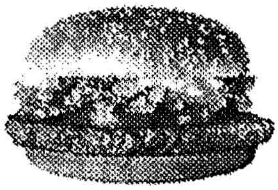
CHAPTER II
Big Mac Index



2.1 Introduction

Big Mac index was first tabulated in September 1986 in *The Economist* magazine as a guide to understand whether currencies are over- or under-valued based on the price of a Big Mac. The Big Mac index is not a precise predictor of currency movement, but it is a relatively simple way to calculate the over or under valuation of currencies against the United States dollar (USD). Initially the Big Mac index was calculated to show the over or under valuation of the dollar itself. In 1993, it was changed to track over or under valuation of each currency against the dollar. Now it is featured regularly in *The Economist* magazine each April.

The Big Mac is one of the world most popular sandwich that was created in 1968 by a McDonald franchisee in Pittsburgh, Pennsylvania. While most people see the Big Mac as " two all beef patties, special sauce, lettuce, cheese and pickles onions on a sesame seed bun", economists also see the sandwich as a consumer goods that are sold at over 25,000 McDonald's restaurants in 116 countries around the world. Because of it popularity, the Big Mac allows economists to make comparisons of exchange rates and relative prices in countries around the globe.

The Big Mac index is based on one of the oldest concepts in international economics: the theory of Purchasing Power Parity (PPP). PPP argues that the exchange rate between two currencies should in the long-run move towards the rate that equalises the prices of identical bundles of traded goods and services in each country. PPP suggests that an entrepreneur could earn profits by purchasing products in country with lower price and selling them to consumers in countries with higher price. This should cause the price of product to rise in country with lower price due to increased exports to other countries. On the other hand, the country with lower price, the price will fall because of an increased supply from imports. PPP theory suggests that price adjustment will continue until the dollar price of the product is the same in each country. In other words, a consumer should be able to buy the same amount of a product everywhere with the same amount of USD. While this theory naturally relies on certain assumptions such as negligible transportation cost, goods and services must be "tradable" and a good in one country does not differ substantially from the same good in another country. The Big Mac PPP also assumes hamburgers from different countries have the same production cost. Comparing a currency's actual exchange rate with it's Big Mac PPP is to test whether the currency is under-valued or over-valued against USD.

The difference between PPP theory and Big Mac PPP is that our bundles of traded goods in Big Mac PPP or Big Mac is strictly tradable between countries. Its prices does vary between locations in any given country. Information about the comparison of Big Mac prices with foreign exchange rates can serve as an unscientific and imperfect indicator of future movements in currency exchange rates. In anyhow, PPP theory is applied to the current dollar price of Big Mac in countries around the world to determine the extent to which currencies are over- or under-valued.

2.2 Methodology

Big Mac Index is calculated from the price of the Big Mac in a range of countries and coverts the local price to USD to produce the Big Mac PPP. The finding implied PPP of the USD is compared with actual exchange rate to generate the result of under-valued and over-valued currencies. It is based upon the theory of PPP that an identical basket of goods and services should cost the same in all countries. The Big Mac PPP is the exchange rate that would leave hamburgers costing exactly the same in United States as abroad. A consumer should be able to buy a hamburger at the same price everywhere.

Table 2.1 gives the latest Big Mac Index published in *The Economist* magazine in April 2001. The first column of Table 2.1 shows local currency prices of a Big Mac. The second column shows a Big Mac price in USD. The third column shows the implied PPP of the USD that is calculated by dividing the local price of a Big Mac with it's USD price.

