Purchasing Power of the U.S. Dollar and Renminbi

Move over, burgernomics.

Here's a real shopping basket.

BY ZHIQIANG ZHANG, QUANHAI ZHAO, AND CHUNXIANG WANG

The United States and China are global economic leaders, together accounting for over 40 percent of total global economic growth in the past five years, and each is an important market for the other. Moreover, the Chinese currency, the renminbi, is in the process of appreciation. Therefore, the exchange rate between the U.S. dollar and the renminbi attracts worldwide attention and its proper value has been hotly debated.

As the flows of people, products, and capital between the United States and China increase, it is ever more important to understand the purchasing power difference between the dollar and the renminbi. To help, we carried out a survey in October/November 2007, collecting price data in supermarkets in both New York and Beijing.

Not many surveys currently examine currency purchasing power. One well-known survey is the Big Mac Index, published periodically by *The Economist* magazine. It calculates purchasing power based solely on a single product, the McDonald's Big Mac hamburger.

The other is the World Bank's International Comparison Program, which calculates purchasing power on nearly one thousand products in about 150 countries. The ICP, based on surveys taken every three to five years, covers a variety of products and ser-

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vices, from food, clothing, and footwear to equipment and construction and education and medical care.

The advantage of the Big Mac Index is its high efficiency in cost and time. The data is simple, standard (a hamburger sold in nearly identical form in many countries around the world), and easy to obtain. The advantage of the ICP is its wide survey coverage.

Note that the Big Mac Index and the ICP seem to mark the two extremes in research about currency purchasing power. We have not seen much relevant research on an in-between level so far.

Actually, the Big Mac Index's high efficiency comes at the cost of representativity. The price of a hamburger does not convincingly represent overall purchasing power. For one thing, a Big Mac is probably a high-grade food in developing countries and a low-grade food in developed countries, making the comparability of two "identical" hamburgers somewhat uncertain.

The ICP, however, gains its representativity at the expense of timeliness and high cost. When it comes to market surveys, time is everything. Because prices are constantly changing, information with such an obvious time lag is likely invalid. In addition, unless for the purpose of calculating the PPP exchange rate, larger survey coverage does not necessarily mean better representativity or greater usefulness. For example, an executive in China who needs to determine the travel expenses for an employee for two weeks in the United States doesn't care about the difference between car prices in China and the United States, but rather car rental rates.

Keeping the above considerations in mind, we decided to survey the most common daily necessities in the supermarket. We do not intend to calculate the PPP exchange rate based on our survey data. Nor do we intend to satisfy all the needs of various policymakers, since we do not believe any survey or research can play such a role. But we do believe our survey is useful because it covers the most frequently purchased products by regular people. Our findings are useful for travelers and executives as well as government officials. We do not intend to address the implications for the exchange rate, but make clear basic facts and trust our readers to use our findings appropriately for their own purposes.

The dollar has 2.99 times the overall purchasing power of the renminbi.

WHY NEW YORK AND BEIJING?

To keep our survey timely and on-budget, we decided to choose one city each in China and the United States. We immediately thought of Beijing and New York. Were these cities good choices based on representativity and comparability? From a geographical perspective, Beijing and New York are both located in the northeast of their countries, both close to latitude 40° north, and the temperatures in the two cities are similar throughout the year. Therefore residents in the two cities are more likely to have similar consumption habits. From a lifestyle perspective, Beijing and New York are both big markets with large populations, and both play an influential role in their respective countries. Thus, we believe Beijing and New York are reasonable choices, and comparison between them represents the comparison between China and the United States to a great extent.

Of course, there are some differences between Beijing and New York. The New York market is more developed and more internationalized, and prices of various products do not fluctuate much throughout the year. Product prices in Beijing, however, usually vary much more between winter and summer, and prices in spring and autumn are likely more representative. Therefore, we decided to carry out our survey in late October.

Categories Surveyed	Product
Meat, eggs, and milk	beef, pork, chicken, eggs, milk
Vegetable	cucumber, bell pepper, tomato, eggplant, Chinese cabbage, cabbage, romaine, celery, green cauliflower, potato, onion, carrot, turnip, scallion, ginger, garlic
Fruit	apple, pear, peach, grape, banana, orange
Rice, flour, and oil	rice, wheat flour, peanut oil, corn oil
Toiletries	scented soap, laundry powder, toothpaste, shampoo, body wash, toilet tissue

Product	Average Price in New York ($ per kilogram)	Average Price in Beijing (¥ per kilogram)	Price Ratio
Beef	7.96	34.74	4.36
Pork	6.55	29.24	4.47
Chicken	5.67	16.25	2.87
Egg	2.90	9.79	3.38
Milk	1.55	5.01	3.24
Cucumber	2.50	4.29	1.72
Bell pepper	2.67	6.33	2.37
Tomato	3.29	5.03	1.53
Eggplant	3.07	4.77	1.55
Chinese cabbage	1.81	2.58	1.43
Cabbage	1.35	2.59	1.91
Romaine	3.13	5.04	1.61
Celery	1.34	3.53	2.63
Green cauliflower	2.55	7.77	3.05
Potato	1.28	3.23	2.53
Onion	1.71	3.66	2.14
Carrot	1.79	3.31	1.85
Turnip	1.09	2.71	2.48
Scallion	3.86	4.27	1.11
Ginger	4.23	6.01	1.42
Garlic	4.41	4.08	0.93
Apple	3.06	8.84	2.89
Pear	3.06	5.01	1.64
Peach	3.49	8.57	2.46
Grapes	3.68	7.70	2.09
Banana	1.20	6.65	5.53
Orange	2.22	11.62	5.23
Rice	1.25	4.51	3.60
Wheat flour	1.04	2.98	2.85
Peanut oil	3.01	12.17	4.04
Corn oil	2.51	15.59	6.20
Scented soap	7.25	29.01	4.01
Laundry powder	3.40	6.81	2.01
Toothpaste	13.87	53.31	3.84
Shampoo	9.90	68.18	6.34
Body wash	8.79	52.31	6.48
Toilet tissue	0.73	1.99	2.72

