FEATURE

Command GDP: the purchasing power of UK output

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SUMMARY

Gross domestic product (GDP) measures the volume of goods and services produced by a nation. By adjusting this measure to reflect movements in the terms of trade, command GDP describes the purchasing power of a nation's output. For an open economy such as the UK, and given recent developments in the global economy such as the introduction of low-cost emerging market producers, large increases in commodity prices and exchange rate volatility, it could be a relevant statistic. This article develops an estimate of command GDP for the UK and discusses recent trends.

The UK is an open economy, with imports and exports together representing close to 60 per cent of gross domestic product (GDP). Therefore, overseas factors represent an important determinant of economic activity. One aspect of this, which has been paid relatively little attention, is the impact of the terms of trade on domestic demand.

The terms of trade is simply a ratio of export prices to import prices. An improvement in the terms of trade stems from export prices growing faster than import prices; a deterioration in the terms of trade arises from the opposite case. As a statistic, it simply captures the rate of exchange between the globally traded goods and services produced by one country relative to its trading partners.

Movement in the terms of trade has an obvious bearing on international competitiveness. If export prices are growing more strongly than import prices, it may encourage substitution away from domestic to foreign producers. In this case, an improvement in the terms of trade may not necessarily be a good thing. Naturally, the extent to which this may influence demand depends on the price sensitivity or, as economists say, price elasticity of exports and imports. Goods and services that are fairly standardised and produced in globally competitive markets are more likely to be price elastic. A nation that trades proportionately high levels of these products may suffer from an improvement in its terms of trade because foreign products become more attractive. However, those producing less price-elastic goods and services, perhaps more specialised and high-technology products or natural resources, are less likely to be competitively disadvantaged by an improvement in the terms of trade.

Changes in international relative prices attract attention for their possible impact on trade flows, that is, the pattern of international demand. The effect on purchasing power is more neglected, but still important, especially in open economies like the UK. An improvement in the terms of trade means that the price the UK achieves for its exports has risen relative to that which it pays for its imports, implying that every good or service exported can be exchanged for a greater volume of imports. This is essentially a positive income effect, hence the terms of trade is an important determinant of the purchasing power of domestic output.

Whereas GDP measures what a country produces, command GDP is a measure that aims to capture the purchasing power of that output over goods and services in world markets. This statistic is regularly published in the US by the Bureau of Economic Analysis, but not in the UK, where it might actually be a more relevant concept due to the openness of the economy.

Recent developments in the UK and global economies have also increased the possible significance of the command GDP measure. Low-cost producers in emerging markets, particularly China, have been

increasingly integrated into world trade. Recent increases in oil, commodity and food prices have been dramatic. And there have been significant movements in exchange rates such as the current fall in the US dollar. All of these factors may have been influential in driving the terms of trade over the last decade.

Command GDP is simply calculated by deflating exports with import prices. When the terms of trade move in favour of the UK, it implies that export prices are increasing relative to import prices. Command GDP will then rise relative to conventional GDP, reflecting the improvement in the purchasing power of domestic output. Vice versa, the opposite is true; a deteriorating terms of trade suggests that import price inflation is greater than that for exports, and command GDP will then fall relative to conventional GDP.

Figure 1 plots a recent history of the UK terms of trade and the ratio of command GDP to conventional GDP. Three things are evident. The first is that movements in the terms of trade are clearly correlated with the ratio of command GDP to conventional GDP. This would be expected given how the data are constructed.

Second, movements in the ratio of command GDP to GDP are dampened relative to more volatile changes in the terms of trade. This is mainly because exports represent about 25 per cent of total GDP, so the majority of command GDP is invariant to the terms of trade. Furthermore, part of the effect on command GDP could be offset by volume movements. If an improvement in the terms of trade generates substitution away from exports to imports, command GDP will not increase as strongly as in the absence of volume effects. Likewise, the effect of a fall in the terms of trade on command GDP could be offset by a relative shift from imports to exports.

Third, the terms of trade, and hence command GDP, although volatile, appears to exhibit a longer term upward trend. In fact, if Figure 1 were extended back to the late 1970s to just after the twin oil-price shocks, these trends would be even more evident. Nor is it simply because the UK was generally a net exporter of oil over this period, as the non-oil terms of trade has shown a similar upward path. This is an important finding, because it suggests that the purchasing power of UK output has tended to grow faster than that output, which may have welfare considerations. The next section will discuss in more detail the factors driving recent movements in the UK terms of trade (see also Dury *et al* 2003 for a review of recent evidence).

Figure 2 plots the growth in command GDP relative to GDP and reflects the trends in the ratio shown in Figure 1. For the most part, the two series move together, but there are some periods of divergence. Command GDP grew faster than conventional GDP between 1996 and 1999 and also between 2002 and 2003. Growth was correspondingly slower in the periods 1994 to 1996 and also in 2005.

