

Gap-ology and globalisation

Measuring the global output gap

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- ▶ **The Fed is starting to talk about the potential inflationary pressures from rising resource utilisation...**
- ▶ **...but globalisation means the US output gap is no longer such a useful input into the Fed's monetary policy framework**
- ▶ **We look at the global output gap and the implications for US inflation as the gap closes**

The last two statements issued after the Fed's FOMC meetings have talked about "*possible increases in resource utilization*" and their "*potential to add to inflation pressures*". Yet, in recent speeches, one FOMC member has warned that the US output gap – the usual measure used by economists to gauge resource utilisation – is no longer a useful concept for the Fed to consider in setting monetary policy because of the forces of globalisation. In other words, the growth potential of the rest of the world now needs to be considered by the Fed in its policy framework, not just the labour and capital capacity of the US.

Does this mean that the concept of a global output gap could be more useful than the US output gap? Possibly – if we could measure it. Because China, India and much of the developing world are growing so rapidly, their share of global GDP is increasing steadily. But the usual methods of calculating estimates of global trend growth do not reflect this. They suggest that the trend rate of global GDP growth is currently 3.5% and the global output gap turned positive to the tune of about 1% of global GDP in 2005: in other words, the global economy is expanding at a rate that is above its trend or "potential" growth rate. But weighting up regional trend growth estimates for the emerging markets according to their current weights in global GDP suggests global trend growth could actually already be 4% or more. This would mean the global output gap would not turn positive until this year.

We estimate that the output gap of the rest of the world is just as important in explaining US inflation as the US output gap itself. With global economic activity set to move above trend in 2006, this, by itself, would imply higher inflation in the US economy this year than in 2005. However our model can only quantify the demand implications of globalisation on inflation, not the role globalisation plays in exerting downward pressure on western wage growth and inflation expectations.

Gap-ology and globalisation

- ▶ Rapid globalisation means monetary policy is determined less by domestic resource utilisation...
- ▶ ...and more by the growth potential of the world
- ▶ The problem is how to measure the global output gap

The world but not as we knew it

The statements issued by the Fed at the time of its last two rate increases have talked about “*possible increases in resource utilisation*” and their “*potential to add to inflation pressures*”. This suggests that the Fed is now focusing on the falling unemployment rate and rising capacity utilisation in the US economy. Yet, in a recent speech, Dallas Federal Reserve President Richard Fisher, has warned about the lack of usefulness of output gaps or capacity constraints to policymakers. He said that the econometric calculations behind such measures were based on assumptions of a world that in his opinion “exists no more” and that the concepts had been “rendered nonexistent” by the forces of globalisation. There is nothing particularly new in this statement, Fisher has made similar comments before and many economists have warned about the difficulties and uncertainties faced by central banks who now have to consider not just domestic resource utilisation but also the productive potential of the rest of the world.

It has been apparent for some time that the information content of the US output gap in isolation is very limited. Indeed in the late 1990s we argued that even though the US output gap had turned positive the weakness of demand in the rest

of the G7 was playing a key role in keeping down inflation in the US. In other words, the G7 output gap told us more about the outlook for US inflation than the US output gap itself.

1. Non-G7 share of global economy has risen



*In nominal US\$ terms. On a PPP basis the non-G7 countries account for 57% of the global economy. Source: Thomson Financial Datastream, HSBC

Since then of course globalisation forces have gained even more momentum and with countries such as China, India and Russia growing very rapidly over the last three years in particular, it is the non-G7 part of the world, particularly the developing world, that is gaining much more influence in the global economic landscape. The non-G7 countries now account for about 38% of the world on a nominal GDP basis and 57% on a PPP basis.

Therefore, before writing off the usefulness of output gaps altogether, it is perhaps worth considering whether we can glean any information about future inflationary pressures from the *global* output gap – the difference between the actual and potential, or trend, GDP growth rate of the global economy.

