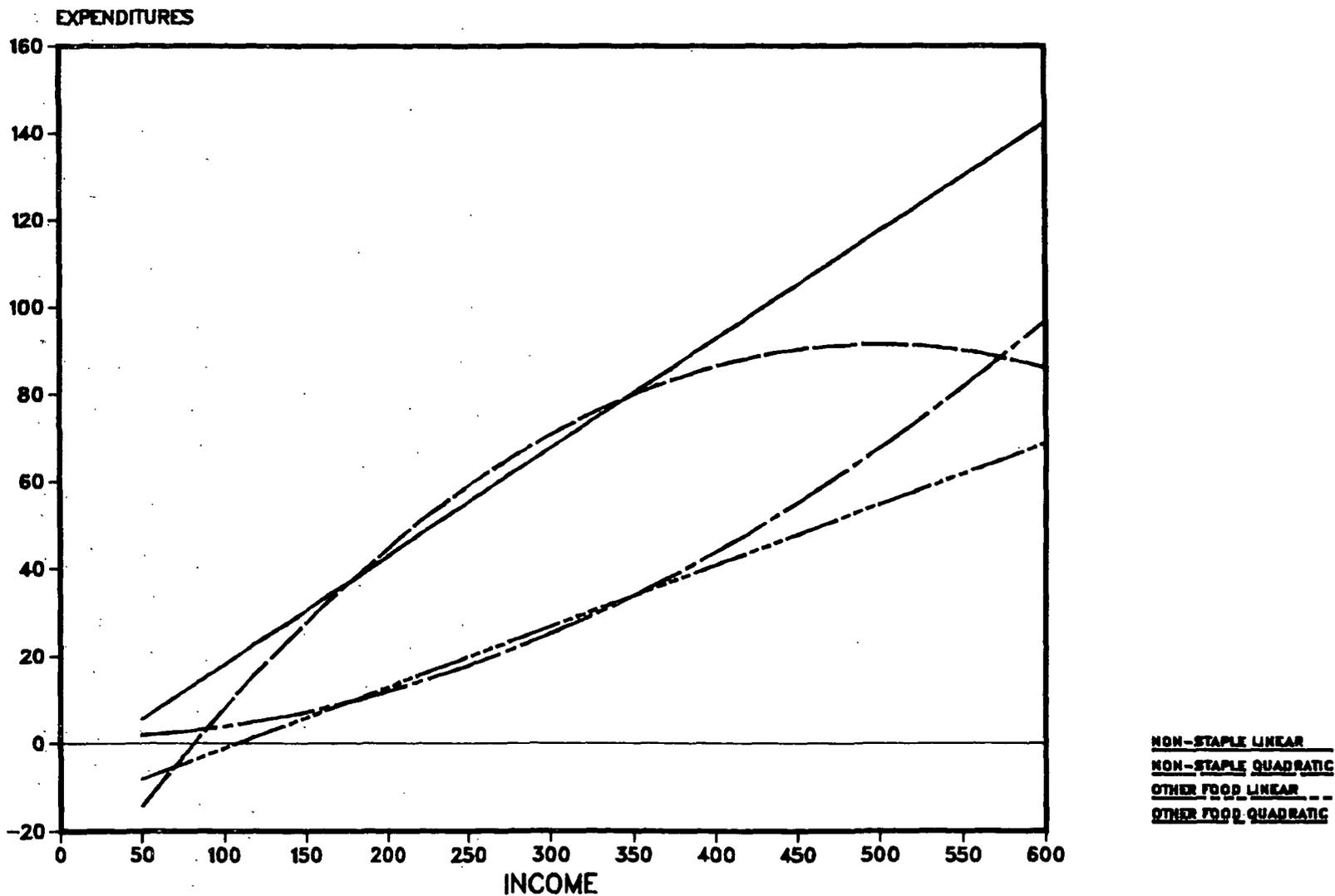
The nonlinear extrapolations for non-staple food and other food items are sketched in Figure 4. Once income exceeds about 400 yuan per capita, the linear extrapolation significantly overestimates the quadratic one.^{1/} The latter one indicates that when per capita expenditures on non-staple food reach a level of about 90 yuan at an income level of just over 400 yuan, the steep growth pattern flattens out, and expenditures stay approximately at that level.

The marginal budget share for other food increases with income. In other words, expenditure on other food will continue to grow, and at an increasing rate, when income rises. The linear extrapolation underestimates expenditures at higher income levels (e.g., at an income level of 500 yuan the linear function predicts 55 yuan but the quadratic function predicts 68 yuan per capita expenditures on other food).

Thus, while for total food not much curvature could be detected in the data, a first look at the composition of food consumption at higher income levels reveals fairly large changes. And for the more detailed food items the choice of the functional form, to be used for the extrapolations, seems to be of great importance. Consequently the projections presented in Table 3.5 should be adjusted accordingly.

^{1/} Which has to be preferred on statistical grounds since the quadratic income term showed a significant effect (Table 3.4A).

FIGURE 4—LINEAR AND QUADRATIC EXTRAPOLATIONS OF
NON-STAPLE FOOD AND OTHER FOOD



3.4.3 Other Sources of Uncertainty

In the above sections we discussed two important sources of uncertainty regarding our projections of consumption patterns: statistical uncertainty and model choice. In doing so we completely ignored the uncertainty due to possible variations in the income projections. In this section we will briefly mention some other factors that impact on the reliability of our projections.

First of all there is the usual problem of making "time-series" projections based on "cross-section" data only. In doing so we make the implicit assumption that our data stem from a stable ("equilibrated") market. This assumption may very well be violated by the structural changes that currently are taking place in China. Furthermore, the cross-section data do not allow us to address dynamic issues that are relevant to projections over time.

Second, we ignored some relevant measurement problems regarding the consumption data. Some consumption items are, at least in part, received by the household in the form of in-kind income. We can obtain some information on this by comparing the Tables 1 and 2 of the Survey of Household Income and Expenditures of Peasants by Province in the Statistical Yearbooks. The latter Tables show cash expenditures only, ignoring consumption of items received in-kind.

While per capita food expenditure averaged 117.71 yuan in 1981 and 136.52 yuan in 1982, cash expenditures were only 45.13 and 54.12 yuan, respectively. In 1981, 10.66 yuan was consumed on fuel, of which 2.90 yuan was spent in cash. For 1982 these numbers are 12.12 yuan of which 3.05 yuan

was cash. No significant differences between "consumption" and "cash expenditures" exist for the other items.

We suspected that this combination of cash expenditures and in-kind consumption may have biased our estimation results for food and fuel. But, as far as the available data allow us to test this, the estimated expenditure slopes do not seem to be influenced by this complication (see Annex 5).

The third additional source of uncertainty regards relative price changes, an issue we will address in the next section, after having presented and discussed estimates of price elasticities.

We finally mention as a source of uncertainty the supply side of the market. Up to now we have implicitly assumed that households can choose any combination of consumer goods, being only restricted by their total resources. From the current data, however, it is not clear whether shortages for certain goods (and in certain provinces) existed during the two years of observations and, if so, to what extent they influenced the observed consumption patterns. If latent demand actually exceeded supply, for instance for such items as building material for houses and consumer durables, our demand projections for these items will exceed realized demand. Moreover, our projections for the other items are then likely to be too low, unless all money not spent on the restricted items is being saved, which seems unlikely.

Even if the effect of shortages during the period 1981/82 on our estimates can be neglected, the possibility of future shortages cannot. Our projections show dramatic yearly growth rates for expenditures on other food, housing and daily articles. It is unclear whether these growth rates can be matched by similar increases in supply.

In this section we have analyzed interprovincial differences in consumption patterns. We have shown that total income (or, more precisely, total expenditure) levels explain a large part of the observed interprovincial variation in per capita consumption. We have presented projections based on income and population growth scenarios for the year 1990 and 2000. We also addressed the reliability of these projections, by briefly discussing various sources of uncertainty.

In the next section we will repeat part of these analyses, using a data set of a somewhat different nature. In Section 5 we will summarize our results, discuss "best guess" scenarios of future developments in consumer demand for each commodity, and make suggestions for further research.

4. A Complete Model of Household Consumer Demand: ELES

4.1 Household Consumption Behavior

In the previous sections we presented various regression results regarding the relationship between expenditure on a particular commodity and total consumer expenditures.^{1/} We did so without making explicit reference to any formal model of consumer behavior. In some cases, however, the regression results can be given two interpretations. First, we can view them as statistical relationships without a behavioral context. Second, we can view them as behavioral equations stemming from a particular representation of household consumption behavior.

In general such a representation states that households, in choosing the combination of goods they want to consume, maximize their welfare given their total budget. More specifically, households are supposed to maximize a utility function, U , defined over a vector of consumption goods,

$x = (x_1, x_2, \dots, x_K)$, subject to a budget constraint. Thus, the maximization problem reads:

$$\begin{aligned} \max_x U &= U(x_1, x_2, \dots, x_K) \\ \text{subject to } \sum_{i=1}^K p_i x_i &= C, \end{aligned}$$

with x_i , quantity of good i ,

p_i , price of good i ,

C , total consumption expenditures.

^{1/} In the previous section "total consumer expenditures" was called "income", for short. In what follows we will make a clear distinction between the two; in general, income will not be equal to total consumer expenditures.

