

Accounting for the stability of the UK terms of trade

By Conall MacCoille of the Bank's Monetary Policy Unit and Karen Mayhew and Kenny Turnbull of the Bank's Inflation Report and Bulletin Division.⁽¹⁾

Since the middle of 2007, the sterling effective exchange rate has depreciated significantly. Over the same period the UK terms of trade — the price of the United Kingdom's exports relative to imports — have remained broadly unchanged. Movements in the exchange rate can affect the price of exports relative to imports. But the timing, size and even direction of the impact on the terms of trade will depend on how companies respond to the movement in the exchange rate. This article considers the factors that determine how the terms of trade move in response to an exchange rate depreciation, and investigates what lies behind the stability of the UK terms of trade since 2007.

Introduction

The terms of trade measure the price of exports relative to the price of imports. They represent the purchasing power of the domestic economy — the amount of imported goods and services a country can buy in exchange for a unit of exported goods and services — and its competitiveness abroad. Therefore, any change in the terms of trade can have important implications for both domestic spending and the country's trade balance.

A depreciation of the domestic currency might be expected to cause import prices to increase which, other things being equal, would reduce the terms of trade. Between 2007 Q2 and 2009 Q3, the sterling effective exchange rate depreciated by around 20%, and import prices increased by around 15%.⁽²⁾ Despite that, however, the UK terms of trade have remained broadly stable, reflecting the fact that export prices also increased significantly.

A number of factors will determine how import and export prices respond to a change in the exchange rate. The prices of traded goods and services are likely to take time to adjust to a change in the exchange rate. That means that the initial impact on the terms of trade will depend on the currencies in which domestic and foreign companies price their exports. Over time, companies may choose to alter their prices if they judge that doing so will increase profits. How much they do so will depend on how responsive demand for their products is to changes in price. Over a longer period, a key determinant of the impact on the terms of trade will be the extent to which supply in the export sector responds to changes in profit margins following exchange rate movements.

This article explores the link between the exchange rate and the terms of trade. The first section examines what happened to the UK terms of trade following previous large movements in sterling. The article then considers how companies' pricing strategies can affect the link between the exchange rate and the terms of trade. Following that, the UK terms of trade is then decomposed by product group and region, to see if this can help explain the stability of the UK terms of trade since 2007.

The exchange rate and the terms of trade: previous episodes

Previous episodes involving significant movements in sterling may give some indication as to how the terms of trade might be affected by large exchange rate movements.

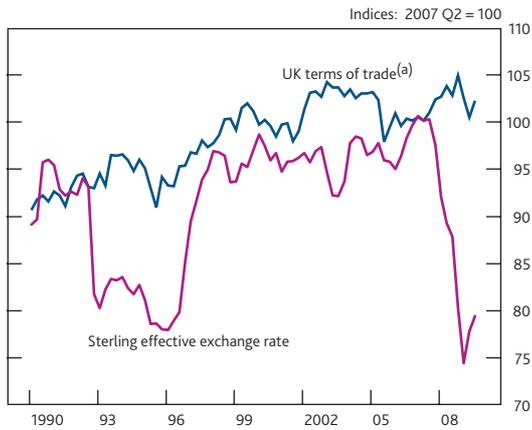
Chart 1 shows the UK terms of trade and the sterling effective exchange rate since 1990. Between 1990 and 2007, there were two episodes where sterling moved significantly. In September 1992, sterling exited from the Exchange Rate Mechanism and within three months had depreciated by around 10%. In 1996, the sterling effective exchange rate started to appreciate and by the end of 1997 had increased by around 20%.

The data in **Chart 1** suggest that the relationship between the terms of trade and the exchange rate is far from close. In the first episode, the UK terms of trade did not fall as the exchange rate depreciated. In the second episode, the terms of trade did increase as sterling appreciated, and for some time afterwards.

(1) The authors would like to thank Varun Paul for his help in producing this article.

(2) Data used in this article are to 2009 Q3 unless stated otherwise.

Chart 1 The UK terms of trade and the sterling effective exchange rate



(a) Excluding fuel and the estimated impact of missing trader intra-community (MTIC) fraud.

