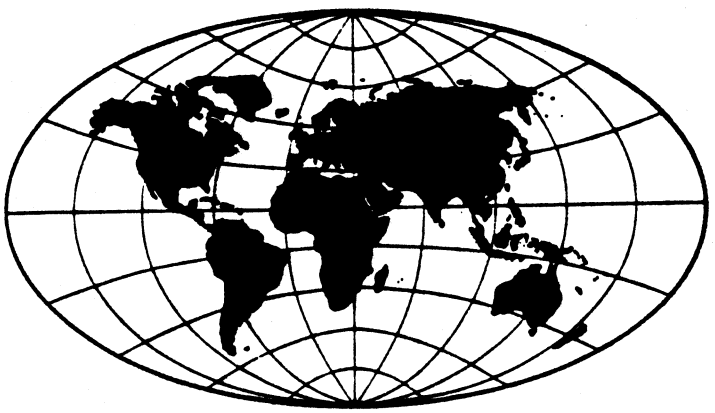
DOLLAR GNP ESTIMATES FOR CHINA

by

Jeffrey R. Taylor



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U.S. Bureau of the Census
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SUMMARY

There is considerable interest among western economists regarding macroeconomic growth trends in China compared to growth in other developing countries. A long-standing problem in making these comparisons is that China's official exchange rate is a poor ratio for converting the country's national accounts into U.S. dollars.

The purpose of this paper is to develop a methodology for producing dollar GNP estimates for China that are free of distortions introduced by exchange rate movements. This methodology is also designed to be consistent with GNP statistics regularly published by statistical authorities in China, thereby easing the task of producing updated dollar GNP estimates.

Our findings include the following:

China's GNP higher than earlier estimates show. Our benchmark dollar GNP estimate for China in 1981 is $418 billion, which is $68 billion higher than previously estimated by the World Bank, and $138 billion higher than obtained from a simple exchange-rate conversion of China's national accounts. For 1989, we estimate China's GNP to total $868 billion in 1981 dollars.

Per capita GNP growth for China impressive. Our estimates indicate that per capita GNP for China in constant 1981 dollars rose from $365 in 1978 to $781 in 1989. World Bank estimates of the same concept, by comparison, show much less change.

Rate of real growth in dollars lower than official rates. We estimate real annual growth in dollar GNP was 8.6 percent on average between 1978 and 1989, compared to a 9.1 percent rate indicated by China's constant price output index for GNP.

Further research on estimating dollar GNP advised. The forthcoming publication of China's 1987 input-output table presents an opportunity to apply the methodology developed here to produce even better dollar GNP estimates for China.

Detailed appendices are included in this report to provide further information on the methodology and data used in estimating China's dollar GNP.

PREFACE

The Center for International Research conducts economic and demographic studies, some of which are issued as Staff Papers. A complete list of these papers is included at the end of this report. The use of data not generated by the U.S. Bureau of the Census precludes performing the same statistical reviews the Bureau does on its own data.

The author is grateful for comments contributed by Barry Kostinsky, Judith Banister, and the sponsor. The author is responsible for any remaining shortcomings.

Comments and questions regarding this study should be addressed to Judith Banister, China Branch, Center for International Research, U.S. Bureau of the Census, Washington, D.C., 20233; telephone (301) 763-4012.

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INTRODUCTION

For years, western analysts interested in macroeconomic growth in China as reflected in its national accounts have labored under a dual liability. First, they have had to contend with problems of coverage. Like many of its socialist brethren, China has traditionally employed the MPS (Material Product System) framework in compiling its national income accounts, thereby omitting service sectors that are among the fastest growing segments of the economy. Second, there have been problems of valuation. The prices at which output is measured and growth rates are calculated in China do not in general reflect the opportunity cost of using resources, and relative prices bear little resemblance to prices facing other developing countries. Users of the country's official exchange rate to make comparisons of China's national accounts with those of other countries encounter an additional problem, namely, that the exchange rate value is set by the state at a level most observers regard as unrealistic.

Because of these problems, it has been particularly difficult to estimate gross national product (GNP) or gross domestic product (GDP) for China in dollar terms. Far from being a concern of armchair economists, the calculation of dollar GNP figures for developing countries such as China is an issue of vital importance from a practical standpoint. Eligibility for low-interest development assistance from the World Bank's International Development Association, the United Nations Development Program, the Asian Development Bank, and OECD's Development Assistance Committee depends in part on the determination that a country's per capita GNP in dollar terms is low enough to qualify its residents as truly indigent.[1] Beneficiary status of countries seeking low tariff rates on sales to the U.S. under the U.S. Generalized System of Preferences (GSP) is also tied to per capita GNP measured in U.S. dollars.

This paper is an attempt to provide a framework for estimating China's GNP and GDP in dollar terms on an ongoing basis. It should be emphasized at the outset that this exercise is hardly without precedent. Over a quarter of a century of research has been devoted to the estimation of China's GNP, including efforts by the World Bank (1983 and 1985), the Central Intelligence Agency,[2] Perkins (1975, 1977, 1980, and 1988), Swamy (1986), Keidel (1986), Yeh (1983), Kravis (1981), Liu and Yeh (1965 and 1973), Eckstein (1958, 1961 and 1973), Hollister (1958), and Wu (1963). However, the World Bank and CIA estimates aside, the emphasis of earlier efforts was on developing yuan estimates of GNP, rather than the dollar GNP estimates. The recent publication of official GNP statistics by China has removed the burden of estimating the country's GNP in yuan, leaving us only with the problem of how best to convert these data to dollar terms.[3]

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[1]Virtually all multilateral lending institutions use dollar GNP per capita estimates prepared by the World Bank's Socioeconomic Data Division as guides in determining low-interest loan eligibility. These estimates are published in the World Bank Atlas each year, and are also summarized in the World Bank's World Tables.

[2]The CIA's estimates of China's GNP are published annually in the Agency's Handbook of Economic Statistics. Estimation techniques used by the CIA throughout the 1970's are discussed in Central Intelligence Agency (1979), and Ashbrook (1972, 1975, and 1978).

[3]China's State Statistical Bureau has published increasingly complete GNP statistics since 1980, and data are now available from 1978 to 1988. Details on the evolution of China's GNP accounts and their composition are discussed in Taylor (1988).

Our goal in this paper is to develop a methodology for estimating China's GNP in constant U.S. dollars, rather than in current prices. A benchmark dollar GNP is estimated for 1981, and it is used in conjunction with constant price growth rates to derive dollar GNP estimates for other years in 1981 dollars.

This study is divided into three parts. First, the methodology and data used in converting China's official GNP estimates into dollars is briefly discussed. Second, the resulting GNP and GDP estimates are presented and evaluated. Finally, conclusions are drawn from these results, and a number of suggestions are made for future improvements. Readers should be aware that there are a variety of methods one can use to estimate a country's GNP in dollar terms, and strong differences of opinion among economists as to which method is best. The methodology used in this paper is one technique among many, and the results should accordingly be regarded as exploratory.

METHODOLOGY AND DATA

As noted above, China's publication of an official GNP time-series from 1978 to 1988 enables us to sidestep the traditional problem of estimating missing service-sector output, and concentrate instead on converting these data to a dollar basis. The easiest method to effect this conversion -- multiplication by the official exchange rate -- is inappropriate for two reasons. First, China's currency is inconvertible, with an exchange rate that is set by the Bank of China at levels unrepresentative of the purchasing power of the currency. Second, even if the exchange rate were set at an equilibrium level, it could not compensate for distortions introduced by China's unusual price system. A legacy of command planning, relative prices in China differ radically from those in other countries, blurring simple GNP comparisons based on exchange rate conversions.[4]

These problems are far from unique. Other developing and centrally planned economies share them, and, not surprisingly, a variety of techniques have evolved to estimate the dollar value of their GNP's. These include the adjusted factor cost approach pioneered by Bergson (1953 and 1954) and expanded on by the CIA (1982), the International Comparisons Project (ICP) approach developed by Kravis, et al. (1975, 1978, and 1982), and the physical indicator method, first used by Jannosy (1963) and Ehrlich (1966).

Unfortunately, none of these methods applies well to China. The adjusted factor cost approach assumes that labor returns for each sector of the economy are valued correctly, yet this is almost certainly untrue in China, where wage scales have changed little since the 1950's.[5] The ICP approach requires the availability of final expenditure weights for GNP, which China has never published.[6] It moreover requires

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[4]China's administered pricing system was established in the 1950's, and prices for many commodities changed little through 1978. Since 1978, prices for a number of agricultural, industrial, and consumer goods have been partially decontrolled, however. Further details may be found in Chan (1987), and Wiemer and Liu (1989).

[5]Empirical research of 7,000 Chinese enterprises by Lu and Li (1987, p. 8) suggests that the marginal product of labor in manufacturing is greater than labor compensation. Intertemporal rigidity in wage scales is partially to blame for this. Zhuang Qidong, et al. (1984, pp. 53-70 and 131-169), provide a historical overview of China's labor compensation system.

[6]GNP can be calculated as either the sum of final expenditures (consumption, investment, government spending, and net exports), or as the sum of value added created by each sector of the economy (the industrial origin approach). All GNP statistics published by China to date have been published on the latter basis. See Taylor (1988), pp. 2-3.

a more detailed survey of Chinese prices for ICP standard products than has yet been conducted.[7] Finally, the fitted relationship between per capita GNP and non-monetary output measures that lies at the heart of the physical indicator approach overlooks obvious differences between China and other countries in output quality, has potential upward bias where high physical output levels reflect greater production inefficiencies than in the west, and yields wide variations in per capita GNP estimates when the set of explanatory variables in the fitted relationship is changed.[8]

Problems with these methods have not prevented others from trying to use them to estimate China's GNP and GDP in dollar terms. Summers and Heston (1984 and 1988) have produced real per capita GDP estimates for China using an ICP framework and earlier purchasing power parity data compiled by Kravis (1981). McConnell and Kellogg (1989) have used the physical indicator approach to derive 1980 per capita GDP estimates for China in dollar terms. Official exchange rate conversions of Chinese GNP data to dollar terms have been used by the CIA in their Handbook of Economic Statistics for the past few years, although the CIA has emphasized the unavoidable limitations of this approach in testimony before Congress. A slightly modified exchange rate approach has been used by the World Bank to produce per capita dollar GNP estimates for China that are published in the World Bank Atlas.[9] The sheer multiplicity of approaches used to develop dollar GNP estimates for China suggest that no single method has been universally excepted.

The methodology developed in this report is more than just another log thrown on the fire of controversy surrounding this subject, for it is designed to take better advantage of national accounts information that statistical authorities in China regularly publish. Dollar GNP estimates developed here can thus be regularly updated and revised, and because exchange rates are not used in effecting conversions, the resulting estimates will be unaffected by variations in China's currency value.

First, we observe that China's official GNP statistics for 1978-1989 include data on current price output levels and constant price output indices on a broad sector of origin basis.[10] As shown in table 1, total GDP is broken down into primary (agriculture), secondary (industry and construction) and tertiary (transport, commerce, and service) sectors. GNP includes these components and net factor income from abroad. If we can use these data to obtain a benchmark conversion of GNP to dollar terms on a sector of origin basis, then the constant price output indices for the components of GDP can be applied to value added components from the benchmark table and summed up to obtain constant-dollar estimates of China's GDP for earlier and later years. Adding relatively small net factor income from abroad to these estimates then yields constant dollar GNP estimates for each year.

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[7]Domestic price data for standard products are compared with comparable average international prices in the ICP approach to produce dollar GNP estimates. Kravis (1981) has tried this approach for China, but collected his price data in an admittedly informal survey, and used estimated expenditure weights in the absence of official data.

[8]The last of these problems is noted by Stoikov (1967) and Heston (1973).

[9]Rather than use the current-period exchange rate to convert GNP data to U.S. dollars, the World Bank uses a three-term moving average of exchange rates that have been adjusted to current-period levels using yuan and U.S. dollar price indices.

[10]See Guojia tongji ju (1990), p. 5.

Table 1. Sectoral Breakdown of Gross Domestic Product

Primary sector	Secondary sector
Agriculture	Industry
Farming	Mining and drilling
Forestry	Electricity production
Animal husbandry	Manufacturing
Fishery	Construction

Tertiary sector

Transport, posts, and telecommunications
- Freight transport, posts, and telecommunications
- Passenger transport

Commerce, catering, material supply, and storage
- Commerce, material supply, and storage
- Catering

Services
- Personal services
- Consulting services

Public services

Real estate
- Real estate management
- Personal and private housing
  - Urban housing
  - Rural housing

Health, education and social welfare

Education, culture and the arts, and radio and TV broadcasting

Scientific research and comprehensive technical services
- Scientific research
- Comprehensive technical services

Banking and insurance

Source: Gu (1987), pp. 82-84.

The question then becomes, how does one obtain the benchmark GNP estimates for China in dollar terms? Because China's official GNP statistics constrain us to taking a sector of origin approach, the appropriate vehicle for obtaining such a benchmark is an input-output table converted to U.S. dollars. By converting all intermediate flows in the input-output table to U.S. dollars and subtracting them from similarly converted gross value of output statistics for each sector, double-deflated estimates of value added in dollars can be derived as a residual. These value added estimates in dollars can then be aggregated to primary, secondary, and tertiary components, then summed to obtain a dollar GDP estimate for the benchmark year. GDP for earlier and later years can then be calculated using constant price output indices for the components of GDP, as discussed above, and GNP can be calculated by adding dollar estimates of net factor income from abroad.

A more rigorous development of the methodology employed in producing dollar GNP estimates for China is provided in Appendix A, though conceptually the approach is quite simple, as the above discussion indicates. The major strengths of this approach are that dollar GNP estimates for China are not rendered meaningless by fluctuations in the exchange rate, and that benchmark estimates are easily updated using constant price output indices that are regularly published by Chinese statistical authorities.

The precision of the estimates hinges on the reliability of the input-output table and the average sectoral dollar/yuan price ratios used for the benchmark year, however. The input-output table employed is an official table compiled for 1981 by China's State Planning Commission and State Statistical Bureau, which was adjusted to include nonmaterial services. Average dollar/yuan price ratios are drawn from Taylor (1989, Appendix B), and represent the most detailed and thoroughly documented set of purchasing power parities for China currently available. Readers interested in a more thorough description of these data sources, their strengths, and their limitations are encouraged to consult Appendix B.

It is important to note that in deriving dollar GNP estimates for China in years other than the benchmark year, we assume that official constant price GDP growth rates are reliable. The veracity of this assumption is open to debate, of course, but because we are restricting our analytical gaze to a relatively short period (1978-1989), bias in these growth rates caused by the familiar "index number" problem is likely to be quite small. Individuals wishing further information on this subject are encouraged to consult Appendix B.

Due to the manner in which they are derived, our dollar GNP estimates for China may be referred to as double-deflated figures. They provide not only a credible alternative to using the official exchange rate to convert China's national accounts into dollars, but also establish an analytical framework that can be adapted to take advantage of new data from China as they become available.

RESULTS

Following the methodology outlined above, a benchmark estimate of China's GNP and GDP in dollar terms was first produced for 1981, and then constant price output indices were used to obtain dollar GNP and GDP estimates for earlier and later years.

Details on the dollar GNP estimates for the benchmark year, 1981, are shown in table 2. China's GNP in dollar terms for 1981 is estimated at $418 billion, 40 percent of which comes from the primary sector, 40 percent from the secondary sector, and 20 percent from tertiary services. Although the share of dollar GNP attributable to the tertiary sector is unchanged from its share of GNP in domestic prices, the dollar share for the primary sector is much higher and the dollar share for the secondary sector is considerably lower than their respective domestic price shares.

Table 2. Composition of China's 1981 GNP in Yuan and in U.S. Dollars

Indicator	Value added (in billions) In yuan	In U.S. dollars
Gross national product (GNP)	477.30	417.69
Net factor income from abroad	-.21	-.12
Gross domestic product (GDP)	477.51	417.81
Primary sector	154.56	166.77
Farming	114.28	121.21
Forestry	8.91	4.43
Animal husbandry	24.61	31.30
Agricultural sidelines	3.81	4.97
Fishery	2.94	4.85
Secondary sector	225.55	165.86
Village industry	13.72	16.53
Metallurgy	15.66	1.93
Electric power	13.05	6.21
Coal and coke	8.59	17.77
Petroleum	14.47	31.95
Heavy chemicals	13.80	-.31
Light chemicals	7.27	-2.05
Heavy machinery	28.65	61.78
Light machinery	11.28	-3.42
Building materials	9.47	17.87
Logging	3.70	.81
Wood and wood products	1.43	.26
Food	18.90	-1.47
Textiles	26.24	-3.30
Clothing and leather	4.97	1.78
Paper, cultural/educational goods	6.78	-.05
Other industry	6.38	1.01
Construction	21.18	18.56
Tertiary sector	97.40	85.18
Transport, posts and telecommunications	17.78	15.55
Commerce, catering, supply	30.24	26.45
Nonmaterial services	49.38	43.18

Note: Some components do not sum to totals because of rounding.

The reason for this is that prices of most Chinese agricultural products are lower than their prices overseas, resulting in higher value added for the primary sector when inputs and output are converted into U.S. dollars. Industry dominates the secondary sector, however, and revaluation generally forces a decline in value added for most sectors. This in turn promotes a decline in the share of total GNP accruing from secondary sector output. It is interesting to note that after conversion into U.S. dollars, inputs are so costly relative to output in dollars for some sectors (chemicals, light machinery, food, textiles, and paper) that value added is actually negative. This follows from the assumption that consumption of intermediate inputs would be the same even if world prices were charged for domestic inputs. Relaxing this assumption is unfortunately not possible because detailed price elasticities for input use in China are unavailable. The benchmark estimates shown in table 2 should be viewed with this constraint in mind.

GNP and GDP time series were developed by applying official constant price growth rates for GDP components to the benchmark figures for 1981 shown above.[11] The results are summarized in table 3. These data show that real GNP in China more than doubled between 1978 and 1989, rising from $351 billion to $868 billion. As impressive as these figures may seem, they actually imply slightly lower real growth rates for GNP than do China's official statistics. This can be seen in chart 1, where China's official constant price GNP output index is compared with an output index constructed from our constant-dollar GNP series in table 3. The reason for the difference is weighting: China's official GNP output index is based on yuan-denominated weights for the primary, secondary, and tertiary sectors, and our index is based on dollar-denominated weights for the same. Although our assumed rates of real growth for these three sectors are the same as those shown in China's official statistics, the different shares of total GNP they take on when converted into dollars in 1981 (our benchmark year) and multiplied by these rates of growth result in lower aggregate rates of increase for the total. Granted the difference is not great: the annual average rate of real growth from 1978 to 1989 is 9.1 percent when calculated from China's GNP index, compared to an 8.6 percent figure obtained from our dollar GNP estimate. Still, chart 1 indicates that the difference in growth rates between the two series grows over time, suggesting that for purposes of international comparison, China's official GNP index overstates real output growth.

Other dollar GNP estimates for China differ substantially from those developed in this report. As shown in table 4, the GNP estimates developed here are $68 billion higher for 1981 than the next-highest estimates available -- those of the World Bank (1985), which were developed using a similar methodological framework, but with somewhat less complete sets of national accounts and relative price data. Even lower are other GNP estimates by the World Bank, a simple exchange-rate conversion of official GNP accounts, and estimates by the Arms Control and Disarmament Agency (1989). A look at GNP estimates for years other than 1981 shows similar patterns, though the use of different price bases in each estimate does complicate matters somewhat. The only GNP estimates for China higher than those developed here are the Penn World Table estimates, which are based on benchmark data from ICP studies of national income.