The resulting demand equations look like

$$\hat{x}_i = \hat{x}_i(p_1, p_2, \dots, p_K, C) \quad i = 1, K ,$$

i.e., the optimal demand for good i , \hat{x}_i , is a function of all prices and the total budget, C .

If we assume that all households face the same prices, as is usually the case in a cross-section sample, the demand functions can be reduced to

$$\hat{x}_i = \hat{x}_i(C) \quad i = 1, K ,$$

i.e., the optimal demand for good i , \hat{x}_i , is a function of C only. Note that the difference between the statistical interpretation on the one hand, and the behavioral interpretation on the other hand, relates to the fact that in the latter case observed demand patterns are interpreted as optimal demand patterns, from the point of view of the utility maximizing household.

Different choices for the (unobservable) utility function U will result in different functional forms of the demand functions. In the previous sections we saw examples of various specifications of these so-called Engel curves. Some of the examples can be interpreted as consistent with a particular representation of household behavior. For example, the linear Engel curves can be viewed as being derived from the Linear Expenditure System, while the share-log form can be derived from the Almost Ideal Demand System.^{1/}

^{1/} See, for example, A. Deaton and J. Muellbauer, Economics and Consumer Behavior, Cambridge University Press, 1980.

In this section we will very explicitly interpret demand equations as being derived from a particular representation of consumer behavior. By doing so we will, for the time being, ignore the possibility that supply factors (such as shortages) have influenced the observed consumption patterns. As we will see below, the strong assumptions we will make regarding consumer preferences, will allow us not only to obtain income effects, but price effects as well.

4.2 The Extended Linear Expenditure System (ELES)

The best known and most widely used complete consumer demand system is the Linear Expenditure System. It is derived as follows:

Assume that households maximize the following utility function:

$$U = \sum_{i=1}^K \beta_i \ln (x_i - \gamma_i) ,$$

i.e., welfare, U , derived from consuming the commodities x_1, x_2, \dots, x_K , is a weighted sum of the logarithm of all these commodities, to the extent that the quantities consumed exceed a given minimum quantity γ_i .

It can be shown that maximization of this function subject to the budget constraint

$$\sum_{i=1}^K p_i x_i = C$$

yields the following demand equations,

$$p_i x_i = p_i \gamma_i + \beta_i (C - \sum_{j=1}^K p_j \gamma_j) \quad i = 1, K$$

or

$$x_i = \gamma_i + (\beta_i / p_i) (C - \sum_{j=1}^K p_j \gamma_j) ,$$

in other words: for all commodities, a household first buys the minimum quantity $\sum_{i=1}^K \gamma_i$ (which costs $\sum_{i=1}^K p_i \gamma_i$). After that, it splits the rest of its budget, $(C - \sum_{j=1}^K p_j \gamma_j)$, in proportions β_i . The minimum quantity γ_i is often referred to as the subsistence level of good i .

Note that when all prices are equal for all consumers, we can write the demand equations as

$$x_i = \gamma_i + \beta_i (C - \sum_{j=1}^K \gamma_j)$$

or

$$x_i = (\gamma_i - \beta_i \sum_{j=1}^K \gamma_j) + \beta_i C$$

or

$$x_i = \alpha_i + \beta_i C$$

with

$$\alpha_i = (\gamma_i - \beta_i \sum_{j=1}^K \gamma_j) .$$

Thus the linear Engel curves estimated in the previous sections can be interpreted as being derived from this consumer demand model (which is known as the Linear Expenditure System, LES).

Lluch (1973) has extended this one-period model to a multi-period model, the demand equations of which read:

$$x_i = \gamma_i + (\beta_i/p_i)(Y - \sum_{j=1}^K p_j \gamma_j)$$

or, in the absence of price differences

$$x_i = \gamma_i + \beta_i (Y - \sum_{j=1}^K \gamma_j)$$

or

$$x_i = \alpha_i + \beta_i Y$$

with

$$\alpha_i = \gamma_i - \beta_i \sum_{j=1}^K \gamma_j .$$

Thus, for estimation purposes, the only difference between the LES and the extended LES, ELES, is the fact that in the first case total consumer expenditures, C, enters the right-hand side of the equation. In the second case, total income, Y, is the explanatory variable. The difference between Y and C is, of course, equal to savings or dissavings.

In the next sections we will present estimates of ELES demand functions:

$$x_i = \alpha_i + \beta_i Y \quad i = 1, K.$$

From these estimates we will calculate the subsistence levels γ_i . We will then show how we can calculate price effects, once estimates of all β_i 's and γ_i 's have been obtained. But first we will discuss the data.

4.3 The Data

The data used for this part of the analyses stem from Hubei province and Beijing municipalities. All data for Hubei relate to peasants. For Beijing the data are for staff and workers in the urban part of the Beijing municipality.

For Hubei the data is available for 1981 and 1982. For seven per capita income classes, detailed information is available on household consumption expenditures. The main difference with data from the previous section is that in addition to total consumption expenditures, average total income is known for each income group. That allows us to estimate the ELES demand equations and, subsequently to calculate income and price elasticities.

For Beijing, the same data is available for 1982.^{1/}

^{1/} The Beijing data give nine income classes.

Tables 4.1A, 4.1B, and 4.1C give summary statistics on consumption patterns.

Per capita consumption expenditures for Hubei 1981 totalled 234.36 yuan, or 72 percent of total income. As in the previous sections the food share is the largest, 64 percent (the province data showed an average of 60 percent). Clothing takes 13 percent of the budget (the provincial average was 12 percent), followed by daily articles, 9 percent; housing, 7 percent; and fuel, 6 percent.^{1/} Note once again that the category housing, for peasants, consists mainly of expenditures on building materials.

Hubei 1982 shows slightly lower income and expenditure levels but approximately the same budget shares (housing somewhat higher, clothing lower).^{2/}

For Beijing, the breakdown of the total budget into individual components is somewhat different. The categories for food and clothing coincide with those for Hubei. Note that the budget share for food is still very large, in spite of the fact that total income and total expenditures in Beijing exceed those in Hubei by a wide margin. This apparent contradiction to Engel's Law is explained by the fact that the Beijing data relate to an urban area, with higher food prices and zero consumption of home grown produce.

^{1/} Provincial averages were 10, 10 and 5, respectively.

^{2/} The summary statistics presented in this section are unweighted averages over the seven income classes. Weighted averages show the total income and expenditure levels of 1982 to exceed those of 1981.

Table 4.1.A: Means, Standard Deviation and Budget Shares

Hubei 1981

	Mean	Standard Deviation	Budget Share
Income	323.68	234.38	--
Total Expenditure	234.36	151.34	1.0
Food	141.22	76.83	0.64
Clothing	34.63	30.34	0.13
Fuel	14.27	9.63	0.06
Housing	19.43	13.30	0.07
Daily Articles	24.98	23.46	0.09

Table 4.1.B: Means, Standard Deviation and Budget Shares

Hubei 1982

	Mean	Standard Deviation	Budget Share
Income	319.88	189.97	--
Total Expenditure	221.64	112.73	1.0
Food	135.94	48.11	0.66
Clothing	26.50	17.50	0.11
Fuel	12.62	3.65	0.06
Housing	25.06	30.17	0.09
Daily Articles	21.52	16.61	0.08

Table 4.1.C: Means, Standard Deviation and Budget Shares

Beijing 1982

	Mean	Standard Deviation	Budget Share
Income	42.31	17.11	--
Total Expenditure	37.84	14.15	1.00
Food	22.84	7.62	0.61
of which:			
Grain	5.19	0.55	0.16
Non-staple	11.90	4.56	0.36
Cigarettes, alcohol	2.06	0.97	0.05
Other	3.68	1.94	0.09
Clothing	5.24	2.36	0.14
Fuel	0.83	0.14	0.02
Non-commodities	3.50	1.14	0.09
Daily Articles	5.45	2.98	0.13

The category housing is replaced by the category "non-commodities", which includes rents. However rents is only 21 percent of this category, and so it constitutes less than 2 percent of the total budget. This reflects the high subsidies for housing for staff and workers in urban areas. As also shown in Table 4.1.D, transportation cost accounts for 24 percent of the group of non-commodities, while water and electricity together account for 12 percent. Other items include tuition, expenditures on nurseries and kindergärten and repairs. These are all items that have virtually zero expenditures in rural areas.

Table 4.1.D: Non-Commodities: Means,
Standard Deviation and Shares

Beijing 1982

	Mean	Standard Deviation	Share
Total Non-commodities	3.497	1.39	1.0
of which:			
Rents	0.704	0.170	0.212
Water	0.168	0.037	0.052
Electricity	0.243	0.090	0.068
Tuition	0.228	0.090	0.084
Nursery and kindergarten	0.366	0.222	0.099
Transportation	0.856	0.374	0.239
Postage and telephone	0.053	0.022	0.015
Entertainment	0.155	0.085	0.040
Repairs	0.331	0.210	0.085
Medical expenses	0.156	0.056	0.044
Other non- commodities	0.238	0.105	0.065
Tax	0.003	0.007	0.0007

A further breakdown of the category daily articles is also available for Beijing (Table 4.1.E). The largest share of this category is for articles of daily use, such as kitchen utensils and appliances. Urban households spent about 1.17 yuan per capita per month on entertainment and minor amounts on books, non-prescription drugs and other commodities.

