# The macroeconomic impact of globalisation: theory and evidence

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The integration into the world economy of labour-abundant economies — such as China, India and Eastern European countries — has had far-reaching effects. This is of interest to policymakers, who need to understand the channels by which globalisation is affecting the macroeconomy. This article uses an economic framework to analyse globalisation. It outlines the impact predicted by an economic model on key macroeconomic variables such as interest rates, wages and relative prices. The article then compares these predictions with the evidence, and finds that although many macroeconomic variables have responded as projected, some — in particular real interest rates and current accounts — have not.

#### Introduction

Globalisation is a widely used term. Wolf (2004) surveys the numerous definitions of globalisation, suggesting that it can be characterised as a 'movement in the direction of greater integration, as both natural and manmade barriers to international economic exchange continue to fall'. This definition includes not only the increased international mobility of goods within the world economy, but also the greater mobility of services, capital, labour and financial assets. And it encompasses many of the forces associated with globalisation: the fall in transportation and communication costs; trade liberalisation under the General Agreement on Tariffs and Trade (GATT) and the World Trade Organisation (WTO), including China's accession to the WTO in 2001; and economic and financial market liberalisation in many countries. This article uses the economic theory embodied in a macroeconomic model to examine the likely outcomes of these forces on key macroeconomic variables such as interest rates, wages and relative prices. It then compares these outcomes with the evidence, focusing in particular on the United Kingdom.

Trade between countries — and economic integration more generally — has been increasing intermittently for at least 2,000 years, as Bernanke (2006) documents. But he suggests that the recent phase of economic integration is distinguished from past episodes by its scale: 'The emergence of China, India, and the former communist-bloc countries implies that the greater part of the earth's population is now engaged, at least potentially, in the global economy. There are no historical antecedents for this development'. Grossman and Rossi-Hansberg (2006) note that, rather than countries producing different goods and then trading, as in the past, there is increasingly 'trade in tasks' with the various stages of production of an individual good taking place across a range of countries based on differences in factor costs and expertise.

The integration into the world economy of labour-abundant economies has accelerated since the early 1990s and has already had far-reaching effects — as noted by King (2006), globalisation is 'a process that has transformed supply and demand conditions across the globe'. On the demand side, sustained rapid growth in countries such as China has bolstered global output (Chart 1). China has made a significant contribution to global growth over the period since 1980, and since 1990 it has accounted for almost a third of global growth in terms of purchasing power parity (PPP). India has accounted for around 9% of global growth since 1990. Globalisation has also boosted the supply capacity of the world economy, given that a large proportion of the world's potential labour supply is concentrated in these countries (Chart 2).

Given its nature, globalisation is likely to affect a number of macroeconomic variables which are important in monetary policy making. As such, policymakers need to understand the channels by which globalisation may have an impact. For instance, Bean (2006) suggests that globalisation may have weakened the short-run trade-off between activity and inflation in three ways: increased trade and specialisation dampens the response of domestic inflation to domestic capacity pressures, and may make it more responsive to capacity pressures in the rest of the world; increased product competition from abroad may limit the extent to which companies can raise prices when domestic demand increases;



#### Chart 2 World population in 2005 by country/region



Source: IMF.

and increased potential for off-shoring of production and sourcing of workers from abroad may reduce the degree to which workers are able to bargain for wage increases when the labour market is tight.

#### How an economic model can be used to analyse globalisation

This section sets out a theoretical building block that can be used to analyse the impact of globalisation on key macroeconomic variables. As economic models typically focus on a limited number of key aspects of the economy, there is no single, all-encompassing model — or indeed theory — that can capture all the potential macroeconomic impacts of globalisation. Nonetheless, an economic model can be a useful starting point when thinking about the impacts of the integration into the world trading system of labour-abundant economies.

A traditional framework for studying trade between different regions of the world is that of Heckscher-Ohlin (HO). This

links industrial specialisation and trade to differences between countries in the availability of factors of production such as capital and labour. The HO framework generates a number of propositions. According to the Heckscher-Ohlin proposition, each region will specialise in and export products that use its abundant factor intensively. And the Stolper-Samuelson proposition states that when the relative price of a good falls, the real return to the factor used intensively in its production will fall.<sup>(1)</sup>

The HO model is a simple model that is silent on dynamic effects, such as the impact on interest rates, current accounts and capital accumulation, as different regions of the world adjust following globalisation. This article explores the issues surrounding globalisation with the aid of a dynamic general equilibrium (DGE) model of the type set out by Benigno and Thoenissen (2003). A DGE model provides a useful framework as it facilitates analysis of the initial impact of globalisation, as well as the subsequent adjustment paths and the long-run equilibrium.