THE SURVEY

We chose a total of twenty-eight supermarkets, sixteen in Beijing, twelve in New York. Originally, we planned to survey sixteen New York supermarkets. But supermarkets there are relatively small in size, and often do not have complete lines of goods. Therefore, data for some supermarkets actually reflect a merge of the data of several smaller supermarkets. For comparison purposes, we narrowed our survey scope to products that are common daily necessities in supermarkets both in Beijing and New York. The final sample covered thirty-seven products in five categories.

The survey began October 20, 2007, in the two cities, and all the questionnaire forms were completed before October 30. Collecting the data within a short time frame contributed to the quality of the survey. To reduce errors in data collection, we revisited to the majority of surveyed supermarkets in November. We made adjustments carefully based on the original data and the second round of data. After collecting the data, we standardized, averaged, and compared the prices we found.

The original price data collected in Beijing was normally for units of 500 grams or one kilogram, making price standardizing easy. The data from New York was often for pound units, but some products are sold in New York by quantity instead of weight, such as one or two boxes, or three apples. We converted New York prices first into dollars per pound, then further transformed them to dollars per kilogram.

An exception is toilet tissue. Since the volumes in one roll vary across supermarkets, we chose a similar-sized toilet tissue (about four square meters each roll) in Beijing and in New York to calculate the average prices to maintain comparability.

We then calculated average prices based on the unified price data. The process included deleting the highest and lowest prices, then averaging the remaining prices. We believe the distortions aris-

Category	Average price ratio	Highest price ratio	Lowest price ratio
Meat, egg, and milk	3.66	Pork: 4.47	Chicken: 2.87
Vegetables	1.89	Green cauliflower: 3.05	Garlic:0.93
Fruits	3.31	Banana: 5.53	Pears: 1.64
Rice, flour, and oil	4.17	Corn oil: 6.20	Wheat flour: 2.85
Toiletries	4.23	Body wash: 6.48	Laundry powder: 2.01

ing from atypical prices and survey errors can be effectively eliminated this way.

OUR FINDINGS

The differences in purchasing power between the renminbi and the dollar can be found by comparing the prices per kilogram in Beijing and New York.

The average price ratio is 2.99, which means that the dollar has 2.99 times the overall purchasing power of the renminbi. The dollar is strongest, or the price in New York is relatively the lowest, in the toiletries category, where the ratio is 4.23, while the weakest category for the dollar is the vegetable category, where the ratio is 1.89.

Can we find some theoretical insight in the order of the above purchasing power ratios? It could be that the more convenient and inexpensive the costs for transportation and stock, the more possible it is for the United States to make use of the lower production costs of other places. Therefore, the dollar's relative purchasing power for these products will be higher. Obviously, in the five categories of products, toiletries is the most advantageous for transportation and stock, and vegetables is the least. The relative purchasing power of the dollar reflects the difference in international production costs and the globalization of the U.S. consumer products market.

LIMITATIONS OF OUR FINDINGS

While our findings offer insight into the flows of people and products between the United States and China, especially between Beijing and New York, our results do not represent the overall levels of purchasing power of the dollar and the renminbi since our survey only covered a portion of the products in supermarkets.

We also observe that the structure of the retail sector in New York is somewhat different from that in Beijing. Big supermarket chains, such as Wal-Mart and others, are located in the inner city in Beijing, but in the suburbs in New York. The supermarkets we surveyed in New York are mostly the local smaller ones, such as Pathmark, Key Food, Kmart, Farm Fresh, Met Foods, and some Chinese supermarkets, in which prices of products are higher than in large chains such as Wal-Mart. Therefore, the price data we collected in New York may be overvalued, and hence the purchasing power of dollar may be under-valued to some extent.

During the process of our survey, prices of foods in China and Beijing began experiencing a sharp rise. As this goes to press, the price data for Beijing may be somewhat undervalued, and hence the purchasing power of renminbi may be somewhat overvalued.

Some additional caveats: We observe that the surveyed data and calculated purchasing power are based on the average quality products, without incorporation of the quality differences between the products sold in New York and Beijing. Normally, product quality in New York is better than that in Beijing. Also, some products are really cheaper in New York or the United States than in Beijing or China, such as cars, computers, and mobile phones, but they are not covered by our survey. And last, our final average of 2.99 is just a simple average of the price surveyed. It does not account for the structure of consumer expenditure among the relevant products.

Most of the above factors indicate that our final results may overvalue renminbi and undervalue the dollar. Taking all the fundamental factors into account, one dollar is probably worth more than 2.99 renminbi in terms of purchasing power. ◆