Table 4.1.E: Daily Articles: Means,
Standard Deviation and Shares

Beijing 1982

	Mean	Standard Deviation	Share
Total Articles	5.45	2.98	1.0
of which:			
Articles of daily use	3.37	1.95	0.608
Entertainment	1.178	0.75	0.209
Books and periodicals	0.37	0.14	0.076
Drugs and medical articles	0.20	0.006	0.050
House and building material	0.11	0.072	0.018
Other commodities	0.22	0.12	0.38

4.4 Estimation Results

For each of the three samples we estimated the following set of equations:

$$x_i = \alpha_i + \beta_i Y \quad i = 1, K$$

with x_i , consumption of good i ,

Y , total income.

The coefficient β_i is the marginal propensity to consume item i out of total income. The sum of all β_i 's is the overall marginal propensity to consume, μ , i.e.:

$$\mu = \sum_{i=1}^K \beta_i$$

Obviously, $(1 - \mu)$ is the marginal propensity to save.

Table 4.2 gives the estimation results for β_i . ^{1/}

We first note that the marginal propensity to consume declined slightly in Hubei, from 0.693 in 1981 to 0.652 in 1982. Thus the rural data imply the very high marginal savings rates of 0.307 and 0.348, respectively. For Beijing, the marginal savings rate is 0.173. ^{2/}

In all cases food has the highest marginal share, especially for Beijing where 44 fen out of every additional yuan is being spent on food.

The results for Hubei 1981 and Hubei 1982 do show some variation, which is probably due to data problems regarding income and housing for Hubei 1982. We therefore decided to base our subsequent analyses on the data for Hubei 1981 only.

^{1/} Complete estimation results of the demand equation are given in Annex 5.

^{2/} One source of this urban-rural difference in the marginal savings rate is that rural income is gross of expenditures on sideline activities. A net income figure would be 8-10 percent lower.

Table 4.2: Marginal Propensities to Consume Out of Income, β_i
(standard error in parentheses)

	Hubei 1981	Hubei 1982	Beijing 1982
Food	0.326 (0.016)	0.249 (0.021)	0.444 (0.011)
of which:			
grain	NA	NA	0.014 (0.011)
non-staple food	NA	NA	0.265 (0.010)
tobacco, alcohol, etc.	NA	NA	0.056 (0.004)
other	NA	NA	0.110 (0.010)
Clothing	0.130 (0.011)	0.090 (0.009)	0.137 (0.006)
Fuel	0.040 (0.003)	0.019 (0.002)	0.007 (0.002)
Housing	0.048 (0.014)	0.148 (0.026)	
Non-commodities			0.065 (0.006)
Daily Articles	0.099 (0.007)	0.087 (0.004)	0.174 (0.004)
$\mu = \sum_{i=1}^K \beta_i$	0.642	0.593	0.827

NA in the Table means data not available.

Based on estimates of all α_i 's and β_i 's we calculate the subsistence levels γ_i . Table 4.3 presents the results. Note first that the results for Hubei relate to yearly data and for Beijing to monthly data.

Table 4.3. Estimates of Subsistence Levels, γ_i

	Hubei 1981 (yearly)	Beijing 1982 (monthly)
Food	59.99	11.41
of which:		
grain	NA	4.84
non-staple food	NA	5.03
tobacco, alcohol, etc.	NA	0.64
other	NA	0.86
Clothing	2.30	1.73
Fuel	4.19	0.74
Housing	7.49	
Non-commodities		1.84
Daily Articles	<u>0.39</u>	<u>0.98</u>
Total	74.29	16.70

NA in this table means data not available.

Taking the "subsistence level" interpretation of the parameters γ_i literally, we find that this level for total consumption in Hubei is 74.29 yuan in 1981. For Beijing the comparable yearly level is 200.40 yuan.

For Hubei, over 80 percent of subsistence expenditures is for food, 10 percent is for housing, and the rest for fuel and clothing.

For Beijing we find that: 68 percent of subsistence expenditures is for total food, while slightly less than half of this is for grain. Monthly per capita subsistence expenditures on clothing, fuel and daily articles are very low. The γ -coefficient for non-commodities which includes rent, equals 1.84 yuan per capita.

We will now use the estimated β coefficients (Table 4.2) and the calculated γ -coefficients (Table 4.3) to calculate income and price elasticities for all goods.

4.5 Income Elasticities

Recall that the demand equations estimated in Section 4.4 can be interpreted as stemming from the Extended Linear Expenditure System. The general form of a demand equation in that system is:

$$p_i x_i = p_i \gamma_i + \beta_i (Y - \sum_{j=1}^K p_j \gamma_j)$$

For this demand equation^{1/} it can be shown that the income elasticity is equal to:

$$\epsilon_i = \frac{\partial x_i}{\partial Y} \cdot \frac{Y}{x_i} = \beta_i \frac{Y}{x_i} .$$

The own price elasticity equals:

$$\eta_{ii} = [(1 - \beta_i) \gamma_i / x_i] - 1 .$$

The cross price elasticity equals:

^{1/} Note, that no observations are available on prices, and all households are assumed to face the same prices. Consequently all prices can be set equal to 1.0 without loss of generality. For details on calculating the elasticities, see Lluh et al. (1977).

$$\eta_{ij} = -\beta_i \gamma_j / x_i \quad i \neq j .$$

Income elasticities and elasticities with respect to total expenditures are presented in Table 4.4. For ease of comparison with Section 3, we will restrict ourselves to discussing the latter to, facilitate comparison with the previous section.

With two exceptions, the results show a relatively stable pattern. As expected, food is a necessity with an income elasticity ranging from 0.834 in Hubei to 0.891 in Beijing. Based on the province data we found a range of 0.759 to 0.802

Table 4.4: Income and Total Expenditure Elasticities

	<u>Income Elasticities</u>		<u>Total Expenditure Elasticities</u>	
	Hubei 1981	Beijing 1982	Hubei 1981	Beijing 1982
Food	0.747	0.822	0.843	0.891
of which:				
Grain	NA	0.114	NA	0.117
Non-staple	NA	0.942	NA	1.021
Cigarettes, etc.	NA	1.150	NA	1.231
Other	NA	1.265	NA	1.368
Clothing	1.215	1.106	1.374	1.192
Fuel	0.907	0.357	1.035	0.365
Housing	0.800		0.865	
Non-commodities		0.786		0.843
Daily articles	1.282	1.351	1.454	1.458

NA = data not available.

(Table 3.3). The very low elasticity for staple food also confirms our previous findings, though the value of 0.117 is only half of what we found in the previous section. The urban nature of the Beijing sample may explain part of this difference.

Clothing turns out to be a luxury in these samples, while the province data implied an income elasticity of about 0.70. Thus if the results from the Beijing and Hubei surveys are to be believed, we significantly underestimated the growth rate of clothing expenditures in the previous section.

Daily articles show an elasticity of about 1.45, which is close to the result presented in Table 3.3 (1.328).

The results for fuel are quite surprising, an expenditure elasticity of 1.035 in Hubei, and only 0.305 in Beijing. Perhaps that urban/rural differences in the distribution of fuel (mainly coal) are responsible for this large difference.

The largest difference between the province data and the results from the current data sets is for housing. For Hubei we find an elasticity of 0.800, while the province data yield 2.692. Clearly more detailed information on housing expenditures is needed to obtain more reliable results.

In Table 4.5 we present total expenditure elasticities as presented by Lluch et al. The elasticities are average values of studies in 16 countries, all based on the Extended Linear Expenditure System. The averages are given by income class.^{1/}

^{1/} Note that the consumption groups are not always equal to the ones used in this study.

Table 4.5: Average Values of Total Expenditure Elasticities,
by Income Class

Income Class <u>1/</u>	Food	Clothing	Housing	Durables	Personal Care	Transport	Recreation	Other Services
100-500	0.66	0.97	1.01	1.98	1.53	2.46	1.81	1.79
500-1,000	0.82	1.28	0.68	1.51	1.10	1.34	1.35	1.18
1,000-1,500	0.67	1.09	0.93	1.70	1.20	1.60	1.29	1.30
1,500 and over	0.50	0.72	1.24	1.20	1.60	1.72	0.90	1.77
Overall	0.64	0.98	1.00	1.58	1.39	1.80	1.31	1.54

1/ Class intervals refer to GNP per capita at sample midpoints in 1970 U.S. dollars.

Source: Lluch et al., Table 3.12, p. 54.

Our results for food are well within the range presented by Lluch et al. The elasticities for clothing calculated from the Hubei and Beijing samples seem quite high compared to Table 4.5, but the province data yield an elasticity for clothing which is slightly less than the lowest value presented by Lluch et al.

The Hubei data show an expenditure elasticity for housing of 0.800. Lluch et al. show a relatively narrow range from 0.68 to 1.24, so our result seems quite plausible. However, we should note again the high elasticity implied by the province data, which is well outside this range.

To the extent that "Daily Articles" and "Durables" refer to approximately the same commodities, our results are very close to the overall average of 1.58. No direct comparisons can be made for fuel. In sum, to the extent that international comparisons can be used as a guide to judge the plausibility of our results, we do not find any strong suggestions that the results for China are very different from those of other countries, with the exception of housing.