Measuring the output gap

The major difficulty in measuring the output gap is how to measure trend growth. There are basically three ways in which it can be calculated.

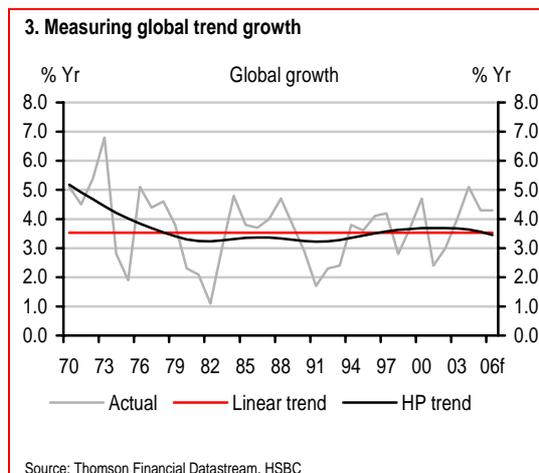
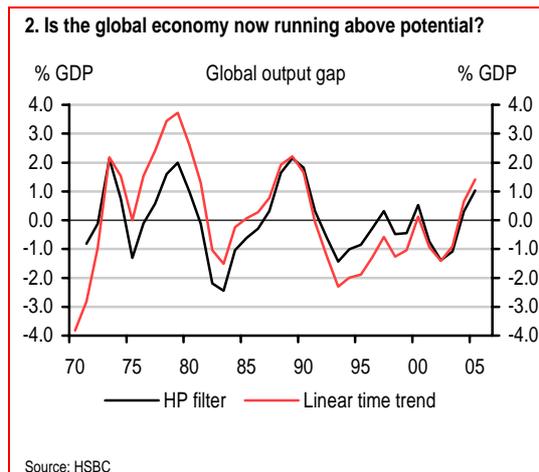
i) Linear time trend: Trend growth is derived from a simple regression of GDP on a linear time trend and hence is a fixed number completely independent of the cycle. In other words, a long term average. This method gives a global trend growth rate of 3.5%.

ii) Hodrick-Prescot (HP) filter: Here the trend rate of growth is correlated with the actual growth rate, reflecting the view that trend growth can be impacted by the cycle. For example, a recession which leads to a loss of capacity may impact on an economy's ability to grow. The difficulty comes in determining exactly how significant is the cyclical impact. This method puts the global trend growth rate in 2005 at 3.5% also.

iii) Production function: This method attempts to directly estimate the resources available for growth. Trend productivity growth, the capital stock and potential employment hence all need to be calculated. This is inevitably problematic even for the most advanced countries and close to impossible for the global economy which is why we cannot give an estimate on this basis.

Taking a look at the HP filter and linear time trend series illustrated in chart 2, it is clear that the global output gap appears to have closed. In fact these measures suggest that by the end of 2005 the global economy was running above its potential to the tune of at least 1% of global GDP – the largest

magnitude since 1990. So does this mean that all of the spare capacity in the global economy has now been eliminated and that inflation is about to reignite?



Even for those of us that still believe that output gaps still have some use, this is not necessarily the case. A potential problem is the great uncertainty regarding the global economy's actual trend growth rate. As mentioned above, both the HP filter and linear time trend estimate that trend growth for the global economy on which these output gaps are based is currently 3.5%. Could it have risen in recent years and what are the implications if it has?

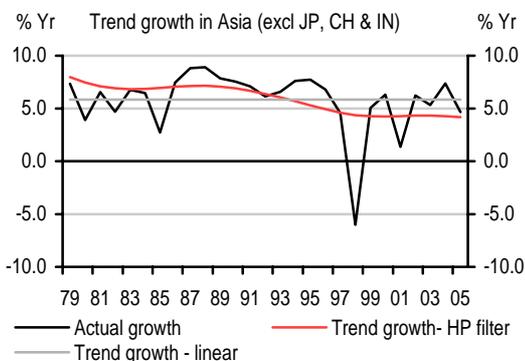
Trend growth in the developing world

In our latest edition of global economics, *The New World Order*, we focused heavily on the fact that the G7 economies are no longer dominating the global economic landscape in the way that they have in the past. As many of the emerging markets are growing rapidly, their share of global GDP is increasing all of the time and most of these have a higher trend growth rate than the more advanced economies. This implies that the productive potential of the global economy may now be higher than it was, for instance, a decade ago. One way of investigating this is to calculate the trend growth rates and output gaps for each major region of the global economy and weight them up into a global aggregate according to their current weights in global GDP.

