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The Big Mac hamburger: is it used to communicate a distorted media message?

Abstract

For more than a decade the Big Mac index has served as a guide to the layman as to whether currencies are at their 'correct' exchange rate level. This article compares the postal rate of a standard letter in South Africa, relative to other selected countries, based on the Big Mac purchasing-power parity. It provides a theoretical overview of the Big Mac Index, its application and shortcomings. The findings indicate that government, private companies and labor unions should be very cautious when using only the Big Mac Index for comparison purposes. It may be concluded that when the Big Mac hamburger is used to compare and determine the relative value of postal rates between South Africa and the rest of the world, a distorted message is communicated.

Vir meer as 'n dekade het die Big Mac indeks as riglyn vir die alleman gedien om te bepaal of geldeenhede op die 'korrekte' wisselkoersvlak is. Die artikel vergelyk die postarief van 'n standaard brief in Suid-Afrika, relatief tot dié van ander lande, gebaseer op die die Big Mac koopkragpariteit. Dit omvat 'n teoretiese oorsig van die Big Mac indeks, 'n toepassing asook tekortkominge daarvan. Die bevindinge dui aan dat die owerheid, private ondernemings en vakbonde baie versigtig te werk moet gaan wanneer alleenlik die Big Mac indeks vir vergelykingsdoeleindes gebruik word. Die gevolgtrekking is dat indien die Big Mac hamburger gebruik word om die relatiewe waarde van postariewe tussen Suid-Afrika en die res van die wêreld te vergelyk en te bepaal, 'n verwronge boodskap gekommunikeer word.

Keywords: Big Mac, communication, currency, economic, elasticity, exchange rate, inflation, postal rate, pricing policies, purchasing power parity

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The Big Mac Index as guide to exchange rate levels

For more than a decade the Big Mac index has served as a guide to the layman as to whether currencies are at their 'correct' exchange rate level. Several academic studies have concluded that the Big Mac index is an accurate tool in predicting exchange rates over the long term. Supporters of the Big Mac index have even extended its application by using 'other products', instead of the Big Mac hamburger, as a method of measurement of relative prices.

The purpose of this article is to measure South Africa's postal rate of a standard letter relative to other countries, based on the Big Mac purchasing-power parity. The article provides a theoretical overview of the Big Mac index, its application, as well as its shortcomings. Thereafter, the Big Mac index is put to the test by comparing the postal rates of standard letters in selected countries. The findings from the study indicate that government, private companies and labor unions should be very cautious when using only the Big Mac index for comparison purposes. They should also take relevant macro-economic principles into account to attain a more realistic economic conclusion.

Defining the Big Mac Index

The Economist magazine (<http://www.economist.com>) launched the so-called Big Mac index in 1986 as a light-hearted guide to measure whether currencies are at their 'correct' exchange rate level. They never intended the Big Mac index as a precise predictor of currency values, nor to compare relative values of individual consumer goods, but simply as a tool to make economic theory more digestible to the layman. Fourteen years down the line, the index has become a popular method of measurement of relative prices. The Big Mac index (also referred to as burger-nomics) is based on the theory of purchasing-power parity (PPP) related to the price of a McDonalds Big Mac hamburger (Ong, 1998:15).

Purchasing-power parity (PPP) is the notion that exchange rates are correct if a dollar buys the same amount of goods in all countries, in this case, the same amount of Big Mac hamburgers in any country. The theory of purchasing-power parity is the notion that currencies move towards the rate that equalizes the prices of an identical basket of goods in each country. The Big Mac index is based on a basket filled with a McDonalds Big Mac hamburger, which is produced in about 120 countries. The Big Mac PPP is seen as the exchange rate that would cause hamburgers to cost the same in America as in South Africa, or any other country. Thus, comparing actual exchange rates with PPP indicates whether a currency is under- or over-valued (*The Economist*, 2000: 91).