To complete the picture we present, in Table 4.6, income elasticities for the detailed breakdown of the groups non-commodities and articles for Beijing 1982.^{1/}

^{1/} The estimation results from which these elasticities have been derived are presented in Annex 6.

Table 4.6: Income Elasticities; Beijing 1982

Non-commodities	0.786	Articles	1.458
of which:		of which:	
Rent	0.535	Articles of	1.351
Water	0.428	daily use	
Electricity	0.871	Entertainment	1.555
Tuition	-0.891	Books	0.800
Child Care	0.566	Drugs	0.085
Transportation	1.073	Building mat.	1.154
Postage and Telephone	0.958	Other	1.346
Entertainment	1.338		
Repairs	1.559		
Medical Expenses	0.624		
Other	1.013		

4.6 Price Elasticities

In Table 4.7 we present own price elasticities, as calculated from our regression results.

Table 4.7: Own Price Elasticities

	Hubei 1981	Beijing 1982
Food	-0.714	-0.722
of which:		
grain	NA	-0.080
non-staple food	NA	-0.686
tobacco, alcohol, etc.	NA	-0.707
other	NA	-0.792
Clothing	-0.942	-0.977
Fuel	-0.718	-0.115
Housing	-0.633	
Non-commodities		-0.508
Daily Articles	-0.986	-0.851

NA in this table means data not available.

We see a relatively stable pattern. The price elasticity for food is quite high (in absolute value). As we can see for Beijing 1982, this is mainly due to a large price elasticity for the luxury food items. Staple food (grain) shows a price elasticity of only -0.080 . An international comparison shows that our results exceed all values reported by Lluch et al., (see Table 4.8).

For clothing we find also fairly large elasticities, within a narrow range, -0.942 to -0.977 . The overall average for other countries is only -0.46 . The same for daily articles: very stable results, but fairly large elasticities as compared to other countries. The own price elasticities for fuel and housing seem to be quite different in urban and rural areas.

In general, we find own-price elasticities that exceed those in other countries, but the results seem quite plausible and, with few exceptions, are relatively stable across the two samples.

We also calculated cross-price elasticities for all commodities. With the exception of the cross-elasticities with respect to the food price, all cross-price elasticities turned out to be less than 0.05 . We therefore present the cross elasticities for the food price only (Table 4.9).

While the own-price elasticities turned out to be rather large, as compared to other countries, the cross-price elasticities lie below international averages (compare to Table 4.10). However, the results still indicate that an increase in the food price (relative to the price of all other commodities) may significantly reduce the demand for clothing, daily articles and, to a lesser extent, housing.

Table 4.8: Own-price Elasticities, Average Values
by Income Class

Income Class <u>1/</u>	Food	Clothing	Housing	Durables	Personal Care	Transport	Recreation	Other Services
100-500	-0.48	-0.30	-0.28	-0.46	-0.34	-0.53	-0.46	-0.45
500-1,000	-0.57	-0.60	-0.40	-0.67	-0.51	-0.61	-0.64	-0.49
1,000-1,500	-0.40	-0.53	-0.52	-0.75	-0.61	-0.73	-0.63	-0.69
1,500 and over	-0.41	-0.46	-0.74	-0.71	-0.87	-0.96	-0.56	-1.01
Overall	-0.47	-0.46	-0.51	-0.65	-0.60	-0.73	-0.57	-0.69

1/ Class intervals refer to GNP per capita at sample midpoints in 1970 U.S. dollars.

Source: Lluch et al., Table 3.13, p. 55.

Table 4.9: Cross-elasticities with Respect to the Food Price

	Hubei 1981	Beijing 1982
Clothing	-0.225	-0.298
Fuel	-0.168	-0.096
Housing	-0.147	-0.212
Daily Articles	-0.238	-0.364

Table 4.10: Cross Elasticities with Respect to the Food Price
Average Values by Income Class

Income Class <u>1/</u>	Clothing	Housing	Durables	Personal Care	Transport	Recreation	Other Services
100-500	-0.46	-0.54	-1.01	-0.78	-1.25	-0.88	-0.89
500-1,000	-0.36	-0.18	-0.41	-0.30	-0.38	-0.36	-0.33
1,000-1,500	-0.32	-0.26	-0.50	-0.33	-0.47	-0.36	-0.36
1,500 and over	-0.17	-0.31	-0.29	-0.40	-0.43	-0.21	-0.44
Overall	-0.31	-0.33	-0.54	-0.46	-0.64	-0.44	-0.51

1/ Class intervals refer to GNP per capita at sample midpoints in 1970 U.S. dollars.

Source: Lluch et al., Table 3.14, p. 56.

4.7 Food Price Effects: An Example

In Section 3 we presented demand projections based on income changes only. In Table 4.11 we show what happens when the food price increases, relative to all other prices. The results are based on the Beijing 1982 data. The first column gives increases in per capita consumption, due to income growth as projected in the medium growth scenario. The results indicate a 101 percent increase in per capita consumption.

The first price scenario we simulated, assumes a ten percent increase of the food price, relative to all other prices, in 1990. And a 20 percent increase in the year 2000. As a result the quantity of food consumed per capita shows only a 20 percent increase in 1990 (instead of 32 percent as projected under the constant price scenario), and an 72 percent increase in 2000 (instead of 101 percent). Expenditures on food rise 28 percent and 106 percent, respectively.

The last two columns show the effect of a 20 percent food price increase in 1990 and a 40 percent increase in 2000. The results clearly indicate the large price effect on the quantity consumed. The effect on expenditures is much less, as of course can be expected.

In the next section we will summarize our results and make suggestions for further research.

Table 4.11: Food Consumption Projections; Beijing

	Constant Prices	Food price increase: 1990 = +10 percent 2000 = +20 percent		Food price increase: 1990 = +20 percent 2000 = +40 percent	
		<u>Quantity</u>	<u>Expenditures</u>	<u>Quantity</u>	<u>Expenditures</u>
1982 (¥ per month)	22.84	22.84	22.84	22.84	22.84
1990/ 1982	+32.8%	+20.76%	+27.9%	+18.2%	+21.9%
2000/ 1982	+101.0%	+72.0%	+106.4%	+51.4%	+112.0%

5. Summary and Conclusion

In this study we analyzed a limited number of data on consumption in China, and used the results to give indications about plausible developments in consumption patterns resulting from continuing economic growth. In this section we will summarize our results and qualify them where necessary.

Food

The budget share for food is very high in China, which indicates a relatively low level of economic well-being. The share will decrease, but food will continue to be the largest item in the budget of an average peasant household. Based on the medium growth income scenario, and a 17.8 percent increase in population between 1982 and 2000, food consumption will grow at a rate of 4.12 percent per year. This projection uses the results from the province data. Additional information from the Hubei and Beijing samples does not suggest any major modifications.

The composition of the food budget will change significantly. Total consumption of staple food will grow a modest 1 percent per year, non-staple food 5.57 percent and other food items 9.30 percent. Some of the results indicate that these projections overestimate the demand growth for non-staple food, but underestimate the growth in other food consumption.

Clothing

Based on the province data we project a yearly growth rate of just over four percent for the demand for clothes. The Hubei and Beijing samples suggest that this projections may be too low. If the income elasticity of clothing is indeed, closer to 1.3 (Hubei and Beijing samples) than to 0.7 (province data) the yearly growth rate maybe closer to seven percent.

Fuel

We project that fuel consumption will grow less than three percent annually. Fuel in rural China consists mainly of wood and plant stalks for cooking purposes. It seems plausible that the demand for fuel for heating and light will start to rise due to better (larger) housing facilities. Also the demand for fuel for transportation may increase. These items are negligible in the current data.

For Beijing we find an income elasticity for electricity of 0.871, and for transportation of 1.073. Both results suggest that the demand for fuel in rural China may grow much faster than now projected, once electricity and vehicles become more commonly available.

Housing

In rural China, housing expenditures are for building material. We seem to witness a transition from mud houses to brick houses. And this transition has a very steep income gradient. Consequently we project a very large growth rate, 9.21 percent per year. Indeed the data seem to indicate that this growth rate may even be too low.

If the current building activities are eliminating shortages of the past, one can expect a flattening out of the demand curve once reasonable housing conditions have been obtained. The data currently available do not show such a trend. More detailed data for households at higher income levels are needed, to improve on the housing projections.

The Beijing data show a modest income elasticity for rent: 0.535. This probably reflects the fact that housing subsidies are a normal part of the total compensation package for staff and workers in urban areas. This job

related rationing mechanism is likely to bias the income effect downward. Consequently this low income elasticity may severely underestimate the future (latent) demand for housing.

Daily Articles

Perhaps the most interesting category of consumption goods is that of daily articles. We project a yearly growth rate of 6.17 percent. However, we would not be surprised if this turns out to be far too low. A major problem with the current study is that we implicitly assume that the observed demand patterns reflect the choice of the household. However, supply factors may also have played a role. The next step in the analysis of consumption in China should take a closer look at these supply factors. Shortages are likely to occur in various consumer goods. In a follow-up study we will take a more detailed look at the category daily articles. We will then try to make an assessment on how shortages of various goods, especially of such durables as television sets or bicycles, may have influenced observed consumption patterns.