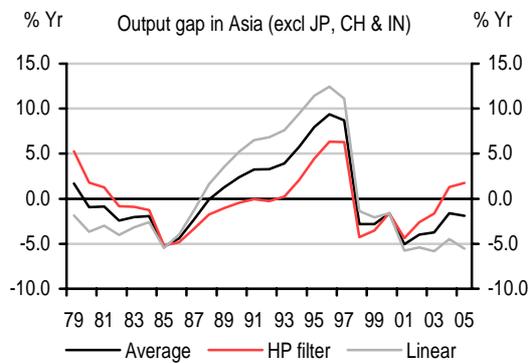
Asia

We start with Asia as it is the most important non-G7 region, in terms of both its share of world output and its growth rate. As with the global output gap above we have used two methods to estimate trend growth and output gaps for Asia but, as shown in table 6, the two measures diverge significantly.

4. Different trend growth assumptions...



5. ...give different output gap estimates in Asia



6. Assessing the Asian output gap (2005)

	Linear time trend	HP filter	Average
Trend GDP growth (% Yr)			
Asia ex Japan	7.7	6.1	6.9
China	9.8	7.5	8.6
India	5.7	5.5	5.6
Asia ex Japan, China and India	5.8	4.2	5.0
Hong Kong	5.3	3.9	4.6
Indonesia	5.1	5.0	5.0
Korea	6.9	4.2	5.5
Malaysia	6.4	4.3	5.3
Philippines	2.8	3.9	3.3
Singapore	7.0	4.1	5.5
Taiwan	6.5	3.5	5.0
Thailand	6.0	3.7	4.8

Output gap (% of trend GDP)

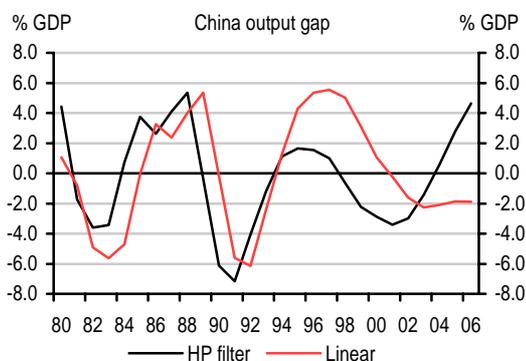
Asia ex Japan	-1.5	2.2	0.3
China	-1.9	2.8	0.5
India	3.4	1.9	2.6
Asia ex Japan, China and India	-5.5	1.8	-1.9
Hong Kong	-5.6	2.7	-1.4
Indonesia	1.8	5.1	3.5
Korea	-10.4	0.0	-5.2
Malaysia	-5.5	1.2	-2.2
Philippines	8.4	1.4	4.9
Singapore	-9.4	0.4	-4.5
Taiwan	-11.2	0.3	-5.4
Thailand	-9.2	1.9	-3.7

Source: Thomson Financial Datastream, HSBC

A reason for the divergence between the two measures is that with the HP filter there is an end-point bias i.e. more weight is given to recent growth developments. So in the case of Asia, the HP filter may underestimate the current trend growth rate because of the deep recessions