The fact that our dollar GNP estimates are generally higher than exchange-rate based estimates (which include the World Tables estimates of the World Bank) suggests that the official exchange rate undervalues the yuan for purposes of national accounts revaluation. This is a significant finding, and is consistent with both the ICP-based Penn World Tables estimate of China's GNP, and with earlier research on other developing countries by Kravis, Heston, and Summers.[12] It may seem counterintuitive to those familiar with

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[11]The methodology employed in developing these estimates is discussed fully in Appendix A.

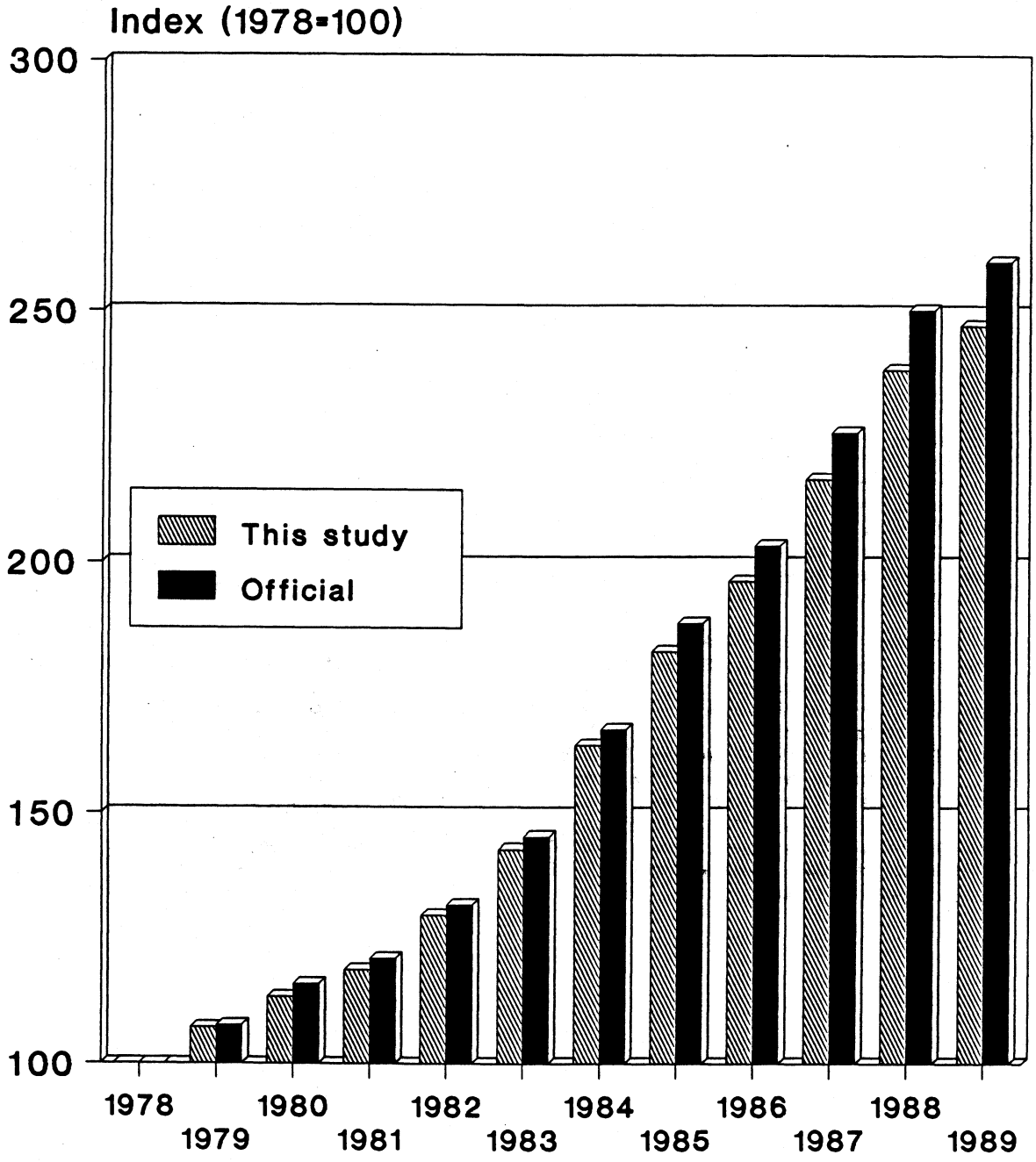
[12]Dollar GDP estimates for developing countries from the ICP project have consistently been higher than estimates obtained by simply applying each country's official exchange rate to its national accounts. The effective local currency/dollar exchange rate for overall GDP is thus generally lower than the official exchange rate for developing countries. For an example of this, see Kravis, Heston, and Summers (1982), pp. 176-179.

Table 3. Constant Dollar GNP Time Series for China, 1978-1989 (billion U.S. dollars, constant 1981 prices)

Year	Gross national product	Net factor income from abroad	Gross domestic product			
			Total	Primary sector	Secondary sector	Tertiary sector
1978	351.22	.00	351.22	149.03	132.48	69.71
1979	376.61	.00	376.61	158.13	143.34	75.14
1980	398.37	.00	398.37	155.89	162.81	79.67
1981	417.69	-.12	417.81	166.77	165.86	85.18
1982	455.81	.57	455.24	186.00	175.00	94.24
1983	501.77	1.11	500.66	201.35	193.15	106.16
1984	574.27	1.46	572.81	227.43	221.10	124.28
1985	639.72	1.03	638.69	231.60	262.17	144.92
1986	689.53	.25	689.28	239.20	289.06	161.02
1987	760.83	-.16	760.99	250.53	328.67	181.79
1988	836.81	-.16	836.97	256.79	376.36	203.82
1989	868.35	-.13	868.48	263.20	393.72	211.56

Source: See text.

Chart 1. Comparison of GNP Indices in Constant Prices, 1978-1989



Sources: Appendix table B-1 and table 3.

Table 4. Comparison of Total GNP Estimates for China, 1978-1989 (billion U.S. dollars, various price bases)

Year	This study	Penn World Tables, Mark 4	World Bank			Arms Control and Disarmament Agency	Official Chinese GNP times exchange rate
			China Division GNP	Gross National Income	GNP, Atlas methodology		
1978	351	--	--	260	212	216	213
1979	377	--	--	283	254	231	257
1980	398	1,598	--	296	296	246	298
1981	418	--	350	310	320	257	280
1982	456	--	--	345	325	281	274
1983	502	--	--	370	329	311	294
1984	574	--	--	426	343	356	300
1985	640	2,567	--	473	347	400	291
1986	690	--	--	501	330	430	281
1987	761	--	--	551	335	471	304
1988	837	--	--	614	373	--	376
1989	868	--	--	--	--	--	416

Notes: Price bases for total GNP estimates are as follows:
This study: 1981 U.S. dollars.
Penn World Tables, Mark 4: 1980 international dollars.
World Bank, China Division GNP: 1981 U.S. dollars.
World Bank, Gross National Income: 1980 U.S. dollars.
World Bank, GNP, Atlas methodology: Current U.S. dollars.
Arms Control and Disarmament Agency: 1987 U.S. dollars.
Official Chinese GNP: Current U.S. dollars.

Sources: This study: Table 3.
Penn World Tables, Mark 4: Summers and Heston (1988), p. 22, multiplied by official population data for each year.
World Bank, China division GNP: World Bank (1985), p. 5, multiplied by official 1981 population data.
World Bank, Gross National Income: Per capita figures from World Bank (1990), pp. 6-7, multiplied by official Chinese population data for each year.
World Bank, GNP, Atlas methodology: Per capita figures from World Bank (1990), pp. 2-3, multiplied by official Chinese population data for each year.
Arms Control and Disarmament Agency: Arms Control and Disarmament Agency (1989), p. 38.
Official Chinese GNP: Guojia tongji ju (1990), p. 5, multiplied by period-average official exchange rates.

China's economy, however; prevailing exchange rates (yuan per dollar) on unofficial grey markets in China are substantially higher than the official rate, suggesting that the currency is overvalued. This contradiction is resolved when one realizes that the low rate of exchange implicit in our dollar GNP estimate is based on value added weights, and that the unofficial exchange rate in China's gray markets is ultimately driven by trading behavior, or trade weights. Largely because of the greater proportional influence of inexpensive agricultural products and services in GNP, the aggregate yuan/dollar purchasing power parity is less than both the official and grey market exchange rates. This does not mean that one is wrong to consider China's currency overvalued. It simply means that the currency is worth less than its stated value to those who would like to import goods from abroad, but worth more than its stated value in terms of an average unit of value added or final demand.

In light of this, one clearly risks underestimating China's dollar GNP if revaluation is performed using the official exchange rate, and the risk of undervaluation is even greater if some shadow exchange rate is used on the assumption that the currency is overvalued. Not surprisingly, when the Arms Control and Disarmament Agency (1989, p. 38, 131-132) used the latter approach, it arrived at some of the lowest dollar GNP estimates shown in table 4.

Our new dollar GNP estimates do not indicate that China is wealthy, but they do suggest that it is somewhat better off than the poorest of the poor. The World Bank currently classifies countries with 1988 per capita GNP's below $480 as being low-income economies, and those with per capita GNP's between $480 and $2000 as lower-middle income economies. As shown in table 5, their Atlas estimates of China's per capita GNP place China squarely in the low-income grouping, but our constant dollar estimates show China moving up to the lower-middle income ranks by the early 1980s. This ostensibly places it in the company of countries like Egypt, New Guinea, and the Dominican Republic -- countries that are poor, but not nearly as poor as India, which lies above China in the World Bank rankings. Even more striking is the fact that our estimates show consistent increases in per capita GNP for China; whereas, the frequently-cited World Bank Atlas estimates show much lower growth, and an actual decline in 1986.

Comparisons such as this should be taken with a grain of salt, of course. The World Bank's estimates of China's per capita GNP in dollar terms are low not because they start from different source data than we do, but because the Chinese economy has not grown at a much faster rate than has the conversion factor they use to convert the country's national accounts statistics to dollars.[13] Moreover, World Bank income groups were established with the Bank's own methodology for estimating per capita GNP in mind, and applying them to our dollar GNP estimates is somewhat akin to using old rules to judge a cake baked with a new set of ingredients. A more appropriate comparison might be between our constant-dollar GDP estimate and the World Bank's measure of China's gross national income (GNY): GDP in constant 1980 prices, adjusted by a terms of trade effect.[14] As chart 2 shows, although our per capita GDP estimate is consistently higher than the World Bank's per capita GNY for China (which may be due in part to our using 1981 constant prices, and their using prices for 1980), the rates of growth are fairly close. Precisely why these results obtain is difficult to say, for the estimation methodologies for the two series are quite different. Further research comparing these two indicators could well yield useful information on reduced-information methods for estimating China's GDP in dollar terms.

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[13]The World Bank converts China's GNP statistics from yuan to dollars using a three-term moving average of the official exchange rate.

[14]The terms of trade effect are calculated as the difference between exports deflated by an implicit price deflator for exports, and imports deflated by an implicit price deflator for imports.

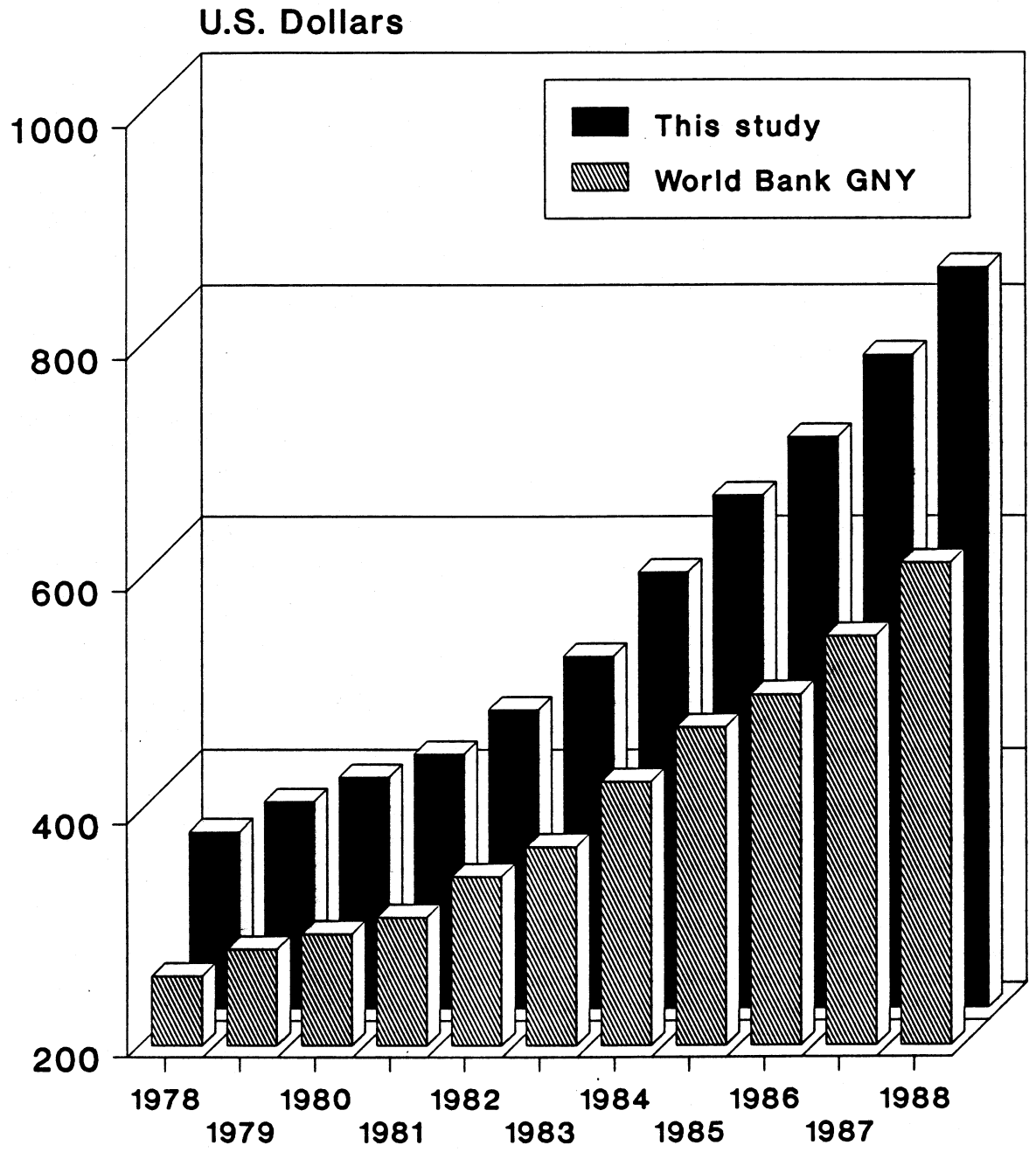
Table 5. Comparison of Per Capita GNP Estimates for China, 1978-1989 (U.S. dollars, various price bases)

Year	This study	Penn World Tables, Mark 4	World Bank			Arms Control and Disarmament Agency	Official Chinese GNP times exchange rate
			China division GNP	Gross national income	GNP, Atlas methodology		
1978	365	--	--	270	220	225	221
1979	386	--	--	290	260	237	264
1980	404	1,619	--	300	300	250	302
1981	417	--	350	310	320	258	280
1982	449	--	--	340	320	279	270
1983	488	--	--	360	320	304	286
1984	553	--	--	410	330	344	289
1985	609	2,444	--	450	330	382	277
1986	647	--	--	470	310	406	264
1987	704	--	--	510	310	438	281
1988	763	--	--	560	340	--	343
1989	781	--	--	--	--	--	374

Notes: Price bases for per capita GNP estimates are as follows:
This study: 1981 U.S. dollars.
Penn World Tables, Mark 4: 1980 international dollars.
World Bank, China division GNP: World Bank (1985), p. 5.
World Bank, Gross National Income: 1980 U.S. dollars.
World Bank, GNP, Atlas methodology: Current U.S. dollars.
Arms Control and Disarmament Agency: 1987 U.S. dollars.
Official Chinese GNP: Current U.S. dollars.

Sources: This study: GNP estimates in table 4, divided by official population data.
Penn World Tables, Mark 4: Summers and Heston, p. 22.
World Bank, China division GNPj: World Bank (1985), p. 5.
World Bank, Gross National Income: World Bank (1990), pp. 6-7.
World Bank, GNP, Atlas methodology: World Bank (1990), pp. 2-3.
Arms Control and Disarmament Agency: Arms Control and Disarmament Agency (1989), p. 38.
Official Chinese GNP: Guojia tongji ju (1990), p. 5, multiplied by period-average official exchange rates, and divided by official population data.

Chart 2. Comparison of Per Capita GDP Series in Constant Prices, 1978-1988



Source: Table 5.

CONCLUSIONS

The basic goal of this paper was to develop a methodology for producing dollar GNP estimates for China that are free of distortions introduced by exchange rate movements, and that can be updated on an ongoing basis. It is not, as noted earlier, the only approach available for accomplishing this task. The adjusted factor cost approach, the ICP framework, and the physical indicator method all have merit, but for the time being, none of these techniques is particularly well-suited to produce dollar GNP estimates for the country using regularly-published statistics. It is for this reason that a new approach has been developed in this paper.

This is not to say that the framework developed here cannot be improved on. Four areas can be identified where further research would almost certainly yield positive results: 1) Adjusting samples used for developing dollar/yuan price ratios so that they better reflect quality differences between China and the U.S.; 2) Disaggregating constant-price GNP growth rates to better account for structural change; 3) Updating the benchmark dollar GNP estimate to 1987 through use of China's new input-output table for that year; and 4) Adjustment for bias imparted by the increased monetization of China's economy since 1978. These subjects are briefly addressed below:

Improvement of Dollar/Yuan Price Ratios

Dollar/yuan price ratios used in this report to produce the benchmark GNP estimate were based on published data, rather than an ICP-style sample of prices for a list of standard products. This is a limitation, though one imposed by circumstances. Statistical authorities in China have yet to approve an ICP-style survey. The problem with using published rather than sample data, however, is that prices of somewhat lower quality Chinese products may be inadvertently compared with prices of higher quality goods abroad. This can yield artificially high dollar/yuan price ratios, leading to upwardly-biased dollar GNP estimates.

Although upward bias in our benchmark GNP estimate for 1981 is probably less than 5 percent because of close attention paid to product specifications in the price comparisons used here (see Appendix B), there are nonetheless uncertainties if quality levels change over time. To the extent that the quality of Chinese products improved over time, bias caused by earlier comparison of prices of nonhomogeneous goods would diminish. The reverse would be true if quality levels in China decline.

Development of an improved methodology for assessing overall changes in product quality by sector would be necessary to provide a more accurate answer to the question of whether bias in price ratios has risen or fallen over time (see Appendix B). Time and resources permitting, it might also be fruitful to consider reestimating dollar/yuan purchasing power parities for a benchmark year later than 1981. This would require the cooperation of statistical authorities in China, though there is evidence that such cooperation might be forthcoming. In early 1989, representatives of China's State Statistical Bureau indicated to the United Nations Statistical Office that they were "in principle" interested in participating in the ICP project.[15] China's participation in the ICP project would open the door to the calculation of detailed purchasing power parities in a standard format, and for comparable products. This not only would facilitate the calculation of ICP measures of dollar GNP for China, but would provide raw material for refining the approach developed here.

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[15]Conveyed to the author directly by Zhang Sai, Director of China's State Statistical Bureau.

Disaggregation of Constant-Price GNP Growth Rates

China's official constant-price GNP output indices are calculated in China by linking output indices compiled in different price bases. This linking is done at an aggregate level for the primary, secondary, and tertiary components of GNP, rather than for the subsectors of these major components. The problem with this is that it tends to obscure structural changes in output below the primary, secondary, and tertiary levels, adversely influencing the official GNP growth rates used in this report (see Appendix B).