In the model considered here there are two regions, corresponding to the advanced economies, 'West', and the emerging economies, 'East'. Goods are freely traded between West and East. Each region includes both consumers and firms. The consumers maximise utility by deciding on how much to consume and invest, and how much to work; and firms maximise profits. A key feature of the model is that this optimising behaviour by consumers and firms jointly determines output, consumption, wages, interest rates and investment in each region. Although the structure of the model considered here is instructive, it also has limitations. One example is that, as it includes only one type of labour, the impact on unskilled wages relative to skilled wages in each region cannot be studied.

For the purposes of the analysis in this article, an important assumption of the model is that in the initial state of the world, productivity is higher in West than in East. Globalisation is modelled as a one-off, permanent jump in total factor productivity in East. This increase in productivity in East is intended to mimic the transition of a large pool of unskilled labour from relatively low productivity sectors (agriculture) into more productive sectors (industrial production, services), that has occurred in countries such as China and India.

The general equilibrium nature of the model implies that the shock to productivity in the emerging economies has implications for a number of macroeconomic variables in both regions of the world.

(1) See, for example, Feenstra (2004) for details.

## How globalisation can affect key macroeconomic variables

This section traces out the likely impact of globalisation on key macroeconomic variables using the model outlined above as the main framework. But, as the model cannot capture all of the impacts of globalisation, it can only be a starting point for the analysis. Given this, the predictions of the model are supplemented by additional economic theory, including the Heckscher-Ohlin and Stolper-Samuelson propositions. The focus is on the effects of globalisation on specialisation and trade; the terms of trade; capital; the current account; labour; and relative prices between raw materials and final goods.

#### Specialisation and trade

In the initial state of the world, little production takes place in East for sale in global markets. But the productivity increase in East leads to a pickup in global output and an increase in the supply of cheap goods, boosting international trade. The model sketched above does not distinguish between goods and services. But, in order to analyse the effect on goods and services, the Heckscher-Ohlin proposition is useful. This states that each region specialises in and exports products that use its abundant factor intensively. Since East has a relatively large stock of unskilled labour, this suggests that East exports manufactured goods in exchange for West's services, the production of which require a more skilled labour force.

#### Terms of trade

With an increase in the supply of goods from East, the model suggests that the price of goods produced in East falls relative to those produced in West. Since West is a net exporter of services, this is equivalent to a fall in the price of manufactures produced in East relative to the price of services produced in West. In other words, West experiences an improvement in its terms of trade and East's terms of trade deteriorates. There is also an appreciation of the real exchange rate of West, defined as the price of the consumption basket in West relative to the price of the consumption basket in East. This reflects the fact that goods produced in West have a large weight in West's consumption basket. As the model predicts that goods produced in West have become more expensive relative to goods produced in East, this larger weight on home-produced goods implies that the relative price of West's consumption basket rises.

#### Capital

In order for East to manufacture goods, investment in plant and machinery is required. In the model, globalisation leads to a rise in investment in East which is driven by the higher returns to capital as a result of the increase in productivity. The model also suggests that investment in West rises slightly. Investing in capital becomes more profitable given the fall in import prices — including of capital goods — from East. As a consequence of the increased returns to capital, global real interest rates rise. Another way of thinking about this is that the integration of East increases the world economy's effective labour supply. As the world capital stock takes some time to adjust, the world economy's effective capital-labour ratio initially falls. So the return on capital (the real interest rate) increases to restore that ratio. In the long run, as the capital stocks in East and West approach their new and higher levels, real interest rates fall back and eventually return to their initial level. Investment also eases in the long run, but remains above its pre-globalisation level as more gross investment is needed to support the higher capital stock.

#### **Current account**

In the model, East has high levels of investment in order to build up its capital stock. As a result, investment exceeds saving, leading to a sustained period in which East runs a current account deficit, matched by West running a current account surplus.