Table 2.1 Big Mac Index in April 2001

	Big Mac Prices				
	In Local Currency	In USD	Implied PPP of the USD	Actual Exchange Rate 17/04/01	Under(−) / over(+) valuation against USD
United States	USD2.54	2.54	–	–	–
Argentina	Peso $2.50	2.50	0.98	1.00	−2
Australia	A$3.00	1.52	1.18	1.98	−40
Brazil	Real3.60	1.64	1.42	2.19	−35
Britain	£1.99	2.85	1.28	1.43	12
Canada	C$3.33	2.14	1.31	1.56	−16
Chile	Peso1260	2.10	496.00	601.00	−17
China	Yuan9.90	1.20	3.90	8.28	−53
Czech Rep.	Koruna56.00	1.43	22.00	39.00	−44
Denmark	DK24.75	2.93	9.74	8.46	15
Euro Area	Euro 2.57	2.27	0.99	0.88	−11
France	FFr18.50	2.49	7.28	7.44	−2
Germany	DM5.10	2.30	2.01	2.22	−9
Italy	Lire4300	1.96	693.00	2195.00	−23
Spain	Pta395	2.09	56.00	189.00	−18
Hong Kong	HK$10.70	1.37	4.21	7.80	−46
Hungary	Forint399	1.32	157.00	303.00	−48
Indonesia	Rupiah14700	1.35	5787.00	10855.00	−47
Japan	Y294	2.38	116.00	124.00	−6
Malaysia	RM4.52	1.19	1.78	3.80	−53
Mexico	Peso21.90	2.36	8.62	9.29	−7
New Zealand	NZ$3.60	1.46	1.42	2.47	−43
Philippines	Peso59.00	1.17	23.20	50.30	−54
Poland	Zloty5.90	1.46	2.32	4.03	−42
Russia	Rouble35.00	1.21	13.80	28.90	−52
Singapore	S$3.30	1.82	1.30	1.81	−28
South Africa	Rand9.70	1.19	3.82	8.13	−53
South Korea	Won3000	2.27	1181.00	1325.00	−11
Sweden	SKr24.00	2.33	9.45	10.28	−8
Switzerland	SFr6.30	3.65	2.48	1.73	44
Taiwan	NT$70.00	2.13	27.60	32.90	−16
Thailand	Baht55.00	1.21	21.70	45.50	−52

Source : http://www.economist.com/markets/bigmac/displayStory.cfm?Story_ID=397291

Malaysia is one of the countries where the cheapest Big Macs are found besides China, the Philippines and South Africa where Big Mac costs less than USD1.20. These countries have the most under-valued currencies, and the under valuation of local currencies are more than 50%. The most expensive Big Macs are found in Britain, Denmark and Switzerland.

Big Mac costs RM4.52 in Malaysia and costs USD2.54 in United States, the Big Mac PPP exchange rate would be calculated as following:

Big Mac PPP = Local price of Big Mac / Price of Big Mac in U.S.

= RM4.52 / USD2.54

= RM1.78/USD

The actual exchange rate of Malaysia is RM3.80/USD, and the Big Mac theory says ringgit is under-valued by 53% with the following calculation:

$$\text{Over or Under-value of currency} = \frac{\text{Big Mac PPP} - \text{Actual Exchange Rate}}{\text{Actual Exchange Rate}} \times 100\%$$