Rather than rely on China's GNP output indices for the primary, secondary, and tertiary sectors, it would be preferable to base constant-dollar GNP estimates on more disaggregated output indices. Decomposing China's GNP accounts to a more disaggregated basis is difficult, though not impossible. The constant-price growth rates these more disaggregated accounts would yield would facilitate the calculation of dollar GNP estimates that do a better job of accounting for structural change.

Use of 1987 I-O Table to Produce New Benchmark GNP

Our dollar GNP estimates here are based on a 1981 benchmark -- a year chosen because it corresponds with the date of the only complete national input-output table China has published. The State Statistical Bureau has recently completed a far more detailed input-output table for 1987, however. Once this table becomes available, it would be wise to redo a set of benchmark dollar GNP estimates, because this input-output table is the first to show actual input flows for nonmaterial services.[16]

It should also be noted that the Price Research Institute of China's State Price Bureau has developed national input-output tables for 1981, 1983, 1985, and 1987 on a standardized basis. Although these tables are currently unavailable outside China, they would clearly permit the calculation of double-deflated dollar GNP estimates for a variety of years. This would minimize index number problems caused by applying constant price output indices compiled in yuan to dollar-based GDP estimates for a single benchmark year, and potentially yield a far more accurate dollar GNP time-series for China. Until these input-output tables become available outside China, however, estimating a benchmark GNP in dollar terms for 1987 would be an improvement.

Adjustment for Increased Monetization Post-1978

The substitution of cash transactions for what were previously barter exchanges in rural areas may well have had an effect on official growth rates for GNP in China. This is not because barter, or "in kind" transactions were not picked up by the statistical system before, but because the prices assigned to rural output transferred in this manner was in all likelihood much lower than their value on rural markets, which weren't fully resurrected in the early 1980's. This would mean that growth rates for the primary sector of China's GNP may have some upward bias, as would our dollar GNP estimates for this sector.

Quantifying this bias is no easy task, however. It may be possible to model the increased monetization of China's economy using a quantity theory of money approach. Research along these lines by Chow (1985) suggests that the velocity of money in China has not been constant, which supports the hypothesis of increased monetization. Further research in this area might reveal more about the effect rising monetization has had on real growth rates.

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[16]The 1987 input-output table is the first official table for China compiled on an SNA basis, rather than the MPS basis used in constructing earlier input-output tables.

Strictly speaking, the dollar GNP estimates produced here should be regarded as exploratory. They are nonetheless the best estimates that can be derived from existing statistics, and map changes in real macroeconomic growth far better than simple exchange rate conversions of national accounts data. They also teach us two valuable lessons: that China's official GNP output index overstates real growth in dollar terms, and that using either the official exchange rate or a higher exchange rate for national accounts conversion yields dollar GNP estimates that are biased downward. Methodological refinements suggested above are not likely to reverse these conclusions. It would nonetheless be fruitful to pursue these refinements, for they would enable us to draw even firmer conclusions on the foremost measure of social welfare we have for China.

APPENDIX A

DETAILED METHODOLOGY FOR ESTIMATING DOLLAR GNP

The methodology employed in this paper to derive dollar estimates of China's GNP and GDP is straightforward, but may be clearer when represented mathematically. Let A represent an n by n matrix of intermediate inputs for 1981 in current yuan (the benchmark year), V be a 1 by n vector of value added in current prices, X be a 1 by n vector of gross value of output, and i be a summation vector. By definition it is true that gross value of output is equal to the sum of intermediate inputs and value added, that is:

$$(1)\quad X = iA + V$$

By rearranging terms, value added may be expressed:

$$(2)\quad V = X - iA$$

Assume now the existence of an n by n matrix P with average dollar/yuan price ratios for each sector of the input-output table on the diagonal, and zeros elsewhere. A double-deflated vector of value added in dollar terms, V^*, may be then obtained by calculating:

$$(3)\quad V^* = PX - iPA$$

Noting that China's GDP is equal to the sum of value added, and that value added is divided into primary, secondary, and tertiary sectors in China's accounting framework, we partition the right-hand side term of equation (3) such that:

$$(4)\quad V^* = (PX-iPA)_I + (PX-iPA)_{II} + (PX-iPA)_{III}$$

or:

$$(5)\quad V^* = V^*_I + V^*_{II} + V^*_{III}$$

where subscripted Roman numerals represent the sector of origin, and the right hand side of both equations is simply a decomposition of double-deflated value added in dollar terms into these sectors.

Now recall that China has published constant price output indices for each of the three components of GDP, which we label δ_I, δ_{II}, and δ_{III}, respectively. Assuming these indices have been rebased so that 1981 = 1, then a GDP time-series in constant 1981 dollars may be estimated:

$$(6)\quad GDP^*_t = V^*_t$$

$$= \delta_{I,t}V^*_I + \delta_{II,t}V^*_{II} + \delta_{III,t}V^*_{III} \qquad t = 1978,...1987$$

GNP in constant dollar terms is calculated by adding net factor income to the dollar GDP estimates derived in equation (6). Net factor income data in current yuan from China's GNP accounts are converted into

constant 1981 dollars through multiplication by the official exchange rate.[17] GNP in constant 1981 dollars may thus be estimated:

$$(7)\quad GNP_t^* = GDP_t^* + e_t F_t$$

where e_t is the current period dollar/yuan exchange rate, and F_t is net factor income in current yuan.

As regards GDP and GNP estimates in the benchmark year, this methodology has more in common with the ICP approach than may seem apparent at first glance. ICP estimates developed using final expenditure weights drawn from the 1981 input-output table would be identical to the estimates derived here if the same sectoral purchasing power parities (matrix P) were employed. This is because it is necessarily true in input-output tables that the sum of value added is equal to the sum of final demand, even for transformed matrices. Here, the emphasis is placed on the value added side of this identity, simply because that is the manner in which China's GNP statistics are drawn up.

[17]China's official GNP statistics contain no constant price index for net factor income from abroad, thus a simple exchange rate conversion must be used to convert these data to dollars. This is a relatively minor defect, because net factor income from abroad is a small portion of GNP.

APPENDIX B

SOURCES OF DATA

Introduction

The methodology discussed in Appendix A requires three sets of information to produce dollar GNP estimates for China: (1) official GNP levels and constant price indices; (2) an input-output table corresponding to these data for some benchmark year; and (3) dollar/yuan price ratios for each sector of this input-output table. Each data set is discussed below.

GNP Statistics

China's official GNP statistics are the most straightforward of these data requirements. GNP levels and constant price indices are summarized in table B-1. China's GNP statistics are compiled on an industry of origin footing rather than a final expenditure basis. GDP is calculated as the sum of value added in the primary, secondary, and tertiary sectors. Coverage for each of these sectors is listed in table 1, in the main body of the report. Value added is calculated as the difference between gross value of output and material inputs for the primary sector, and as the sum of factor incomes for the secondary and tertiary sectors. Factor incomes include only employee compensation and depreciation for tertiary activities such as education and scientific research. Value added for other secondary and tertiary activities, however, includes these expenses and profits, taxes, interest, and administrative expenses, as well.[18]

Three points about China's official GNP statistics are worth noting. First, net factor income, the difference between GDP and GNP, is not listed in official statistics, but can be easily calculated as a residual, as is done in table B-1. Second, it is clear from table 1 in the main report that the tertiary sector excludes national government activities such as the wages of military personnel and government bureaucrats, and may thus understate actual output levels.

Finally, the constant price growth rates appear to have been calculated using linked output indices based in 1970 prices for 1978-1981, and 1980 prices for 1981-87. This is a methodological defect, but barely affects the reliability of the figures because it means that index number problems are a potential problem only for 1978-80.

This is an important point, and some background information may be useful. Real growth rates for most socialist countries are calculated from constant price indices of output, measured in either gross or net terms.[19] These indices are typically assembled by linking together constant price output indices compiled in different base year prices. For China's official output indices, this means linking together indices in 1952 prices for 1952-57, in 1957 prices for 1957-61, in 1970 prices for 1971-1981, and in 1980 prices for 1981-1989. Once these indices are joined together by using data for overlapping years, the composite index could be easily expressed in either 1952, 1970, or 1980 prices, though in fact the official indices reflect a mix of these price weights.

This creates certain problems when one analyzes official constant-price output indices that span an overlapping year (1957, 1971, or 1981). Because a mixed set of price weights are employed, official indices of growth tend to be higher than if later year prices alone were employed, yet lower than if the output were valued entirely at earlier period prices. The reason for this is that relative prices of industrial to agricultural products tend to be higher in early periods than in later periods. Since industrial output generally grows at a faster rate over time than agricultural output, this means that growth rates appear to be higher if

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[18]See Guojia tongji ju kexue yanjiu suo (1985), pp. 24-84.

[19]In the MPS national income accounting framework, gross indices are based on gross value of output; net indices are based on net value of output, or gross value added less depreciation.

TABLE B-1. OFFICIAL GNP STATISTICS FOR CHINA, 1978-1989

Indicator	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Output levels (billion yuan, in current prices):												
Gross national product	358.81	399.81	447.00	477.30	519.30	580.90	696.20	855.76	969.63	1,130.10	1,398.42	1,567.70
Gross domestic product	358.81	399.81	447.00	477.51	518.23	578.70	692.82	852.74	968.76	1,130.71	1,399.02	1,568.20
Primary sector	101.84	125.89	135.94	154.56	176.16	196.08	229.55	254.16	276.39	320.43	383.10	420.30
Secondary sector	174.52	191.35	219.20	225.55	238.30	264.62	310.57	386.66	449.27	525.16	658.72	735.40
Tertiary sector	82.45	82.57	91.86	97.40	103.77	118.00	152.70	211.92	243.10	285.12	357.20	412.50
Net income from abroad	0.00	0.00	0.00	-0.21	1.07	2.20	3.38	3.02	0.87	-0.61	-0.60	-0.50
Output indices (1978=100, in constant prices):												
Gross national product	100.0	107.6	116.0	121.2	131.8	145.4	166.6	187.8	203.4	225.8	250.2	260.0
Gross domestic product												
Primary sector	100.0	106.1	104.6	111.9	124.8	135.1	152.6	155.4	160.5	168.1	172.3	176.6
Secondary sector	100.0	108.2	122.9	125.2	132.1	145.8	166.9	197.9	218.2	248.1	284.1	297.2
Tertiary sector	100.0	107.8	114.3	122.2	135.2	152.3	178.3	207.9	231.0	260.8	292.4	303.5

Note: Constant-price output indices are indices produced by linking together two or more constant-price output indices with different base-year prices using data for overlapping years.

Source: Guojia tongji ju (1990), p. 5.

expressed in earlier period prices. Long-term growth rates derived from official output indices lie between these extremes, because they are derived from linked output indices compiled in both earlier and later period prices.

It should thus be clear that if one's analytical gaze is restricted to a period of time that does not span one of the linking years, then the official output indices represent growth rates expressed in one set of prices only. The index number problem described above is thereby not encountered, and the chief methodological shortcoming with China's official output indices is avoided.

Official constant-price output indices for the components of China's GNP are available for only 1978-1989. Only one crossover year is spanned by the data (1981), meaning that only the output indices for 1978-1980 are calculated in a different set of prices (1970 prices) than for later years (1980 prices). It is in this sense that we consider constant price GNP growth rates to be reliable for the bulk of our sample period (1978-1989). At worst, 1978-1980 official output indices slightly overstate value added in industry and underestimate it in agriculture relative to the price base used for later year data.

It should also be noted that changes in data quality over time may have influenced official rates of growth. Chinese statisticians do a much better job today of tracking growth than they did ten years ago. This is particularly true for the service sectors, which have been targeted for special attention in improved statistical coverage since 1985.[20] To the extent that later statistics pick up output that was inadvertently omitted in earlier years, some upward bias in GNP growth rates may result.

Input-Output Table

To date, the only complete national input-output table that Chinese statistical authorities have published is a table for 1981.[21] Other national tables reportedly exist, including an input-output table for 1987, but their unavailability makes the 1981 table our candidate by default for use in producing benchmark dollar GNP estimates.[22] Interindustry demand in the 1981 input-output table is presented at the 24-sector level, spanning most, but not all of the sectors included in China's GDP.

Three adjustments had to be made to the 1981 table so that it was consistent with GDP statistics for that year. First, the agricultural sidelines row and column had to be separated into a village and below industry component and a residual agricultural sidelines component. The reason for this is that in China's current GNP statistics, the village industry portion is included as part of industrial output in the secondary sector, whereas residual agricultural sidelines are part of agricultural output in the primary sector. Total sideline activities in the original input-output table were divided into these two sectors by noting that in the commodity-pure version of China's 1981 input-output table (as opposed to the industry by industry

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[20]See "Guowuyuan..." (1985).

[21]Guojia jihua weiyuan hui jingji yuce zhongxin, guojia tongji ju guomin jingji pingheng tongji si (1986).

[22]Taylor (1989), p. 145, documents the existence of national input-output tables compiled by Chinese government agencies and research institutes for 1973, 1979, 1981, 1983, 1985, and 1987. All but the 1981 table are unavailable to western scholars, however.

table), activities of village and below industry were removed from the sideline activity rows and columns.[23] Sideline activities in the commodity-pure input-output table were thus assumed to represent true agricultural sideline endeavors, and village and below industry rows and columns were estimated by simply subtracting these flows from the sideline activity rows and columns in the industry by industry table.

The second adjustment made to the 1981 input-output table was to adjust intermediate flows, depreciation, and gross and net value of output for each sector so that they corresponded to revised national accounts statistics for 1981. Gross and net value of output totals for agriculture, industry, construction, transport and commerce were changed so that they matched data recently published in the Statistical Abstract of China, 1990.[24] Depreciation was reestimated for each sector by first subtracting net value of output for the appropriate subsectors of GDP from the primary, secondary, and tertiary GDP totals listed in table 1, then adjusting the depreciation flows in the input-output table so that they added up to these new controls.[25] New intermediate input totals were then derived by subtracting depreciation and net value of output from gross value of output for each sector, and the interindustry demand matrix was adjusted so that each column added up to these controls using a RAS procedure.[26]

The final adjustment made to the 1981 input-output table was to transform it from an MPS (material product system) accounting basis to an SNA (system of national accounts) basis by adding estimates of nonmaterial services to the first quadrant. Value added for nonmaterial services was estimated by subtracting value added for transport and commerce in the input-output table (after the above adjustments) from tertiary sector GDP for 1981 shown in table 1. Gross value of output for nonmaterial services was drawn from an earlier attempt by the World Bank (1985, p. 56) to derive an SNA-format input-output table for 1981 China. Use of inputs from other sectors by nonmaterial services was estimated by applying shares of total material inputs for this sector shown in the World Bank (1985) study to gross value of output minus net value of output controls for nonmaterial services. A row showing nonmaterial service inputs to other sectors was estimated as a markup on total material inputs for each sector, on the assumption that for intermediate consumers these services consisted mainly of finance and insurance charges. Markup rates for each sector were based on World Bank (1985, pp. 55-56) data; all other intermediate flows were reduced

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[23]This feature of China's input-output table is not documented, but can easily be seen by comparing the sideline industry vectors in the commodity by commodity table and the industry by industry table. The difference in gross value of output for sideline activities in the two tables is very close to published gross value of output totals for village and below industry.

[24]See Guojia tongji ju (1990), p. 5. These adjustments were minimal on both the gross and net value of output side. Details on gross and net value of output for manufacturing subsectors in current 1981 yuan were not available, so a pro-rata adjustment was made based on the difference between the totals shown in the input-output table, and the most recent published totals.

[25]Depreciation changed little for agriculture, but depreciation totals estimated from China's GDP statistics were considerably less than the sum of depreciation for industry and construction in the original 1981 input-output table. No explanation is given for this in official statistical yearbooks, but the most likely reason for it is the removal of depreciation on non-productive assets (employee housing, dining halls, schools, etc.) from these sectors in the GDP statistics, and their reallocation to the tertiary sector.

[26]The RAS procedure is an iterative approach of forcing matrices to simultaneously sum to known row and column totals. Row totals here were total material inputs for each sector. Row control totals were gross value of output, as a vector of total final demand was included in the adjustment matrix. For row and column sums to be balanced, the column control for final demand was set equal to total value added. Further information on the RAS procedure may be found in Taylor (1984), Lecomber (1975), and Bacharach (1970).

accordingly, so that total material inputs for each sector did not exceed the difference between gross value of output and value added.[27] The final table is not included here, but is available upon request.

Dollar/Yuan Price Ratios

The last information we need are dollar/yuan price ratios, used in conjunction with the transformed 1981 input-output table to derive a double-deflated GDP estimate in U.S. dollars that serves as a benchmark. As Taylor (1986a) points out, earlier comparisons of Chinese and foreign prices are problematic because of the use of small and unrepresentative samples, noncomparable products, and inadequate attention paid to the difference between retail and producer prices. Fortunately, recent research by Taylor (1989, Appendix B) on shadow prices in China provides us with an alternative: a carefully constructed set of weighted average dollar/yuan price ratios that follows the industrial classification system used in China's 1981 input-output table.

Taylor used a sample of over 200 commodities in conducting his price comparisons. Consistent with the valuation basis used in the 1981 input-output table, yuan prices were Chinese producer prices or farmgate procurement prices.[28] Dollar prices were either prices on world markets, Japanese or U.S. producer prices, or import unit values (adjusted to remove insurance and freight margins). Wherever possible, Taylor used published price data for 1981. In instances where 1981 data were unavailable, price data for other years were adjusted to a 1981 basis using producer price indices.[29] Appendix C summarizes Taylor's weighted average conversion factors for 1981 by input-output sector. To obtain our sectoral dollar/yuan price ratios, we simply divided the weighted average conversion factors for each sector by 2.23 -- the yuan/dollar shadow exchange rate used by Taylor in calculating conversion factors. Weights used by Taylor are gross value of output weights from official sources, and subsector means are geometric means. Price data sources for each commodity are detailed in Appendix D.

Despite this abundance of data, dollar/yuan price ratios for a few sectors still present problems. We must separately estimate a fairly crude price ratio for village industry, and this is done simply by weighting Taylor's dollar/yuan price ratios for each industry by estimated gross value of output shares for village industry. A considerably more complex procedure had to be used to estimate dollar/yuan price ratios for service sectors (construction, transport, commerce, and nonmaterial services) and for rural sidelines (which include service-sector activities). Existing comparisons of foreign and Chinese domestic prices for these sectors are tenuous and undocumented, suggesting that one base price ratios for these sectors on the price ratios known to be of better quality, namely, those for non-service sectors discussed above.

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[27]Strictly speaking, a portion of the nonmaterial input markup should come from net value of output, because in China this includes interest on borrowed funds and personal transport of a business nature. It appears based on conversations with Chinese statisticians, however, that official GDP figures are calculated by simply adding depreciation to existing net value of output figures. This means that nonmaterial inputs must be calculated as a markup on material inputs rather than factor inputs for consistency's sake.

[28]Where only retail prices were available, Taylor used retail/producer price markups to deflate yuan prices to a producer price equivalent.

[29]For dollar price data, U.S. producer price indices, Japanese domestic wholesale price indices, or Japanese export price indices were used, depending on the price origin. For Chinese data, sectoral price indices compiled by Ma Yuxiang and Zhang Pinglu (1985) were used to adjust price data from the 1970's and early 1980's, and unpublished producer price indices compiled from official Chinese data by Robert Michael Field were used to adjust price data for 1984 and 1985.