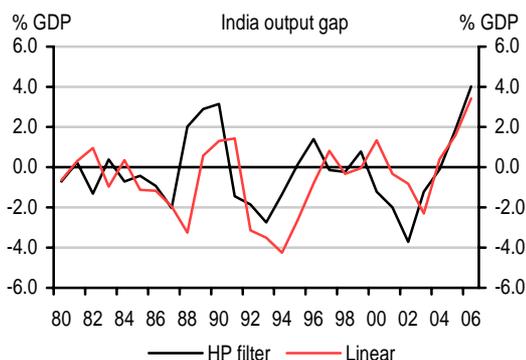
registered in 1998, while the linear time trend method weights equally the whole period since 1978, the beginning of the open-door policy in China. We have therefore taken an average of the two measures and on this basis both China and India are now running above potential while the rest of Asia, except the Philippines and Indonesia, still has spare capacity.

7. Has China's output gap closed?



Source: Thomson Financial Datastream

8. India's economy looks to be running above potential



Source: Thomson Financial Datastream

Despite the large variation of these different measures, there may still be some information value in these output gaps. It is worth noting that the only three Asian countries (excluding China) where the average output gaps have obviously closed – India, Philippines and Indonesia – are also the three countries with the highest inflation rates (table 9).

9. High inflation Asian countries have biggest output gaps

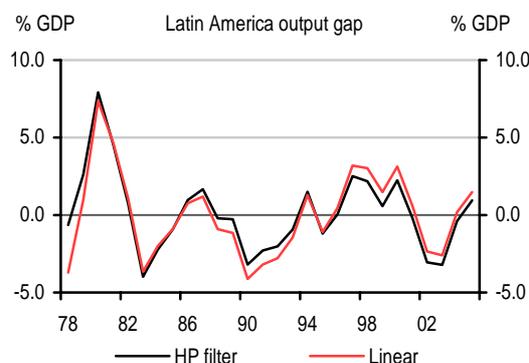
Inflation rates (% Yr)	2004	2005	2006f	Output gap (% GDP)
China	3.9	1.6	1.8	0.5
India	3.8	3.7	4.9	2.6
Hong Kong	-0.4	1.0	2.2	-1.4
Indonesia	6.1	10.7	9.4	3.5
Korea	3.6	2.8	3.3	-5.2
Malaysia	1.4	3.0	3.2	-2.2
Philippines	6.0	7.7	8.0	4.9
Singapore	1.7	0.3	0.9	-4.5
Taiwan	1.6	2.4	2.8	-5.4
Thailand	4.5	4.0	3.7	-3.7

Source: Thomson Financial Datastream, HSBC

Latin America

Turning to Latin America we again used the two methods. This time both threw up very similar estimates of trend growth and output gaps for the region as a whole. The only major difference was in the estimate for Chile, where the linear time trend suggests there is still spare capacity and the HP filter does not (table 11).

10. Latin America's output gaps appear to have closed



Source: Thomson Financial Datastream

Taking all of the measures together and looking at the region in aggregate it would appear that after just two years of above-trend growth in 2004-05, Latin America has now exhausted its spare capacity. Argentina, in particular, appears to be running a sizeable output gap, presumably contributing to the 12.7% inflation rate registered by the end of 2005.

11. Latin America's output gaps (2005)

	Linear time trend	HP filter	Average
Trend GDP growth (% Yr)			
Latin America	2.6	2.5	2.5
Mexico	2.7	2.6	2.7
Brazil	2.3	2.3	2.3
Argentina	1.8	1.9	1.8
Chile	5.6	3.9	4.8
Output gap (% GDP)			
Latin America	1.5	1.0	1.2
Mexico	1.7	0.1	0.9
Brazil	0.9	0.7	0.8
Argentina	5.3	3.5	4.4
Chile	-3.9	1.2	-1.4

(These estimates intuitively appear very conservative and are certainly below what is generally considered to be trend growth for the region. (See below) Source: Thomson Financial Datastream, HSBC