#### Labour

In the model, the rise in total factor productivity boosts the real wages of workers in East. As globalisation allows consumers in West access to cheap manufactures from abroad, the model suggests that the real consumption wage workers' take-home pay relative to the retail prices of goods and services — in West also rises. In the model, there is only one type of labour in each country. But in order to analyse the effect on unskilled and skilled labour, the Stolper-Samuelson proposition can be used. This states that when the relative price of a good falls, the relative real return to the factor used intensively in its production, will fall. Increased competition from East reduces the price of labour-intensive goods in West. Therefore, in West real wages paid to unskilled labour fall relative to the real wages paid to skilled labour.

#### Relative prices between raw materials and final goods

In the economic framework considered in this article, the price of raw materials relative to final goods is not modelled. But simple supply and demand analysis suggests that globalisation is likely to affect the relative prices of raw materials and final goods. The increase in global production associated with globalisation requires additional raw materials and is likely to be associated with rises in the relative price of materials such as oil and metals. Assuming that the supply of raw materials is fairly inelastic, the increase in their demand results in a persistent increase in their relative prices.<sup>(1)</sup> The price of final goods relative to raw materials is likely to fall as a consequence of globalisation, given that the labour cost of production has decreased. However, it is likely that wages in East — and the relative prices of goods produced there — will

Note that if the rise in demand for raw materials had been perfectly anticipated, their prices would have risen in advance of globalisation rather than following it.

rise towards wages in West in the long term as surplus labour in East is eventually absorbed into the productive sector of the economy and the amount of spare capacity in the economy falls.

It is important to note that such price changes are relative rather than absolute. In the medium to long run, inflation will be determined by monetary policy. Falling prices in some parts of the economy will be offset by rising prices in other parts of the economy. This will happen via a number of channels: as the policymaker adjusts policy to meet the inflation target; as consumers spend the increase in their purchasing power associated with lower prices of imported finished goods on other goods and services; and as companies respond to the higher prices of raw materials by attempting to cut other costs of production. Unless globalisation has altered the nominal target variable for monetary policy, it should not affect the medium to long-term level of inflation. Globalisation may have affected the dynamics of the inflationary process, however, as noted by Bean (2006).

**Table A** summarises what the theory outlined above implies about the impact of globalisation. It focuses on the initial impact of globalisation and the period over which the economies adjust, rather than on the very long-run effects.

Table A The predicted impact of globalisation on key macroeconomic variables

	East	West
Specialisation and trade	Increase in output, in particular of unskilled labour-intensive final goods	Production shifts to skilled labour-intensive services
Terms of trade	Deteriorate	Improve
Capital	Increase in investment	Slight increase in investment
	Global real inter	est rates rise
Current account	Deficit	Surplus
Labour	Real wages rise	Real wages for unskilled labour fall relative to skilled wages
Relative prices between raw materials and final goods	Increase in the relative price of raw materials (oil, metals)	

Fall in the relative price of final goods

#### Assessment of the evidence

This section offers a brief overview of the empirical evidence on the variables considered above, noting the extent to which recent economic developments, in particular in the United Kingdom, are consistent with the predictions outlined above and where they differ.

#### Specialisation and trade

The predicted increase in output in East is consistent with the rapid output growth in China and, to a lesser extent, India and

Chart 3 Share of annual world GDP (PPP weighted), 1980–2005



other emerging economies in Asia (**Charts 1** and **3**). Lomax (2006) notes that China is now an important part of global and regional supply chains for the production of low-cost manufactured goods and that it now produces 80% of the world's photocopiers, 50% of the world's textiles and 50% of the world's computers.

In the G7 countries, the industrial structure has shifted away from manufacturing and towards services, in line with the prediction of a decrease in the share of production that is intensive in unskilled labour in West and an increase in the share of production that is intensive in skilled labour. Charts 4 and 5 show the changes in the share of services and manufacturing in nominal GDP for the G7 countries since 1980.<sup>(1)</sup> They suggest that since the early 1990s the United Kingdom's industrial structure has changed by more than the other G7 countries.<sup>(2)</sup> The sharp fall in the relative size of the UK manufacturing sector partly reflects increased competition from low-cost countries, in common with the other G7 countries. But it also reflects UK-specific factors, such as the appreciation of sterling in the mid-to-late 1990s.<sup>(3)</sup> Moreover, it is not a recent trend: Besley (2007) notes that the shift of the UK economy from manufacturing towards services has been taking place for more than 50 years.