Our basic assumption is that dollar/yuan price ratios for services should be calculated as weighted averages of price ratios for inputs they need in order to be produced. This is easily explained in the context of a general equilibrium model for price formation. Redefine A to be an n by n matrix of direct input coefficients, V to be an n by n diagonal vector of value added coefficients, P to be an n by 1 vector of output dollar/yuan price ratios, and π to be an n by 1 vector of value added adjustment coefficients resulting from the double-deflation process discussed earlier. Given this new notation, equation (3) in Appendix A above may be reexpressed:

(8) $V'\pi = P - A'P$

Our problem, however, is that we cannot solve directly for $V'\pi$ because all elements of P are not known. Let us then first rearrange equation (8) so that we solve out for P:

(9) $P = (I-A')^{-1}V'\pi$

Now we partition equation (9) according sectors for which dollar/yuan price ratios are known (P_k) and rural sideline and service sectors for which the reverse is true (P_u):

(10)
$$\begin{bmatrix} P_k \\ - - \\ P_u \end{bmatrix} = \begin{bmatrix} A'_{ku} & | & A'_{ku} \\ - - - & | & - - - \\ A'_{uk} & | & A'_{uu} \end{bmatrix} \begin{bmatrix} P_k \\ - - \\ P_u \end{bmatrix} + \begin{bmatrix} V'_k\pi_k \\ - - - \\ V'_u\pi_u \end{bmatrix}$$

Since dollar/yuan price ratios P_k are given, we have k+2u unknowns (P_u, π_k, and π_u) in a system of k+u equations, requiring additional assumptions in order to obtain a solution.

The assumptions we make are twofold. First, we assume that the value added adjustment coefficient for rural sidelines, $\pi_{u=1}$, is equal to a weighted average of π_k for forestry, fishery, animal husbandry, construction, transport, commerce, and nonmaterial services.[30] Second, we assume that value added adjustment coefficients π_u for all service sectors are identical and equal to the ratio of value added in dollar terms to value added in yuan for all sectors of the economy. Mathematically, this can be expressed:

(15) $$\pi_u = \frac{\sum_{j=1}^{n} \pi_j v_j}{\sum_{j=1}^{n} v_j}$$ for u = construction, transport, commerce, and nonmaterial services

[30]Weights here are simply shares of gross income accruing from these activities to nonindustrial sideline enterprises.

This provides us with u additional constraints, bringing the number of equations equal to the number of unknowns. Missing relative price ratios and even value added adjustment coefficients may then be solved for directly.[31]

Dollar/yuan ratios used to revalue gross value of output and intermediate inputs in the revised 1981 input-output table are shown in table B-2. The adjacent column of relative price levels, which represent the average ratio of dollar prices to Chinese prices when the former are converted to yuan at the official exchange rate, confirms much of what one would expect to be true for China.[32] World prices for most agriculturally-oriented sectors are higher than Chinese prices -- a byproduct of China's traditional policy of setting low agricultural procurement prices to raise profit margins for state-run industries that use agricultural products as inputs.[33] Similar pricing patterns are shown for providers of key industrial inputs, including energy (electricity, coal, and petroleum), heavy machinery, and building materials. China's practice of charging low prices for necessities causes domestic food prices to be lower than prices abroad, but for somewhat less essential items, such as light machinery products (TV's, cassette players, etc.) the reverse is true.[34] Finally, construction, transport, commerce, and nonmaterial services have uniformly higher prices overseas than within China -- a very typical pattern for labor-abundant developing countries, as pointed out by Kravis, Heston, and Summers (1982, p. 23).

Similar findings on price levels in China compared to those abroad have been reported by Taylor (1986a, p. 19). However reassuring it is to have price ratios that appear to make sense, it is infinitely preferable to use price ratios constructed from a sample survey of standard products rather use than comparisons based on published prices, as is done here. This is because quality differences between similarly-named products in two countries can cause purchasing power parities to differ substantially from what they would be if prices for comparable products were compared.

Unfortunately, sample survey-based price comparisons for comparable products are simply not available for China. Relative price ratios compiled from an informal field survey by Kravis (1981) -- the only ones known to have been compliled using an ICP-style comparable products approach -- have never been published. We are thus left with no choice but to use comparisons of published price data. As far as such comparisons go, the price ratios compiled by Taylor (1989) which we use in this report are the best available. They are not only based on the largest sample of prices yet assembled, but sources of price data used are far more thoroughly documented than in earlier efforts by Ahmad (1983), Wharton Econometric Forecasting Associations (1984), the World Bank (1985), and Taylor (1986b, Appendix H).

It should be apparent from the listing of product specifications and sources shown in Appendix D that considerable attention was paid by Taylor (1989) to ensure comparison of homogeneous products. For example, price ratios for steel sheets distinguished not only between hot and cold-rolled products, but also made price per ton comparison for sheets of virtually identical dimensions. Price ratios for fertilizers were adjusted for nutrient content prior to comparison, and only the prices of basic chemicals having comparable levels of purity were compared.

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[31]This method of solving for missing dollar/yuan price ratios has its origins in shadow pricing theory, particularly research by Kuyvenhoven (1978) and Tower and Pursell (1986, pp. 57-58).

[32]A relative price level greater than 1 implies higher world prices than domestic prices.

[33]See Lardy (1983, pp. 98-145), Sicular (1988), and Wiemer and Liu (1989).

[34]Domestic prices appear to be higher than world prices for textiles and clothing, as well. This could reflect either a "stickiness" in domestic prices for these products relative to world prices since the 1950's, or simply sampling problems for the price comparisons.

Table B-2. Average Dollar/Yuan Price Ratios, 1981

Sector	Average dollar/yuan price ratio	Relative price level
Primary sector		
Farming	0.992	1.691
Forestry	0.509	0.868
Animal husbandry	1.161	1.980
Rural sidelines	0.947	1.615
Fishery	1.436	2.448
Secondary sector		
Village industry	0.967	1.649
Metallurgy	0.584	0.996
Electric power	0.773	1.318
Coal and coke	1.575	2.685
Petroleum	1.793	3.057
Heavy chemicals	0.499	0.851
Light chemicals	0.303	0.517
Heavy machinery	1.393	2.375
Light machinery	0.352	0.600
Building materials	1.441	2.457
Logging	0.507	0.864
Wood and wood products	0.454	0.774
Food	0.708	1.207
Textiles	0.372	0.634
Clothing and leather	0.485	0.827
Paper, cultural & educational goods	0.397	0.677
Other industry	0.582	0.992
Construction	0.957	1.632
Tertiary sector		
Transport, posts & telecomm.	0.993	1.693
Commerce, catering and supply	0.833	1.420
Nonmaterial services	0.775	1.321

Notes: Average dollar/yuan price ratios are producer price comparisons, and are used to revalue gross value of output and intermediate inputs in this paper. Relative price levels are calculated by multiplying the dollar/yuan price ratios by the 1981 official exchange rate of 1.7050 yuan per dollar. A relative price level greater than 1 implies higher world prices than domestic prices.

Source: See text.

Bias caused by comparing prices for nonhomogeneous products is unlikely for agriculture (farming, forestry, animal husbandry, and fishery), metallurgy, electric power, petroleum, heavy chemicals, light chemicals, logging, and the food industries. Chinese price data for these sectors were plentiful, detailed product specifications were readily available, and at least for the benchmark year (1981), the pricing system for these commodities was relatively uniform nationwide.

There is a greater probability of error in the price ratios for heavy machinery, light machinery, building materials, wood products, textiles, clothing, and "other industry" sectors. For the machinery sectors, much of the price data used was drawn from earlier CIA studies, requiring extensive use of price indices to update the data to 1981.[35] Dollar prices of machinery had been adjusted by the CIA to be comparable to Soviet equipment, but not Chinese equipment. To the extent that Chinese machinery is based on Soviet designs (a plausible hypothesis, given economic cooperation between the two countries prior to 1960), use of these data is acceptable, but problems with using non-benchmark year data must still be acknowledged. As for the other sectors, price data and product specifications were scarce, yielding smaller samples for price comparisons than desired.

If we assume generally higher quality for products on world markets compared to Chinese products for these problem sectors, then their dollar/yuan price ratios are likely to have been upwardly biased. That is, adjusting world products to Chinese quality levels would result in lower dollar prices, hence, lower dollar/yuan price ratios than in fact estimated for these sectors.

Upward bias in dollar/yuan price ratios for any of these sectors would tend to yield somewhat higher dollar GNP estimates than appropriate. The reason for this is that output is valued at higher dollar prices than quality levels justify, yielding higher value-added in dollar terms. This is partially offset by upward bias in material input costs, engendered by applying the same inflated dollar/yuan price ratios to inputs to other industries from the problem sectors. Since total intermediate inputs from problem sectors is generally less than total output, the net effect of overestimating dollar/yuan price ratios is thus to impart upward bias to the resulting dollar GNP estimates.

In all likelihood, the magnitude of upward bias in our dollar GNP estimates for China is minor. Sectors listed above having price ratios with a relatively higher probability of error accounted for only 18 percent of total 1981 value-added (GNP) in yuan. Overestimating dollar/yuan price ratios for these sectors by as much as 20 percent would probably impart less than a 5 percent increase in overall dollar GNP on a net basis.

To the extent that the quality of Chinese products in problem sectors approached quality levels in world markets over time, any bias caused by comparison of prices of nonhomogeneous goods would likely diminish. It is frankly difficult to say whether or not product quality improved in the problem sectors, for China publishes no comprehensive quality indices. It does, however, publish selected quality indicators for certain commodities. Table B-3 summarizes quality indicators that are available for selected commodities in our problem sectors.

These quality indicators generally show little variation between 1981 and 1988. The exceptions are glass, where quality levels surged until 1984 then declined; wrist watches, where a sharp peak in quality was observed in 1985; printed and dyed cloth, where quality was its zenith in 1984; and silk textiles, which apparently suffered a monotonic decline in quality from 1981 through 1987.

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[35]Many Chinese machinery prices were drawn from Central Intelligence Agency (1975), and prices for comparable U.S. machinery were drawn from Central Intelligence Agency (1980).

Table B-3. Selected Quality Indicators for China, 1981-1988

	1981	1982	1983	1984	1985	1986	1987	1988
Machinery								
Quality rating:								
Sewing machines	87.2	88.9	89.5	91.6	91.9	91.3	92.0	91.1
Bicycles	85.7	89.0	91.4	93.3	94.2	93.7	93.2	90.1
Wrist watches	84.7	90.4	91.3	90.0	114.8	94.3	92.8	91.6
Percent of light bulbs up to standard	88.3	89.0	89.3	89.3	90.3	88.3	88.6	88.2
Building materials								
Percent of cement up to standard	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Percent of glass qualifying as first-grade	79.8	78.9	82.5	93.3	82.3	75.5	69.5	68.5
Textiles								
Percent of products up to standard:								
Viscose fibers	98.4	98.6	98.8	99.1	98.6	99.1	98.5	98.1
Synthetic fibers	98.0	98.5	99.0	99.1	98.9	98.4	98.1	98.1
Mulberry silk	97.5	97.0	97.0	97.8	98.4	98.9	98.0	98.8
Rate of first-grade product put into storage:								
Cotton cloth	96.0	95.9	95.5	95.5	94.9	95.3	95.8	96.1
Printed and dyed cloth	88.8	88.9	87.7	96.2	84.9	83.8	84.6	85.6
Worsted woolen products	93.5	93.5	92.5	93.6	93.1	90.7	90.9	92.1
Knitting wool	93.2	92.2	92.6	93.8	94.3	93.9	94.0	94.0
Silk textiles	93.0	91.3	89.8	88.2	86.5	83.5	76.7	81.5

Sources: Guojia tongji ju (1983), pp. 284-286; Guojia tongji ju (1985), pp. 362-364; Guojia tongji ju (1987), pp. 302-303; Guojia tongji ju (1989), pp. 337-338.

It would be tempting to conclude on the basis of this sample of commodities that quality changes have generally been so small that they have neither improved nor diminished the reliability of our dollar/yuan price ratios. Products portrayed in table B-3 are a small and possibly unrepresentative sample of commodities in our problem sectors, however. Development of an improved methodology for assessing overall changes in product quality by sector would be necessary to provide a more accurate answer to the question of whether bias in price ratios has risen or fallen over time.

APPENDIX C

DETAILED PURCHASING POWER PARITIES

Table C-1. Detailed Purchasing Power Parities from Taylor (1989)

Sector	Unit	Domestic price (yuan)	World price (US $)	PPP (yuan/$)	Sub-sector ê/PPP	Gross value of output weights (100m yuan)	Gross value of output times ê/PPP	Weighted average sectoral ê/PPP
Farming						1537.35	3402.76	2.213
Grain						1080.97	2211.92	
Rice	ton	316	484	.653	3.416	454.9	1553.94	
Wheat	ton	397	177	2.243	.994	236.77	235.35	
Corn	ton	264	131	2.015	1.107	156.3	173.02	
Sorghum	ton	267	127	2.102	1.061	17.76	18.84	
Soybeans	ton	586	288	2.035	1.096	54.64	59.89	
Other (gmean above, except rice)					1.064	160.6	170.88	
Industrial crops						272.61	317.76	
Ginned cotton	ton	3116	1790	1.741	1.281	92.48	118.47	
Peanuts	ton	1216	631	1.927	1.157	46.52	53.82	
Rapeseed	ton	864	272	3.176	.702	35.12	24.65	
Sesame	ton	1418	725	1.956	1.140	7.23	8.24	
Jute & ambary hemp	ton	940	331	2.840	.785	11.84	9.29	
Hemp	ton	1614	565	2.857	.781	.81	.63	
Ramie	ton	2170	555	3.910	.570	1.06	.6	
Cured tobacco	ton	1596	1595	1.001	2.229	20.41	45.49	
Other (gmean of above)					.990	57.14	56.57	
Other crops						183.77	873.08	
Vegetables, melons					6.013	117.84	708.57	
Fresh vegetables	ton	112	302	.371	6.013			
Tea, mulberry & fruits						46.57	139.7	
Tea	ton	3238	2236	1.448	1.540	11.11	17.11	
Mulberry cocoons	ton	3392	11200	.303	7.363	8.55	62.95	
Apples	ton	346	329	1.052	2.120	10.4	22.05	
Citrus and oranges	ton	515	373	1.381	1.615	4.11	6.64	
Other (gmean of above)					2.496	12.4	30.95	
Forage, green manure					1.064	8.79	9.35	
Same as other grain, above					1.064			
Other crops					1.463	10.57	15.46	
Gmean of all crops					1.463			
Forestry						98.89	112.2	1.135
Growth of forest reserves					1.131	42.85	48.46	
Coniferous logs	cu.m.	143	79	1.810	1.232			
Mao bamboo	1000 logs	2304	1073	2.147	1.039			
Forest products					1.146	23.61	27.06	
Natural rubber	ton	6090	1119	5.442	.410			
Raw lacquer	ton	12760	19345	.660	3.381			
Tea oil	ton	2927	876	3.341	.667			
Tung oil	ton	2809	1402	2.004	1.113			
Palm fiber	ton	1000	860	1.163	1.918			
Bamboo and wood cutting					1.131	32.43	36.68	
Coniferous logs	cu.m.	143	79	1.810	1.232			
Mao bamboo	1000 logs	2304	1073	2.147	1.039			

Table C-1 (continued). Detailed Purchasing Power Parities from Taylor (1989)

Sector	Unit	Domestic price (yuan)	World price (US $)	PPP (yuan/$)	Sub-sector ê/PPP	Gross value of output weights (100m yuan)	Gross value of output times ê/PPP	Weighted average sectoral ê/PPP
Animal husbandry						402.17	1041.22	2.589
Livestock breeding/raising						274.59	800.69	
Hogs					1.925	227.26	437.48	
Hogs	head	120.7	104.2	1.158	1.925			
Large animals					8.124	36.04	292.79	
Cattle	head	175.4	639.0	.274	8.124			
Sheep and goats					6.237	11.29	70.42	
Sheep/goats	head	25.6	71.6	.358	6.237			
Poultry					1.593	40.1	63.88	
Poultry	head	2.8	2.0	1.400	1.593			
Live animal products						68.13	76.04	
Milk	ton	600	176	3.409	.654	7.75	5.07	
Eggs	ton	1840	887	2.074	1.075	36.8	39.56	
Honey	ton	1898	837	2.268	.983	2.09	2.05	
Sheep wool	ton	3480	2083	1.671	1.335	6.58	8.78	
Goat wool	ton	2420	895	2.704	.825	.31	.26	
Cashmere	ton	10600	26154	.405	5.502	.42	2.31	
Other (gmean of above)					1.270	14.18	18.01	
Other animal husbandry					1.270	19.35	24.57	
Same as Other above					1.270			
Fishery						43.69	139.9	3.202
Saltwater products					2.736	23.06	63.09	
Saltwater fish	ton	754	2061	.366	6.096			
Spanish mackeral	ton	950						
Hairtail	ton	643						
Yellow croaker	ton	649						
Chinese yellow croaker	ton	775						
Prawns	ton	2821	3810	.740	3.012			
Dried squid	ton	9200	5545	1.659	1.344			
Dried abalone	ton	40000	40722	.982	2.270			
Freshwater products					3.723	20.63	76.81	
Freshwater fish	ton	1062	1773	.599	3.723			
Black carp	ton	1248						
Grass carp	ton	1171						
Carp	ton	1084						
Silver carp	ton	745						

Table C-1 (continued). Detailed Purchasing Power Parities from Taylor (1989)

Sector	Unit	Domestic price (yuan)	World price (US $)	PPP (yuan/$)	Sub-sector ê/PPP	Gross value of output weights (100m yuan)	Gross value of output times ê/PPP	Weighted average sectoral ê/PPP
Metallurgy						456.69	594.63	1.302
Ferrous metals					1.420	313.78	445.57	
Iron ore	ton	58	33	1.758	1.269			
Scrap steel	ton	190	81	2.346	.951			
Pig iron	ton	265	235	1.128	1.978			
Steel ingots	ton	317	194	1.634	1.365			
Steel billets	ton	379	439	.863	2.583			
Steel bars	ton	495	373	1.327	1.680			
Steel plates	ton	592	348	1.701	1.311			
Angle steel	ton	481	254	1.894	1.178			
Channel steel	ton	486	254	1.913	1.165			
I-Beam steel	ton	495	320	1.547	1.442			
Strip steel	ton	472	484	.975	2.287			
Hot-rolled steel sheets	ton	666	330	2.018	1.105			
Cold-rolled steel sheets	ton	897	402	2.231	.999			
Medium plate steel	ton	527	308	1.711	1.303			
Tin-plated steel sheets	ton	1540	1381	1.115	2.000			
Zinc-plated steel sheets	ton	999	693	1.442	1.547			
Carbon-steel bars/rods	ton	648	429	1.510	1.476			
Carbon tool steel bars/rods	ton	740	983	.753	2.962			
Bearing steel	ton	981	822	1.193	1.869			
Spring steel	ton	823	528	1.559	1.431			
High-speed tool steel	ton	8057	8635	.933	2.390			
Stainless steel	ton	6198	1979	3.132	.712			
Stainless steel plate	ton	8298	1593	5.209	.428			
Nonferrous metals					1.043	142.91	149.06	
Tungsten ore	ton	9685	5277	1.835	1.215			
Molybdenum ore	ton	16320	8863	1.841	1.211			
Aluminium ingots	ton	2529	1676	1.509	1.478			
Electrolytic copper	ton	5245	1846	2.841	.785			
Electrolytic lead	ton	1975	806	2.450	.910			
Electrolytic zinc	ton	1770	982	1.802	1.237			
Nickel ingots	ton	21324	7560	2.821	.791			
Tin	ton	17941	14159	1.267	1.760			
Mercury	ton	29025	11966	2.426	.919			
Magnesium	ton	4608	2954	1.560	1.430			
Antimony	ton	3470	2011	1.726	1.292			
Cadmium	ton	19000	3117	6.096	.366			
Electric power					1.723	194.86	335.74	1.723
Electricity	1000 kwh.	66	51	1.294	1.723			
Coal and coke						157.26	552.4	3.513
Coal					3.604	146.26	527.12	
Coal	ton	30.67	49.57	.619	3.604			
Coking and coke chemical					2.298	11	25.28	
Coking coal	ton	49.44	60.78	.813	2.741			
Coke	ton	103	89	1.157	1.927			
Petroleum						282.13	1128.18	3.999
Extraction					6.425	130.49	838.4	
Crude oil	ton	84	242	.347	6.425			
Refining & other					1.911	151.64	289.78	
Gasoline	ton	585	354	1.653	1.349			
Aviation kerosene	ton	418	335	1.248	1.787			
Diesel oil	ton	276	299	.923	2.416			
Fuel oil	ton	54	184	.293	7.599			
Associated natural gas	1000 cu.m	58	32	1.813	1.230			
Nonassociated natural gas	1000 cu.m	137	55	2.491	.895			