General

In this paper we have almost completely ignored one potential source of information that can be used as a base for projecting China's future household consumption patterns: international comparisons. This omission allowed us to ignore the major problem of comparing relative prices across countries. Nevertheless, given the scarcity of information on past and current consumption patterns in China, international comparisons may yield useful insights into China's likely development. In a follow-up study we will attempt to deal with this issue.

Annex 1

Total expenditures projections 1983-2000: Three scenarios

<u>Percent growth per year</u>	<u>1980-1990</u>	<u>1990-2000</u>
High	5.0	6.0
Medium	4.0	5.0
Low	3.0	4.0

Per Capita Consumption Expenditures

	<u>High</u>	<u>Medium</u>	<u>Low</u>
1983	241.06	238.76	236.47
1984	253.11	248.31	243.56
1985	265.77	258.25	250.87
1986	279.06	268.58	258.40
1987	293.01	279.32	266.15
1988	307.66	290.49	274.13
1989	323.04	302.11	282.36
1990	339.20	314.20	290.83
1991	359.55	329.91	302.46
1992	381.12	346.40	314.56
1993	403.99	363.72	327.14
1994	428.23	381.91	340.23
1995	453.92	401.00	353.83
1996	481.16	421.05	367.99
1997	510.02	442.11	382.71
1998	540.63	464.21	398.02
1999	573.06	487.42	413.94
2000	607.45	511.79	430.49

Annex 2

Expenditures projections 1983-2000, by item

Per Capita Food Expenditures

	<u>High</u>	<u>Medium</u>	<u>Low</u>
1983	138.89	137.86	136.83
1984	144.30	142.14	140.01
1985	149.98	146.61	143.29
1986	155.95	151.24	146.68
1987	162.21	156.07	150.15
1988	168.79	161.08	153.74
1989	175.70	166.30	157.43
1990	182.95	171.73	161.24
1991	192.09	178.78	166.46
1992	201.78	186.19	171.89
1993	212.04	193.96	177.54
1994	222.93	202.13	183.42
1995	234.46	210.70	189.52
1996	246.69	219.70	195.88
1997	259.65	229.16	202.49
1998	273.40	239.08	209.36
1999	287.96	249.50	216.51
2000	303.40	260.45	223.94

Per Capita Staple Food Expenditures

	<u>High</u>	<u>Medium</u>	<u>Low</u>
1983	68.25	68.10	67.96
1984	69.02	68.71	68.41
1985	69.83	69.35	68.88
1986	70.68	70.01	69.36
1987	71.57	70.70	69.86
1988	72.51	71.41	70.37
1989	73.50	72.16	70.89
1990	74.53	72.93	71.44
1991	75.83	73.94	72.18
1992	77.21	74.99	72.95
1993	78.68	76.10	73.76
1994	80.23	77.26	74.60
1995	81.87	78.49	75.47
1996	83.62	79.77	76.37
1997	85.46	81.12	77.32
1998	87.42	82.53	78.30
1999	89.50	84.02	79.31
2000	91.70	85.58	80.37

Annex 2 (continued)

Expenditures projections 1983-2000, by item

Per Capita Non-Staple Food Expenditures

	<u>High</u>	<u>Medium</u>	<u>Low</u>
1983	52.28	51.71	51.15
1984	55.24	54.06	52.89
1985	58.35	56.50	54.69
1986	61.62	59.04	56.54
1987	65.05	61.69	58.45
1988	68.66	64.44	60.41
1989	72.44	67.29	62.43
1990	76.42	70.27	64.52
1991	81.42	74.13	67.38
1992	86.73	78.19	70.36
1993	92.36	82.45	73.45
1994	98.32	86.92	76.67
1995	104.64	91.62	80.02
1996	111.34	96.55	83.50
1997	118.44	101.73	87.12
1998	125.97	107.17	90.89
1999	133.95	112.88	94.80
2000	142.41	118.87	98.87

Per Capita Other Food Expenditures

	<u>High</u>	<u>Medium</u>	<u>Low</u>
1983	18.36	18.04	17.73
1984	20.04	19.37	18.71
1985	21.80	20.75	19.73
1986	23.65	22.19	20.77
1987	25.59	23.68	21.85
1988	27.62	25.24	22.96
1989	29.76	26.85	24.10
1990	32.01	28.53	25.28
1991	34.83	30.71	26.90
1992	37.83	33.01	28.58
1993	41.01	35.41	30.33
1994	44.38	37.94	32.15
1995	47.95	40.60	34.04
1996	51.74	43.38	36.01
1997	55.75	46.31	38.05
1998	60.00	49.38	40.18
1999	64.51	52.61	42.39
2000	69.29	56.00	44.70

Annex 2 (continued)

Expenditures projections 1983-2000, by item

Per Capita Expenditures on Clothes

	<u>High</u>	<u>Medium</u>	<u>Low</u>
1983	27.93	27.75	27.56
1984	28.91	28.52	28.14
1985	29.94	29.33	28.73
1986	31.01	30.16	29.34
1987	32.14	31.03	29.97
1988	33.33	31.94	30.61
1989	34.58	32.88	31.28
1990	35.88	33.86	31.97
1991	37.53	35.13	32.91
1992	39.28	36.47	33.89
1993	41.13	37.87	34.91
1994	43.10	39.34	35.97
1995	45.18	40.89	37.07
1996	47.38	42.51	38.22
1997	49.72	44.22	39.41
1998	52.20	46.01	40.65
1999	54.83	47.83	41.94
2000	57.61	49.86	43.28

Per Capita Expenditures on Fuel

	<u>High</u>	<u>Medium</u>	<u>Low</u>
1983	12.06	12.00	11.94
1984	12.37	12.25	12.12
1985	12.70	12.50	12.31
1986	13.04	12.77	12.51
1987	13.41	13.05	12.71
1988	13.79	13.34	12.92
1989	14.19	13.64	13.13
1990	14.61	13.96	13.35
1991	15.14	14.37	13.65
1992	15.70	14.80	13.97
1993	16.29	15.25	14.29
1994	16.92	15.72	14.64
1995	17.59	16.22	14.99
1996	18.30	16.74	15.36
1997	19.05	17.28	15.74
1998	19.85	17.86	16.14
1999	20.69	18.46	16.55
2000	21.58	19.10	16.98

Annex 2 (continued)

Expenditures projections 1983-2000, by item

Per Capita Expenditures on Housing

	<u>High</u>	<u>Medium</u>	<u>Low</u>
1983	30.30	29.64	28.99
1984	33.75	32.38	31.02
1985	37.37	35.22	33.11
1986	41.17	38.17	35.26
1987	45.16	41.24	37.48
1988	49.35	44.44	39.76
1989	53.75	47.76	42.11
1990	58.37	51.22	44.54
1991	64.19	55.71	47.86
1992	70.36	60.43	51.32
1993	76.90	65.38	54.92
1994	83.83	70.58	58.66
1995	91.18	76.04	62.55
1996	98.97	81.78	66.60
1997	107.22	87.80	70.81
1998	115.98	94.12	75.19
1999	125.25	100.76	79.75
2000	135.09	107.73	84.48

Per Capita Expenditures on Culture and Services

	<u>High</u>	<u>Medium</u>	<u>Low</u>
1983	5.39	5.35	5.31
1984	5.53	5.51	5.43
1985	5.81	5.68	5.55
1986	6.03	5.85	5.68
1987	6.27	6.04	5.81
1988	6.52	6.23	5.95
1989	6.78	6.42	6.09
1990	7.06	6.63	6.23
1991	7.40	6.90	6.43
1992	7.77	7.18	6.64
1993	8.16	7.47	6.85
1994	8.57	7.78	7.07
1995	9.01	8.11	7.30
1996	9.47	8.45	7.54
1997	9.96	8.80	7.80
1998	10.48	9.18	8.06
1999	11.03	9.58	8.33
2000	11.62	9.99	8.61

Annex 3

Interval prediction for linear fit of food expenditures

The interval prediction^{1/} (95 percent, two-tailed) for the mean value of the dependent variable (i.e., food expenditures) at given levels of the explanatory variable x (i.e., income) is given by

$$\hat{\alpha} + \hat{\beta}\hat{x} \pm t_{\epsilon/2} \hat{s} \sqrt{\frac{1}{n} + \frac{(\hat{x} - \bar{x})^2}{\sum \dot{x}_i^2}}$$

where

- x_i is the observed value,
- \hat{x} is the given value,
- \bar{x} is the sample mean,
- \hat{s} is the standard deviation of \bar{x} ,
- n is the number of observations,
- $\dot{x}_i = x_i - \bar{x}$ is the i^{th} deviation from the mean value.

^{1/} See M. D. Intriligator, "Econometric Models, Techniques and Applications," North Holland, 1978.

Annex 3 (continued)

<u>Income</u>	<u>Upper Bound 95 percent interval</u>	<u>Lower Bound 95 percent interval</u>
100	100.17	40.92
150	121.89	74.09
200	137.54	103.33
250	161.94	123.82
300	193.31	137.34
350	227.17	148.37
400	261.89	158.54
450	296.99	168.33
500	332.27	177.93
550	367.67	187.43
600	403.13	196.86

Annex 4

Cash versus total expenditures

In order to see how sensitive our results are to the particular way in which consumption has been measured, we re-estimated the linear Engel curves for food and fuel, using cash expenditures on these items as the dependent variable and total cash expenditures as the independent one. The results for food are illustrated in Figure 5, for 1981.