#### Terms of trade

The United Kingdom has increased the share of goods it imports from emerging economies since the mid-1990s, and reduced the proportion it imports from the advanced economies (**Chart 6**). Over a similar time period, the United Kingdom has become more specialised in business and financial services, as noted by Besley (2007). The United Kingdom's terms of trade have risen since the late

As these shares are nominal, a fall (rise) in the relative price of manufactures (services) will contribute to the fall (rise) in the share of manufactures (services).

<sup>(2)</sup> To ensure that the shares are comparable across countries, OECD data are used.

National data sources show a similar picture.

<sup>(3)</sup> See for instance Buisán et al (2006).







### Chart 6 Cumulative shift in the share of UK expenditure on imported goods since 1995



(a) Rest of the world is calculated as a residual.

 (b) Prior to 1998, data for the EU25 are calculated by adding together imports from the EU15 and the ten Accession countries.





(a) Excluding missing trader intra-community (MTIC) fraud.

1980s, reflecting a rise in the price of exports relative to imports (**Chart 7**). This suggests that the United Kingdom has been able to adapt and to exploit its comparative advantage in the globalised economy. Dury et al (2003) report that the terms of trade for the United States and Germany rose slightly between 1995 and 2002, whereas for some other advanced economies they were flat or fell. Although the model predicts a fall in the terms of trade in the emerging economies, the Chinese terms of trade have been fairly stable since the early 1990s. The World Bank (2006) suggests that this may reflect China expanding the variety and quality of the products it exports. And Grossman and Rossi-Hansberg (2006) note that a wide range of tradable services are being developed in India. As such, while the UK terms of trade have risen as predicted, the evidence for other economies is ambiguous.

#### Capital

Data for emerging economies can be very uncertain but, according to the available data, investment has grown rapidly in China since the early 1990s, in line with the predictions of the model. The data reports that investment now accounts for 45% of Chinese GDP, up from less than 24% two decades ago.





This is high in comparison with all of the advanced economies and even other emerging economies (**Chart 8**). In the advanced economies, the change in the industrial structure will have required additional investment in expanding sectors, such as services. But insofar as these sectors are less capital-intensive than manufacturing, the net effect of globalisation may have been to depress business investment in the advanced economies. Gieve (2006) presents data that show that in the United Kingdom some service sectors are more capital-intensive than manufacturing, and in the aggregate, non-manufacturing is slightly more capital-intensive than manufacturing. So the evidence is ambiguous and it is not clear whether globalisation has boosted or depressed investment in the advanced economies.

Real interest rates have fallen since the early 1990s in the United Kingdom, United States and other advanced economies, reaching particularly low levels in recent years (**Chart 9**). This is at odds with the predictions of the model. There are two main candidate explanations, which relate the low level of global real interest rates to the global savings-investment balance. The IMF (2005) emphasise the role of investment, which is low relative to its normal cyclical relationship with growth. They suggest that this reflects companies in many countries using their revenues to repay debt rather than spending on new capital equipment.

Chart 9 Real interest rates in the United Kingdom, United States and Germany



By contrast, Bernanke (2005) suggests that the low level of real interest rates reflects high desired saving. Some of this saving is in the advanced economies, related for instance to the expected increase in the number of retired people relative to workers. But Bernanke suggests that the increase in desired saving over the past decade has been driven by the emerging economies. This reflects a change in their behaviour following the financial crises in emerging markets in the late 1990s, which led emerging economies to accumulate foreign reserves, both to hold as a buffer against potential capital outflows and to prevent exchange rate appreciation to foster export-led growth. Dooley, Folkerts-Landau and Garber (2004) argue that the emphasis of a large number of emerging economies on managing their exchange rates has led implicitly to a revived version of the Bretton Woods system.

#### Current account

In contrast to the predictions of the model, the developing economies in aggregate have run current account surpluses since the late 1990s (Chart 10). This is dominated by China's current account surplus, which has outweighed the impact of India's recent, small current account deficit. The counterpart to this has been an increase in the US current account deficit, with the United Kingdom and Australia also running current account deficits. But there have been large surpluses in most other advanced countries such as Germany and Japan. The Middle East's surpluses have increased in recent years, associated with the rise in oil prices.