Table C-1 (continued). Detailed Purchasing Power Parities from Taylor (1989)

Sector	Unit	Domestic price (yuan)	World price (US $)	PPP (yuan/$)	Sub-sector e/PPP	Gross value of output weights (100m yuan)	Gross value of output times e/PPP	Weighted average sectoral e/PPP
Heavy chemicals						368.11	409.44	1.112
Basic chemical materials					.833	71.76	59.78	
Sulphuric acid	ton	165	31	5.323	.419			
Caustic soda (sodium hydroxide)	ton	621	357	1.739	1.282			
Soda ash (sodium carbonate)	ton	291	170	1.712	1.303			
Sodium cyanide	ton	4000	1036	3.861	.578			
Sulphur	ton	340	151	2.252	.990			
Chemical fertilizers & pesticides					1.871	119.58	223.73	
Urea	ton	398	216	1.843	1.210			
Sodium nitrate	ton	485	1330	.365	6.115			
TSP	ton	364	161	2.261	.986			
Compound chemical fertilizer	ton	345	289	1.194	1.868			
Potassium sulphate	ton	301	228	1.320	1.689			
Potassium chloride	ton	252	138	1.826	1.221			
Ammonium nitrate	ton	276	353	.782	2.852			
Organic chemicals					.764	80.72	61.67	
Glycerine (glycerol)	ton	3107	1814	1.713	1.302			
Methanol	ton	728	191	3.812	.585			
Benzene	ton	874	480	1.821	1.225			
Methyl benzene	ton	874	365	2.395	.931			
Phosphorus dimethyl benzene	ton	825	481	1.715	1.300			
Paradimethyl benzene	ton	2427	598	4.059	.549			
Styrene	ton	2913	665	4.380	.509			
Acetone	ton	1908	571	3.342	.667			
Butyl alcohol	ton	2504	670	3.737	.597			
Octanol	ton	2504	606	4.132	.540			
Ores, rubber, and plastics					.669	96.05	64.26	
Natural rubber	ton	6090	1119	5.442	.410			
Butadiene-styrene rubber	ton	4369	1365	3.201	.697			
Butadiene rubber	ton	3786	1574	2.405	.927			
Polyvinyl chloride	ton	1903	780	2.440	.914			
Polyethylene (high-pressure)	ton	2330	764	3.050	.731			
Polyethylene (low-pressure)	ton	3010	853	3.529	.632			
Polypropylene	ton	2913	821	3.548	.629			
Polystyrene	ton	3883	994	3.906	.571			
						Gross	Gross	
Light chemicals						223.32	150.67	.675
Organic chemicals					.764	38.84	29.67	
Glycerine (glycerol)	ton	3107	1814	1.713	1.302			
Methanol	ton	728	191	3.812	.585			
Benzene	ton	874	480	1.821	1.225			
Methyl benzene	ton	874	365	2.395	.931			
Phosphorus dimethyl benzene	ton	825	481	1.715	1.300			
Paradimethyl benzene	ton	2427	598	4.059	.549			
Styrene	ton	2913	665	4.380	.509			
Acetone	ton	1908	571	3.342	.667			
Butyl alcohol	ton	2504	670	3.737	.597			
Octanol	ton	2504	606	4.132	.540			
Chemicals for daily use					.786	48.13	37.83	
Organic & basic chemicals combined					.786			

Table C-1 (continued). Detailed Purchasing Power Parities from Taylor (1989)

Sector	Unit	Domestic price (yuan)	World price (US $)	PPP (yuan/$)	Sub-sector ê/PPP	Gross value of output weights (100m yuan)	Gross value of output times ê/PPP	Weighted average sectoral ê/PPP
Drugs, rubber, and plastics					.610	136.35	83.17	
Aspirin	kg.	21.54	4.85	4.441	.502			
Vitamin B6	kg.	300	42	7.143	.312			
Vitamin C	kg.	38.38	11.9	3.225	.691			
Natural rubber	ton	6090	1119	5.442	.410			
Butadiene-styrene rubber	ton	4369	1365	3.201	.697			
Butadiene rubber	ton	3786	1574	2.405	.927			
Polyvinyl chloride	ton	1903	780	2.440	.914			
Polyethylene (high-pressure)	ton	2330	764	3.050	.731			
Polyethylene (low-pressure)	ton	3010	853	3.529	.632			
Polypropylene	ton	2913	821	3.548	.629			
Polystyrene	ton	3883	994	3.906	.571			
Heavy machinery						767.76	2385.3	3.107
Agricultural machinery					3.653	58.28	212.9	
Single/double-blade plow	item	134	542	.247	9.020			
Five-blade plow	item	1600	4447	.360	6.198			
Cultivators	item	1723	2709	.636	3.506			
Land leveler	item	5422	3996	1.357	1.644			
Combine	item	12496	33930	.368	6.055			
Tractor, 25-27 hp.	item	8500	7433	1.144	1.950			
Tractor, 37.9-40 hp.	item	9500	13288	.715	3.119			
Tractor, 52.6-55 hp.	item	12000	14395	.834	2.675			
Industrial machinery					6.040	190.01	1147.66	
Steam boilers, 410-420 ton/hr.	ton/hr.	11346	49273	.230	9.684			
Steam boilers, 640-670 ton/hr.	ton/hr.	11992	47787	.251	8.886			
Steam turbines, 100-115 mw.	kwh.	44.83	113.04	.397	5.623			
Steam turbines, 200 mw.	kwh.	40.17	52.37	.767	2.907			
Diesel engines, 40 hp.	hp.	64.08	126.74	.506	4.411			
Electric motors, 1.12-1.5 kw.	kw.	56.39	219.05	.257	8.663			
Electric motors, 3.7-5.0 kw.	kw.	50.75	134.53	.377	5.911			
Electric motors, 10.0-11.2 kw.	kw.	42.29	83.41	.507	4.398			
Transformers, 1,000 kva.	kva.	11.01	5.38	2.046	1.090			
Lathes	item	5075	19879	.255	8.735			
Planers, 19-25 tons capacity	ton	2030	11391	.178	12.513			
Punch presses, 270-350 tons ca.	ton	134	851	.157	14.162			
Transport equipment					2.064	124.2	256.35	
Truck, 3.6-4.0 ton	item	13533	12527	1.080	2.064			
Other production machinery					4.739	81.03	384	
Same as above three equipment groups					4.739			
Electronic machinery					1.487	80.76	120.09	
Television, black & white	set	390	260	1.500	1.487			
Radio, transistor	set	29.06	19.39	1.499	1.488			
Metal products & repair					1.132	233.48	264.3	
I-Beam steel	ton	495	320	1.547	1.442			
Hot-rolled steel sheets	ton	666	330	2.018	1.105			
Cold-rolled steel sheets	ton	897	402	2.231	.999			
Zinc-plated steel sheets	ton	999	693	1.442	1.547			
Carbon tool steel bars/rods	ton	740	983	.753	2.962			
High-speed tool steel	ton	8057	8635	.933	2.390			
Power cable, 10-15 kv	km.	3185	579	5.501	.405			
Light bulbs, incandescent	item	.46	.14	3.286	.679			
Batteries	item	.21	.06	3.500	.637			

Table C-1 (continued). Detailed Purchasing Power Parities from Taylor (1989)

Sector	Unit	Domestic price (yuan)	World price (US $)	PPP (yuan/$)	Sub-sector ê/PPP	Gross value of output weights (100m yuan)	Gross value of output times ê/PPP	Weighted average sectoral ê/PPP
Light machinery						312.19	245.16	.785
Agricultural machinery					3.653	5.66	20.68	
Single/double-blade plow	item	134	542	.247	9.020			
Five-blade plow	item	1600	4447	.360	6.198			
Cultivators	item	1723	2709	.636	3.506			
Land leveler	item	5422	3996	1.357	1.644			
Combine	item	12496	33930	.368	6.055			
Tractor, 25-27 hp.	item	8500	7433	1.144	1.950			
Tractor, 37.9-40 hp.	item	9500	13288	.715	3.119			
Tractor, 52.6-55 hp.	item	12000	14395	.834	2.675			
Electronic machinery					1.487	38.12	56.68	
Television, black & white	set	390	260	1.500	1.487			
Radio, transistor	set	29.06	19.39	1.499	1.488			
Metal products for daily use					.681	96.17	65.49	
Enamel basins	basin	3.000	.600	5.000	.446			
Refrigerators	liter	8.12	5.42	1.498	1.488			
Flashlights	item	1.62	.37	4.378	.509			
Light bulbs, incandescent	item	.46	.14	3.286	.679			
Batteries	item	.21	.06	3.500	.637			
Household machines & repair					.594	172.24	102.31	
Bicycle	item	164	41	4.000	.558			
Sewing machine	item	131	95.17	1.376	1.620			
Watches	item	100	13	7.692	.290			
Clocks	item	20	3	6.667	.335			
Cameras	item	109	41	2.659	.839			
Building materials						195.07	626.71	3.213
Cement and cement products					1.959	72.35	141.73	
Cement	ton	57.94	50.9	1.138	1.959			
Bricks/tiles/lime & other					4.534	84.42	382.76	
Lime	ton	30	61	.492	4.534			
Fire-resistant materials					2.514	20.92	52.59	
Cement	ton	57.94	50.9	1.138	1.959			
Lime	ton	30	61	.492	4.534			
Glass	sq. m.	1.87	1.5	1.247	1.789			
Glass industry					1.789	11.66	20.86	
Glass	sq. m.	1.87	1.5	1.247	1.789			
Ceramics industry					2.514	5.72	14.38	
Cement	ton	57.94	50.9	1.138	1.959			
Lime	ton	30	61	.492	4.534			
Glass	sq. m.	1.87	1.5	1.247	1.789			
Nonmetallic minerals					1.340	10.74	14.39	
Gravel	ton	21	5	4.200	.531			
Talc	ton	63	60	1.050	2.124			
China clay	ton	69	66	1.045	2.133			
Logging					1.131	39.08	44.2	1.131
Coniferous logs	cu.m.	143	79	1.810	1.232			
Mao bamboo	1000 logs	2304	1073	2.147	1.039			

Table C-1 (continued). Detailed Purchasing Power Parities from Taylor (1989)

Sector	Unit	Domestic price (yuan)	World price (US $)	PPP (yuan/$)	Sub-sector ê/PPP	Gross value of output weights (100m yuan)	Gross value of output times ê/PPP	Weighted average sectoral ê/PPP
Wood and wood products						65.82	66.59	1.012
Lumber & wood chemicals					.882	25.79	22.75	
Sawn conifer lumber	cu.m.	268	106	2.528	.882			
Wood products					.666	65.82	43.84	
Plywood	m.	1196	357	3.350	.666			
Food						690.12	1088.96	1.578
Grain and oil					1.116	203.98	227.64	
Rice	ton	316	484	.653	3.416			
Wheat	ton	397	177	2.243	.994			
Corn	ton	264	131	2.015	1.107			
Sorghum	ton	267	127	2.102	1.061			
Soybeans	ton	586	288	2.035	1.096			
Peanuts	ton	1216	631	1.927	1.157			
Sesame	ton	1418	725	1.956	1.140			
Rapeseed	ton	864	272	3.176	.702			
Tea oil	ton	2927	876	3.341	.667			
Tung oil	ton	2809	1402	2.004	1.113			
Salt making					.880	19.81	17.43	
Raw salt	ton	38	15	2.533	.880			
Slaughter, meat processing					2.628	117.97	310.03	
Pork	ton	1882	1916	.982	2.270			
Beef	ton	1682	1523	1.104	2.019			
Mutton	ton	1520	2698	.563	3.958			
Canned food					2.365	21.19	50.11	
Corn	ton	264	131	2.015	1.107			
Pork	ton	1882	1916	.982	2.270			
Beef	ton	1682	1523	1.104	2.019			
Mutton	ton	1520	2698	.563	3.958			
Fresh vegetables	ton	112	302	.371	6.013			
Apples	ton	346	329	1.052	2.120			
Citrus and oranges	ton	515	373	1.381	1.615			
Sugar refining					.626	36.45	22.82	
Sugar	ton	1332	374	3.561	.626			
Tobacco manufacture					2.367	100.51	237.91	
Cured tobacco	ton	1596	1595	1.001	2.229			
Cigarettes	case	653	736	.887	2.513			
Liquor					1.461	52.59	76.83	
Beer	ton	455	298	1.527	1.461			
Beverages					1.461	5.63	8.23	
Beer	ton	455	298	1.527	1.461			

Table C-1 (continued). Detailed Purchasing Power Parities from Taylor (1989)

Sector	Unit	Domestic price (yuan)	World price (US $)	PPP (yuan/$)	Sub-sector e/PPP	Gross value of output weights (100m yuan)	Gross value of output times e/PPP	Weighted average sectoral e/PPP
Aquatic products					2.910	3.31	9.63	
Saltwater fish	ton	754	2061	.366	6.096			
Spanish mackeral	ton	950						
Hairtail	ton	643						
Yellow croaker	ton	649						
Chinese yellow croaker	ton	775						
Prawns	ton	2821	3810	.740	3.012			
Dried squid	ton	9200	5545	1.659	1.344			
Dried abalone	ton	40000	40722	.982	2.270			
Freshwater fish	ton	1062	1773	.599	3.723			
Black carp	ton	1248						
Grass carp	ton	1171						
Carp	ton	1084						
Silver carp	ton	745						
Spices and condiments					1.540	13.44	20.7	
Tea	ton	3238	2236	1.448	1.540			
Bakery products					.849	33.87	28.76	
Wheat	ton	397	177	2.243	.994			
Sugar	ton	1332	374	3.561	.626			
Honey	ton	1898	837	2.268	.983			
Sweets					.784	19.33	15.15	
Sugar	ton	1332	374	3.561	.626			
Honey	ton	1898	837	2.268	.983			
Tea and dairy products					1.027	62.04	63.72	
Tea	ton	3238	2236	1.448	1.540			
Eggs	ton	1840	887	2.074	1.075			
Milk	ton	600	176	3.409	.654			
Textiles						856.02	710.72	.830
Chemical fiber textiles					.323	53.46	17.27	
Polyester fiber filament	ton	19253	2791	6.898	.323			
Cotton textiles					.747	517.91	386.88	
Cotton cloth	meter	.99	.41	2.415	.924			
Cotton yarn	ton	7454	4402	1.693	1.317			
Cotton fiber filament	ton	18120	2775	6.530	.342			
Other textiles					1.077	284.65	306.57	
Gunny sacks	100 bags	238	44	5.409	.412			
Raw silk	ton	48018	60661	.792	2.817			
Clothing and leather						205.82	222.58	1.081
Sewn goods					.790	147.24	116.32	
Men's nylon socks	pair	2.63	.54	4.870	.458			
Cotton socks	pair	.65	.59	1.102	2.024			
Synthetic fiber socks	pair	1.93	.62	3.113	.716			
Undershirts and singlets	item	1.42	.55	2.582	.864			
Cotton jerseys and trousers	item	3.61	.85	4.247	.525			
Underwear	item	5.01	.72	6.958	.320			
Cloth shoes	pair	3.2	1.1	2.909	.767			
Rubber shoes	pair	4.3	2.3	1.870	1.193			
Plastic shoes	pair	2.3	1.4	1.643	1.357			
Leather					1.814	58.58	106.26	
Cattle hides	hide	21.8	32.7	.667	3.345			
Goat skin	hide	4.2	4.1	1.024	2.177			
Leather shoes	pair	11.7	4.3	2.721	.820			

Table C-1 (continued). Detailed Purchasing Power Parities from Taylor (1989)

Sector	Unit	Domestic price (yuan)	World price (US $)	PPP (yuan/$)	Sub-sector ê/PPP	Gross value of output weights (100m yuan)	Gross value of output times ê/PPP	Weighted average sectoral ê/PPP
Paper, cuture/educ. goods						191.16	169.27	.885
Paper					.932	69.4	64.68	
Unbleached wood pulp	ton	789	280	2.818	.791			
Bleached wood pulp	ton	900	337	2.671	.835			
Newsprint	ton	920	505	1.822	1.224			
Cultural & educational goods					.859	121.76	104.59	
Newsprint	ton	920	505	1.822	1.224			
Fountain pens, iridium nibs	pen	1.42	.37	3.838	.581			
Pencils	pencil	.05	.02	2.500	.892			
Other industry					1.298	172.26	223.59	1.298
Explosives	ton	1290	1500	.860	2.593			
Matches	case	18	6	3.000	.743			
Ethanol	ton	2427	758	3.202	.696			
Mao bamboo	1000 logs	2304	1073	2.147	1.039			
Palm fiber	ton	1000	860	1.163	1.918			
Glass	sq. m.	1.87	1.5	1.247	1.789			

Note: Subsector ratios of ê/PPP are geometric means of ratios for commodities listed below them.

Sources: Price data sources are listed in Appendix C. Gross value of output weights are from Field (1988), pp. 572-73; Guojia tongji ju (1983), pp. 222-225; and Du Ziduan (1984), p. 194.

APPENDIX D.

DATA SOURCES FOR PURCHASING POWER PARITIES

Abbreviations Used in Price Sources

AGTECH	Niu Ruofeng and Liu Tianfu (1983)
AHMAD	Sultan Ahmad (1983)
BYRD	William A. Byrd (1985)
CLTD	World Bank (1985)
CSED	World Bank (1983a)
CTPS	State Statistical Bureau (1987)
CTPT	World Bank (1983b)
CXL	Guowuyuan jiage yanjiu zhongxin bangong shi (1984)
CPZ	Guojia wujia yanjiu suo (1985)
FAOFERT	Food and Agriculture Organization (1986)
FAOYB	Food and Agriculture Organization (1987)
HK	Census and Statistics Department, Hong Kong (1980)
MOFERT	Lu Xuzhang, et al., eds. (1985)
PMEPRC	Central Intelligence Agency (1975)
SPZ	Guojia jihua weiyuanhui (1987)
SY83	Guojia tongji ju (1983)
UNMBS	United Nations Statistical Office (1987)
USPPI	U.S. Bureau of Labor Statistics (1982)
USSRUS	Central Intelligence Agency (1980)
ZMWTZ	Guojia tongji ju (1984)
ZNTN85	Guojia tongji ju (1986)

Hogs

Yuan price: CTPS, p. 158. Composite average procurement price for hogs in 1981.
Dollar price: FAOYB, table 131. U.S. wholesale price of hogs (Omaha gilts) in 1981.

Cattle

Yuan price: CTPS, p. 158. Composite average procurement price for beef cattle in 1981.
Dollar price: FAOYB, table 131. U.S. wholesale price of steers (Omaha) in 1981.

Sheep/goats

Yuan price: CTPS, p. 159. Composite average procurement price for sheep or goats in 1981.
Dollar price: FAOYB, table 131. New Zealand price for prime lamb (North Island, at slaughter weight) in 1981.

Poultry

Yuan price: CTPS, p. 159. Composite average procurement price for chicken in 1981.
Dollar price: FAOYB, table 131. U.S. farm price of chicken (broilers, live weight) in 1981, assuming 7.17 lbs./head.