But Dury *et al* (2003) argue that the appreciation of sterling in the second half of the 1990s was not the reason behind the rise in the UK terms of trade. They note that the appreciation of sterling was predominantly against EU countries, whereas the rise in the UK terms of trade was predominantly against non-EU countries. In addition, the UK terms of trade actually began increasing prior to the start of the appreciation. Dury *et al* suggest that the rise in the UK terms of trade in the middle of the 1990s was most likely due to an increase in foreign buyers' demand for UK services (pushing up on UK export prices) and productivity improvements in ICT export sectors abroad (pushing down on UK import prices).

Data measurement is also likely to affect the observed relationship between the terms of trade and the exchange rate. The majority of trade prices are now measured directly from surveys. But **Table A** shows that this was not always the case. Between 1990 and 1997, the majority of trade prices were measured by taking the equivalent domestic price measures (using the producer price indices (PPIs)) and adjusting those using the exchange rate. As such, it is possible that the relationship between the exchange rate and the terms of trade in previous episodes was somewhat distorted by measurement problems.

Table A Measurement of UK import prices^(a)

	Exchange rate		
	Surveyed prices	Adjusted PPIs	Unit values ^(b)
1990–94		80%	20%
1995–97	45%	55%	1%
1998–2009	75%	25%	

Source: Statistics on Trade in Goods, *ONS Methodological Series*, No. 36, 2007.

(a) Rows may not sum to 100 because of rounding.

(b) Unit values measure the ratio of the value of shipped products to the quantity (measured as number of units).

Importing and exporting companies' pricing decisions

The response of the terms of trade will initially depend on the currency in which domestic and foreign companies set their prices. This is because prices may adjust slowly, perhaps because some companies have agreed fixed-price contracts for a period of time. But over time, companies will be able to change their prices, and so the response of the terms of trade will depend on how they do so: that in turn will depend on the relative responsiveness of export and import demand to changes in price, and the responsiveness of supply in the export sector.

The next subsection discusses how the currency companies set their prices in — their invoice currency — can influence the initial response of the terms of trade to an exchange rate depreciation. The following subsection examines how companies will respond once they are able to reset prices, for example, once fixed-price contracts come up for renegotiation. The responsiveness of supply in the export sector is then considered.

The initial impact on the terms of trade

It is likely that prices take time to adjust following a change in the exchange rate. In part, that will reflect the fact that some contracts are negotiated for a fixed period. But companies may also choose to wait and see whether or not the movement in the exchange rate persists. If prices adjust gradually then the currencies that foreign and domestic companies price their exports in will play an important role in determining the initial impact on the terms of trade.

Companies can set prices for the goods and services they export in their home currency (home currency pricing), or in the currency of the foreign destination (foreign currency pricing).⁽¹⁾ If all UK and foreign exporting companies home currency price, then the UK terms of trade would be expected to *fall* initially after a sterling depreciation — sterling export prices would be unchanged, but sterling import prices would rise. UK exports would become cheaper relative to UK imports in sterling terms.

But if all exporting companies foreign currency price, then the UK terms of trade would *rise* initially after a sterling depreciation — sterling export prices would increase, but sterling import prices would remain unchanged. In this case, UK exports would become more expensive relative to UK imports in sterling terms.

So the direction in which the terms of trade move initially will depend on the currencies in which UK and foreign companies

(1) In the literature, home currency pricing is often termed producer currency pricing, and foreign currency pricing is often termed local currency pricing. See Devereux and Engel (2003).

set prices. Indeed it is possible that the terms of trade could remain completely unchanged. That would be the case if the proportion of UK exports priced in foreign currency is equal to the proportion of foreign exports to the United Kingdom that are priced in the home currency of the exporter.

