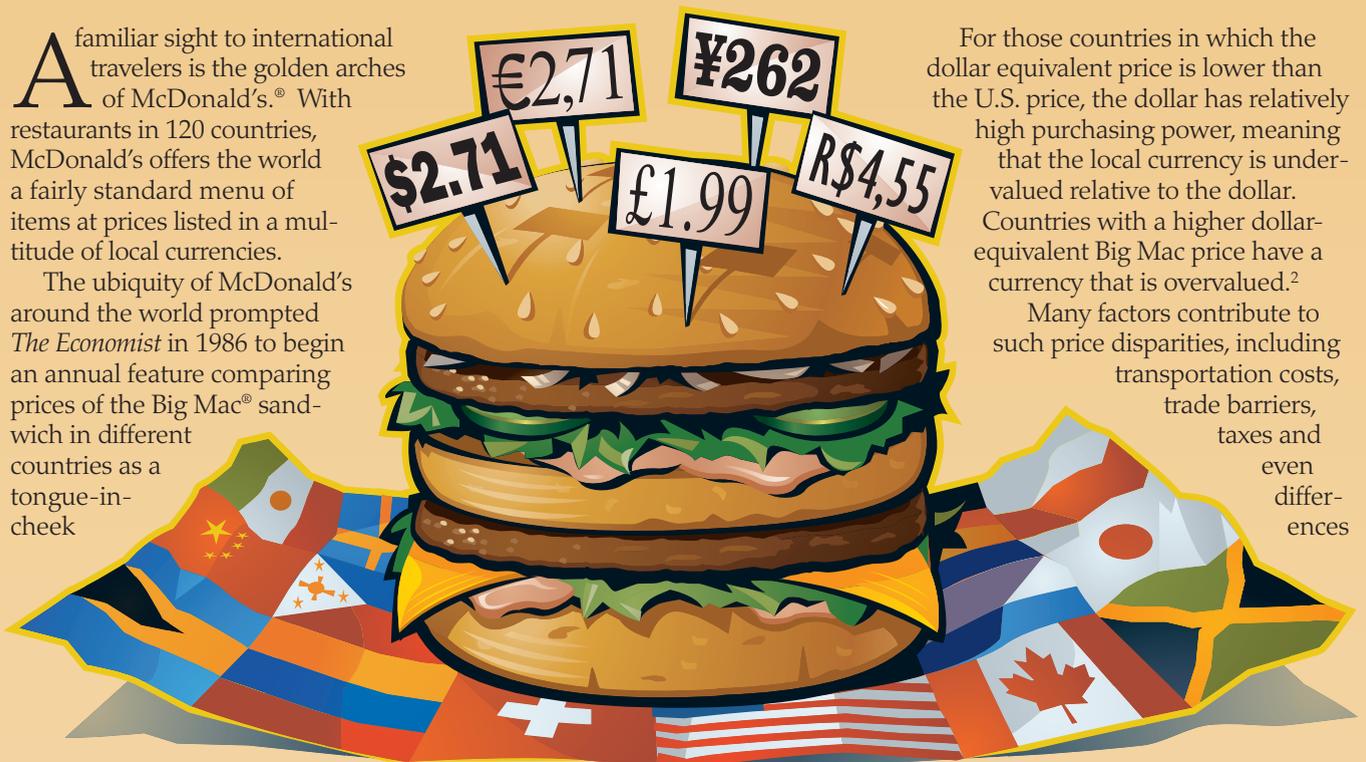


# Burger Survey Provides Taste of International Economics

By Michael R. Pakko and Patricia S. Pollard

A familiar sight to international travelers is the golden arches of McDonald's.<sup>®</sup> With restaurants in 120 countries, McDonald's offers the world a fairly standard menu of items at prices listed in a multitude of local currencies.