Pork

Yuan price: CTPS, p. 150. Composite average retail price of pork in 1981, deflated by 12 percent to approximate the wholesale price (markup is from Hu Changnuan (1982), p. 408).
Dollar price: UNMBS, p. 196. German Federal Republic import price of pork from Belgium-Luxembourg in 1981, free at border.

Beef

Yuan price: CTPS, p. 150. Composite average retail price of beef in 1981, deflated by 12 percent to approximate the wholesale price (markup is from Hu Changnuan (1982), p. 408).
Dollar price: FAOYB, table 131. Argentina average export unit value (f.o.b.) of beef in 1981.

Mutton

Yuan price: CTPS, p. 150. Composite average retail price of mutton in 1981, deflated by 12 percent to approximate the wholesale price (markup is from Hu Changnuan (1982), p. 408).
Dollar price: FAOYB, table 131. London wholesale price for New Zealand mutton (Smithfield market) in 1981.

Eggs

Yuan price: CTPS, p. 159. Composite average procurement price for eggs in 1981.
Dollar price: FAOYB, table 131. U.S. average producer price of eggs at the farm in 1981.

Milk

Yuan price: CLTD, Annex 2, p. 124. Procurement price for milk in 1982.
Dollar price: FAOYB, table 131. Netherlands average wholesale price for milk powder (skim) in 1981, assuming a reconstitution ratio of 8.3 parts water to 1 part powder.

Saltwater fish

Yuan price: AGTECH, p. 750-53. Arithmetic mean of 1979 average procurement prices for spanish mackeral, hairtail, yellow croaker, and Chinese yellow croaker.
Dollar price: HK. Unit value for imports from China of marine water fish, nes, fresh or chilled (code 034102) in 1979.

Prawns

Yuan price: AGTECH, p. 745. Composite average procurement price for prawns in 1978, adjusted to a 1979 basis using the official procurement price index for acquatic products in CTPS, p. 121.
Dollar price: HK. Unit value for imports from China of prawns, fresh, chilled or frozen (code 036011) in 1979.

Dried squid

Yuan price: AGTECH, p. 754. Composite average procurement price for dried squid, premium quality, in 1979.
Dollar price: HK. Unit value of imports from China of squids, salted or dried (code 036025) in 1979.

Dried abalone

Yuan price: AGTECH, p. 754. Composite average procurement price for dried abalone, premium quality, in 1979.
Dollar price: HK. Unit value of imports from China of abalone, salted or dried (code 036023) in 1979.

Freshwater fish

Yuan price: AGTECH, pp. 746-749. Arithmetic mean of 1979 average procurement prices for black carp, grass carp, carp, and silver carp.
Dollar price: HK. Unit value of imports from China of freshwater fish, fresh or chilled (code 034104) in 1979.

Rice

Yuan price: ZNTN85, p. 15, ZMWTZ, p. 112, and World Bank project files. Weighted average of quota, above quota, and negotiated prices for rice in 1981. Quota prices are from ZNTN85, above-quota and negotiated prices are estimated from ratios to quota prices shown for 10 villages in North China surveyed by Thomas Wiens of the World Bank in 1982. Procurement weights for each price tranche are from ZMWTZ.
Dollar price: FAOYB, table 131. F.o.b. price for Thai white rice in Bangkok (5 percent broken) in 1981.

Wheat

Yuan price: AGTECH, p. 742. ZMWTZ, p. 112, and World Bank project files. Weighted average of quota, above quota, and negotiated prices for wheat in 1981. Quota prices are from ZNTN85, above-quota and negotiated prices are estimated from ratios to quota prices shown for 10 villages in North China surveyed by Thomas Wiens of the World Bank in 1982. Procurement weights for each price tranche are from ZMWTZ.
Dollar price: FAOYB, table 131. F.o.b. price for U.S. hard winter wheat (No. 2, Gulf) in 1981.

Corn

Yuan price: AGTECH, p. 742. ZMWTZ, p. 112, and World Bank project files. Weighted average of quota, above quota, and negotiated prices for corn in 1981. Quota prices are from ZNTN85, above-quota and negotiated prices are estimated from ratios to quota prices shown for 10 villages in North China surveyed by Thomas Wiens of the World Bank in 1982. Procurement weights for each price tranche are from ZMWTZ.
Dollar price: FAOYB, table 131. F.o.b. price for U.S. yellow maize (No. 2, Gulf) in 1981.

Sorghum

Yuan price: AGTECH, p. 742. ZMWTZ, p. 112, and World Bank project files. Weighted average of quota, above quota, and negotiated prices for sorghum in 1981. Quota prices are from ZNTN85, above-quota and negotiated prices are estimated from ratios to quota prices shown for 10 villages in North China surveyed by Thomas Wiens of the World Bank in 1982. Procurement weights for each price tranche are from ZMWTZ.
Dollar price: FAOYB, table 131. F.o.b. price for U.S. yellow sorghum (No. 2, Gulf) in 1981.

Fresh vegetables

Yuan price: CTPS, p. 161. Composite average procurement price of fresh vegetables in 1981.
Dollar price: SY83, p. 412. Chinese export unit value (f.o.b.) of fresh vegetables in 1981.

Apples

Yuan price: CTPS, p. 160. Composite average procurement price of apples in 1981.
Dollar price: SY83, p. 412. Chinese export unit value (f.o.b.) of apples in 1981.

Citrus and oranges

Yuan price: CTPS, p. 160. Composite average procurement price of citrus and oranges in 1981.
Dollar price: SY83, p. 412. Chinese export unit value (f.o.b.) of mandarin oranges and oranges in 1981.

Sugar

Yuan price: CTPS, p. 151. Composite average retail price of sugar in 1981, deflated by 12 percent to approximate the wholesale price (markup is from Hu Changnuan, 1982, p. 408).
Dollar price: CTPT, p. 66. International Sugar Council world daily price of raw sugar (f.o.b., stowed Caribbean ports) in 1981.

Honey

Yuan price: CTPS, p. 160. Composite average procurement price of honey in 1981.
Dollar price: SY83, p. 412. Chinese export unit value (f.o.b.) of honey in 1981.

Tea

Yuan price: CTPS, p. 159. Composite average procurement price of tea in 1981.
Dollar price: SY83, p. 412. Chinese export unit value (f.o.b.) of tea in 1981.

Beer

Yuan price: CXL, p. 47. Retail price of beer in 1983, converted to a 1981 basis using Ma and Zhang's price index for food products, and deflated by 12 percent to approximate the wholesale price (markup is from Hu Changnuan (1982), p. 408).
Dollar price: SY83, p. 413. Chinese export unit value (f.o.b.) of beer in 1981.

Cured tobacco

Yuan price: CTPS, p. 160. Composite average procurement price of crude tobacco in 1981.
Dollar price: SY83, p. 413. Chinese export unit value (f.o.b.) of flue-cured tobacco in 1981.

Cigarettes

Yuan price: CTPS, p. 151. Composite average retail price of cigarettes in 1981, deflated by 13 percent to approximate the wholesale price (markup is from Hu Changnuan (1982), p. 408).
Dollar price: USPPI, p. 72. U.S. producer price for cigarettes (filter tip, king size) in December 1981.

Cattle hides

Yuan price: CTPS, p. 162. Composite average procurement price of cattle hides in 1981.
Dollar price: MOFERT, p. 1091. Chinese import unit value (c.i.f.) for cattle hides in 1982, converted to an f.o.b. basis by deflating by 7 percent.

Goat skin

Yuan price: CTPS, p. 162. Composite average procurement price of goat skin in 1981.
Dollar price: SY83, p. 413. Chinese export unit value (f.o.b.) for goat skin in 1981.

Soybeans

Yuan price: AGTECH, p. 742, ZMWTZ, p. 112, and World Bank project files. Weighted average of quota, above quota, and negotiated prices for soybeans in 1981. Quota prices are from ZNTN85, above-quota and negotiated prices are estimated from ratios to quota prices shown for 10 villages in North China surveyed by Thomas Wiens of the World Bank in 1982. Procurement weights for each price tranche are from ZMWTZ.
Dollar price: FAOYB, table 131. C.i.f. price of U.S. soybeans (No. 2, bulk) in Rotterdam, 1981.

Peanuts

Yuan price: AGTECH, p. 742, ZMWTZ, p. 112, and World Bank project files. Weighted average of quota, above quota, and negotiated prices for peanuts in 1981. Quota prices are from ZNTN85, above-quota and negotiated prices are estimated from ratios to quota prices shown for 10 villages in North China surveyed by Thomas Wiens of the World Bank in 1982. Procurement weights for each price tranche are from ZMWTZ.
Dollar price: FAOYB, table 131. C.i.f. price of peanuts (shelled, any origin) in Europe, 1981.

Sesame

Yuan price: AGTECH, p. 742, ZMWTZ, p. 112, and World Bank project files. Weighted average of quota, above quota, and negotiated prices for sesame in 1981. Quota prices are from ZNTN85, above-quota and negotiated prices are estimated from ratios to quota prices shown for 10 villages in North China surveyed by Thomas Wiens of the World Bank in 1982. Procurement weights for each price tranche are from ZMWTZ.
Dollar price: MOFERT, p. 949. Unit value (f.o.b.) for Chinese exports of sesame in 1982.

Tea oil

Yuan price: AGTECH, p. 742, ZMWTZ, p. 112, and World Bank project files. Weighted average of quota, above quota, and negotiated prices for tea oil in 1981. Quota prices are from ZNTN85, above-quota and negotiated prices are estimated from ratios to quota prices shown for 10 villages in North China surveyed by Thomas Wiens of the World Bank in 1982. Procurement weights for each price tranche are from ZMWTZ.
Dollar price: MOFERT, p. 949. Unit value (f.o.b.) for Chinese exports of tea oil in 1982.

Tung oil

Yuan price: CTPS, p. 163. Composite average procurement price for tung oil in 1981.
Dollar price: SY83, p. 414. Unit value (f.o.b.) for Chinese exports of tung oil in 1981.

Crude rubber

Yuan price: CLTD, Annex 2, p. 124. Average procurement price of natural rubber in 1981.
Dollar price: FAOYB, table 131. Kuala Lumpur f.o.b. price for natural rubber (RSS 1) in 1981.

Butadiene-styrene rubber

Yuan price: CPZ, p. 381. Ex-factory price for butadiene-styrene rubber (packaged) in June 1984, adjusted to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: CPZ, p. 381. Japanese market price in June 1984, deflated to a 1981 basis using Japan's domestic wholesale price index for synthetic rubber.

Butadiene rubber

Yuan price: CPZ, p. 381. Ex-factory price for butadiene rubber (grade 1, packaged) in June 1984, adjusted to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: CPZ, p. 381. Japanese market price in June 1984, deflated to a 1981 basis using Japan's domestic wholesale price index for synthetic rubber.

Coniferous logs

Yuan price: SPC, p. 124. Average procurement price of Inner Mongolia and Northeast China coniferous logs in 1985, calculated by dividing border price by conversion factor.
Dollar price: SPC, p. 124. Average Chinese c.i.f. import unit value, 1981-1985. Obtained dollar figure by dividing published border price by the State Planning Commission's shadow exchange rate (4.00 yuan/dollar) and their distribution markup (6%). Converted to f.o.b. basis by dividing by insurance and freight markup of 1.07.

Sawn conifer lumber

Yuan price: SPC, p. 124. Ex-factory price of sawn conifer lumber in 1985, calculated by dividing border price by conversion factor.
Dollar price: SPC, p. 124. Average Chinese c.i.f. import unit value, 1981-1985. Obtained dollar figure by dividing published border price by the State Planning Commission's shadow exchange rate (4.00 yuan/dollar) and their distribution markup (6%). Converted to f.o.b. basis by dividing by insurance and freight markup of 1.07.

Mao bamboo

Yuan price: CTPT, p. 163. Composite average procurement price for mao bamboo in 1981.
Dollar price: MOFERT, p. 981. Chinese export unit value (f.o.b.) of mao bamboo in 1982.

Unbleached wood pulp

Yuan price: SPC, p. 120. Ex-factory price of unbleached wood pulp in 1985, calculated by dividing border price by conversion factor.
Dollar price: SPC, p. 120. Average Chinese c.i.f. import unit value, 1981-1985. Obtained dollar figure by dividing published border price by the State Planning Commission's shadow exchange rate (4.00 yuan/dollar) and their distribution markup (6%). Converted to f.o.b. basis by dividing by insurance and freight markup of 1.07.

Bleached wood pulp

Yuan price: SPC, p. 120. Ex-factory price of bleached wood pulp in 1985, calculated by dividing border price by conversion factor.
Dollar price: SPC, p. 120. Average Chinese c.i.f. import unit value, 1981-1985. Obtained dollar figure by dividing published border price by the State Planning Commission's shadow exchange rate (4.00 yuan/dollar) and their distribution markup (6%). Converted to f.o.b. basis by dividing by an estimated insurance and freight markup of 7 percent.

Mulberry cocoons

Yuan price: CTPS, p. 161. Composite average procurement price for mulberry cocoons, 1981.
Dollar price: MOFERT, p. 979. Chinese export unit value (f.o.b.) in 1982.

Ginned cotton

Yuan price: CTPS, p. 160. Composite average procurement price for ginned cotton, 1981.
Dollar price: SY83, p. 417. Chinese import unit value (c.i.f.) in 1981. Converted to an f.o.b. basis by deflating by an estimated insurance and freight markup of 7 percent.

Jute & ambary hemp

Yuan price: CTPS, p. 161. Composite average procurement price for jute and ambary hemp in 1981.
Dollar price: SY83, p. 417. Chinese import unit value (c.i.f.) in 1981. Converted to an f.o.b. basis by deflating by an estimated insurance and freight markup of 7 percent.

Hemp

Yuan price: CTPS, p. 161. Composite average procurement price for hemp, 1981.
Dollar price: MOFERT, p. 983. Chinese export unit value (f.o.b.) in 1982.

Ramie

Yuan price: CTPS, p. 161. Composite average procurement price for ramie, 1981.
Dollar price: MOFERT, p. 983. Chinese export unit value (f.o.b.) in 1982.

Palm fiber

Yuan price: CTPS, p. 163. Composite average procurement price for palm fiber, 1981.
Dollar price: MOFERT, p. 982. Chinese export unit value (f.o.b.) in 1982.

Sheep wool

Yuan price: CTPS, p. 162. Composite average procurement price for sheep wool, 1981.
Dollar price: FAOYB, table 131. U.S. average producer price of shorn wool in 1981.

Goat wool

Yuan price: CTPS, p. 162. Composite average procurement price for goat wool, 1981.
Dollar price: MOFERT, p. 996. Chinese export unit value (f.o.b.) in 1982.

Cashmere

Yuan price: CTPS, p. 162. Composite average procurement price for cashmere, 1981.
Dollar price: SY83, p, 413. Chinese export unit value (f.o.b.) in 1981.

Gravel

Yuan price: World Bank project files. 1982 cost of gravel according to a 5/9/83 memorandum by Thomas Wiens on building construction costs in Guangdong province, adjusted to a 1981 basis using Ma and Zhang's producer price index for building materials.
Dollar price: USPPI, p. 71. U.S. producer price of gravel for use in making concrete, December 1981.

Talc

Yuan price: SPC, p. 109. Ex-factory price of talc in 1985, calculated by dividing border price by conversion factor. Adjusted to a 1981 basis using Ma and Zhang's producer price index for building materials.
Dollar price: SY83, p. 413. Chinese export unit value (f.o.b.) in 1981.

China clay

Yuan price: SPC, p. 109. Ex-factory price of China clay in 1985, calculated by dividing border price by conversion factor. Adjusted to a 1981 basis using Ma and Zhang's producer price index for building materials.
Dollar price: MOFERT, p. 1043. Chinese export unit value (f.o.b.) in 1982.

Raw salt

Yuan price: CXL, p. 47. Average wholesale price of raw salt in 1983, adjusted to a 1981 basis using Ma and Zhang's producer price index for building materials.
Dollar price: SY83, p. 413. Chinese export unit value (f.o.b.) in 1981.

Iron ore

Yuan price: CPZ, p. 385. Ex-factory price of iron ore (50-66% iron content) in June 1984, adjusted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: USPPI, p. 54. U.S. producer price for iron ore (Mesabi, regular-unscreened, 51.5 percent iron) in December 1981.

Scrap steel

Yuan price: CPZ, p. 386. Wholesale price of scrap steel (like products) in June 1984, adjusted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p. 386. Japanese wholesale price (grade 1) in June 1984, adjusted to a 1981 basis using Japan's domestic wholesale price index for semifinished steel products.

Tungsten ore

Yuan price: BYRD, p. 12. Ex-factory price of tungsten ore (65 percent) in 1981.
Dollar price: BYRD, p. 12. International price of tungsten ore (65 percent) in 1981, provided by Chinese sources.

Molybdenum ore

Yuan price: BYRD, p. 12. Ex-factory price of molybdenum ore (51 percent) in 1981.
Dollar price: BYRD, p. 12. International price of molybdenum ore (51 percent) in 1981, provided by Chinese sources.

Raw lacquer

Yuan price: CTPS, p. 163. Composite average procurement price of raw lacquer in 1981.
Dollar price: MOFERT, p. 981. Chinese export unit value (f.o.b.) for raw lacquer in 1982.

Coal

Yuan price: CPZ, p. 383. Average ex-mine price for select coal in June 1984, adjusted to a 1981 basis using Field's producer price index for coal and coke.
Dollar price: SY83, p. 413. Chinese export unit value (f.o.b.) in 1981.

Coking coal

Yuan price: CPZ, p. 383. Ex-factory price of grade-8 coal for smelting use (Yuzhou Dongcheng select coal facility) in June 1984, adjusted to a 1981 basis using Field's producer price index for coal and coke.
Dollar price: CPZ, p. 383. U.S. Great Lakes f.o.b. price of coking coal (16-22 percent), adjusted to a 1981 basis using the U.S. producer price index for metallurgical/coke producers (commodity code 120303).

Coke

Yuan price: CPZ, p. 385. Ex-factory price of metallurgical coke in June 1984, adjusted to a 1981 basis using Field's producer price index for coal and coke.
Dollar price: SY83, p. 413. Chinese export unit value (f.o.b.) of coke and semi-coke in 1981.

Crude oil

Yuan price: CPZ, p. 383. Ex-factory price of crude oil (Daqing) in June 1984, adjusted to a 1981 basis using Field's producer price index for the petroleum industry.
Dollar price: SY83, p. 413. Chinese export unit value (f.o.b.) for crude oil in 1981.

Gasoline

Yuan price: CPZ, p. 383. Ex-factory price of gasoline (85 octane) in June 1984, adjusted to a 1981 basis using Field's producer price index for the petroleum industry.
Dollar price: CTPT, p. 112. Rotterdam f.o.b. price of regular gasoline (91/92 octane) in 1981.

Aviation kerosene

Yuan price: CPZ, p. 384. Ex-factory price of aviation kerosene (export quality, No. 3) June 1984, adjusted to a 1981 basis using Field's producer price index for the petroleum industry.
Dollar price: CTPT, p. 112. Rotterdam f.o.b. price of jet fuel kerosene in 1981.

Diesel oil

Yuan price: CPZ, p. 384. Ex-factory price of diesel oil (Northeast and North China, No. 0) in June 1984, adjusted to a 1981 basis using Field's producer price index for the petroleum industry.
Dollar price: CTPT, p. 112. Rotterdam f.o.b. price of gas oil (minimum 53 diesel index) in 1981.

Fuel oil

Yuan price: CPZ, p. 384. Ex-factory price of heavy fuel oil (3 percent sulphur, Northeast and North China, No. 200) in June 1984, adjusted to a 1981 basis using Field's producer price index for the petroleum industry.
Dollar price: CTPT, p. 112. Rotterdam f.o.b. price of heavy fuel oil (3.5 percent sulphur) in 1981.

