Trade, exchange rates and income distribution

A research topic and a comment on global governance

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The analysis in this paper is prompted by scepticism about the role of exchange rate adjustment in the resolution of problems of global imbalance considering in particular the correlation of purchasing power parities with per capita income which has become more pronounced in recent decades (Bergin et al. 2004). The paper may help to explain why globalisation has resulted in increasing inequality within countries evidenced by rising Gini coefficients.

There are two relatively extreme views about the equilibrium exchange rate. On one view, the exchange rate should settle at a level that brings demand in each country to its productive potential. This view is implicit in CGE models where output and income are determined by the supply side and competition in the labour market brings about full employment (see Taylor and von Armin, 2006). On the other view the equilibrium exchange rate is the level which achieves an acceptable internal distribution of income. This view is typical of structuralist models in which changes in nominal exchange rates result in wage and price changes that tend to restore the pre-existing income distribution.

There is evidently a third more optimistic possibility; namely, that changes in exchange rates alter the distribution of income and in particular the profitability of exports. Therefore in economies with structural under-employment exchange rate devaluation may make it possible to achieve a higher GDP growth rate accompanied by increased productivity growth and reductions in under-employment. This view accords with experience, at least for some countries and historical periods - China being in most people's opinion a topical example. But as this paper seeks to point out, there is also some truth in the idea that the equilibrium real exchange rate is strongly influenced by the existing economic structure, in particular the distribution of income, implying that changes in the nominal exchange rate will tend to be offset by movements of the internal price level. This implies that the role of exchange rate policy as an instrument for accelerating economic development is limited.

The analysis that follows examines the relationship between real exchange rates and the distribution of income, the latter being considered in two parts - distribution between countries and distribution within countries.

The first section reviews income distribution between countries and its relationship to exports, import propensities and capital flows and points out that trade performance is driven by many other factors in addition to the real exchange rate. We then proceed to

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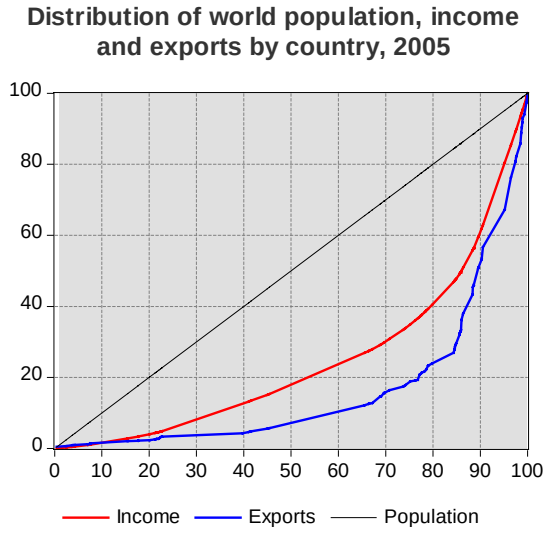
consider the well-known paradox that high income countries with the strongest trade performance have the highest real exchange rates.

It is generally agreed that this paradox has to be explained by changes in the relationship between tradeable and non-tradeable production sectors as economic development proceeds. It is these changes which influence, to a large degree, the internal distribution of income. In the case of tradeable sectors the key issues are real wage costs and output per person which together determine the profitability of exports. The behaviour of income, employment and productivity in non-tradeable sectors is more controversial. According to the competition model, wages and profit shares should tend to equality across sectors. Therefore differences in the relative price of tradeables and non-tradeables should reflect differences in productivity (Balassa 1964, Samuelson 1964). On the other hand in structuralist models the low level of real exchange rates in low income countries is explained by competition in non-tradeable sectors holding the level of prices and wages in these sectors far below that in tradeable sectors that are more closely aligned with global markets.

This brings us to the consideration that there are limits to the role of exchange rate realignment as an instrument for securing convergence of income levels between and within countries, posing a difficult question about how an improved distribution of income can be achieved in the context of market-driven globalisation. Although low and middle income countries may achieve a degree of catching up through internal policies, it seems likely that global regulation and redistribution is required to compensate market forces that in many regions perpetuate or intensify income inequality.