Whether companies choose to price in home or foreign currency is likely to depend on how much they expect the exchange rate to fluctuate, and how much of any fluctuation they are willing to absorb in profit margins. Foreign currency pricing means companies' profit margins will automatically fluctuate with the exchange rate (assuming that most costs are fixed in domestic currency), but sales will not fluctuate with the exchange rate — because prices are fixed in foreign currency. Home currency pricing means that exchange rate movements will affect sales but not profit margins. If exporting companies value stability in their profit margins and the cost of hedging against exchange rate movements is large, they may be less willing to set their prices in foreign currency. In addition, companies with relatively small profit margins may have little scope to absorb fluctuations without making losses. Hence, such companies may be less likely to engage in foreign currency pricing.

The volatility of the exchange rate can influence the choice of invoice currencies in trade. And Campa and Goldberg (2005) find evidence that countries with lower exchange rate variability do have lower rates of pass-through of nominal exchange rate movements into their import prices. This could suggest that exporters to markets where the bilateral exchange rate volatility is low are more likely to engage in foreign currency pricing.

Recent detailed evidence on the prevalence of home currency pricing and foreign currency pricing is somewhat limited. Goldberg and Tille (2009) suggest that around 70% of UK and euro-area exporters price in foreign currency terms, compared with less than 10% of US exporters.⁽¹⁾ But to draw firm conclusions from such estimates about the impact of an exchange rate move on the terms of trade more detailed information would be needed — for example, the proportions of UK imports from the euro area that are priced in euros and sterling.

The impact on the terms of trade over time

Over time, as contracts expire, an increasing proportion of companies will be able to reset prices. Effectively this means that companies will not be constrained by the choice of invoice currency they had been using prior to the exchange rate movement.

Price elasticity of demand

Companies will take into account the responsiveness of demand for their products to a change in price — the price elasticity of demand — when setting their prices. The price

elasticity of demand for an exported product is said to be low if changes in its price lead to a relatively small proportional change in demand. The price elasticity of demand faced by a company tends to be low for goods in niche or specialised markets where competition for market share is limited and so price changes lead only to small changes in demand.

Following an exchange rate depreciation, domestic exporters that price in foreign currency will initially see an increase in their home currency price. Since their foreign currency price will be unaffected by the depreciation, demand for their product should also be unchanged, and so higher home currency prices will lead to higher profits. But these companies may judge that profits can be raised further by cutting their foreign currency price, and boosting demand. This will depend on the price elasticity of demand — the lower the price elasticity of demand faced by the company, the smaller will be the incentive to cut prices.

For exporting companies pricing in home currency terms a depreciation will initially lead to an increase in the demand for their products, since their foreign currency price will fall. But these companies may choose to raise their home currency price so that their foreign currency price returns towards its pre-depreciation level. Again this will depend on the price elasticity of demand. In both cases, a low price elasticity of demand will tend to put upwards pressure on home currency export prices following a depreciation.

Exporters to the domestic market will face similar considerations. The lower the price elasticity of demand, the larger will be the rise in home country import prices as the foreign currency appreciates. With a low price elasticity of demand foreign exporters will face little penalty of reduced demand. This will have the effect of reducing the home country's terms of trade for given export prices.

How exporting companies respond will also depend on the nature of the competition that they face. For example, if foreign exporters are competing with domestic companies, then raising their price may lead to significant loss in market share. Conversely, if foreign exporters mainly compete with other exporting companies that have also seen their currencies appreciate, then all foreign exporters may have an incentive to raise prices, and so any loss in market share might be limited.

Globally determined prices

The price of some products such as oil and other commodities are set in global markets, typically in US dollars. Companies producing those commodities will be price-takers in their respective markets and will always take the dollar price for

(1) The results for the United Kingdom are broadly in line with a Her Majesty's Customs and Excise study carried out in 2002.

their goods. This means that the sterling price of crude oil exports and imports, for example, will move by the same amount following nominal exchange rate movements against the dollar. Indeed, the UK terms of trade for crude oil has been broadly flat over the past decade.

But there could be an impact on the aggregate terms of trade, following an exchange rate movement, if a country runs a net surplus or deficit in trade of a globally priced commodity. This is because the weight given to those import and export prices in the aggregate terms of trade will differ. The United Kingdom has in the recent past been broadly balanced in trade in oil. This means movements in sterling oil prices following exchange rate movements have little impact on the aggregate terms of trade. The United Kingdom, however, does run a net trade deficit in some other globally traded commodities, implying that exchange rate depreciations will tend to push down on the aggregate terms of trade through this channel.