Natural gas (associated and nonassociated)

Yuan price: CLTD, Annex 3, p. 76. Retail prices less distribution and treatment charges for early 1985, deflated to a 1981 basis by Field's producer price index for the petroleum industry.
Dollar price: CLTD, Annex 3, p. 76. FOB prices are U.S. domestic prices for early 1985, deflated by the U.S. producer price index for gas fuels to approximate 1981 levels.

Electricity

Yuan price: CLTD, Annex 3, p. 76. Average 1982 electricity tariff for commercial and small industries, large industries, and agriculture. No deflation of this price was made, as electricity tariffs in China have changed little over time.
Dollar price: Haiguan tongji [Customs Statistics], various issues in 1982, and Guojia tongji ju gongjiao wuzi ju [State Statistical Bureau Department of Industry and Transport Materials] (1987), p. 28. Import unit value in 1981, calculated by dividing dollar import totals for SITC 35 (electricity) in the former source by electricity imports in volumes terms in the latter source.

Glycerine (glycerol)

Yuan price: CPZ, p. 380. Ex-factory price of glycerine (96% pure, unpackaged) in June 1984, deflated to a 1981 basis by Field's producer price index for the chemical industry.
Dollar price: CPZ, p. 380. Ex-warehouse price of glycerine for printing use in Japan, deflated to a 1981 basis by the Japanese domestic wholesale price index for organic industrial chemicals.

Methanol

Yuan price: CPZ, p. 380. Ex-factory price of methanol (grade 1, unpackaged) in June 1984, deflated to a 1981 basis by Field's producer price index for the chemical industry.
Dollar price: CPZ, p. 380. Spot price on U.S. markets in June 1984, deflated to 1981 value by the U.S. producer price index for methanol (commodity code 06140363).

Ethanol

Yuan price: CPZ, p. 380. Ex-factory price of ethanol (grade 1, unpackaged) for use in making polyester fiber in June 1984, deflated to a 1981 basis by Field's producer price index for the chemical industry.
Dollar price: CPZ, p. 380. U.S. market price in June 1984, deflated to a 1981 basis by the U.S. producer price index for ethanol (commodity code 06140341).

Benzene

Yuan price: CPZ, p. 380. Ex-factory price of petroleum benzene (northeast China and other regions) in June 1984, deflated to a 1981 basis by Field's producer price index for the chemical industry.
Dollar price: CPZ, p. 380. U.S. market price in June 1984, deflated to a 1981 basis by the U.S. producer price index for benzene (commodity code 06140101).

Methyl benzene

Yuan price: CPZ, p. 380. Ex-factory price of petroleum methyl benzene (northeast China and other regions) in June 1984, deflated to a 1981 basis by Field's producer price index for the chemical industry.
Dollar price: CPZ, p. 380. U.S. market price in June 1984, deflated to a 1981 basis by the U.S. producer price index for benzene (commodity code 06140101).

Phosphorus dimethyl benzene

Yuan price: CPZ, p. 381. Ex-factory price of phosphorus dimethyl benzene (96% pure, northeast China and other regions) in June 1984, deflated to a 1981 basis by Field's producer price index for the chemical industry.
Dollar price: CPZ, p. 381. U.S. market price in June 1984, deflated to a 1981 basis by the U.S. producer price index for benzene (commodity code 06140101).

Paradimethyl benzene

Yuan price: CPZ, p. 381. Ex-factory price of paradimethyl benzene (northeast and north China) in June 1984, deflated to a 1981 basis by Field's producer price index for the chemical industry.
Dollar price: CPZ, p. 381. U.S. market price in June 1984, deflated to a 1981 basis by the U.S. producer price index for benzene (commodity code 06140101).

Styrene

Yuan price: CPZ, p. 381. Ex-factory price of styrene (grade 1, unpackaged) in June 1984, deflated to a 1981 basis by Field's producer price index for the chemical industry.
Dollar price: CPZ, p. 381. U.S. market price in June 1984, deflated to a 1981 basis by the U.S. producer price index for intermediate basic organic chemicals (commodity code 001402).

Acetone

Yuan price: SPC, p. 105. Ex-factory price of acetone for 1985, calculated by dividing border price by conversion factor.
Dollar price: SPC, p. 105. Average of Chinese c.i.f. import unit values, 1981-1985. Obtained dollar figure by dividing published border price by the State Planning Commission's shadow exchange rate (4.00 yuan/dollar) and their distribution markup (6%). Converted to f.o.b. basis by dividing by insurance and freight markup of 1.12.

Butyl alcohol

Yuan price: SPC, p. 105. Ex-factory price of butyl alcohol for 1985, calculated by dividing border price by conversion factor.
Dollar price: SPC, p. 105. Based on Chinese c.i.f. import unit values, 1981-1985. Obtained dollar figure by dividing published border price by the State Planning Commission's shadow exchange rate (4.00 yuan/dollar) and their distribution markup (6%). Converted to f.o.b. basis by dividing by insurance and freight markup of 1.12.

Octanol

Yuan price: SPC, p. 105. Ex-factory price of octanol for 1985, calculated by dividing border price by conversion factor.
Dollar price: SPC, p. 105. Based on Chinese c.i.f. import unit values, 1981-1985. Obtained dollar figure by dividing published border price by the State Planning Commission's shadow exchange rate (4.00 yuan/dollar) and their distribution markup (6%). Converted to f.o.b. basis by dividing by insurance and freight markup of 1.12.

Sulphuric acid

Yuan price: CPZ, p. 379. Ex-factory price of sulphuric acid (98 percent solution or greater, concentrated acid, grade 2) in June 1984, deflated to a 1981 basis by Field's producer price index for the chemical industry.
Dollar price: CPZ, p. 379. Chinese c.i.f. import price of sulphuric acid from Japan (98 percent solution or greater), in June 1984, deflated to a 1981 basis by the Japanese domestic wholesale price index for sulphuric acid. Converted to f.o.b basis by dividing by freight and insurance markup of 1.12.

Caustic soda (sodium hydroxide)

Yuan price: CPZ, p. 379. Ex-factory price of caustic soda (99.5% solution or greater, in steel drums) in June 1984, deflated to a 1981 basis by Field's producer price index for the chemical industry.
Dollar price: SY83, p. 418. Chinese c.i.f. import unit value of caustic soda in 1981, converted to dollars at an exchange rate of 1.67 yuan/dollar. Converted to f.o.b basis by dividing by freight and insurance markup of 1.12.

Soda ash (sodium carbonate)

Yuan price: CPZ, p. 379. Ex-factory price of soda ash (general industrial use, in gunny sacks) in June 1984, deflated to a 1981 basis by Field's producer price index for the chemical industry.
Dollar price: SY83, p. 418. Chinese c.i.f. import unit value of caustic soda in 1981, converted to dollars at an exchange rate of 1.67 yuan/dollar. Converted to f.o.b basis by dividing by freight and insurance markup of 1.12.

Sodium cyanide

Yuan price: SPC, p. 103. Ex-factory price of sodium cyanide for 1985, calculated by dividing border price by the State Planning Commission's conversion factor.
Dollar price: SPC, p. 103. Average of Chinese c.i.f. import unit values, 1981-1985. Obtained dollar figure by dividing published border price by the State Planning Commission's shadow exchange rate (4.00 yuan/dollar) and their distribution markup (6%). Converted to f.o.b basis by dividing by freight and insurance markup of 1.12.

Sulphur

Yuan price: CPZ, p. 380. Ex-factory price of sulphur (99.5 percent pure) in June 1984, deflated to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: SY83, p. 418. Chinese c.i.f. import unit value for sulphur in 1981, converted to dollars at the custom's exchange rate of 1.67 yuan/dollar. Converted to f.o.b basis by dividing by freight and insurance markup of 1.12.

Aspirin

Yuan price: CSED, Vol. I, p. 340. Retail price of aspirin in Beijing, November 1980 (converted from tablets to tons).
Dollar price: USPPI, p. 48. U.S. producer price of aspirin in December 1981.

Vitamin B6

Yuan price: World Bank project files. Ex-factory price of vitamin B6 for a Tianjin pharmaceutical plant, April 1980.
Dollar price: USPPI, p. 48. U.S. producer price of vitamin B6 in December 1981.

Vitamin C

Yuan price: World Bank project files. Ex-factory price of vitamin C for a Tianjin pharmaceutical plant, April 1980.
Dollar price: USPPI, p. 48. U.S. producer price of vitamin C in December 1981.

Urea

Yuan price: CPZ, p. 379. Ex-factory price of urea (47 percent nitrogen) in June 1984, deflated to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: CTPT, p. 142. F.O.B. price for urea (bagged) in Europe, any origin, 1981.

Sodium nitrate

Yuan price: CPZ, p. 379. Ex-factory price of sodium nitrate (at least 99.3% content) in June 1984, deflated to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: FAOFERT, p. 34. U.S. domestic price for sodium nitrate, 1981/82.

Triple calcium superphosphate (TSP)

Yuan price: CPZ, p. 379. Ex-factory price of TSP (43 percent P_2O_5) in June 1984, deflated to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: CTPT, p. 140. F.O.B. price for U.S. Gulf ports, 1981.

Compound chemical fertilizer

Yuan price: CPZ, p. 379. Ex-factory price of compound fertilizer (15-15-15) in June 1984, deflated to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: FAOFERT, p. 146. W. German price for compound chemical fertilizer (15-15-15) in 1981/82.

Potassium sulphate

Yuan price: CPZ, p. 380. Ex-factory price of potassium sulfate (48 percent K20) in June 1984, deflated to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: FAOFERT, p. 141. Potassium sulfate muriate (over 45% K20) in Canada, 1981/82.

Potassium chloride

Yuan price: CPZ, p. 380. Ex-factory price of potassium chloride (99.5 percent content) in June 1984, deflated to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: CTPT, p. 138. F.O.B. price in Vancouver, B.C., 1981.

Ammonium nitrate

Yuan price: CPZ, p. 380. Ex-factory price of ammonium nitrate (50-60 percent content) in June 1984, deflated to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: FAOFERT, p. 129. U.S. price of ammonium nitrate, 1981/82, adjusted to 55 percent nitrogen content.

Explosives

Yuan price: World Bank project files. 1982 price of explosives required for building excavation.
Dollar price: World Bank project files. 1982 world price of explosive required for building excavation.

Polyvinyl chloride

Yuan price: CPZ, p. 382. Ex-factory price of polyvinyl chloride (gum, XS-1 grade 2, packaged) in June 1984, deflated to 1981 basis using Field's producer price index for the chemical industry.
Dollar price: SY83, p. 418. Chinese c.i.f. import unit value of polyvinyl chloride in 1981, converted to dollars at an exchange rate of 1.67 yuan/dollar. Converted to f.o.b basis by dividing by freight and insurance markup of 1.12.

Polyethylene (high-pressure process)

Yuan price: CPZ, p. 382. Ex-factory price of polyethylene (high-pressure process, common shaped, grade 1, packaged) in June 1984, converted to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: CPZ, p, 382. Price on U.S. market in June 1984, deflated to a 1981 basis by the U.S. producer price index for other basic organic chemicals (commodity code 061403).

Polyethylene (low-pressure process)

Yuan price: CPZ, p. 382. Ex-factory price of polyethylene (white pellets, grade 1, packaged) in June 1984, converted to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: CPZ, p, 382. Price on U.S. market in June 1984, deflated to a 1981 basis by the U.S. producer price index for other basic organic chemicals (commodity code 061403).

Polypropylene

Yuan price: CPZ, p. 382. Ex-factory price of polypropylene (copolymer stage, grade 1, packaged) in June 1984, converted to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: SY83, p. 418. Chinese c.i.f. import unit value of polypropylene in 1981, converted to dollars at an exchange rate of 1.67 yuan/dollar. Converted to f.o.b basis by dividing by freight and insurance markup of 1.12.

Polystyrene

Yuan price: CPZ, p. 382. Ex-factory price of polystyrene (modified foam, unpackaged) in June 1984, converted to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: SY83, p. 418. Chinese c.i.f. import unit value of polystyrene in 1981, converted to dollars at an exchange rate of 1.67 yuan/dollar. Converted to f.o.b basis by dividing by freight and insurance markup of 1.12.

Rubber tires

Yuan price: CPZ, p, 381. Ex-factory price of rubber tires (750-20-10) in June 1984, converted to a 1981 basis using Field's producer price index for the chemical industry.
Dollar price: CPZ, p. 381. Hong Kong f.o.b. price of Japanese tires (750-20), deflated to a 1981 basis by the Japanese export price index for tires and tubes for motor vehicles.

Plywood

Yuan price: SPC, p. 125. Ex-factory price of plywood for 1985, calculated by dividing border price by the State Planning Commission's conversion factor.
Dollar price: SPC, p. 125. Average Chinese c.i.f. import unit values, 1981-1985. Obtained dollar figure by dividing published border price by the source's shadow exchange rate (4.00 yuan/$) and their distribution markup (6%). Converted to f.o.b basis by dividing by freight and insurance markup of 1.09.

Newsprint

Yuan price: CPZ, p. 378. Ex-factory price of newsprint (rolls , 49 grams per square meter) in June 1984, converted to a 1981 basis using Field's producer price index for the paper industry.
Dollar price: SY83, p. 419. Chinese c.i.f. import unit value of polystyrene in 1981, converted to dollars at an exchange rate of 1.67 yuan/dollar. Converted to f.o.b basis by dividing by freight and insurance markup of 1.09.

Cotton cloth

Yuan price: CPZ, p. 377. Ex-factory price of cotton cloth (Tianjin-produced, 30 x 30/72 x 69.38") in June 1984, converted to a 1981 basis using Field's producer price index for the textile industry.
Dollar price: CPZ, p. 377. Osaka f.o.b. price for cotton cloth (30 x 30/72 x 69.38") in June 1984, deflated to a 1981 basis by the Japanese export price index for cotton fabric.

Cotton yarn

Yuan price: CPZ, p. 378. Ex-factory price of cotton yarn (40 count, single-thread) in June 1984, converted to a 1981 basis using Field's producer price index for the textile industry.
Dollar price: CPZ, p. 378. Osaka f.o.b. price for cotton yarn (40 count, single-thread) in June 1984, deflated to a 1981 basis by the Japanese export price index for natural fiber yarns.

Raw silk

Yuan price: CPZ, p. 378. Ex-factory price of raw silk (26/28D, AAA grade) in June 1984, converted to a 1981 basis using Field's producer price index for the textile industry.
Dollar price: CPZ, p. 378. Yokohama market price for raw silk (26/28D, AAA grade) in June 1984, deflated to a 1981 basis by the Japanese domestic wholesale price index for raw silk.

Polyester fiber filament

Yuan price: CPZ, p. 378. Ex-factory price of polyester fiber filament (50D) in June 1984, converted to a 1981 basis using Field's producer price index for the textile industry.
Dollar price: CPZ, p. 378. Japanese f.o.b. price of polyester fiber (50D) in June 1984, deflated to a 1981 basis by the Japanese export price index for synthetic fibers suitable for spinning.

Cotton fiber filament

Yuan price: CPZ, p. 378. Ex-factory price of cotton fiber filament (70-89D) in June 1984, converted to a 1981 basis using Field's producer price index for the textile industry.
Dollar price: CPZ, p. 378. Japanese f.o.b. price of polyester fiber (70D) in June 1984, deflated to a 1981 basis by the Japanese export price index for natural fiber yarns.

Gunny sacks (hemp)

Yuan price: CPZ, p. 378. Ex-factory price of gunny sacks in June 1984, converted to a 1981 basis using Field's producer price index for the textile industry.
Dollar price: SY83, p. 414. Chinese f.o.b. export unit value of gunny sacks in 1981, converted to dollars at an exchange rate of 1.67 yuan/dollar.

Glass

Yuan price: CPZ, p. 385. Ex-factory price of glass sheets (10m/2 mm., grade 1) in June 1984, converted to a 1981 basis using Field's producer price index for building materials.
Dollar price: SY83, p. 415. Chinese f.o.b. export unit value for plate glass in 1981, converted to dollars at an exchange rate of 1.67 yuan/dollar.

Cement

Yuan price: CPZ, p. 385. Ex-factory price of cement (#525) in June 1984, converted to a 1981 basis using Field's producer price index for building materials.
Dollar price: SY83, p. 415. Chinese f.o.b. export unit value for cement in 1981, converted to dollars at an exchange rate of 1.67 yuan/dollar.

Lime

Yuan price: CXL, p. 45. Ex-factory or distribution price of lime in 1983, converted to a 1981 basis using Ma and Zhang's price index for building materials.
Dollar price: MOFERT, p. 1041. Chinese export unit value (f.o.b.) of slaked lime in 1982.

Vacuum flasks

Yuan price: CTPS, p. 154. Composite average retail price of thermos vacuum flasks in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: SY83, p. 416. Chinese export unit value (f.o.b.) in 1981.

Pig iron

Yuan price: CPZ, p. 385. Ex-factory price of pig iron (foundry) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: USPPI, p. 56. U.S. producer price for pig iron (No. 2, foundry) in December 1981.

Steel ingots

Yuan price: CPZ, p. 386. Ex-factory price of steel ingots (ordinary carbon steel) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p. 386. Tokyo market price for small steel ingots in June 1984, deflated to a 1981 basis using Japan's domestic wholesale price index for ordinary steel products.

Steel billets

Yuan price: CPZ, p. 386. Ex-factory price of steel billets (carbon steel) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: USPPI, p. 55. U.S. producer price for steel billets (merchant quality, carbon) in December 1981.

Steel bars

Yuan price: CPZ, p. 386. Ex-factory price of steel bars (class II killed steel, 19-24 millimeters) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p. 386. Japanese wholesale market price for steel bars (16-25 millimeters) in June 1984, deflated to 1981 levels by Japan's domestic wholesale price index for round steel bars.

Steel plates

Yuan price: CPZ, p. 386. Ex-factory price of steel plates (class II killed steel, 3-5 x 25-45 mm.) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p. 386. Japanese wholesale market price for steel plates (3 x 25 mm) in June 1984, deflated to a 1981 level by Japan's domestic wholesale price index for steel plates.

Angle steel

Yuan price: CPZ, p. 387. Ex-factory price of angle steel (class II killed steel, 5-12 x 75-79 mm) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p, 387. Japanese wholesale market price for angle steel (10 x 100 mm.) in June 1984, deflated to a 1981 level by Japan's domestic wholesale price index for steel sections.

Channel steel

Yuan price: CPZ, p. 387. Ex-factory price of channel steel (class II killed steel, Nos. 12-16) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p, 387. Japanese wholesale market price for channel steel (6.5 x 75 x 150 mm.) in June 1984, deflated to a 1981 level by Japan's domestic wholesale price index for steel sections.

I-beam steel

Yuan price: CPZ, p. 387. Ex-factory price of I-beam steel (class II killed steel, Nos. 12-16) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p, 387. Japanese wholesale market price for I-beam steel (7 x 100 x 200 mm.) in June 1984, deflated to a 1981 level by Japan's domestic wholesale price index for steel sections.

Strip steel

Yuan price: CPZ, p. 387. Ex-factory price of strip steel (class II killed steel) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: USPPI. p. 55. U.S. producer price of strip steel (hot-rolled, carbon) in December 1981.

Hot-rolled steel sheets

Yuan price: CPZ, p. 387. Ex-factory price of hot-rolled steel sheets (1-1.5 x 1000 x 2000 mm.) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p. 387. Japanese wholesale market price for hot-rolled steel sheets (1.6 x 914 x 1829 mm.) in June 1984, deflated to a 1981 level by Japan's domestic wholesale price index for hot-rolled steel sheets.

