14.73 Notes on Purchasing Power Parity[*]

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September 12, 2009

- GDP is the value of all final goods and services produced in a country in a year

- In theory we could just count up all of these goods and multiply by the prices

- Q: Why do we care about GDP, GDP per Capita?

- Two problems in macro-development:

    - Over time, within a country:
        * Currency becomes inflated. Dollars in 1999 bought you more than dollars in 2009.
        * We use the Consumer Price Index (CPI) in order to adjust for inflation. We pick a basket of goods and look at the price of that basket in, say, 1999 and in 2009 in order to see how much prices have changed.
        * Q: If the basket costs $100 in 1999 and $110 in 2009, what how much inflation has there been over this 10-year period? What is the value of $1 (in 1999 dollars) in 2009 dollars?

    - Same time period, across countries:
        * Different countries have different currencies.
        * At first glance, exchange rates are sufficient. Consider US dollars and Japanese yen.
        * Q: If the yen goes up by 10% against the dollar this week, does this mean that Japan has become 10% richer relative to the US (even though the amount of output produced by both countries is the same)? (Of course the answer is no.)
        * Obviously, there are a lot of factors that affect exchange rates.
        * Moreover, traded goods tend to affect exchange rates more than locally produced goods and services. Locally produced goods and services tend to be more labor intensive. For instance, the wage for a waiter is much lower in India than in the US.

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[*]This explanation comes from the appendix to Chapter 1 in David Weil's *Economic Growth*.

* Simply using exchange rates will ignore the fact that local goods and services are cheaper in developing countries.

- Q: Putting the above together, when we simply use exchange rates to compute the relative wealth of a developing country to the US, do we overestimate or underestimate poverty?

  * A: Comparisons of GDP at market exchange rates systematically overestimate poverty. That is, the comparisons understate the relative income of developing countries

• Consider the following table which has information in local currency (^{A} or ^{B}):

Country	TV per capita	Haircuts per capita	TV price	Hair price	GDP/cap
A	4	40	$^A10$	$^A2$	$^A120$
B	1	10	$^B10$	$^B1$	$^B20$

- GDP is the value of all final goods and services produced in the country. We know that country A produces $4\times$ as many TVs and $4\times$ as many haircuts.

- Q: What should the relative GDP of A to B be?

  * A: A's GDP is $4\times$ that of B's.

- Exchange rate approach:

  * TVs are the traded good. So exchange rates will be 1:1.
  * That means $^A1=$^B1$.
  * GDP in ^{A} terms for country A is $^A120$.
  * GDP in ^{A} terms for country B is $^A20$ because the exchange rate is $^A1=$^B1$.
  * Therefore, country A is $6\times$ richer than country B, since $\frac{\$^A120}{\$^A20} = 6$.
  * Notice that this is a problem since A literally has $4\times$ more of both goods than B, so how can we say it is $6\times$ richer?

- PPP approach:

  * Create artificial exchange rates which are based on the prices of a standardized basket fo goods and services (both traded and non-traded).
  * Notice both country A and B consume 10 haircuts for every 1 TV. B consumes exactly 1 TV and 10 haircuts, A consumes 4 TVs and 40 haircuts.
  * Use that as the basket of goods to construct our PPP exchange rate.
  * The basket (1 TV, 10 haircuts) costs $^A30$ in country A.

· This is because 1 TV costs $\$^A 10$, 10 haircuts cost $\$^A 2 \times 10 = \$^A 20$.

* The basket (1 TV, 10 haircuts) costs $\$^B 20$ in country B.

· This is because 1 TV costs $\$^B 10$, 10 haircuts cost $\$^B 1 \times 10 = \$^B 10$.

* Therefore, the same basket of goods costs $\$^A 30$ and $\$^B 20$. This means that $\$^B 1 = \$^A \frac{3}{2}$.

* GDP in $\$^A$ terms for country A is still $\$^A 120$.

* GDP in $\$^A$ terms for country B is now $\$^A 30$ because the exchange rate is $\$^B 1 = \$^A \frac{3}{2}$.

* Therefore, country A is 4× richer than country B, since $\frac{\$^A 120}{\$^A 30} = 4$.

* Notice that using PPP gets us the correct result. A is indeed 4× richer than B.

- Real world example:

Country	GDP per capita (exchange rates)	GDP per capita (PPP)
US	$35587	$35587
Japan	$37560	$26375
India	$450	$2650

– Using exchange rates, the US seems almost 80× wealthier than India. Using PPP we see that the US is, in fact, only 13× wealthier than India.

- For those who are interested, *The Economist* publishes the Big Mac Index. They use a basket of one good, the Big Mac, to do PPP adjustments.

  – You can find the index at: http://www.economist.com/markets/bigmac/

- Some questions to ask yourselves:

  – Do you see any problems with using PPP?

  – How do you think we should deal with new goods?

  – What do you think happens as technology progresses and goods get replaced in some countries but not in others?

  – If different countries have different consumption patterns, what is an appropriate basket of goods to do pricing?