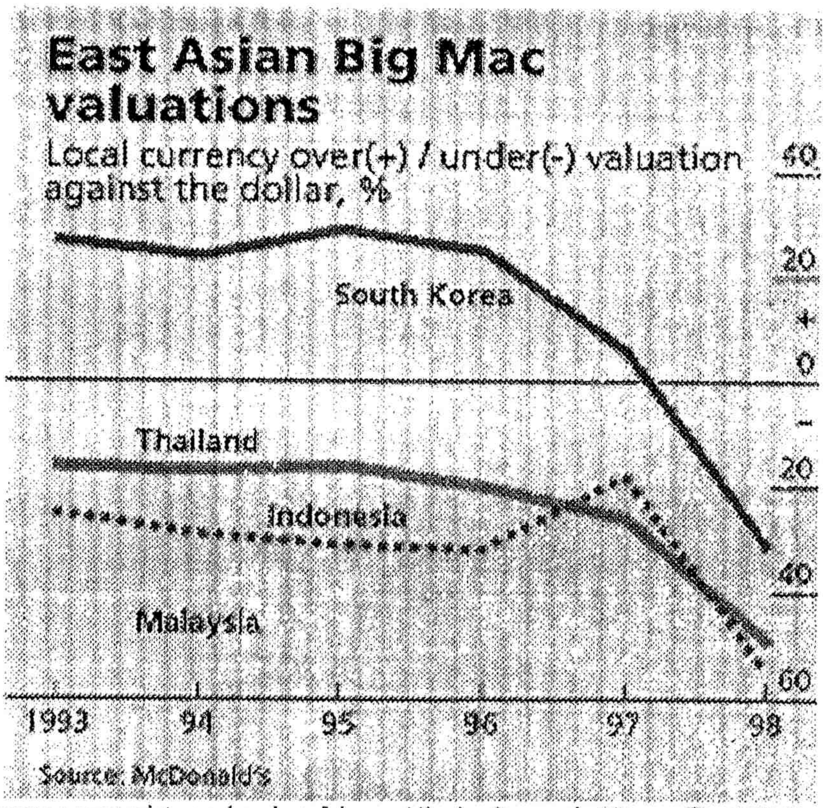
$$= \frac{3.80 - 1.78}{3.80} \times 100\%$$

$$= -53\%$$

According to PPP theory you should expect ringgit Malaysia to appreciate as the results show that ringgit Malaysia is under-valued by 53%.

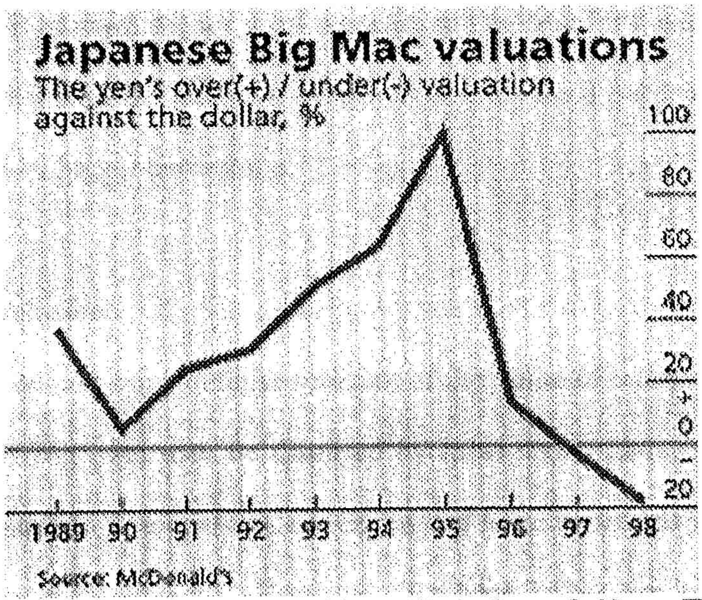
We can also understand from the Graph 1.2 that the ringgit Malaysia (RM) has been under-valued since 1993. In 1993 ringgit Malaysia was under-valued by around 43%, and was further improved to 40% in 1994 and around 38% in 1995 till 1997. It was under-valued by 58% in year 1996 and 53% in year 1997 till now. Thailand, Singapore and Indonesia also have the same trend that local currencies have been under-valued since 1993. On the other hand, currencies of Japan and Korea have been over-valued since 1993. Japan yen (Graph 2.2) and South Korea Won have been under-valued after the economy crisis in 1997. Malaysia, Indonesia, Singapore, Thailand, Japan and South Korea showed a drastic under-valued of local currencies after the financial crisis in year 1997. This is due to a drastic depreciation of local currencies for the above countries.