1. Export-led growth



The distribution of income between countries remains extremely unequal even though there has been a degree of convergence in recent decades due to rapid GDP growth in most countries in Asia. Countries in the top 20% by per capita income still receive 60% of world income. Those in the bottom 50% receive less than 20% of world income.

In other words, per capita income of one half of the world's population is less than one-quarter of the level achieved by the other half of the world's population.

If we examine exports per capita we find that countries in the top 20% by per capita income produce 75% of world exports. Those in the bottom 50% by per capita income produce 7% of world exports. Exports per capita of the low-income half of the world's population are less than one twelfth of the level achieved by the other half.

There are three views about how this imbalance could be resolved.

According to the neo-classical model market forces will ensure that low income countries catch up provided their institutions do not obstruct globalisation and the free play of internal markets. This is the celebrated factor-price equalisation theorem which states that in a free trade system incomes tend to be equalised without requiring a free international labour market, or in other words, extensive international migration (Ohlin 1933).

A more pragmatic view of international competition allows for the impact of structural differences but asserts that each country or country group must look after its own interests and find its own way to achieve economic development while respecting international rules.

The problem that has to be faced is that many low and middle income countries have been unable to achieve significant catching up in recent decades as global market integration proceeded. This suggests that structural policies are required at the global level - a topic to which we shall return at the end of the paper.

The relationship between trade performance and GDP can be expressed quite simply by considering the balance of payments identity

$$X - M + K - R = 0$$

where X denotes exports and other receipts of income from abroad

M denotes imports and external income payments

K denotes net capital inflows

and R represents the accumulation or drawing down of exchange reserves.

Writing m to denote the ratio of imports to gross domestic product Y, the balance of payments identity may be rewritten as[2]

$$Y = (X + K - R)/m$$

The elements of this relationship may be illustrated by a simple table:

(US $ per capita, 2005)

	X	***K - R***	***m***	***Y***
USA	4,334	2,637	0.167	41,807
China	915	-88	0.475	1,743
Africa	309	-53	0.321	798

If we examine historical performance for all countries over the past three decades we find that net capital flows and reserve accumulation, $K - R$, which together are equal and opposite to the balance of payments current account, have with few exceptions been very small. The one dramatic exception which has attracted huge attention is the USA as illustrated in the table above.

When net capital flows and reserve accumulation are small, GDP is nearly equal to X/m. Given that globalisation implies an increasing level of imports relative to GDP it follows that export performance has been the most critical factor for GDP growth in recent decades.

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[2] McCombie and Thirlwall, 1993.

2. The drivers of export performance

If we think of world markets as being highly competitive and readily accessible to producers in all countries, irrespective of the level of income and other factors such as resource endowment and institutional structure, we should expect that low and middle income countries could rapidly increase their shares of world exports ensuring convergence as implied by the factor price equalisation theorem.

The fact that this has not happened for so many countries can either be blamed on the countries themselves, in particular on institutional obstructions to the play of market forces, or may be attributed to high costs of entry and control of world markets by international companies that are the main vehicle for world trade, extending their reach through mergers and acquisitions.

In modern oligopolistic markets the instruments of market control are branding and, increasingly, innovation in terms of products and processes[3]. Commercialisation of new technology and protection of intellectual property rights (IPR) requires major investments that can only be managed by large companies with ready access to global markets. Such investments often have a huge pay-off in terms of growth of sales, productivity and profitability. But world stock markets are dominated by a few hundred blue chip companies covering most sectors of world trade. Complex rules designed to promote transparency and multilateralism on the one hand and counter-acting regulations introduced by governments anxious to protect domestic industries on the other, not to mention the need to undertake massive promotional campaigns in each national market, give a major advantage to the largest companies that have the financial and organisational resources to extend their reach across the globe.