Emerging Europe

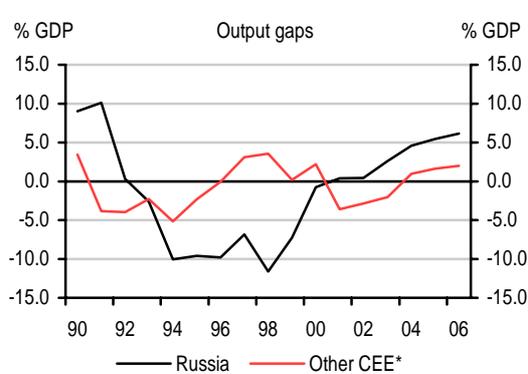
Finally we looked at Central and Eastern Europe. Here we were constrained by the relatively short time series of data that is available so we were only able to calculate the measures on the HP filter. The results are shown in table 12 and chart 13. Like Latin America, it shows one country, Russia, which appears to be expanding at a rate significantly above trend, while the rest of the region's output gaps have also closed and moved into positive territory, albeit to a lesser extent.

12. No apparent spare capacity in emerging Europe

	Trend GDP growth (% Yr)	Output gap (% GDP)
Russia	5.1	5.4
Emerging Europe	3.2	1.6
Poland	3.4	0.1
Hungary	3.8	0.7
Turkey	3.8	3.3

Source: Thomson Financial Datastream, HSBC

13. Emerging Europe looks to be growing above trend



Source: * Central and eastern Europe. Weighted average of Hungary, Poland and Turkey Source: Thomson Financial Datastream, HSBC

Back to the world

Weighting these up these trend growth estimates for each of the non-OECD regions and using the OECD's own estimates for trend growth in the OECD (based on production function methodology) and the IMF's weights in global GDP on a PPP basis gives a global trend growth rate of about 4% (table 14). This is roughly half a percentage point higher than the growth rate arrived at when running a simple regression of the aggregate global GDP series.

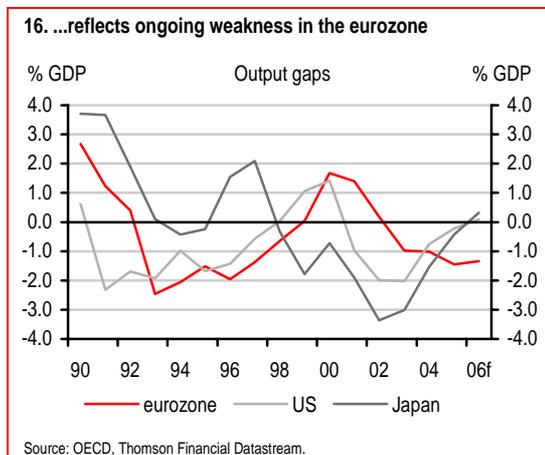
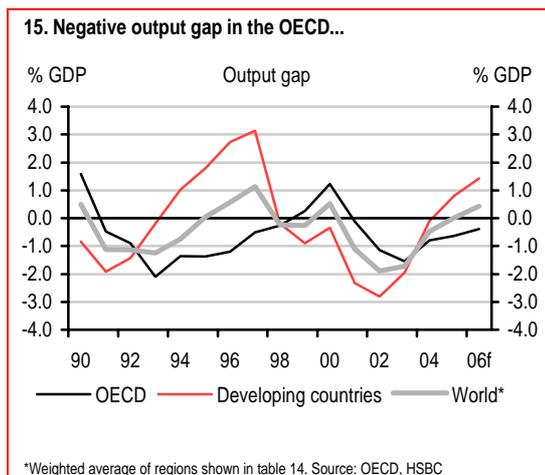
14. Building up a global trend growth rate

	Trend GDP growth (% Yr)
Advanced OECD ^a	2.6
Latin America	2.5
Eastern Europe	3.2
Russia	5.1
China	8.6
India	5.6
Other Asia	5.0
World -weighted average^b	4.0
World - HP/linear	3.5

^a Based on production function. Includes Czech. ^b Based on IMF PPP weights. Excludes Middle East and Africa. Source: HSBC, OECD

If we then weight up the regional output gaps (according to their current PPP weights in global GDP) to calculate a global aggregate, it appears that the global output gap was just about eliminated in 2005 and on current forecasts the global economy is likely to move above trend in

2006. It is interesting to note, however, that despite using this higher trend growth estimate of 4% and looking at the world region by region, the major negative influence on the global output gap continues to come through from the OECD rather than the developing world (chart 15).