Application of the Big Mac Index

Research by Robert Cumby, an economist at Georgetown University, suggests that a currency's deviation from Big Mac PPP can be a useful predictor of exchange rates. In 1997, the Big Mac index has correctly predicted the direction of exchange-rate movements for eight of 12 currencies of large industrial economies (*The Economist*, 1997: 71). Supporters of the index have extended its application by replacing the Big Mac hamburger with 'other products' to determine the purchasing-power parity.

A study by Ong and Mitchell (2000:869-876) used the Big Mac index to compare the salaries of academics by converting the nominal salaries in each country to their purchasing power equivalents. The comparison was in reaction to academic staff unions and associations who argued for higher salaries on the grounds that existing salaries were below commercial salaries, and much lower than the salaries of their overseas counterparts.

In South Africa, the merchant bank Investec, argued that the Big Mac index is not applicable in Africa, seeing that McDonalds has branches in only one sub-Saharan country namely South Africa. They 'replicated' the authority and accuracy of the Big Mac index to their own beer index, known as Investec's beer index. They believe it is easier to compare the cost of a 375ml bottle of clear lager in various African countries, than a hamburger (*The Economist*, 1999: 78).

The above studies indicate that the Big Mac index and its principles are widely used for comparison purposes. Various South African newspapers and magazines also report on the Big Mac index on a regular basis. The Financial Mail, for example, has regular updates in its economic section rating the Rand against other foreign currencies according to the Big Mac index (<http://www.fm.co.za>). The Big Mac index has become a well-known phrase among consumers making it a media topic well-worth writing about. Popular headings such as 'McCurrency valuation time' and 'Rand undervalued' entice consumers to purchase the newspaper or magazine featuring the latest Big Mac results (Fabricius, 1999).

The influential *Economist* magazine is making a name for itself by creating economic indices. In 1992, *The Economist* magazine suggested the R-word index as 'an alternative indicator of economic activity'. The idea is to count how many newspaper stories used the word 'recession' per quarter. Several journalists, whether they have knowledge of economic activity or not, use the R-word as a tool to predict GDP growth (Financial Mail, 1998a). Unfortunately readers are not always provided with a thorough background on the interpretation of the indices, but rather the media's 'abbreviated' version. *The Economist* does however emphasise, that its indices should be seen as light-hearted guides, but surely the layman can be influenced, not being aware of the limitations of these indices. The various shortcomings of the Big Mac index can thus lead to a situation where the media communicates a distorted media message to its readers.

Since the Big Mac index and its principles are widely used for comparison purposes the remainder of the article puts the Big Mac index to the test by means of comparing the postal rate of a standard letter in selected countries. Thereafter, shortcomings are highlighted and an adopted Big Mac application is shown. This revised measurement takes Gross National Product (GNP) per capita into account from which certain conclusions are drawn.

Tables 1 and 2 present the results of the postal rates comparison, based on the Big Mac index, as well as against the actual dollar (\$) exchange rate for 1994 and 1998. The statistics in Tables 1 and 2 indicate that the postal rate of a standard letter relative to the price of a Big Mac hamburger is much cheaper in South Africa than in any other of the selected countries. This is also true for the postal rate relative to other currencies weighted with the actual American (US) dollar exchange rate. The only exception was the relative Big Mac currency price of a standard letter in Britain in 1998 (28 cents in Britain against 32 cents in SA).

The question arises whether one can interpret the results from Tables 1 and 2 as scientifically correct? Do the results convey a message to the South African Post Office (SAPO) that postal rates could be increased to a higher, relatively more 'reasonable' level? To be able to answer this question, one needs to take the shortcomings of the Big Mac index into consideration.