These results are consistent with the following simple model:

$$(x_c + x_K) = \alpha_1 + \beta(Y_c + x_K) ,$$

where x_c is cash expenditure,

x_K is value of consumer goods received in-kind,

Y_c is cash income;

i.e., we assume that everyone receives the same quantity (on a per capita base) of food.^{1/}

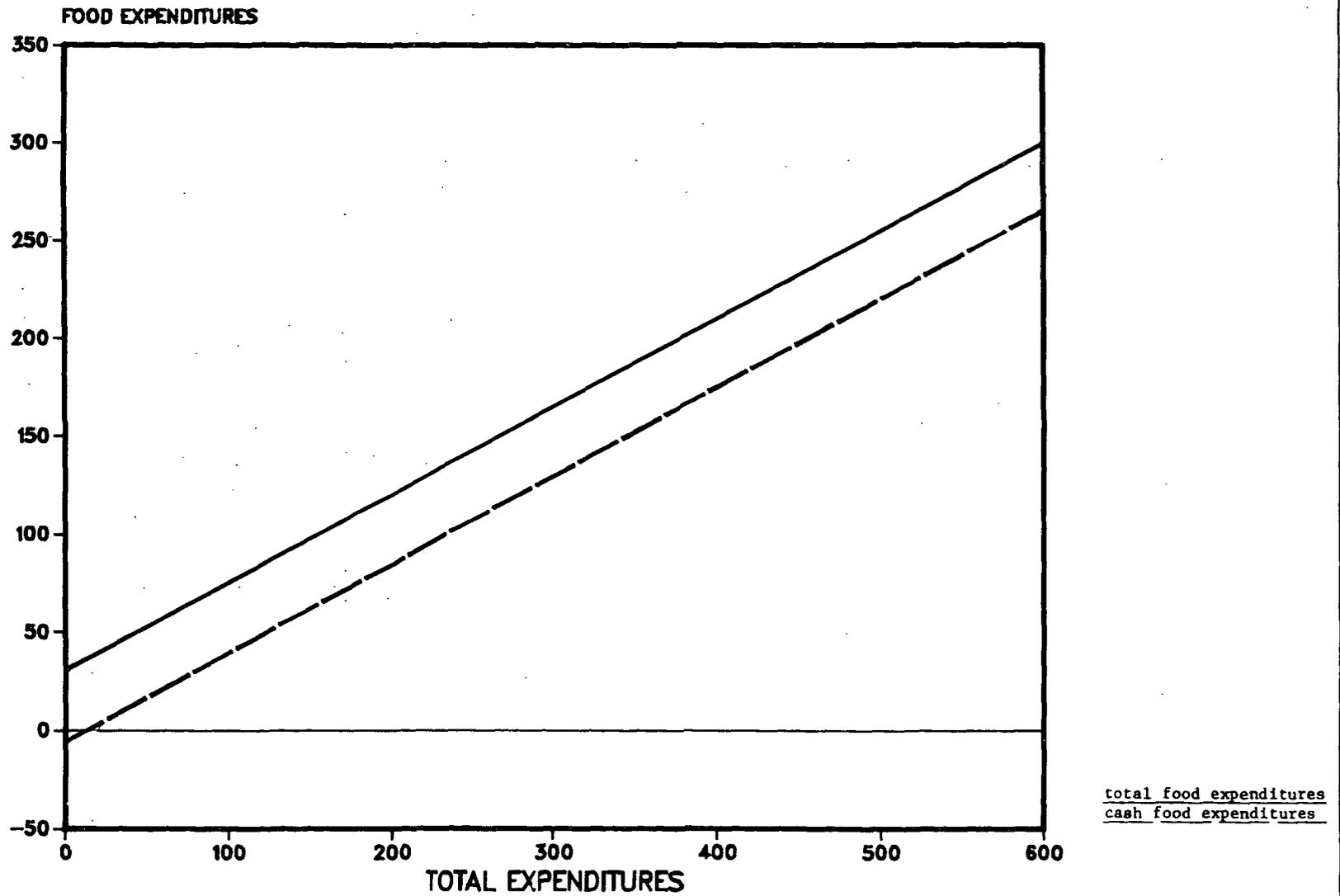
The value of this quantity, x_K , is added to both cash consumption and cash income to obtain total consumption and income measures.

This equation, of course, can be written as:

$$x = \alpha_1 + \beta Y$$

^{1/} This need not be the case. For instance in-kind distribution of food and fuel may be a function of cash income.

FIGURE 5—TOTAL VS CASH FOOD EXPENDITURES



where $x = x_c + x_K$,

$$Y = Y_c + Y_K.$$

We have estimated this equation in the previous section. Subtracting x_K from both sides, yields

$$x_c = \alpha_2 + \beta Y_c$$

where $\alpha_2 = \alpha_1 + (\beta - 1) x_K$.

Note that if this simple model is correct, the estimate for β in this equation should be equal to the β in the previous equation. This seems to be the case: the two regressions yield parallel Engel curves.

Since similar results were obtained for fuel, we conclude that the fact that consumption includes both cash expenditures and in-kind items, does not seem to have biased our results.

Table A4: Cash Versus Total Expenditures, Regression Results

	<u>Constant</u>	<u>Total Expenditures</u>	<u>R²</u>
Total Food Expenditures	30.653	0.449 (0.02)	0.892
Cash Expenditures	-5.746	0.452 (0.02)	0.951

Total Fuel Expenditures	5.789	0.026 (0.01)	0.201
Cash Fuel Expenditures	2.086	0.007 (0.006)	0.019

Annex 5

Linear regression results, Hubei 1981 and 1982, Beijing

	Hubei			Hubei 1982		
	Constant	Income	\bar{R}^2	Constant	Income	\bar{R}^2
Food	35.771	0.326 (0.016)	0.985	56.261	0.249 (0.021)	9.960
Clothing	-7.357	0.130 (0.011)	0.958	-2.271	0.090 (0.009)	0.942
Fuel	1.214	0.040 (0.003)	0.956	6.629	0.019 (0.002)	0.938
Housing	3.933	0.048 (0.014)	0.654	-22.346	0.148 (0.026)	0.844
Daily Articles	-6.964	0.099 (0.007)	0.966	-6.348	0.087 (0.004)	0.990

	Beijing 1982		
	Constant	Income	\bar{R}^2
Food	4.034	0.444 (0.011)	0.995
of which:			
Staple	4.603	0.014 (0.011)	0.073
Non-staple	0.686	0.265 (0.010)	0.989
Alcohol, etc.	-0.293	0.056 (0.110)	0.951
Other food	-0.968	0.110 (0.010)	0.934
Clothing	-0.542	0.137 (0.006)	0.982
Fuel	0.537	0.007 (0.002)	0.660
Non-commodities	0.756	0.065 (0.006)	0.939
Daily articles	-1.912	0.174 (0.004)	0.996

Annex 6

Regression results for articles and non-commodities

Beijing 1982

	<u>Constant</u>	<u>Income</u>	<u>R²</u>
<u>Articles</u>	-1.912	0.174 (0.004)	0.996
of which:			
Articles of daily use	-1.434	0.114 (0.005)	0.987
Entertainment	-0.634	0.043 (0.004)	0.936
Books and periodicals	0.071	0.007 (0.001)	0.772
Drugs	0.188	0.0004 (0.0013)	-0.127
House and building material	-0.028	0.003 (0.0009)	0.599
Other commodities	-0.074	0.007 (0.0007)	0.917
<u>Non-commodities</u>	0.756	0.065 (0.006)	0.939
of which:			
Rents	0.326	0.009 (0.002)	0.781
Water	0.098	0.002 (0.0005)	0.556
Electricity	0.032	0.005 (0.0006)	0.893
Tuition	0.431	0.005 (0.008)	0.799
Child care	0.160	0.005 (0.005)	0.020

Annex 6 (Continued)

Regression results for articles and non-commodities

Beijing 1982

	<u>Constant</u>	<u>Income</u>	<u>\bar{R}^2</u>
Transportation	-0.060	0.022 (0.001)	0.981
Postage and telephone	0.001	0.001 (0.0001)	0.934
Entertainment	-0.050	0.005 (0.0004)	0.939
Repairs	-0.187	0.012 (0.0004)	0.989
Medical expenses	0.058	0.002 (0.0009)	0.435
Other	-0.004	0.006 (0.0008)	0.864

The following list of papers and publications have been used for background information in writing this report. A large number of these reports were previously only available in Chinese and were provided to the author by staff of the Chinese Academy of Social Sciences, as part of the cooperative research project.