This pattern of current accounts may be explained by factors relating back to savings, specifically to the allocation of savings across assets and markets. Caballero, Farhi and Gourinchas (2006) emphasise the comparative advantage of the US financial system, reflecting strong institutions and good corporate governance. A key feature of their argument is that, by contrast, emerging economies are unable to provide saving instruments that are a good store of value, for example because property rights are not sufficiently well defined. As a consequence, savings are primarily directed into US assets, helping to finance the US current account deficit. Miller and Zhang (2007) present a model in which the emerging economies are highly concerned that their consumption does not fall in the event of a drop in incomes as happened during their financial crises of the late 1990s. This results in high precautionary savings by consumers there which are directed into US assets, associated with a current account deficit in the advanced economies and a current account surplus in the

emerging economies. Such factors may help explain why emerging economies have been lenders rather than borrowers in international capital markets, and why global real interest rates have been low as discussed above.<sup>(1)</sup>

#### Labour

In line with the prediction of the model, wages in the emerging economies have risen. The OECD (2005) finds that since 1980 average incomes in China have increased almost eightfold and urban wages have increased 18-fold, consistent with higher productivity in the manufacturing sector.

In the advanced economies, there is some evidence supporting the prediction of increasing dispersion of wages between skilled and unskilled labour. The OECD (2006) notes that pre-tax earnings inequality within the employed population has generally increased in favour of skilled labour in the OECD countries since 1994. Also the pace of the increase in earnings inequality accelerated relative to the previous decade. But factors other than globalisation may also have led to an increase in wage inequality. For instance, Guscina (2006) suggests that technological change — in particular the IT revolution — may have been biased in favour of those with higher skills.

#### Relative prices between raw materials and final goods

The predicted increase in the demand for raw materials associated with increased world output is consistent with the rise in the prices of oil, energy and metals in recent years (**Chart 11**). By contrast, UK goods price inflation has been subdued for most of the past ten years, as noted by Bank of England (2007). Pain, Koske and Sollie (2006) attempt to isolate the effect on raw materials prices of demand from the emerging economies. They present a scenario which assumes that since 2000 these economies grew at the same (lower) rate as the advanced economies. Were this to have happened, oil prices would have been up to 40% lower, and metals prices 10% lower, in real terms.

#### Chart 11 World commodity prices

- Economist price index metals (right-hand scale)
   Economist price index all items (right-hand scale)
- Brent crude oil (left-hand scale)



As noted above, the relative price changes associated with globalisation should not affect consumer price inflation in the medium to long term, which is determined by monetary policy.

Table B updates Table A with the observed outcomes, marked as ✓ for positive evidence, X for negative evidence and ? for ambiguous evidence.

 Table B
 The predicted and actual impact of globalisation on key macroeconomic variables

	East	West
Specialisation and trade	Increase in output ✓, in particular of unskilled labour-intensive final goods ✓	Production shifts to skilled labour-intensive services ✓
Terms of trade	Deteriorate ?	Improve ?
Capital	Increase in investment $\checkmark$	Slight increase in investment ?
	Global real interest rates rise 🗡	
Current account	Deficit 🗡	Surplus 🗡
Current account Labour	Deficit X Real wages rise ✓	Surplus ✗ Real wages for unskilled labour fall relative to skilled wages ✓

#### Conclusion

The economic theory underlying this article suggests that the integration of China, India, Eastern Europe and other labour-abundant economies into the world trading system is likely to have an impact on a number of key economic variables in the advanced as well as in the emerging economies. As **Table B** shows, much of the empirical evidence thus far seems consistent with the analysis of how globalisation is likely to affect key macroeconomic variables although it is often hard to isolate the effect of globalisation from other changes in these economies.

There are two key 'puzzles' where the evidence does not match up with the predictions from the theory: the pattern of current account imbalances and the low level of real interest rates. Some of the candidate explanations for these puzzles relate to differences between the advanced and the emerging economies, such as differences in property rights and financial infrastructure, and the emerging economies' desire to accumulate foreign reserves.

 See also Lucas (1990) for a review of the possible explanations for capital flows from emerging to advanced economies.

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