Table 1: Postal rate comparisons based on the Big Mac index in 1994

	Big Mac prices		Implied PPP* (Big Mac PPP)	Postal rate of a standard letter		Actual US\$ exchange rate	Relative postal rate#
	Local currency	In US\$		Local currency	In Big Mac dollar currency		
USA	\$2.32	\$2.32	-	32c	33c	-	-
Aus	A\$2.45	\$1.78	1.05	45c	43c	1.37	33c
Britain	£1.74	\$2.67	0.75	25p	33c	0.65	38c
Germany	DM4.80	\$2.96	2.07	DM1.00	48c	1.62	62c
Japan	Y391	\$3.83	169	Y80	47c	102	78c
SA	R7.00	\$1.97	3.02	60c	20c	3.55	17c

*PPP: Local price divided by price in US\$. This gives the so-called Big Mac Parity exchange rate
Price in US cent at actual US\$ exchange rate

Sources: Anon. 1998b. Postal rates worldwide. <http://www.geocities.com/wallstreet/exch>; Big MacCurrencies. *The Economist* (various editions). <http://www.economist.com>.
International Financial Statistics. 2000. vol LIII (6). June.

Table 2: Postal rate comparisons based on the Big Mac index in April 1998

	Big Mac prices		Implied PPP* (Big Mac PPP)	Postal rate of a standard letter		Actual US\$ exchange rate	Relative postal rate#
	Local currency	In US\$		Local currency	In Big Mac dollar currency		
USA	\$2.56	\$2.56	-	33c	33c	-	-
Aus	A\$2.65	\$1.75	1.04	45c	43c	1.51	29c
Britain	£1.84	\$3.05	0.71	20p	28c	0.60	33c
Germany	DM4.95	\$2.69	1.93	DM1.10	57c	1.84	60c
Japan	Y260	\$2.08	109	Y80	73c	135	60c
SA	R8.00	\$1.59	3.13	100 c	32c	5.04	20c

*PPP: Local price divided by price in US\$. This gives the so-called Big Mac Parity exchange rate

Price in US cent at actual US\$ exchange rate

Sources: Anon. 1998b. Postal rates worldwide. <http://www.geocities.com/wallstreet/exch>

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Shortcomings of the Big Mac Index

The developers of the Big Mac index admit that it is an imperfect measure, despite many forecasting successes (*The Economist*, 2001:118). The hamburger standard does have its flaws and the following is not taken into account when using the Big Mac index.

The theory of PPP relates only to traded goods. The Big Mac is not shipped across borders and there may be big differences between countries in the cost of non-traded inputs such as rent (which account for a large share of total costs). Sales taxes and trade barriers (for example rates on beef) may also distort local prices. Thus while the Big Mac PPP are a handy guide to the cost of living in countries, it may not be a reliable guide to future exchange rate movements (*The Economist*, 2000:91).

The type of product (Big Mac hamburger) used in this comparison (Big Mac index), has questionable economic meaning. The use of a *single* product, especially a product like a hamburger, should be used very cautiously to make a conclusion that, for example the cost of a standard letter in South Africa is very inexpensive. The comparisons made in Tables 1 and 2 are economically speaking incorrect, seeing that it does not take important macro-economic principles into consideration. Firstly, the comparison does not take living standards, socio-economic levels and development levels of different countries into consideration. If one has to compare

a middle-income developing country, such as South Africa, with the industrial countries (high-income and developed) listed in Tables 1 and 2, one has to use a measurement that equates living standards or purchasing power. It would be more appropriate to use a universal comparison where per capita income is expressed in US dollar.

Secondly, it does not take price elasticity of demand and revenue into consideration. Basic economic theory postulates that whenever there is an increase in price, the quantity demanded normally decreases. The question for any supplier of goods or services is whether an increase in price will affect their total revenue, and consequently their profits. The answer lies in the elasticity of demand, or how sensitive consumers are to any price change. If consumers are very price sensitive, then they will react strongly to any price increase, by decreasing their quantity demanded more than the relative increase in price. For example, if the price of a car increases by 10%, and volume sales (quantity demanded) decreases by 20%, then it means that the elasticity coefficient is two (2). The demand for cars is therefore elastic (elasticity coefficient > 1). In this case, total revenue and thus profits, will decrease if price increases. If the demand elasticity coefficient is smaller than one (< 1), the demand curve is inelastic (Mansfield, 1997: 114). To determine the exact elasticity coefficients for different users of postal services in South Africa, is a time consuming process and falls beyond the scope of this study. One can however assume that postal rates would have a price elasticity smaller than one, which normally applies to necessities such as postal rates. Therefore total revenue and profits will most likely increase due to a price increase.