List of Literature

1. TITLE : Nationwide survey of worker family cost of living
AUTHOR :
REF :
CONTENTS : Data from 1980 survey; 86,955 white and blue collar workers in 44 cities; income, income distribution, wages; 6 pages.
2. TITLE : Trends in demand in Guangdong province for ten durable consumer products
AUTHOR :
REF : Guangdong Province Statistical Bureau
CONTENTS : 1980 survey among 450 worker households and 539 commune member households; purchases, latent demand and projected demand for ten durables; 5 pages.
3. TITLE : Reductions in the scale of investment in capital construction and subsequent changes in investment trends
AUTHOR :
REF :
CONTENTS : Beijing 1981 data; capital construction, retail sales, farmer income, urban employment, population; 5 pages.
4. TITLE : Consumption of chemical fiber materials by urban and rural residents far from being saturated
AUTHOR : Yang Xiaomei
REF : Hubei province
CONTENTS : Survey of 613 urban and rural households on consumption of chemical fiber materials; Hubei province, 1982; 7 pages.
5. TITLE : Improvement of peasants' living standard viewed from the changes in consumption structure
AUTHOR :
REF : Department of Agriculture, State Statistical Bureau
CONTENTS : 1981 survey of 18,529 households in 568 counties; income, consumption by item, durables, living space; 5 pages.

6. TITLE : A discussion of our country's investment policy in the consumer goods industry during the Sixth and Seventh five year plans
AUTHOR : Tang Ruo Ni, State Council Economic Research Center
REF : Journal of Industrial Economic Management
CONTENTS : Discussion of investment policy in consumer goods industry; income, consumption structure, investment policy, production structure; 24 pages.
7. TITLE : The relationship between consumption structure and industrial structure
AUTHOR :
REF : Socialist consumer economics editorial group, Department of Economics
CONTENTS : Essay on relationship between consumption structure and structure of agriculture, light industry and heavy industry; retail sales, industry for food, textile, daily consumer goods, durables, building materials, education, science, health care; 21 pages..
8. TITLE : Representative survey results concerning income distribution in 228 agricultural producers' co-operatives in the year 1957
AUTHOR : Information Office of Statistical Study
REF : Statistical Study, volume 8, 1958 (from Xinhua Fortnightly, no. 8, 1958)
CONTENTS : Survey data from a 1957 survey in 228 agricultural coops in 24 provinces and prefectures; labor force, labor force participation by sex, income distribution, taxes, public reserve fund, public welfare fund, production cost, management funds, liquid assets, fixed assets, income from coop, side-line income; 14 pages.
9. TITLE : Construction to serve the people's livelihood obtained notable success during the past three years
AUTHOR :
REF : State Statistics Bureau, Basic Statistics Department
CONTENTS : Data for 1979/80/81 on nonproductive construction (staff and worker dwellings, commercial network points, urban public utilities, culture, education and health); 5 pages.
10. TITLE : Individual consumption and the production of the means of subsistence
AUTHOR :
REF : Chapter 5 of ?
CONTENTS : Extensive data on and discussion of the production of consumption goods; income and consumption for the period 1952-1957; peoples livelihood by urban and rural; 48 pages.

11. TITLE : A survey of the distribution of earnings by agricultural production cooperatives in 1955
AUTHOR :
REF : Statistical Work Report, vol. 17, 1956
CONTENTS : Data form a 1955 survey among 26,935 cooperatives; labor force, grain production, income and expenditures; 8 pages.
12. TITLE : Survey of incomes and expenditures of 62 peasant families in Changqing commune in the suburb of Cuzhou city
AUTHOR : Wang Gengjin, Ni Xinyi, Zhang Liuzheng
REF :
CONTENTS : Income from collective, side-line activities and other; labor force, dependency ratios, daily labor value; consumption expenditures; 20 pages.
13. TITLE : Structure of people's consumption
AUTHOR : Yang Shenming
REF : Chapter 18 of China's Economic Structure, People's Publishing Company, December 1981.
CONTENTS : Essay on development of consumption patterns; over time, urban-rural differentials; income, mental and physical labor differentials; annual pay by sector; individual, gratis and collective consumption; 23 pages.
14. TITLE : How to view the changes in the people's livelihood over the past three years
AUTHOR : Li Cheng Rui, Zhang Zhong Ji
REF :
CONTENTS : Discussion of peasants' and workers' change in well-being, 1979-1981, in nominal and real terms; income, consumption, wages, fringe benefits, bonus payments; price subsidies; 10 pages.
15. TITLE : State Statistical Bureau survey in 49 cities, including Beijing, Shanghai and Tianjin shows that in the last three years, living conditions of urban worker families has gone up markedly.
AUTHOR :
REF : Guang Ming Daily, March 12, 1982
CONTENTS : Data on income, income distribution, consumption, labor force participation, durables, housing, retail price; 1981; 3 pages.
16. TITLE : Rural Demand for major items of merchandise has been markedly on the increase--a survey of 26 provinces, municipalities and autonomous regions
AUTHOR :
REF : News Bulletin State Statistics Bureau, September 1983
CONTENTS : Data on expected purchase in 1983 of producer's goods, building materials and consumer articles; 2 pages.

17. TITLE : Increase in the peasants' standard of living as seen from the changes in the consumption composition
AUTHOR :
REF : State Statistical Bureau, Department of Agriculture
CONTENTS : Data on income and consumption, 1981; food, clothing, durables, housing, cash expenditures; 5 pages.
18. TITLE : Wages, prices and the standard of living of urban workers in the PRC
AUTHOR : Christopher Howe
REF : China Business Review, July 1978
CONTENTS : Wages for factory workers; 3 pages.
19. TITLE : The development of Chinese agriculture, 1950-1959
AUTHOR : Peter Schran
REF : Urbana, 1969
CONTENTS : Data on consumption, income prices, 1950-1959
20. TITLE : Income differentials in rural China
AUTHOR : E.B. Vermeer
REF : China Quarterly, March 1982
CONTENTS : Income distribution, consumption, subsistence, poverty, quality of survey data in the fifties, pre-liberation data and data from 1977-1979; 33 pages.
21. TITLE : Employment, wages and welfare
AUTHOR :
REF : China Facts and Figures, November 1982
CONTENTS : Employment, income, consumption, 1952-1980; 5 pages.
22. TITLE : Problems concerning the proportion between agriculture, light industry and heavy industry
AUTHOR : Yang Xiaomei
REF : Hubei province
CONTENTS : Survey of 613 urban and rural households on consumption of chemical fiber materials; Hubei province, 1982; 7 pages.
23. TITLE : A model for measuring the production, distribution and ultimate use of the Chinese national income
AUTHOR : He Juhuang
REF : Working paper, Chinese Academy of Social Sciences, Economic Institute
CONTENTS : Explanation of a 20 equation model of the Chinese economy, no data or estimates; 14 pages.
24. TITLE : Three articles on prices, in China
AUTHOR :
REF : Beijing Review, August 1983
CONTENTS : Price indices, 1980-82, explanation of price system, cost of living index, 1978-81, price scissors 1930-81.

25. TITLE : Inequality and stratification in China
AUTHOR : M.T. Whyte
REF : The China Quarterly, December 1975
CONTENTS : Income inequality, urban rural differentials, wages, educational distribution, other aspects of inequality; 28 pages.
26. TITLE : Income distribution in small rural Chinese communities
AUTHOR : M. Blecher
REF : The China Quarterly, December 1976
CONTENTS : Income distribution in six villages, 1939-74; 22 pages.
27. TITLE : Living standards and economic development in Shanghai and Taiwan
AUTHOR : J.E. Nickum, D.C. Schak
REF : The China Quarterly, March 1979
CONTENTS : Living standards, 1974, industrial output 1965-74, wages, wage scales, earnings, comparative living cost, prices in terms of income, budget shares; 25 pages.
28. TITLE : Basic commodity distribution in the People's Republic of China
AUTHOR : D.L. Chinn
REF : The China Quarterly, December 1980
CONTENTS : Description of food distribution system, official retail prices in Beijing, 1979; 11 pages.
29. TITLE : Income differentials in rural China
AUTHOR : K. Griffin
REF : The China Quarterly, December 1982
CONTENTS : Comment on Vermeer (see #20), and reply; 7 pages.
30. TITLE : The staff of life: living standards in China, 1977-81
AUTHOR : W. Klatt
REF : The China Quarterly, March 1983
CONTENTS : Discussion of and tables on: urban work force and wage bill, urban wage income and expenditure, urban retail food prices, purchasing power of urban wage, international comparison of retail food prices, urban grain rations, food consumption, food intake, food balance, food basket, rural commune members income and expenditure, farm-gate prices, rural-urban income disparity, world agriculture indicators, international comparisons; 1977/78-1981; 34 pages.