Figure 1
UK terms of trade and the ratio of command to normal GDP

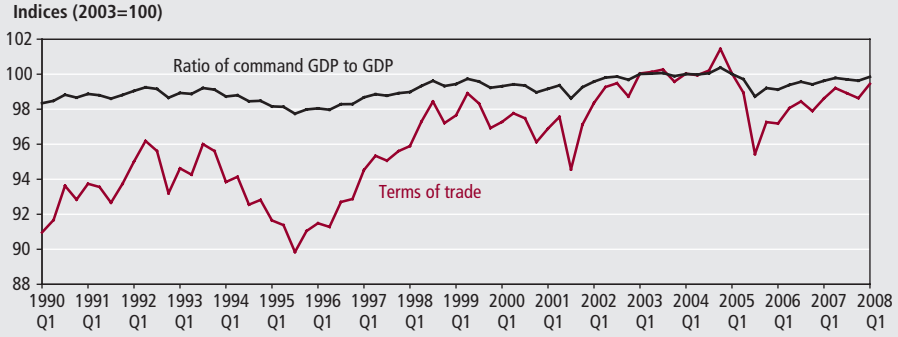
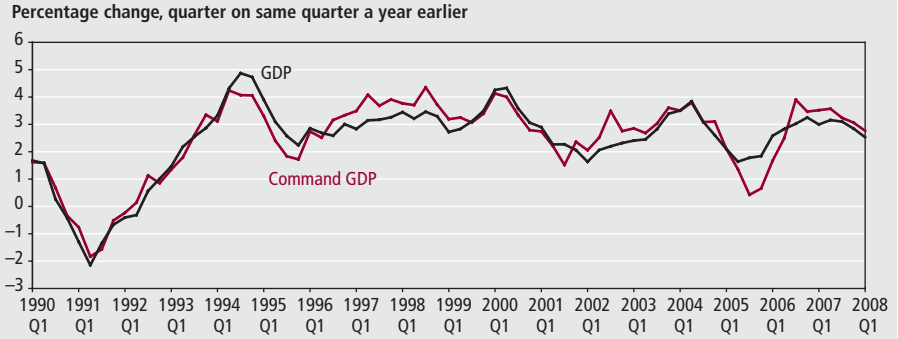


Figure 2
Economic growth of command GDP and GDP



The UK terms of trade

Given that the terms of trade is the ratio of export to import prices, its trends are simply determined by the relationship of export and import price inflation. These are plotted in **Figure 3**. It is noticeable that the periods previously identified where command GDP growth differed from actual GDP growth correspond to respective differences in the inflation figures.

One of the key drivers of the terms of trade is the exchange rate which determines the rate at which one currency is traded for another. The exact feed through from changes in sterling to the UK terms of trade depends on a number of factors, but **Figure 4** tends to suggest it is nonetheless important, especially between 1993 and 1999.

If foreign firms set prices in their own currency, then sterling appreciation will see the sterling cost of imports fall. Were the same companies to set prices in sterling, then of course sterling appreciation would see foreign companies enjoy higher margins rather than there be a fall in UK import prices. This is often known as 'pricing to market', where a firm recognises the strategic importance of setting a certain price in a certain market. For example, if a foreign firm had invested heavily in establishing themselves in the UK market, they might not wish to be made uncompetitive by a sterling depreciation and opt to allow the currency movement to adversely impact on margins rather than prices in sterling to rise.

The same reasoning applies to domestic firms. If they price in sterling, then exchange rate movements will have limited effects on the UK terms of trade; export prices in sterling remain stable. Instead, the only impact will be on the price in terms of foreign currency. However, pricing to market behaviour would see the sterling value of exports adjusted as the effect of currency movements are offset by margins and in this case the terms of trade are affected. So, overall, it depends on the relative proportions of firms pursuing different pricing strategies.

The large fall in the sterling effective exchange rate in late-1992 as the UK left the European Exchange Rate Mechanism, followed by its subsequent appreciation

Figure 3
UK import and export price inflation (implied deflators)

