Box 1

MEASURING WORLD GROWTH: DO WEIGHTS MATTER?

This box discusses the sensitivity of measures of global economic growth to the choice of weighting scheme for the different regions of the world. The rate of global real output growth is usually computed as a weighted average of real GDP growth across the main regions of the world, with the weights reflecting the relative importance of each region in the world economy (i.e. its share in the total value of world GDP). In order to compute this share, national data, initially expressed in the national currency, are converted into a common currency using an exchange rate measure.

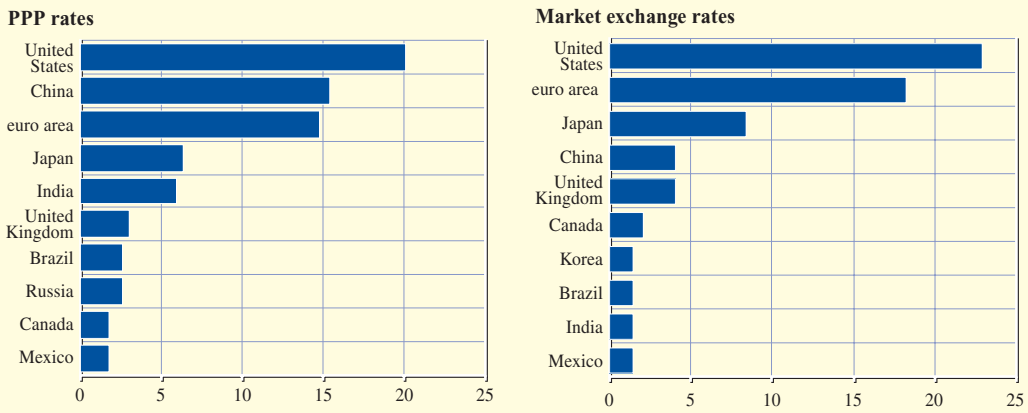
The most common approach (which is also used by the ECB) uses exchange rates based on purchasing power parities (PPPs). PPP rates are defined as the exchange rates that equalise the purchasing power of different currencies, given the prices of goods and services in the corresponding economies.[1] The preference for using PPP rates instead of other conversion factors, notably market exchange rates, has been extensively discussed in the literature.[2] In fact, when comparing national outputs and incomes in nominal terms, it is important to take account of differences in national price levels to ensure that the regional weights correctly reflect each region's share in world output. For this reason, weights based on PPPs are generally believed to yield more accurate (and less volatile) measures of the relative weight of countries and regions than those based on market exchange rates.

1 See, for example, Dornbusch, R., "Purchasing Power Parity", *The New Palgrave: A Dictionary of Economics*, in Eatwell, J., Milgate, M. and Newman, P. (eds.), Macmillan, London, 1987, pp. 1075-85; and Krugman, P.R. and Obstfeld, M., *International Economics: Theory and Policy*, 7th Edition, Addison-Wesley, Boston, 2005, Chapter 15.

2 See, for example, Gulde, A.M. and Schulze-Ghattas, M., *Purchasing power parity based weights for the World Economic Outlook*, IMF Staff Studies for the WEO, December 1993.

Chart A Ten largest economies in terms of GDP under alternative conversion rates

(share of world GDP, 2005)



Source: IMF's World Economic Outlook, April 2006.

Nevertheless, the preference for using PPP rates instead of market exchange rates is not irrelevant, as it can result in a different distribution of the world output across regions. To illustrate this point, Chart A shows the ten largest individual economies in the world in terms of GDP in 2005, as measured by PPP rates and market exchange rates. Interestingly, the position of the euro area changes depending on the conversion rate used; from second (after the United States) when the weight is derived from market exchange rates to third (after both the United States and China) when it is derived from PPP rates. The differences are particularly pronounced for China and India, whose shares are around four times larger when based on PPP rates rather than on market exchange rates.

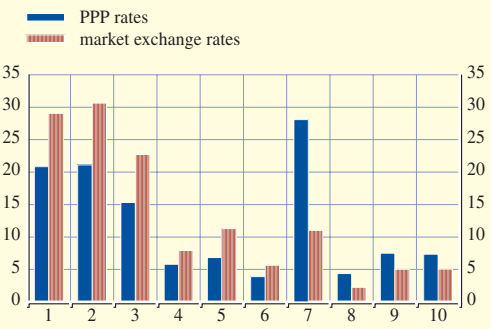
Chart B shows the average weights of the various regions according to the conversion rates used for the period 2003-2005. The weights of the main developed economies – the United States, Japan and the euro area – are significantly lower when PPP rates are used than when market exchange rates are used; in particular, the weight of the euro area declines from about 23% to 15%. By contrast, the weights of the emerging regions are much higher when PPP rates are used. The difference is particularly pronounced for emerging Asia, for which the weight is 28% when derived from PPP rates and 11% when derived from market exchange rates.