The supply response in the export sector

As discussed, following an exchange rate depreciation, profit margins in the export sector may rise. Any increase in profit margins should, over time, encourage other companies to enter the export market. As supply increases in the export market, profit margins would likely fall back as a result of increased competition. As export prices decline so too would the terms of trade, for given import prices.

The responsiveness of supply to changes in price will depend upon the extent to which new companies enter the market, or existing companies expand capacity and output. If set-up costs for new firms are high or labour and capital are relatively immobile between sectors, then export prices may remain high for longer than if the responsiveness of supply was high.

The extent to which companies are willing to enter the export market or expand existing capacity will also depend upon whether they perceive the sterling depreciation to be temporary or permanent, and hence if high profit margins are expected to be maintained.

Summarising pricing decisions

Because prices may adjust only gradually, the initial impact of the exchange rate on the terms of trade will depend on the currencies in which exporting companies set their prices. As companies are able to adjust prices, it is the relative price elasticity of demand for exports and imports that will be an important determinant of the impact of the exchange rate on the terms of trade.

If the price elasticity of demand for the home country's exports and imports is low, then following an exchange rate depreciation, both the domestic and foreign exporting companies may choose to raise their prices in the home currency. The home country's terms of trade will change if the

price elasticities of demand for their exports and imports are different. Over time, as prices adjust, there may be an incentive for supply to respond and this too will have a bearing on how the terms of trade respond.

Decomposing the UK terms of trade

This section decomposes the UK terms of trade into its various components to see what lies behind its stability since 2007. It first looks more closely at movements in sterling export and import prices and then decomposes the UK terms of trade by product and area.

Sterling export and import prices

The broad stability of the terms of trade since the depreciation began in mid-2007 implies that export and import prices have moved in a similar way. In fact both import and export prices have increased by around 15% (Chart 2). So what are the potential explanations?

Chart 2 Export and import prices^(a)



(a) Excluding fuel and the estimated impact of MTIC fraud.

The stability of the UK terms of trade might reflect the pricing strategies adopted by UK exporters and foreign exporters to the United Kingdom. It would be consistent, for example, with equal proportions of UK exporting companies pricing in foreign currency and foreign exporting companies pricing in their own domestic currency. In fact, sterling export and import prices have both increased by only a little less than the exchange rate depreciation. That might suggest that a significant proportion of UK exporters have been foreign currency pricing, and a significant proportion of exporters to the United Kingdom have been home currency pricing.

But as noted, once companies are able to reset prices, the initial choice of invoice currency will no longer be a constraint. It may be that UK exporters have decided to increase their sterling prices (or allowed them to increase), so that their foreign currency denominated price remains constant, and their profit margins rise. As discussed previously, this would be

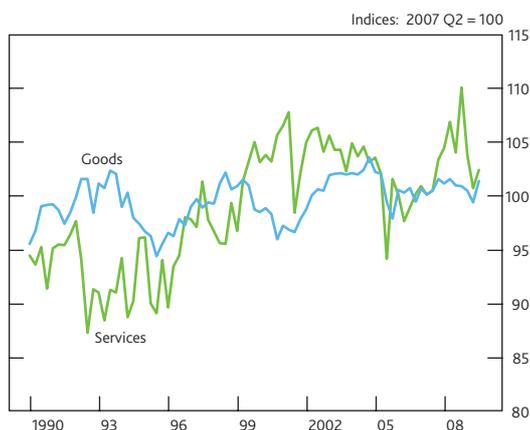
consistent with the price elasticity of demand for UK exports being relatively low, perhaps because many exporters are specialised with few close substitutes. But this increase in profit margins would be expected to encourage entry into the export sector and so over time export prices may fall back. The speed and strength of the response in supply will depend on how easy it is for companies to switch into export production.