The disinflationary impact of globalisation may be stemming from emerging markets (through the downward pressure they are exerting on global goods prices and western wage growth) but when looked at from a demand point of view, it is the relative weakness of demand in the developed world that has prevented the global output gap from being eliminated more quickly than it actually has in recent years. This point applies primarily to the eurozone, which registered its fifth consecutive year of sub-trend GDP growth in

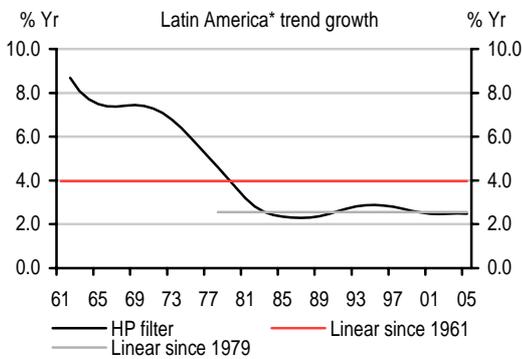
2005. According to the OECD's calculations, the output gaps in Japan and the US will close in the coming year (chart 16).

Global trend growth could be higher

Without wishing to sound overly optimistic, there are some reasons why global trend growth may even be slightly higher than 4%. The estimates of trend growth in Asia ex Japan/China, Latin America and emerging Europe are being held down by the fact that they have all suffered deep recessions in the past decade. But the emerging markets are currently on a much sounder footing with current account surpluses, generally better fiscal positions and lower inflation. Crucially, they are much less dependent on foreign capital inflows whose reversal triggered most of the recessions in the 1990s. If they sustain their recent GDP growth rates for another couple of years then all of these trend growth estimates will start to edge up, which, by implication, means these output gap calculations will be re-estimated in a way that suggests fewer capacity constraints. There are two specific regions where our estimates may be significantly underestimating trend growth currently:

1) Latin America's trend growth rate of 2.5% is probably underestimated. Simply using a longer time series gives a higher trend growth rate on the linear time trend method. Using data from 1960 (rather than from 1979) incorporates Latin America's glory days in the 1970s (which were fuelled by persistently rising commodity prices and strong capital inflows) and produces a trend growth rate on the linear time trend of 4% rather than 2.5%, in which case the average of the two measures would be 3.2%. Given that the structural growth story underway in China and India appears set to keep global demand for energy and other commodities buoyant in the coming years, a trend growth rate of at least this level would appear reasonable for Latin America in the current cycle.

17. Latin America's trend growth rate may be understated



*Weighted average of Argentina, Brazil, Chile and Mexico. Source: HSBC

18. Structural growth story in Asia may have raised Latam's trend growth



*Weighted average of Argentina, Brazil, Chile and Mexico Source: Thomson Financial Datastream

2) India's trend growth of 5.6% is almost certainly underestimated

India may not be quite as buoyant as China, but it grew by more than 8% for the first half of FY05-06, despite setbacks from the monsoons and a disruption in oil output. In contrast to China, growth is primarily consumer driven and there are strong structural reasons to believe that consumption will stay strong. Investment has recently revived after several years of lacklustre growth and the fastest growing area of exports – business process outsourcing – is largely immune to cyclical pressures. Such developments have prompted HSBC's economists in Asia to suggest that the trend growth rate in India may have already stepped up above the 7% level. Concern

over India's double deficits has increased in some quarters, particularly with regard to its widening double deficits, but these are unlikely to become a near-term constraint on India's growth. We may have become accustomed to Asian countries running current account surpluses of 4–5% of GDP or more in recent years but a current account deficit of 3% of GDP (HSBC's forecast for India in 2006) may actually be appropriate for a country at India's stage of development.