The ubiquity of McDonald's around the world prompted *The Economist* in 1986 to begin an annual feature comparing prices of the Big Mac<sup>®</sup> sandwich in different countries as a tongue-in-cheek



For those countries in which the dollar equivalent price is lower than the U.S. price, the dollar has relatively high purchasing power, meaning that the local currency is undervalued relative to the dollar. Countries with a higher dollar-equivalent Big Mac price have a currency that is overvalued.<sup>2</sup>

Many factors contribute to such price disparities, including transportation costs, trade barriers, taxes and even differences

exercise explaining relative currency valuations. A similar index is published periodically by the financial firm UBS. These lighthearted analyses of hamburger prices provide a palatable example of the economic principle of Purchasing Power Parity (PPP)—as well as an illustration of why the principle often does not appear to hold as a practical matter.<sup>1</sup>

The accompanying table shows the price of a Big Mac in various countries in April 2003. The first column lists prices in local currencies. Dividing this price by the exchange rate in the second column yields the price in U.S. dollars, which is shown in the third column. These directly comparable U.S. dollar prices show a wide disparity, ranging from \$1.40 or less in China, Malaysia, Philippines, Russia and Thailand to \$3.60 or more in Denmark, Sweden and Switzerland. On the face of it, this range violates the principle of PPP, which suggests that the Big Mac should have the same price everywhere.

The underlying foundation of PPP is known as the “law of one price,” which states that the price of a particular commodity—say, sesame seeds—should be equal in different countries

after accounting for exchange rates between currencies. If sesame seeds were less expensive in one country than in another, an astute trader could buy sesame seeds in the low-price country and sell them in the higher-price country at a profit. This type of activity, known as arbitrage, would tend to drive the price of sesame seeds higher in the low-price country and lower in the high-price country until no further profit opportunities existed. Abstracting from complicating factors such as transportation costs, taxes and tariffs, this process would drive the prices in the different countries—when expressed in terms of a common currency unit—toward equality.

The concept of PPP extends the law of one price to cover groups of tradable commodities. If the law of one price holds for the individual components of a market basket of goods, PPP suggests that the price of the bundle of goods should be equal from country to country. It is clear from the table, however, that the price of a “bundle” consisting of “two all-beef patties, special sauce, lettuce, cheese, pickles, onions on a sesame seed bun” varies considerably around the world.

in tastes. One of the most pervasive and explicable causes for deviations from PPP derives from the fact that a Big Mac—like many other “bundles” of goods—is more than just the sum of its components. The sandwiches are prepared and served by local workers, in restaurants that are also built and maintained by the domestic labor force. Hence the local wage rate is a factor in the total cost of serving a Big Mac. Moreover, the local level of earnings affects the demand for McDonald's products.

This relationship between prices and wages is an illustration of the Balassa-Samuelsion theory, which explains deviations from PPP as being related to differences in productivity across countries.<sup>3</sup> In particular, countries that are relatively more productive at producing tradable goods will have higher wages for workers in the tradable goods sector. This tends to drive up wages and prices throughout the economy, including non-tradable, service-intensive sectors.

The table also illustrates this principle in relation to the prices of Big Macs. Using data from UBS for 2003, the fourth column of the table shows average net wages. It is clear from

these figures that locations with lower wages tend to have lower Big Mac prices, while those with higher wages tend to have higher Big Mac prices. This relationship is also revealed in the final column of the table, which uses the wage data to calculate the number of minutes of work needed to purchase a Big Mac. In fact, in countries with relatively high prices, the working time required to purchase a Big Mac turns out to be relatively low. Much of the discrepancy between Big Mac prices in different countries is explained by differences in wages and incomes.

Moreover, PPP is generally recognized as a long-run property of international price determination, and there is evidence to suggest that price discrepancies between similar countries tend to dissipate over time. Robert Cumby, a Georgetown

University researcher, found that deviations of Big Mac prices from PPP are temporary, with adjustment taking place through both exchange rate changes and local currency prices.

Originally intended as a lighthearted way to learn about the basics of Purchasing Power Parity, the Big Mac index has become a standard in and of itself.<sup>4</sup> It has been cited often in textbooks and has been the subject of serious research on PPP. When combined with a lesson on the Balassa-Samuelson effect, the Big Mac survey can give budding “consumers” of economics a taste of the principles of international currency valuation.