If the price elasticity of demand for UK imports is low, foreign exporters to the United Kingdom will be more likely to push up their sterling prices in response to the sterling depreciation. But UK import prices have risen by less than the exchange rate depreciation, suggesting some foreign exporters to the United Kingdom have reduced their profit margins. It is possible that over time foreign exporters may choose to restore their profit margins, or leave the UK market, putting upward pressure on UK import prices and downward pressure on the UK terms of trade.

The terms of trade for goods and services

As well as being decomposed into export and import prices, the terms of trade can also be decomposed into the terms of trade for goods and services (**Chart 3**) separately. Also the goods terms of trade can be decomposed further into product categories. The goods terms of trade have been broadly flat, while the services terms of trade have been very volatile, but are currently at a similar level to that in 2007 Q2, prior to the depreciation of sterling.

Chart 3 The terms of trade for goods and services

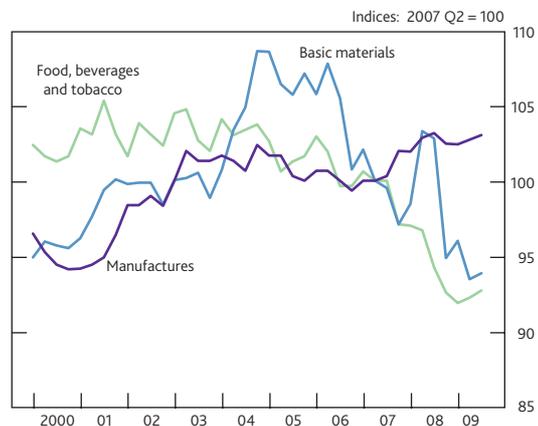


Services make up only around a third of UK trade. In addition, the ONS has few directly surveyed prices for UK trade in services, and relies on various assumptions and proxy measures to construct the services trade price deflator. And the ONS does not publish any further breakdown of the services trade price deflators into different sectors. Hence this section concentrates on decomposing the goods terms of trade.

The broad stability of the goods terms of trade (in aggregate) masks a considerable degree of variation at the product level.

Manufactured goods account for around 80% of all trade in goods and since mid-2007, the manufactures terms of trade have risen slightly. This has broadly offset sharp falls in the terms of trade for food, beverages and tobacco and basic materials (**Chart 4**).

Chart 4 The goods terms of trade by product



What might explain the contrasting movements at product level? It is possible that companies producing manufactured goods are more likely to price in foreign currency terms. This may be because the high value added in this sector means that profit margins are high and hence companies are able to absorb price fluctuations in their margins. The rise in the manufactures terms of trade would also be consistent with the price elasticity of demand for UK exports being lower than the price elasticity of demand for UK imports — this might be the case if UK exports are more specialised than foreign exports to the United Kingdom.

The fall in the terms of trade for food is likely to be explained, in part, by the relative price elasticities of demand for food in the United Kingdom and foreign markets. If the elasticity of demand for UK imports of food is lower than the price elasticity of demand for UK exports of food, then the UK food terms of trade would fall following an exchange rate depreciation. But the exchange rate depreciation is not the only factor that has affected food prices in recent years. Between August 2007 and August 2009, global food prices increased by around 15%. And it is possible that this increase also contributed to the decline in the food terms of trade, for example if cost pressures affected the price of food imports more than the price of food exports.

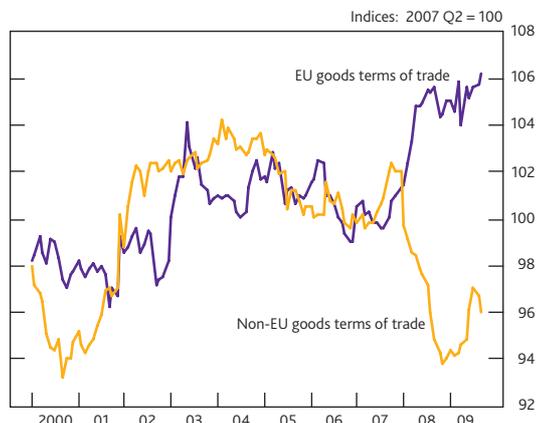
In summary, the aggregate UK terms of trade have been relatively flat since the middle of 2007. This can largely be explained by the relative stability of the goods terms of trade, which make up around two thirds of trade. The stability of the goods terms of trade can be decomposed into, first, a small rise in the terms of trade for manufactured goods — perhaps because companies have been engaging in foreign currency pricing, or perhaps because UK exports are more

specialised. And second, that had been offset by falls in the terms of trade for food and basic materials — perhaps because of the relative price elasticities of demand in the United Kingdom and abroad, or as a result of a cost shock to UK food import prices.