Cold-rolled steel sheets

Yuan price: CPZ, p. 388. Ex-factory price of cold-rolled steel sheets (0.5-0.65 mm.) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ p. 388. Japanese wholesale market price for cold-rolled steel sheets (0.5 x 914 x 1829 mm.) in June 1984, deflated to a 1981 level by Japan's domestic wholesale price index for cold-rolled steel sheets.

Medium plate steel

Yuan price: CPZ, p. 388. Ex-factory price of medium plate steel (class II killed steel) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p. 388. Japanese wholesale market price for medium plate steel (4.5 x 1219 x 2438 mm.) in June 1984, deflated to a 1981 level by Japan's domestic wholesale price index for medium steel plates.

Tin-plated steel sheets

Yuan price: CPZ, p. 388. Ex-factory price of tin-plated steel sheets (ordinary carbon steel) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: USPPI, p. 55. U.S. producer price for tin plate (electrolytic) in December 1981.

Zinc-plated steel sheets

Yuan price: CPZ, p. 388. Ex-factory price of zinc-plated steel sheets (class II killed steel, 1.0-1.5 mm.) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: USPPI, p. 55. U.S. producer price for galvanized steel sheets (carbon) in December 1981.

Carbon-steel bars/rods

Yuan price: CPZ, p. 388. Ex-factory price of carbon-steel bars and rods (05-70, 17-28 mm. diameter) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p. 388. Tokyo wholesale market price for carbon-steel bars/rods ($S_{10}O$ - $S_{55}O$) in June 1984, deflated to a 1981 level by the Japanese domestic wholesale price index for structural carbon steel.

Carbon tool steel bars/rods

Yuan price: CPZ, p. 389. Ex-factory price of carbon tool steel bar/rods (T_7-13, 17-28 mm. diameter, hot-rolled) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p. 388. Tokyo wholesale market price for carbon tool steel bars/rods (SK_1-7) in June 1984, deflated to a 1981 level by the Japanese domestic wholesale price index for alloy tool steel.

Bearing steel

Yuan price: CPZ, p. 389. Ex-factory price of bearing steel (COr1.5, 17-28 mm. diameter) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p. 389. Japanese wholesale market price for bearing steel (SuJ_2) in June 1984, deflated to a 1981 level by the Japanese domestic wholesale price index for bearing steel.

Spring steel

Yuan price: CPZ, p. 389. Ex-factory price of spring steel ($55Si_2Mn$) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p. 389. Japanese wholesale market price for spring steel (SuP_6, round) in June 1984, deflated to a 1981 level by the Japanese domestic wholesale price index for spring steel.

High-speed tool steel

Yuan price: CPZ, p. 389. Ex-factory price of high-speed tool steel ($W_6M_{05}Cr_4V_2$) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p. 389. Japanese wholesale market price for high-speed tool steel (SKH_9) in June 1984, deflated to a 1981 level by the Japanese domestic wholesale price index for high-speed tool steel.

Stainless steel

Yuan price: CPZ, p. 389. Ex-factory price of stainless steel ($1Cr_{18}Ni_9Ti$, 17-28 mm. diameter) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p. 389. Japanese wholesale market price for stainless steel (SuS_{304}(18-8), 25-100 mm. diameter) in June 1984, deflated to a 1981 level by the Japanese domestic wholesale price index for stainless steel.

Stainless steel plates

Yuan price: CPZ, p. 390. Ex-factory price of stainless steel plates ($1Cr_{18}Ni_9Ti$, 1 mm, hot-rolled) in June 1984, converted to a 1981 basis using Field's producer price index for ferrous metals.
Dollar price: CPZ, p. 390. Japanese wholesale market price for stainless steel plates (SuS_{304}, 1 mm) in June 1984, deflated to a 1981 level by the Japanese domestic wholesale price index for stainless steel plates.

Aluminum ingots

Yuan price: CPZ, p. 390. Ex-factory price of aluminum ingots (95.0-99.7 percent pure) in June 1984, adjusted to a 1981 basis using Field's producer price index for nonferrous metals.
Dollar price: CTPT, p. 114. New York market producer list price for unalloyed aluminum ingot (99.5% pure) in 1981.

Electrolytic copper

Yuan price: CPZ, p. 390. Ex-factory price of electrolytic copper (99.5-99.95 percent pure) in June 1984, adjusted to a 1981 basis using Field's producer price index for nonferrous metals.
Dollar price: CTPT, p. 118. New York market producer price for electrolytic wirebar copper at domestic refineries in 1981.

Electrolytic lead

Yuan price: CPZ, p. 390. Ex-factory price of electrolytic lead (99.5-99.994 percent pure) in June 1984, adjusted to a 1981 basis using Field's producer price index for nonferrous metals.
Dollar price: CTPT, p. 120. New York market domestic producer price for pig lead, desilverized, in 1981.

Electrolytic zinc

Yuan price: CPZ, p. 390. Ex-factory price of electrolytic zinc (98.7-99.995 percent pure) in June 1984, adjusted to a 1981 basis using Field's producer price index for nonferrous metals.
Dollar price: CTPT, p. 124. New York market domestic producer price for zinc, Prime Western Grade, delivered in New York, in 1981.

Nickel ingots

Yuan price: CPZ, p. 391. Ex-factory price of nickel ingots (99.2-99.99 percent pure) in June 1984, adjusted to a 1981 basis using Field's producer price index for nonferrous metals.
Dollar price: CTPT, p. 130. Canadian nickel electrolytic cathodes, contract price, f.o.b., shipping point, U.S. duty included, in 1981.

Tin

Yuan price: CPZ, p. 391. Ex-factory price of tin (99-99.95 percent pure) in June 1984, adjusted to a 1981 basis using Field's producer price index for nonferrous metals.
Dollar price: CTPT, p. 122. London Metal Exchange price for standard tin, minimum 99.75 percent pure.

Mercury

Yuan price: CPZ, p. 391. Ex-factory price of mercury (99.99-99.999 percent pure) in June 1984, adjusted to a 1981 basis using Field's producer price index for nonferrous metals.
Dollar price: USPPI, p. 56. U.S. producer price for mercury (in flasks), December 1981.

Magnesium

Yuan price: CPZ, p. 391. Ex-factory price of magnesium (99.85-99.92 percent pure) in June 1984, adjusted to a 1981 basis using Field's producer price index for nonferrous metals.
Dollar price: USPPI, p. 56. U.S. producer price for magnesium pig ingots, December 1981.

Antimony

Yuan price: BYRD, p. 12. Ex-factory price of antimony, 1981.
Dollar price: BYRD, p. 12. International price for antimony, 1981, provided by Chinese sources.

Cadmium

Yuan price: BYRD, p. 12. Ex-factory price of cadmium, 1981.
Dollar price: BYRD, p. 12. Average London Metals Exchange price for cadmium, 1981.

Power cable, 10-15 kv

Yuan price: World Bank project files. November 1980 wholesale price of 10 kv transmission cable in China's North China Plain.
Dollar price: USPPI, p. 57. U.S. producer price of 15 kv. thermosetting power cable in December, 1981.

Enamel basins

Yuan price: CTPS, p. 155. Retail price of enamel basins, adjusted to a wholesale price basis by removing an estimated 15 percent retail markup.
Dollar price: MOFERT, p. 999. Chinese export unit value (f.o.b.) of enamel basins in 1982.

Steam boilers, 410-420 tons/hour

Yuan price: PMEPRC, p. 4. Ex-factory price of a 410 tons/hour boiler (drives 100-125 MW steam turbine) in 1973, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 5. U.S. producer price of a 420 tons/hour boiler, adjusted to a 1981 basis using an average of U.S. producer price indices for oil, gas, and steel heating boilers.

Steam boilers, 640-670 tons/hour

Yuan price: PMEPRC, p. 4. Ex-factory price of a 670 tons/hour boiler (drives 200 MW steam turbine) in 1973, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 5. U.S. producer price of a 640 tons/hour boiler, adjusted to a 1981 basis using an average of U.S. producer price indices for oil, gas, and steel heating boilers.

Steam turbines, 100-115 megawatts

Yuan price: PMEPRC, p. 5. Ex-factory price of a 100 mw. steam turbine in 1973, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 5. U.S. producer price of a 115 mw. steam turbine (with generator) in 1972, adjusted to a 1981 basis using the U.S. producer price index for foundry/forge shop products.

Steam turbines, 200 megawatts

Yuan price: PMEPRC, p. 5. Ex-factory price of a 200 mw. steam turbine in 1973, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 5. U.S. producer price of a 200 mw. steam turbine (with generator) in 1972, adjusted to a 1981 basis using the U.S. producer price index for foundry and forge shop products.

Diesel engines, 40 hp.

Yuan price: AGTECH, p. 779. Ex-factory price of a 40 hp. diesel engine (No. 490, used to drive an electrical generator) in 1980, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 5. U.S. producer price of a 40 hp. diesel engine in 1972, adjusted to a 1981 basis using the U.S. producer price index for high-speed diesel engines.

Electric motors, 1.12-1.5 kw.

Yuan price: PMEPRC, p. 9. Ex-factory price of a 1.5 kw. electric motor in 1972, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 5. U.S. producer price of a 1.12 kw. electric motor in 1972, adjusted to a 1981 basis using the U.S. producer price index for electric motors.

Electric motors, 3.7-5.0 kw.

Yuan price: PMEPRC, p. 9. Ex-factory price of a 5 kw. electric motor in 1972, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 5. U.S. producer price of a 3.7 kw. electric motor in 1972, adjusted to a 1981 basis using the U.S. producer price index for electric motors.

Electric motors, 10.0-11.2 kw.

Yuan price: PMEPRC, p. 9. Ex-factory price of a 10 kw. electric motor in 1972, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 5. U.S. producer price of a 11.2 kw. electric motor in 1972, adjusted to a 1981 basis using the U.S. producer price index for electric motors.

Single/double-blade plow

Yuan price: AGTECH, p. 776. Average 1980 ex-factory prices of six double-blade plows, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 11. U.S. producer price of a single blade plow, tractor mounted, with moldboard, in 1972. Adjusted to a 1981 basis using the U.S. producer price index for plows.

Five-blade plow

Yuan price: AGTECH, p. 776. Ex-factory price of a five-blade plow (L-5-35 model) in 1980, left unadjusted because the price had not changed between 1967 and 1980.
Dollar price: USSRUS, Vol. I, p. 11. U.S. producer price of a 5-blade plow, tractor mounted, with moldboard, in 1972. Adjusted to a 1981 basis using the U.S. producer price index for plows.

Cultivators

Yuan price: AGTECH, p. 776. Average 1980 ex-factory price of six different brands of cultivators, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 12. U.S. producer price of a tractor-drawn field cultivator in 1972, adjusted to a 1981 basis using the U.S. producer price index for agricultural machinery and equipment.

Land leveler

Yuan price: AGTECH, p. 777. Ex-factory price for a PD-3 land leveler in 1980, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 12. U.S. producer price for a tractor-drawn land leveler in 1972, adjusted to a 1981 basis using the U.S. producer price index for agricultural machinery and equipment.

Combine

Yuan price: CSED, Vol. I, p. 335. Ex-factory price of a combined threshing machine (GT-4.9 model) in 1979, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 11. U.S. producer price of a self-propelled grain combine in 1972, adjusted to a 1981 basis using the U.S. producer price index for self-propelled combines.

Tractor, 25-27 hp.

Yuan price: AGTECH, p. 775. Ex-factory price of a 27-hp. Bountiful Harvest tractor (feng shou - 27) in 1980, left unadjusted because the price had not changed between 1967 and 1980.
Dollar price: USSRUS, Vol. I., p. 11. U.S. producer price of a 25-hp. tractor in 1972, adjusted to a 1981 basis using the U.S. producer price index for wheel-type farm tractors, 35-49 hp.

Tractor, 37.9-40 hp.

Yuan price: AGTECH, p. 775. Ex-factory price of an East is Red tractor (dong fang hong - 40) in 1980, left unadjusted because the price had not changed between 1967 and 1980.
Dollar price: USSRUS, Vol. I, p. 11. U.S. producer price of a 37.9 hp. tractor in 1972, adjusted to a 1981 basis using the U.S. producer price index for wheel-type farm tractors, 35-49 hp.

Tractor, 52.6-55 hp.

Yuan price: AGTECH, p. 775. Ex-factory price of a 55 hp. Iron Ox tractor (tie nu - 55) in 1980, left unadjusted because the price had not changed between 1967 and 1980.
Dollar price: USSRUS, Vol. I, p. 11. U.S. producer price of a 52.6 hp. tractor in 1972, adjusted to a 1981 basis using the U.S. producer price index for wheel-type farm tractors, 50-69 hp.

Sewing machine

Yuan price: CTPT, p. 154. Composite average retail price for sewing machines in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: AHMAD, p. 7. Average U.S. retail price for sewing machines in 1980 (ICP specifications).

Lathes

Yuan price: PMEPRC, p. 11. Ex-factory price of a C-620 metal-cutting lathe (a copy of the Soviet 1A62) in 1974, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 6. U.S. producer price of an analog to the Soviet 1K62 metal-cutting lathe in 1972, adjusted to a 1981 basis using the U.S. producer price index for lathes.

Planers, 19-25 tons capacity

Yuan price: PMEPRC, p. 12. Ex-factory price of 25 ton capacity planer (model B-2012) in 1973, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 7. U.S. producer price for a 19 ton capacity double-housing planer in 1972, adjusted to a 1981 basis using the U.S. producer price index for metal-cutting machine tools.

Punch presses, 270-350 tons capacity

Yuan price: PMEPRC, p. 12. Ex-factory price of a 315 ton capacity punch press (model JA31-315T) in 1973, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 7. U.S. producer price of a 270 ton capacity straight-sided mechanical press in 1972, adjusted to a 1981 basis using the U.S. producer price index for punch presses.

Television, black and white

Yuan price: AHMAD, p. 7. 1980 retail price for a standard 12-inch black and white television set.
Dollar price: AHMAD, p. 7, 1980. U.S. retail price for a standard black and white television set (ICP comparison list) in 1980.

Radio, transistor

Yuan price: AHMAD, p. 7. 1980 retail price for a small-sized transistor radio.
Dollar price: AHMAD, p. 7, 1980. U.S. retail price for a portable transistor radio in 1980.

Transformers, 1,000 kva.

Yuan price: PMEPRC, p. 10. Arithmetic mean of the 1972 ex-factory prices of 25 transformers (25-5,600 kva), adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 6. U.S. producer price of a 1,000 kva power transformer in 1972, adjusted to a 1981 basis using the U.S. producer price index for transformers and power regulators.

Refrigerator

Yuan price: AHMAD, p. 7. 1980 retail price per liter for a standard household refrigerator.
Dollar price: AHMAD, p. 7, 1980. U.S. retail price per liter for a standard household refrigerator (ICP comparison list) in 1980.

Flashlights

Yuan price: CTPS, p. 155. Composite average retail price of flashlights in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: SY83, p. 416. Chinese export unit value (f.o.b.) of flashlights in 1981.

Light bulbs, incandescent

Yuan price: CTPS, p. 156. Composite average retail price of light bulbs in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: MOFERT, p. 1019. Chinese export unit value (f.o.b.) of light bulbs in 1982.

Batteries

Yuan price: CTPS, p. 155. Composite average retail price of batteries (non-automotive dry-cells) in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: SY83, p. 415. Chinese export unit value (f.o.b.) of non-automotive dry-cell batteries in 1981.

Truck, 3.6-4.0 ton

Yuan price: PMEPRC, p. 10. Ex-factory price of a 4-ton Liberation (jiefang) truck in 1973, adjusted to a 1981 basis using Ma and Zhang's producer price index for the machinery industry.
Dollar price: USSRUS, Vol. I, p. 11. U.S. producer price for a 3.6 ton platform truck in 1972, adjusted to a 1981 basis using the U.S. producer price index for trucks, 10,000 lbs. and under.

Bicycle

Yuan price: CTPS, p. 155. Composite average retail price of bicycles in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: SY83, p. 416. Chinese export unit value (f.o.b.) of bicycles in 1981.

Men's nylon socks

Yuan price: CSED, Vol. I, p. 340. Retail price in Beijing of men's nylon socks (254 gm.) in November 1980, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: MOFERT, p. 968. Chinese export unit value (f.o.b.) of nylon socks in 1982.

Cotton socks

Yuan price: SY83, p. 381. Average retail price in China of cotton socks, derived by dividing total retail sales of cotton socks in 1981 by the number of pairs sold. Adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: MOFERT, p. 967. Chinese export unit value (f.o.b.) of cotton socks in 1982.

Synthetic fiber socks

Yuan price: SY83, p. 381. Average retail price in China of polyamide fiber socks, derived by dividing total retail sales in 1981 by the number of pairs sold. Adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: MOFERT, p. 968. Chinese export unit value (f.o.b.) of acrylic socks in 1982.

Undershirts and singlets

Yuan price: SY83, p. 381. Average Chinese retail price of undershirts and singlets, derived by dividing total retail sales in 1981 by the number sold. Adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: MOFERT, p. 966. Chinese export unit value (f.o.b.) of cotton undershirts/singlets in 1982.

Cotton jerseys and trousers

Yuan price: SY83, p. 381. Average retail price in China of cotton jerseys and trousers, derived by dividing total retail sales in 1981 by the number sold. Adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: MOFERT, p. 967. Chinese export unit value (f.o.b.) of cotton jerseys/trousers in 1982.

Underwear

Yuan price: SY83, p. 381. Average retail price in China of underwear, derived by dividing total retail sales in 1981 by the number of pairs sold. Adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: MOFERT, p. 972. Chinese export unit value (f.o.b.) of cotton/polyester blend underwear in 1982.

Leather shoes

Yuan price: CTPS, p. 153. Composite average retail price of leather shoes in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: SY83, p. 416. Chinese export unit value (f.o.b.) of leather shoes in 1981.

Cloth shoes

Yuan price: CTPS, p. 153. Composite average retail price of cotton shoes in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: SY83, p. 416. Chinese export unit value (f.o.b.) of cloth shoes in 1981.

Rubber shoes

Yuan price: CTPS, p. 153. Composite average retail price of rubber shoes in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: MOFERT, p. 1001. Chinese export unit value (f.o.b.) of rubber shoes in 1982.

Plastic shoes

Yuan price: CTPS, p. 153. Composite average retail price of plastic shoes in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: MOFERT, p. 1001. Chinese export unit value (f.o.b.) of PVC plastic shoes in 1982.

Watches

Yuan price: CTPS, p. 155. Composite average retail price of watches in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: SY83, p. 416. Chinese export unit value (f.o.b.) of watches in 1981.

Clocks

Yuan price: CTPS, p. 155. Composite average retail price of clocks in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: SY83, p. 416. Chinese export unit value (f.o.b.) of clocks in 1981.

Cameras

Yuan price: CXL, p. 46. Retail price of cameras in 1983, adjusted to a 1981 basis using the official retail list price index for cultural and recreational articles, and adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: SY83, p. 416. Chinese export unit value (f.o.b.) of cameras in 1981.

Fountain pens, iridium nibs

Yuan price: CTPS, p. 156. Composite average retail price of fountain pens with iridium nibs in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: MOFERT, p. 1011. Chinese export unit value (f.o.b.) of fountain pens with iridium nibs in 1982.

Pencils

Yuan price: CTPS, p. 157. Composite average retail price of pencils in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: SY83, p. 416. Chinese export unit value (f.o.b.) of pencils in 1981.

Matches

Yuan price: CTPS, p. 153. Composite average retail price of matches in 1981, adjusted to a wholesale price basis by removing an estimated 14 percent retail markup.
Dollar price: MOFERT, p. 1007. Chinese export unit value (f.o.b.) of matches in 1981.

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