31. TITLE : Income, prices, and the standard of living
AUTHOR : Christopher Howe
REF : Chapter 6 in China's Economy, A Basic Guide
CONTENTS : GNP 1949/75, consumption of grain, cotton cloth, bicycles, 1949/74, wages 1952/74, rationing, consumer goods prices in Peking, 1974/75, food prices in Peking 1974/75 food prices in Shanghai 1973, monthly expenditures urban families, rural income, income inequality; 73 pages.
32. TITLE : China's economic growth since 1949--an assessment
AUTHOR : S. Ishikawa
REF : The China Quarterly, June 1983
CONTENTS : national income, output of industry, agriculture food grain, population, 1952-80, growth path of economy 1949/80, urban/rural population migration, employment, wages, consumption, investment, foodgrain production, market ratio of foodgrains; general study on the development of economy, 1949-80; 41 pages.
33. TITLE : Institutional change and income distribution in the Chinese country side
AUTHOR : K. and K. Griffin
REF : Oxford bulletin of economics and statistics, August 1983
CONTENTS : responsibility system, two experiments in two counties, output growth, income distribution; 52 pages.
34. TITLE : Food policy in China recent efforts to balance supplies and consumption requirements
AUTHOR : E. Rada
REF : Asian Survey, April 1983
CONTENTS : food rationing, food supplies; 19 pages.
35. TITLE : The pattern of income inequality in rural China
AUTHOR : K. Griffin, A. Saith
REF : Oxford Economic Papers, March 1982
CONTENTS : income distribution among counties, communes, brigades, changes over time, inter-team inequality, inter-household inequality; 35 pages.
36. TITLE : Equity and efficiency in the distribution of non-food consumer goods in China: Shanghai as an example
AUTHOR : H.V. Wortzel
REF : Asian Survey, July 1983
CONTENTS : description of distribution system of non-food items; 14 pages.

37. TITLE : China's economic indicators
AUTHOR :
REF : China Trade Report, Volume XX, June 1982.
CONTENTS : China's economic indicators on energy, building materials, chemicals, machinery, consumer products, textiles, housing, farm products, labour and wages, transport, communications, education and culture; 2 pages..
38. TITLE : Remarkable improvement in living standards
AUTHORS : Li Chengrui and Zhang Zhongji
REF : Beijing Review, Vol. 25, No. 17, April 26, 1982
CONTENTS : Developments of incomes in China. Peasant incomes. Monthly income of wage-earning families. Increases of basic consumer goods. Aspects of housing and savings. Statistics, 1978-81; 5 pages.
39. TITLE : China's economic achievements
AUTHOR : Liang Xiufeng
REF : Beijing Review, No. 40, Vol. 24, October 5, 1981
CONTENTS : History of China, since 1840. Industrial development and production. The scientific and technology level. Agricultural production. Transport. Communications. Improvement of people's livelihood. Figures, 1980; 6 pages.
40. TITLE : China's growing consumer market
AUTHOR : Karen Berney
REF : China Business Review, Volume 8, No. 2, March-April 1981.
CONTENTS : Growth of the consumer market of China for various products. Domestic output and import of consumer goods. Personal incomes. GDP. Food consumption. 3 pages.
41. TITLE : The production responsibility system in Chinese agriculture: some examples from Guangdong
AUTHOR : Graham E. Johnson
REF : Pacific Affairs, Volume 55, No. 3, Fall 1982.
CONTENTS : Outline of the origins, development and adoption of the production responsibility systems in China, exemplified by the agricultural situation in the Pearl river delta region of Guangdong. Changes in acreage, yields, and output of rice, sugar-cane, and peanuts in various areas. Income distribution. Statistics, 1977-81; 22 pages.
42. TITLE : The role of the people's commune in rural development in China
AUTHOR : Greg O'Leary, Andrew Watson
REF : Pacific Affairs, Volume 55, No. 4, Winter 1982-83
CONTENTS : Characteristics and evaluation of the role of the commune structure in the development of rural China PR. Advantages of the system. Criticism of the commune model. Productivity. Income distribution. Incentives. Rigidity of the operation. Commune leadership. Reforms of the commune system. Statistics, 1957-78; 20 pages.

43. TITLE : Comments on consumption and savings
AUTHOR : Zeng Qixian
REF : Social Sciences in China, Vol. IV, No. 4, December 1983
CONTENTS : Theoretical discussion of role of consumption; savings; data on urban/rural income; consumption, light industry, heavy industry; general discussion of role of savings; 27 pages.
44. TITLE : Peasant Consumption, Saving, and Investment in Mainland China
AUTHOR : Lawrence J. Lau
REF : Agrarian Policies and Problems in Communist and Non-Communist Countries, edited by W. A. Douglas Jackson, University of Washington Press, 1971.
CONTENTS : Theoretical models on labor supply, consumption, saving; 33 pages.
45. TITLE : A Profile of Beijing, Shanghai, and Tianjin
AUTHOR : Christopher M. Clarke and Elizabeth Jurkacek
REF : The China Business Review, Volume 8, No. 4, July-August 1981
CONTENTS : Sizable communities. Foreign trade autonomy. Key indicators. Industrial production. Agricultural production. Capital construction. Transport. Employment. Wages. Education. Health. Figures, 1979-80; 8 pages.
46. TITLE : China's thriving new light industry
AUTHOR :
REF : Beijing Review, 27, 1984
CONTENTS : Interview with Yang Bo, minister of light industry, some data on industry output and investment; 3 pages.
47. TITLE : China in pursuit of economic modernization
AUTHOR :
REF : C.I.A., December 1978
CONTENTS : General discussion of China's economic development with reference to the ten year plan, 1976-1985; 18 pages.
48. TITLE : Report on the 1984 economic plan
AUTHOR :
REF : Beijing Review, 27, May 28, 1984
CONTENTS : Achievements of 1983 compared with 1982, targets for 1984, as stated by Song Ping, state councillor state planning commission, output data on grain, cotton, coal, crude oil, electricity, steel, light industry; investment, state revenue, price increases in 1983; 3 pages.
49. TITLE : Standard of living
AUTHOR :
REF : China trade report, October 1978
CONTENTS : Some 1977 data on consumer goods; 2 pages.

50. TITLE : Possible impact of PRC's soaring foodprices on worker productivity
AUTHOR :
REF : Business China, November 7, 1978
CONTENTS : Price increases pork, mutton, beef, poultry, seafood, 1977; 2 pages.
51. TITLE : SSB Stats for 1980 show stress on light industry in PRC
AUTHOR :
REF : Business China, May 6, 1981
CONTENTS : China's economic output, 1979, 1980, detailed data on industry and agricultural production, consumer goods output 1980; 3 pages.
52. TITLE : Communique on fulfillment of China's 1983 National economic plan
AUTHOR : State Statistical Bureau, April 29, 1984
REF : Beijing Review, vol 27, 20, May 14, 1984
CONTENTS : Output data on: farm products, animal by-products, light and heavy industry; investment, transportation, trade, living standards; 8 pages..
53. TITLE : The study of income distribution and its application in China
AUTHOR : Fang Zhenmin
REF : Central China Technology Institute
CONTENTS : Income distribution, log-normal curve, Lorez curve, Gini coefficient, wage policies; staff and workers, cities 1980, 18 pages.
54. TITLE : Analysis of consumption make-up in Shanghai
AUTHOR : Zheng Shaolian, Zhang Wenda
REF : Department of Management Science, Fudan University
CONTENTS : 1981 data on 500 families, consumption functions on food clothing, daily articles, fuel, non-commodities; impact of family size; projections, income elasticities; 11 pages.
55. TITLE : Engel curve and its application to China
AUTHOR : Fang Zhenmin
REF :
CONTENTS : Engel curves, staff and workers family income, expenditures; income elasticities, 1981; 8 pages.
56. TITLE : A study on income distribution in Shanghai
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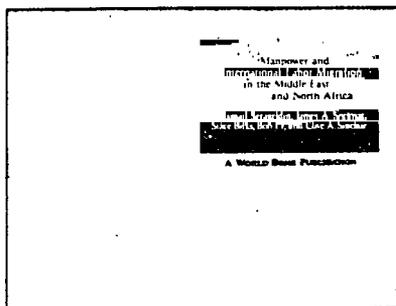
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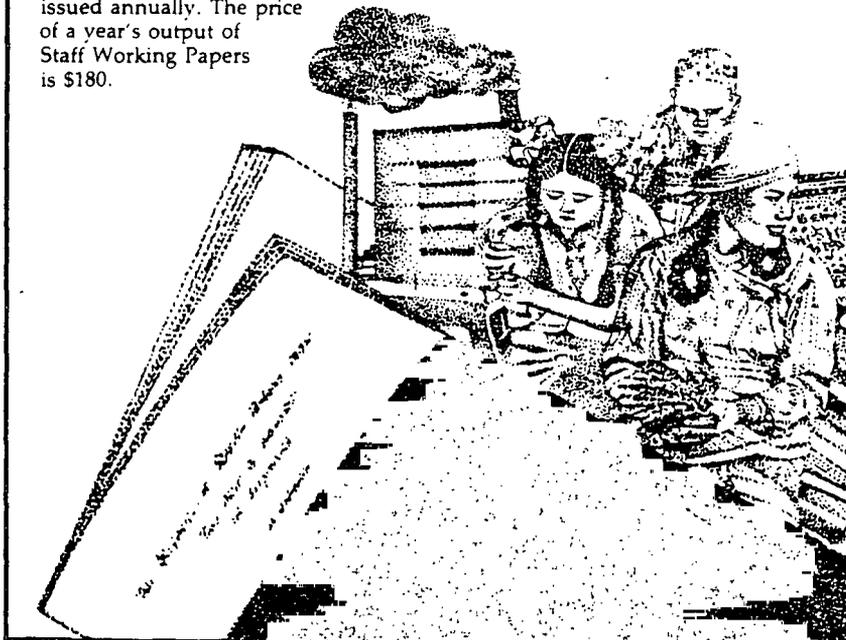
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