Graph 2.1 East Asian Big Mac Valuations



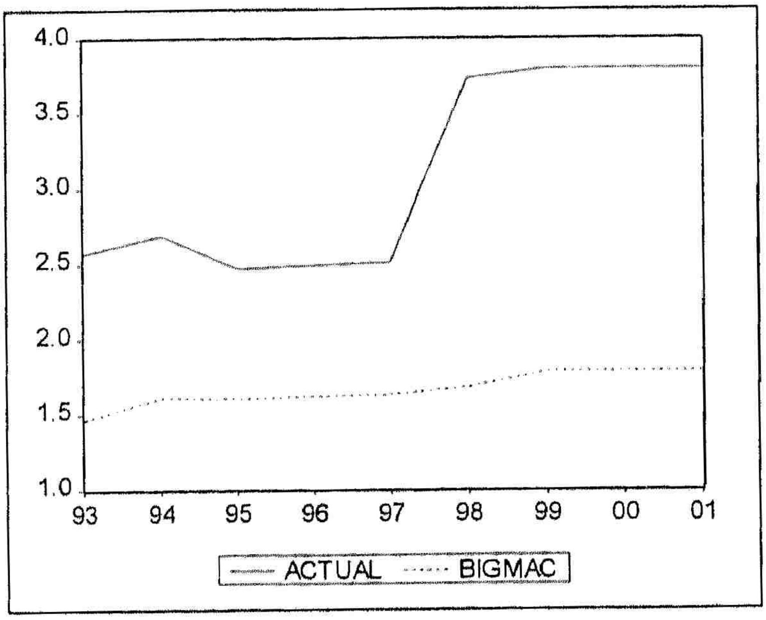
Source : http://www.economist.com/markets/bigmac/displayStory.cfm?Story_ID=397291

Graph 2.2 Japanese Big Mac Valuations



Source : http://www.economist.com/markets/bigmac/displayStory.cfm?Story_ID=397291

Graph 2.3 Actual Exchange Rate vs. Big Mac PPP Exchange Rate of Ringgit Malaysia



Notes:
Actual is actual exchange rate of ringgit Malaysia (RM) to United States dollar (USD).
BIGMAC is Big Mac PPP exchange rate of RM to USD.

From the Graph 2.3, we can clearly understand the actual exchange rate of RM to USD is at much higher level compare to Big Mac PPP exchange rate. This also means that after the effective of capital control since September 1998, RM is under-valued by bigger percentage.

2.3 Conclusion

Big Mac is not a definite measure of the value of exchange rates, because the price of Big Mac may be distorted by local taxes, trade barriers, monetary policy to maintain a competitive currencies and large variations in the cost of non-traded input such as rents. However, Big Mac Index can be a predictor for exchange rate although nowadays we have much more sophisticated methods on estimating the exchange rate.

The greatest triumph of the Big Mac index has been in tracking the euro. When Europe's new currency was launched in January in 1999, virtually everybody predicted that it would be appreciated against United States dollar. But the Big Mac index suggested that the euro started off significantly over-valued. The euro was depreciated later and this proved that Big Mac index has been able to forecast correctly. Research by Robert Cumby an economist at Georgetown University suggested that a currency deviation from Big Mac PPP can be a useful predictor of exchange rate. Over the past years, the Big Mac index has correctly predicted the direction of exchange rate movements for eight of the twelve currencies of large industrial economics. Of the seven currencies which changed by more than 10%, the Big Mac standard got the direction right in six cases.

The biggest threat to Big Mac Index may be the changes of Big Mac price in United States. As the Big Mac PPP is estimated based on Big Mac prices, the massive discount in United Sates by McDonald's would distort PPP calculations. For example price of Big Mac in United States was reduced by 5% from USD2.56 in 1998 to USD2.43 in 1999. But the price of Big Mac was increased by 3% to USD2.51 in 2000, and it was further increased by only 1% to USD2.54 in year 2001. As the changes of the price is not significant to affect the Big Mac PPP yet, annual Big Mac PPP calculation can be continued.

PPP is the best thought of as a long-run theory of exchange rate determination. The Big Mac is not a tradable good and its price does vary between locations in any given country. Therefore Big Mac index is an imperfect indicator of future exchange rate movement. Big Mac index suggests that RM is under-valued since 1993, and under the fixed exchange rate policy RM is under-valued by a higher percentage.