Thirdly, the Big Mac index does not take inflation into account. Although postal services amount to a small component when calculating the Consumer Price Index (CPI), the direct and indirect effect of a substantial price increase in postal rates could have a significant effect on the inflation rate. Communication services accounted for approximately 3% in the weight attributed towards the calculation of the CPI in South Africa. The contribution of communication services (of which postal services form part) was 0.3% of the total core inflation rate of 7.7% in 1998 (StatsSA, 1998: 7). An increase in postal rates will lead to a direct increase in the overall inflation rate, and affect the lower income groups directly and more so than the higher income groups. Given the multiplier effect of increased rates that are transferred to customers (public) by producers, the indirect effect is an increase on the overall inflation rate. A higher inflation rate will cause a depreciation of the Rand exchange rate and put pressure on interest rates to rise. On the other hand, the inflation rate of the selected countries is substantially lower than that of South Africa. Therefore, their inflation rate has not had such a noticeable effect.

Adapted application of the Big Mac Index

The above shortcomings of the Big Mac index lead to the need to use a more appropriate measurement that will equate living standards and purchasing power. Tables 3 and 4 present a revised measurement using a universal comparison where per capita income is expressed in US dollar.

In Tables 3 and 4 (as opposed to Tables 1 and 2), there is thus a more reliable method of comparison. This measurement uses per capita income (1994 and 1998 prices) to weigh the prices of the countries, relatively to the living standards of South Africa. For a US citizen with the same living standard and income level as a South African, a Big Mac hamburger would have cost \$19.75 in 1994 (refer to Table 3). This is 8.5 times more than its 1994 price in the USA. Given the increase in living standard from 1994 to 1998 in the USA, relatively to that of South Africa, the weighted price of a Big Mac had increased to 10.18 times more than the 1998 price in the USA (refer to Table 4). This was due to the fact that per capita income in the US had increased by 13.4% compared to a decrease of 5.2% for South Africa. Taking this measurement as a method to compare the postal rate of a standard letter in the two given countries, one can see that a US citizen, during 1994, had paid only 32 cents for a standard letter, in weighted Big Mac currency, whilst the relative comparison in South Africa is 171 cents in weighted Big Mac currency (434% higher). This relationship during 1998 deteriorated even further, given the decrease in per capita income in South Africa, with the relative weighted price of a standard letter in the USA only 33 cents against 286 cents in South Africa (767% higher).

The same pattern emerges in the relationship with the other four countries. Tables 3 and 4 indeed show that the relative cost of a standard letter is far more expensive in South Africa. The relative difference in postal tariffs is even more noticeable in 1998 compared to 1994. It is therefore evident that the comparison made in Tables 1 and 2 cannot be taken as an economically reliable figure.

Table 3: Postal rate comparisons weighted with GNP per capita: 1994

	GNP per capita 1994 (US\$)	Weight	Weighted cost of a Big Mac	Weighted Big Mac PPP*	Postal rate of standard letter (local currency)	In weighted Big Mac dollar currency#
USA		8.513	\$19.75	-	32c	32c
Aus		5.921	A\$14.50	0.73	45c	62c
Britain		6.033	£10.49	0.53	25p	47c
Germany		8.414	DM40.38	2.04	DM1	49c
Japan		11.391	Y4453.88	225	Y80	36c
SA		1.00	R7.00	0.35	60c	171c

*PPP: Local price divided by price in US\$. This gives the so-called Big Mac Parity exchange rate
Price in US cent at actual US\$ exchange rate

Sources: Anon. 1998b. Postal rates worldwide. <http://www.geocities.com/wallstreet/exch>

Big MacCurriencies. *The Economist* (various editions). <http://www.economist.com>.