Given the growth differentials across regions, the choice of weighting scheme has a significant influence on aggregate world growth. In particular, weights derived from PPP rates that typically assign a comparatively larger importance to fast-growing emerging economies tend to result in higher world growth rates. Indeed, Chart C shows that, since 1995, the rates of world real GDP growth computed using PPP-based weights have been consistently above those computed using weights based on market exchange rates. Consequently, the gap between the growth rates derived from different weighting schemes has increased over time, from an average of around ½ percentage point in the second half of the 1990s to 1¼ percentage point in the first half of this decade. Therefore, depending on the weighting scheme used, world output grew by either 4.5% or 3.3% in 2005.

The importance of the choice of exchange rate measure can be further illustrated by looking at how the regional contributions to world GDP growth vary under different weighting schemes

Chart B Shares of main regions in world GDP under alternative conversion rates

(percentages, average shares over period 2003-2005)

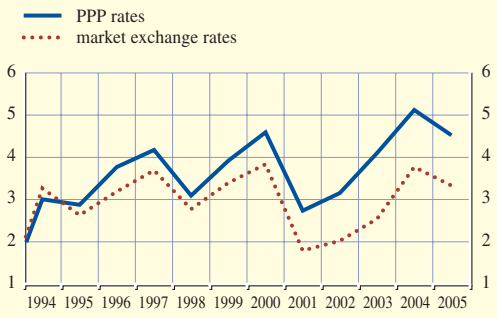


1 United States
2 European Union
3 euro area
4 Non-euro area EU countries
5 Japan
6 Other developed economies
7 Emerging Asia
8 CIS + other CEECs
9 Latin America
10 others

Sources: IMF's World Economic Outlook, April 2006; ECB calculations.
Notes: European Union refers to EU25; other developed economies include Australia, Canada, New Zealand, Norway and Switzerland; emerging Asia refers to Asian economies excluding Japan; CIS: Commonwealth of Independent States; CEECs: Central and Eastern European Countries.

Chart C World real GDP growth

(annual percentage changes)



Source: ECB calculations.

(see Table). According to PPP-based weights, world GDP growth has been predominantly driven by emerging economies in recent years. When the weights are computed using market exchange rates, however, the picture is quite different, with developed and emerging economies, on average, contributing broadly equally to world growth.

To sum up, the choice of weighting scheme is important in the measurement of world growth. In particular, the most common approach using PPP-based weights results in a comparatively larger weight for fast-growing emerging economies, and ultimately yields higher world growth rates than the alternative approach based on market exchange rates.

Regional contributions to world real GDP growth under alternative conversion rates

(percentage points)

	(1) PPP rates			(2) Market rates			*(1) - (2)*		
	2003	2004	2005	2003	2004	2005	2003	2004	2005
World	**4.1**	**5.1**	**4.5**	**2.5**	**3.8**	**3.3**	**1.6**	**1.3**	**1.2**
United States	0.6	0.9	0.7	0.8	1.2	1.0	-0.2	-0.3	-0.3
European Union	0.4	0.6	0.3	0.0	0.5	0.3	0.3	0.1	0.0
euro area	0.1	0.3	0.2	0.1	0.4	0.3	0.0	-0.1	-0.1
Non-euro area EU countries	0.3	0.3	0.1	-0.1	0.1	0.0	0.4	0.3	0.1
of which: United Kingdom	0.1	0.1	0.1	0.1	0.2	0.1	0.0	-0.1	0.0
Japan	0.1	0.2	0.2	0.2	0.3	0.3	-0.1	-0.1	-0.1
Other developed economies	0.1	0.1	0.1	0.1	0.2	0.2	0.0	0.0	0.0
Emerging Asia	2.1	2.2	2.1	0.7	0.8	0.8	1.3	1.4	1.3
CIS + other CEECs	0.3	0.4	0.3	0.3	0.3	0.3	0.0	0.0	0.0
Latin America	0.2	0.4	0.3	0.1	0.2	0.2	0.1	0.1	0.1
others	0.4	0.4	0.4	0.2	0.3	0.3	0.1	0.2	0.1
Developed economies	1.2	1.7	1.3	1.2	2.1	1.7	0.0	-0.4	-0.4
Emerging economies	2.9	3.4	3.2	1.4	1.7	1.6	1.6	1.7	1.6

Notes: European Union refers to EU25; other developed economies include Australia, Canada, New Zealand, Norway and Switzerland; emerging Asia refers to Asian economies excluding Japan; CIS: Commonwealth of Independent States; CEECs: Central and Eastern European Countries.