19. Has India's trend growth rate moved up to the 7% range?

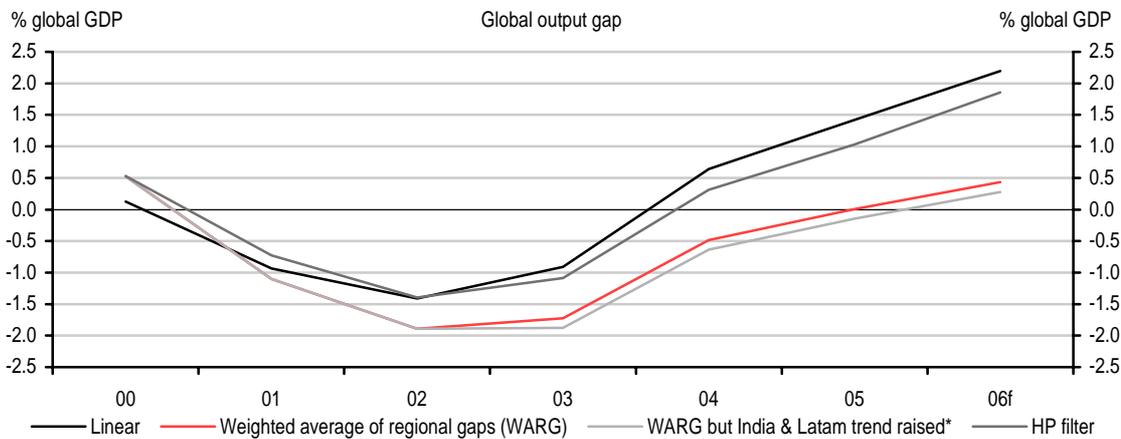


Source: Thomson Financial Datastream

Lies, damned lies and output gaps

If we now re-visit our weighted global trend growth rate and global output gap but use the assumption of 3.2% trend growth for Latin America and 7% for India for the three years from 2003-2005 then the global output gap did not start to narrow until 2004 and will only become positive in 2006 (chart 20). It is often said that it is possible to show whatever trend you like with statistics as long as you manipulate them enough. This is certainly the case with output gaps at a time of rapid globalisation. In other words, Fisher may be right, the usefulness of this concept has been "rendered non-existent".

20. Where is the global output gap? Depends which way you measure it



*India's trend growth rate revised up from 5.6% to 7% and Latin America's from 2.5% to 3.2% compared with WARG. 2006 forecasts for all of these output gap measures are calculated using HSBC's global GDP growth forecast of 4.2% for 2006. Source: HSBC

Implications for US inflation

Nonetheless, it is worth considering whether the global output gap tells us anything more about the outlook for US inflation than using the US output gap in isolation. The effects can be gauged through the equation in table 21. Bear in mind that this is not an attempt to identify every variable that has any influence on US inflation. The equation is simply an attempt to explain developments in US inflation through movements in the US output gap and movements in the output gap of the rest of the world.

rest of world output gap terms are roughly the same. In fact the latter is slightly larger, implying that a 1% point rise in the output gap of the rest of the world would push up US inflation by nearly ½% point while a 1% point rise in the US output gap would add less than 0.4% points to US inflation.

21a. The role of output gaps in explaining US inflation

$$USI_t = 0.0091 + 0.36USG_t + 0.49USXG_t + 0.80USI_{t-1}$$

2.019 1.913 1.716 6.873

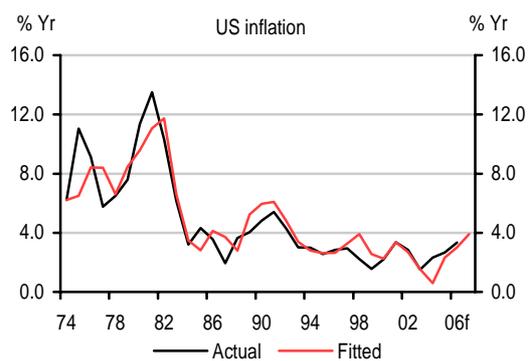
R²=0.81, F (3, 29), sample period from 1973 to 2005 with 32 annual observations

Where USI is US inflation, USG is the US output gap and USXG is the output gap of the rest of the world.