*Michael R. Pakko is a senior economist and Patricia S. Pollard is a research officer, both at the Federal Reserve Bank of St. Louis. Heidi Beyer provided research assistance.*

### Big Mac Prices Around the World

Country	Big Mac Price (Local Currency)	Exchange Rate (Local Currency/Dollar)	Big Mac Price (Dollars)	Net Hourly Wage (Dollars)	Minutes of Work to Buy a Big Mac
Argentina	4.10	2.88	1.42	1.70	50
Australia	3.00	1.61	1.86	7.80	14
Brazil	4.55	3.07	1.48	2.05	43
Britain	1.99	0.63	3.14	12.30	15
Canada	3.20	1.45	2.21	9.35	14
Chile	1,400.00	716.00	1.96	2.80	42
China	9.90	8.28	1.20	2.40	30
Czech. Rep.	56.57	28.90	1.96	2.40	49
Denmark	27.75	6.78	4.09	14.40	17
Hong Kong	11.50	7.80	1.47	7.00	13
Hungary	490.00	224.00	2.19	3.00	44
Indonesia	16,100.00	8,740.00	1.84	1.50	74
Japan	262.00	120.00	2.18	13.60	10
Malaysia	5.04	3.80	1.33	3.10	26
Mexico	23.00	10.53	2.18	2.00	65
New Zealand	3.95	1.78	2.22	6.80	20
Peru	7.90	3.46	2.28	2.20	62
Philippines	65.00	52.50	1.24	1.20	112
Poland	6.30	3.89	1.62	2.20	44
Russia	41.00	31.10	1.32	2.60	30
Singapore	3.30	1.78	1.85	5.40	21
South Africa	13.95	7.56	1.85	3.90	28
South Korea	3,300.00	1,220.00	2.70	5.90	27
Sweden	30.00	8.34	3.60	10.90	20
Switzerland	6.30	1.37	4.60	17.80	16
Taiwan	70.00	34.80	2.01	6.90	17
Thailand	59.00	42.70	1.38	1.70	49
Turkey	3,750,000.00	1,600,500.00	2.34	3.20	44
United States	2.71	—	2.71	14.30	11
Venezuela	3,700.00	1,598.00	2.32	2.10	66
Euro area	2.71	0.91	2.98	9.59	19

SOURCES: *The Economist*, April 26, 2003; UBS, 2003; and authors' calculations

### ENDNOTES

- For a more detailed discussion of the Big Mac and PPP, see Pakko and Pollard (2003).
- The terms “undervalued” and “overvalued” are used here in a purely descriptive sense, not to indicate that currency valuations are somehow wrong.
- Balassa (1964) and Samuelson (1964).
- See Ong (2003) and the references cited therein.

### REFERENCES

- Balassa, Bela. “The Purchasing-Power Parity Doctrine: A Reappraisal,” *Journal of Political Economy*, Vol. 72, No. 6, December 1964, pp. 584-96.
- Cumby, Robert. “Forecasting Exchange Rates and Relative Prices With the Hamburger Standard: Is What You Want What You Get With McParity?” Unpublished Manuscript, Georgetown University, 1997.
- Ong, Li Lian. *The Big Mac Index: Applications of Purchasing Power Parity*, New York: Palgrave Macmillan, 2003.
- Pakko, Michael R. and Pollard, Patricia S. “Burgernomics: A Big Mac Guide to Purchasing Power Parity,” *Federal Reserve Bank of St. Louis Review*, Vol. 85, No. 6, November/December 2003, pp. 9-27.
- Samuelson, Paul A. “Theoretical Notes on Trade Problems,” *Review of Economics and Statistics*, Vol. 46, No. 2, May 1964, pp. 145-54.
- UBS, *Prices and Earnings Around the Globe*, Zurich: UBS, 2003.

“McDonald’s” and “Big Mac” are registered trademarks of the McDonald’s Corp. and its affiliates.