International Financial Statistics. 2000. vol LIII (6). June.

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Table 4: Postal rate comparisons weighted with GNP per capita: 1998

	GNP per capita 1998 (US\$)	Weight	Weighted cost of a Big Mac	Weighted Big Mac PPP*	Postal rate of standard letter (local currency)	In weighted Big Mac dollar currency#
USA	29 340	10.18	\$25.55	-	33c	33c
Aus	20 300	7.04	A\$18.23	0.71	45c	63c
Britain	21 400	7.43	£14.12	0.55	20p	36c
Germany	25 850	8.97	DM44.76	1.75	DM1.10	63c
Japan	32 380	11.24	Y3304	129	Y80	62c
SA	2 880	1.00	R9.00	0.35	R1.00	286c

*PPP: Local price divided by price in US\$. This gives the so-called Big Mac Parity exchange rate
Price in US cent at actual US\$ exchange rate

Sources: Anon. 1998b. Postal rates worldwide. <http://www.geocities.com/wallstreet/exch>

Big MacCurriencies. *The Economist* (various editions). <http://www.economist.com>.

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World Bank. 1999/2000. *World Development Report*. Oxford University Press.

If postal rates were to increase based on the Big Mac index alone, it would cause more regressiveness in the South African tax system, as the lower income groups will carry a relatively heavier burden than the higher income groups. An increase in postal rates will therefore be more severe on the lower income groups, as they normally have less access to alternative forms of communication (for instance e-mail and cell phones). The infrastructure in the rural areas is also inferior to that of metropolitan areas, and an increase in postal rates may therefore further increase the burden of low-income groups. It is thus the lower income groups that will be affected severely. The higher income groups probably use the postal services because of the relatively lower price compared to other similar services. With an increase in postal rates they would most likely not pay more, but rather change to a more reliable form of communication service. This tendency of low income groups spending more on postal services, could increase even more in years to come. The ratio will become more distorted, making life even worse for the already overburdened low-income groups. High-income consumers not only spend a relatively

small fraction of their income on postal services, but also have various substitutes at their disposal, like fax machines, internet and e-mail facilities. On the other hand, low-income groups spend a larger portion of their income on postal services, due to the lack of substitutes. These groups will spend a larger portion of their income on postal services in case of a substantial price increase, and in return will have to forgo other basic need satisfaction like clothes, food and/or shelter.

One can further assume that large users of postal services, such as banks, retailers, doctors, and municipalities have limited substitutes. Most companies use the postal system to mail account statements to individual customers. Therefore, their elasticity coefficient will be smaller than one (in other words inelastic). One would therefore expect that their volume of transactions would not decrease by 50%, if postal rates were increased by 50%, for example.

Another possible consequence of an unreliable measurement of price increases on postal rates is the impact on companies who use promotional mail. Many companies spend a large amount of their income on postal services for the distribution of their promotional mail. Their elasticity coefficient will be greater than one (in other words elastic). The impact of higher postal rates on these companies could persuade them to use alternative direct response media.

Conclusion

This article investigated the application of the Big Mac index and its shortcomings as a tool for developing pricing policies. The Big Mac index was adapted to a more appropriate universal comparison measurement, using per capita GNP as a welfare proxy. The consequences of using only the Big Mac index for comparison and interpretation purposes with other countries was illustrated with a fictitious example, namely postal rates. The more realistically weighted Big Mac index showed quite different results.

The main findings suggested that a increase (based on the Big Mac index alone) could have a severe effect on the South African economy. The study also showed that an increase in postal rates will be regressive in nature and that low income groups, who spend more than four times the amount of high income groups, relatively to their income on postal services, will be negatively affected. An 'unjust' increase in postal rates will increase the rate of inflation directly and indirectly. The elasticity of different postal service user groups, such as large mail users, may lead to substitution to other forms of communication. One can conclude that when the Big Mac hamburger is used to compare and determine the relative value of postal rates between South Africa and the rest of the world, a distorted message is communicated.

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