The t-stats, though statistically significant, are not as high as we would ideally like and may reflect multi co-linearity between the two output gap terms. In other words the regression equation may find it difficult to distinguish between the separate effects of the two output gap terms. Source: HSBC

Each of the terms in the equation is statistically significant and the equation helps to explain over 80% of any movements in US inflation on an annual basis. The coefficients on the US and the

21b. Model points to further rise in US inflation in 2006



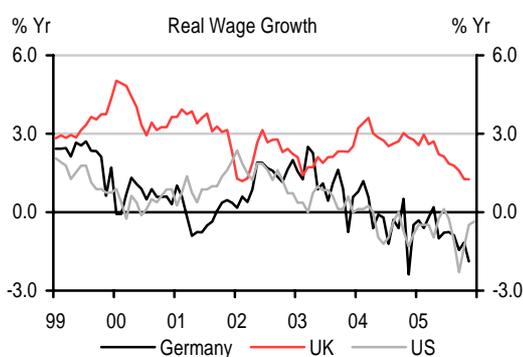
Source: HSBC and Thomson Financial Datastream

Note that in this simple model the previous year's inflation rate (USI_{t-1}) still has by far the biggest impact on US inflation: today's low inflation is just as "sticky" as high inflation was in the 1970s. The very low and remarkably stable inflation expectations during the past three years of rising energy prices reflect central banks' credibility in

achieving price stability as well as the effects of globalisation on labour costs. Workers have been unable to compensate for the rise in headline inflation through higher wage growth because of the increased availability of foreign workers (either through immigration or offshoring) and in the eurozone, through the demise of centralised wage bargaining.

It is this impact that is virtually impossible to quantify. The global output gap is an attempt to gauge the implications of global demand growth on inflation but cannot assess the indirect implications of globalisation on western wage growth. Nor how long such effects are likely to persist. To put recent labour flows in context, however, over the past decade about 80mn Chinese have left the rural areas for urban areas and the official unemployment rate has actually risen over this period. Despite this massive migration, China still has a surplus rural workforce of more than 200mn (see *The Great Migration* October 2005 by Qu Hongbin) and the ILO estimates that the global labour force will expand by some 40mn each year over the next decade. It would appear that the effects of globalisation on western wage growth still have some way to run.

22. Real wages are being squeezed in the West



Source: Thomson Financial Datastream

Conclusion

We estimate that the output gap of the rest of the world is just as important at explaining US inflation as the US output gap itself. With global economic activity set to move above trend in 2006, this, by itself, would imply higher inflation in the US economy this year than in 2005.

However our model can only quantify the demand implications of globalisation on inflation, not the role globalisation plays in exerting downward pressure on western wage growth and inflation expectations. The vast surplus pool of labour in the global labour force implies these effects are likely to continue.

Even the direct impact from the closing output gap may need to be viewed with caution. The main problem with output gap analysis is that it all comes down to the assumption for trend growth. And in a rapidly globalising world, global trend growth may well have risen. We have indicated that it may already be 4%, while structural improvements in India and Latin America mean it could be even higher. The only way to assess this more accurately is to try to calculate trend growth for the major developing countries – China, India, Brazil, Mexico and Russia – using a production function approach, rather than either the linear time trend or HP filter methods which are both effectively long term averages of past growth. The production function approach directly estimates the resources available for growth, involving calculations of trend productivity growth, the capital stock and potential employment. These data series are not readily available for developing countries but in future research we will investigate ways of calculating them for the key developing countries.

Notes

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