The terms of trade by region

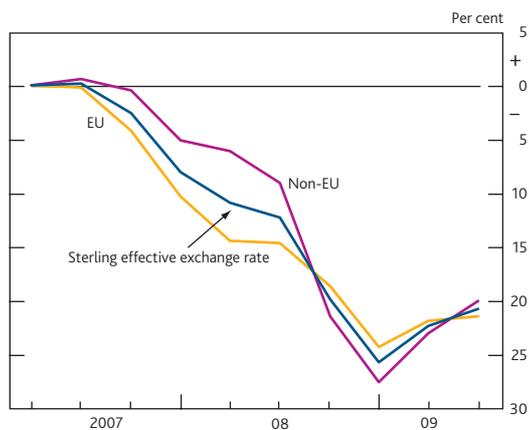
The UK goods terms of trade can also be decomposed into the terms of trade with EU and non-EU countries. The goods terms of trade (excluding oil) with EU countries have increased significantly since 2007 Q2, whereas they have fallen significantly with non-EU countries (Chart 5). But sterling has fallen by similar amounts against both EU and non-EU countries (Chart 6). So differing movements in the exchange rate cannot explain the different movements of the UK terms of trade with these countries.

Chart 5 Terms of trade with EU and non-EU countries^(a)



(a) Excluding oil.

Chart 6 Cumulative change in effective exchange rates since 2007 Q2



One possible explanation for the different movement in the terms of trade between EU and non-EU countries could be that the composition of UK trade differs between the two regions. For example, if the United Kingdom's trade in manufactured goods was primarily with the EU, then this could explain the divergence. But the composition of the

Table B UK trade in goods shares (2008)

	Food, beverages and tobacco	Basic materials	Fuels	Semi-manufactures	Finished manufactures	Misc.
UK exports to:						
EU	6.7	2.3	17.3	31.6	41.7	0.4
Non-EU	3.9	3.0	9.8	28.6	53.5	1.1
UK imports from:						
EU	11.7	2.7	6.3	27.4	51.7	0.2
Non-EU	6.1	3.7	22.4	18.6	47.9	1.3

Table C UK terms of trade with EU and non-EU countries

Percentage changes between August 2007 and August 2009

	Food, beverages and tobacco	Basic materials	Semi-manufactures	Finished manufactures	Total goods
Terms of trade					
Total	-8.1	-5.8	4.2	2.5	0.9
EU	-2.7	-3.0	6.9	8.2	5.6
Non-EU	-20.2	-10.4	0.7	-4.5	-4.2

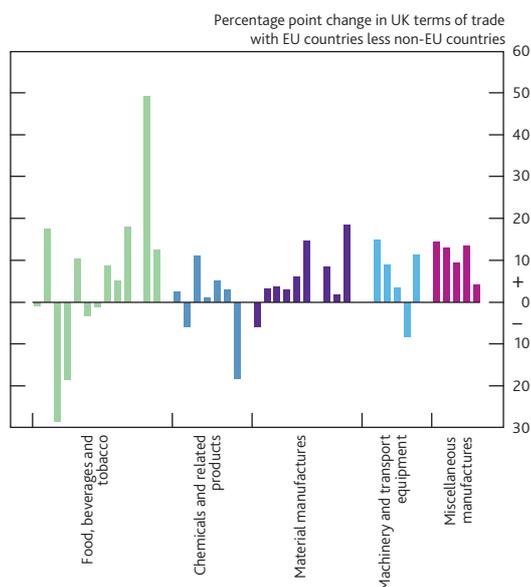
United Kingdom's trade with EU and non-EU countries is broadly similar (Table B) and therefore does not appear to be the explanation.