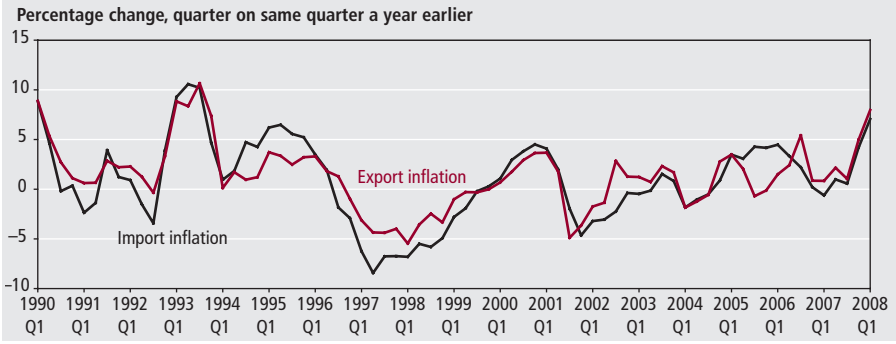
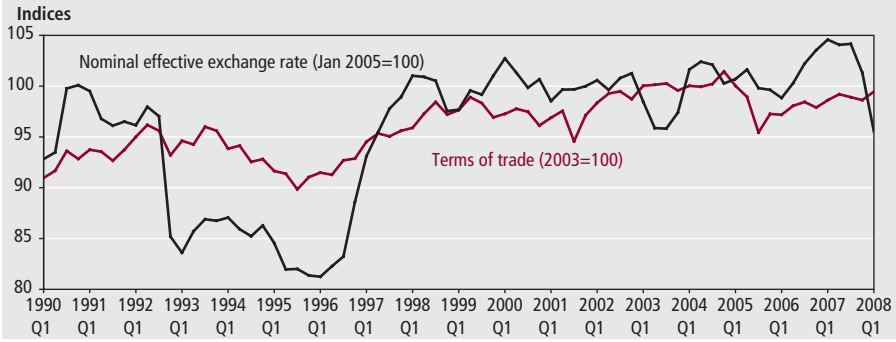


Figure 4
UK terms of trade and the nominal effective sterling exchange rate



through 1999, does seem to account for import and export price inflation and hence the terms of trade over this period. Movements in the terms of trade appear less volatile and more gradual than those in the exchange rate, implying that pricing to market behaviour is important. As Chamberlin and Henry (2002) suggest, the incomplete pass through may also reflect costs of physically adjusting prices known as menu costs. Also, firms tend to delay reacting to volatile economic data such as exchange rates while they consider the relative importance of permanent and transitory shocks to the economy.

Looking at disaggregated information on the terms of trade may also be informative. Movements in the terms of trade may be driven by particular commodity types or even simply be accounted for by changes in the composition of trade. **Figure 5** shows the Michaely indices for the main components of the trade in goods and services in the UK. A Michaely index is simply the proportion of total exports minus the proportion of total imports for each product type and is a simple device for monitoring the changing composition of trade (see Michaely 1962).

Food and basic materials have represented a fairly constant proportion of trade. The index for oil and fuels has not changed much, but recently made the headline change from positive to negative territory as the UK became a net importer of oil for the first time since the first half of 1980. Despite this, and the dramatic increases in oil prices in the last few years, the effect on the terms of trade has been fairly muted, as shown in **Figure 6**. The terms of trade excluding oil and fuel has not differed that much from the total index. Over the last 15 years, the UK has neither been a big net exporter nor net importer of oil, so the terms of trade is relatively immune from oil price changes. For example, in Figure 3, the recent episode of oil price inflation is observed in both import and export prices, and in Figure 6 the overall downward effect on the terms of trade has not been large.

Outside oil and fuel, it is more interesting to look at the Michaely indices for manufacturing and services. The share of services in total exports has risen substantially as has the share of manufactures in imports. Taken together, the evidence could be interpreted as the UK increasingly specialising in services in line with its comparative advantage. However, it should also be considered that the UK trade balance has deteriorated significantly over the period, so the two are not offsetting in that the net deficit in manufacturing trade is matched by the growing net surplus in services.

Figure 7 plots the terms of trade for the UK manufacturing and services sector. The increase in the Michaely index for services has occurred at the same time