Table C shows the UK terms of trade with EU and non-EU countries by product. It shows that for both EU and non-EU countries, the terms of trade for food and basic materials have fallen while the terms of trade for manufactured goods have generally increased. But it also shows that for each category, the terms of trade have increased by more (or fallen by less) against EU countries compared with non-EU countries.

The contrast between the terms of trade with EU and non-EU countries can also be seen at a more disaggregated level. Separating UK goods trade into 41 sectors reveals that in 29 of these sectors (71%) the terms of trade have increased by more (or fallen by less) against EU countries compared with non-EU countries (Chart 7). And this picture is reasonably broad-based across sectors.

Another possible explanation for the different movements in the terms of trade between the two regions is that the pricing decisions of UK exporters are dependent, in part, on whether the destination country is part of the EU and in particular the euro area. More specifically, it is possible that UK exporters are more willing to price their exports in euros than in other currencies, because the more liquid foreign exchange market in euros reduces the cost of hedging the associated currency risk. UK exporters may therefore be more willing to price in foreign currency to euro-area countries than they are to non-EU countries.

Chart 7 Disaggregated sectoral differences in UK terms of trade: movements against the EU and non-EU countries (August 2007–August 2009)^(a)



(a) Two and three-digit Standard International Trade Classification sectors. The 41 sectors accounted for 87% of UK goods trade in 2008.

Conclusion

Between 2007 Q2 and 2009 Q3, the sterling effective exchange rate depreciated by around 20%, yet the UK terms of trade remained broadly unchanged. There are a number of factors that can influence the response of the terms of trade to movements in the exchange rate. And the exchange rate itself is only one possible explanation behind any movement in a country's terms of trade.

Because prices may adjust only gradually, the currency in which traded products are priced can affect the initial response

of the terms of trade to a change in the exchange rate. How companies respond once they are able to reset prices will depend on their price elasticities of demand. And it is the relative price elasticities of demand for exports and imports that will determine the response of the terms of trade to an exchange rate movement. Over time, the responsiveness of supply in the export sector will be a key determinant of how the terms of trade respond.

The recent stability of the UK terms of trade reflects the fact that sterling import and export prices have risen by similar amounts and by only a little less than the overall exchange rate depreciation. The stability of the aggregate UK terms of trade can largely be explained by the relative stability of the goods terms of trade. This can be explained by a small rise in the terms of trade for manufactured goods being broadly offset by a fall in the terms of trade for food and basic materials.

The broad stability in the UK terms of trade masks considerable differences in the terms of trade between EU and non-EU countries. The UK terms of trade with the EU has increased significantly whereas it has fallen significantly against the non-EU countries. Movements in the components of the terms of trade are likely to reflect the relative price elasticities of demand for UK exports and imports. Differing movements across regions could reflect the fact that the euro foreign exchange market is more liquid.

But if the rise in export prices is persistent, then this will create an incentive for rebalancing within the UK economy. It might encourage resources to be reallocated towards the export sector. And over time as these margins are competed away, sterling export prices would be expected to fall back and as they do so the UK terms of trade would decline.

References

Campa, J and Goldberg, L (2005), 'Exchange rate pass-through into import prices', *The Review of Economics and Statistics*, MIT Press, Vol. 87, No. 4, December, pages 679–90.

Devereux, M B and Engel, C (2003), 'Monetary policy in the open economy revisited: price setting and exchange rate flexibility', *Review of Economic Studies*, Vol. 70, pages 765–83.

Dury, K, Piscitelli, L, Sebastia-Barriel, M and Yates, A (2003), 'What caused the rise in the UK terms of trade?', *Bank of England Quarterly Bulletin*, Summer, pages 164–76.

Goldberg, L and Tille, C (2009), 'Micro, macro and strategic forces in international trade invoicing', *NBER Working Paper no. 15470*.

Her Majesty's Customs and Excise (2002), 'United Kingdom imports and exports currency of invoicing for year 2001'.