Figure 5
Michaely indices for UK trade

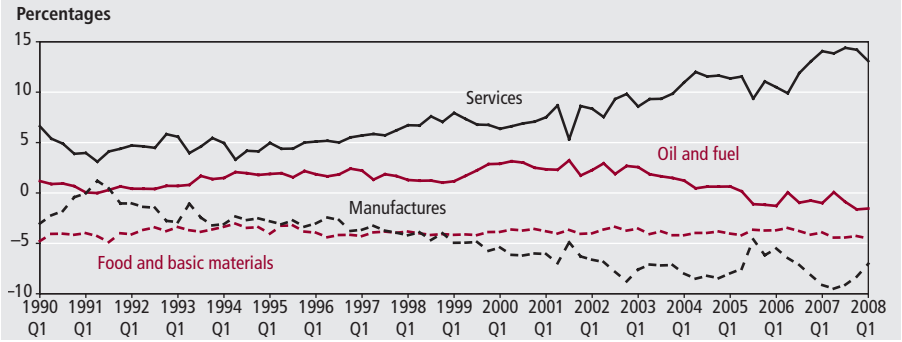


Figure 6
Impact of oil prices on the terms of trade

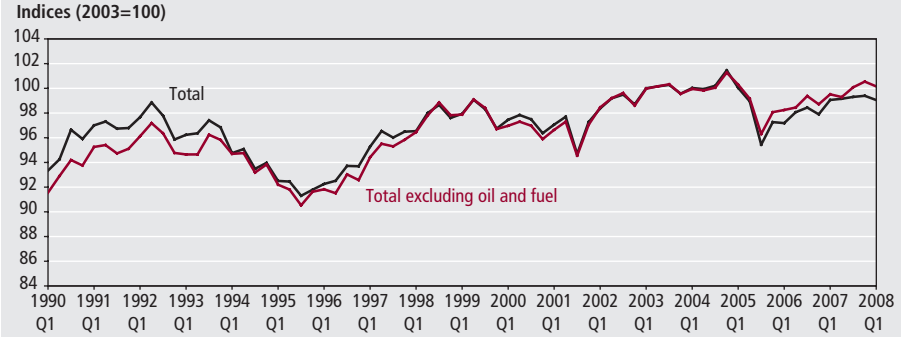
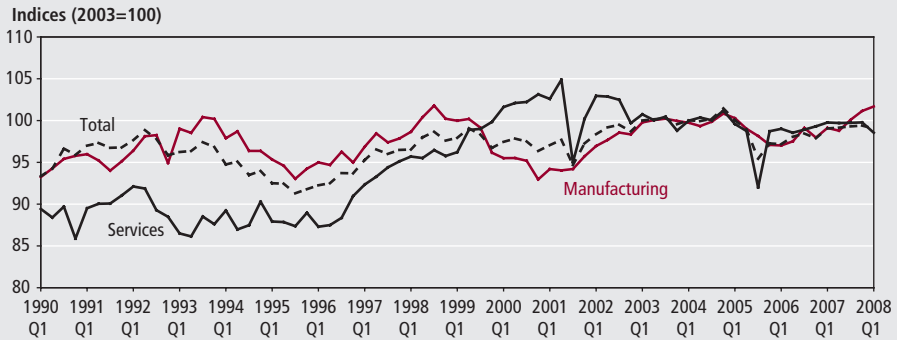


Figure 7
Terms of trade in manufacturing and services



as an improvement in the terms of trade, suggesting that the reorientation of UK trade to this sector has been beneficial. The sharp improvement in services terms of trade between 1996 and 2001 coincided with the strong appreciation of sterling, but did not adversely affect services trade volumes.

The two sharp downward spikes in 2001Q3 and 2005Q3 reflect insurance claims banked to these quarters from the 11 September terrorist attacks and Hurricane Katrina, respectively. Because volumes of insurance services output (the difference between premiums and claims) are treated as constant, the volatility in values is then reflected in the export deflator.

Because manufacturing trade represents the majority of total trade, it is not surprising that the total terms of trade is similar to that of this sector. The improvement in the terms of trade between 1996 and 1999 could well reflect the appreciation of sterling, and at the same time the Michaely index started to fall, implying the substitution effects of this were strong. An alternative hypothesis is that the trends represent the growing participation of low-cost emerging market producers in the global economy (see MacCoille 2008 for some recent analysis of the impact of low-cost producers on UK import prices).

Within the manufacturing sector, the experiences of different industries have also varied. Buisan *et al* (2006) show that certain UK industries such as medical and pharmaceuticals; radio, television and communications equipment; and office machinery and computers increased their share of global exports. However, the bulk of UK manufacturing industry, including material manufactures; motor vehicles; and clothing and footwear saw its global market share fall over the period. These trends may lend further weight to the idea that globalisation has prompted the UK economy towards its comparative advantage, not just in services, but also more specialised manufactures.

Therefore, the longer-run trend in the UK terms of trade and the ratio of command GDP to actual GDP seems to be connected with structural developments in the economy. The terms of trade have improved in both services and manufacturing, but with opposite effects on volumes. Net exports of services have grown alongside an improvement in the terms of trade, suggesting that demand for UK services is price inelastic. At the same time, improving terms of trade in manufactures have been associated with a growing deficit. The implication is that UK manufacturing trade is more price elastic and there has been substitution to lower-cost foreign producers, particularly in less specialised and lower-technology goods.

Conclusion

This article has introduced the concept of command GDP and attempted to demonstrate its potential significance in economies where trade is a significant share of GDP. Actual GDP is simply a measure of the output of an economy, so terms of trade movements are only captured to the extent that they alter patterns of exports and imports. The command GDP statistic acknowledges that terms of trade movements have income as well as substitution effects which are reflected in the purchasing power of output. Given that the recent history of the ratio of command GDP to actual GDP shows an upward trend for the UK, it is suggestive of a positive welfare effect from trade.

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