We may examine international trade as a competitive process between countries or as a competition between networks of large multinational companies. Policy discussion tends to emphasise the countries rather than the firms. In reality governments have tended to become the suitors of firms. Governments must compete in the offer of privileges to international business in order to persuade them to locate production in their country. Many people in rich and poor countries alike fear that such competition implies a 'race to the bottom' in terms of social and distributional consequences in each country and world region. On the other hand it must be recognised that the premium attached to product and process innovation, accompanied by investment in social and physical infrastructure, has generated major benefits for a large proportion of the world's population - and that there are substantial benefits to local sub-contractors, spread also by cross-border trade and local migration, in regions of the world that attract a growing share of world production of tradeables.

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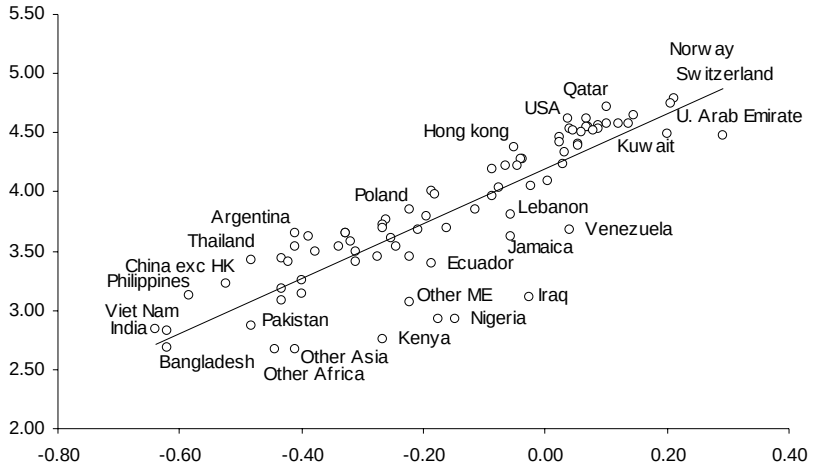
[3] Political power is of course not strange to the dynamics of market control. But we may assume that geopolitics follow, rather than lead, the accumulation and concentration of economic power.

Country	*Rating*
France	AAA
Chile	AA
Malaysia	A+
China	A
India	BBB-
Brazil	BB+
Turkey	BB
Nigeria	BB
Venezuela	BB-
S&P: May 2007	

For regions and individual countries at the bottom of the income hierarchy there are many difficulties. Firstly these countries do not have the resources to provide the social and physical infrastructure required to attract international business. Secondly participation of low-income countries in international trade may imply extremes of inequality within each country that make it very difficult to achieve political stability and security. Below a certain income threshold most countries cannot get the BBB rating that is considered to provide the necessary security to global investors. In the worst case this means that international business is channelled through the least reputable companies willing to take high risks in terms of social responsibility in order to extract abnormally high profits.

3. The exchange rate paradox

In recent decades it has become apparent that the most successful countries have the highest real exchange rates.



Income per capita at market prices against real exchange rate, 2005

The relationship has become noticeably stronger. In 1970 the mean coefficient of the relationship between the real exchange rate and income per capita was 0.1. In other words the real exchange rate increased by 1% for every 10% movement up the per capita income ladder. There was very wide dispersion of the relationship in individual countries. By the late 1990s the mean coefficient had increased to 0.3 and dispersion was greatly reduced. Since the late 1990s the slope and dispersion have remained about the same.

There are several possible explanations for this paradox.

First we may note that the price of tradeables is generally analysed in terms of unit labour costs and the share of profits. This approach has been particularly popular in high income countries and is usually applied to manufacturing industries that were considered to be the most dynamic component of their exports.

In a simplified analysis of costs and profitability the price of manufactured exports *p* may be considered to be determined by a markup on unit labour cost:

$$p = u(1+\pi)$$

where *u* denotes labour cost per unit of output

and π is the profit markup.

Unit labour cost itself is determined by the net result of wage pressure on one side and productivity growth, measured by output per person employed, on the other:

$$u = w / b$$

where *w* denotes the average wage rate

and *b* is output per person employed.

When countries eliminate tariffs and export subsidies, the price of tradeables tends to equalise through competitive pressure. Using the international price as the numeraire, the share of profits in value-added, *s*, is given by

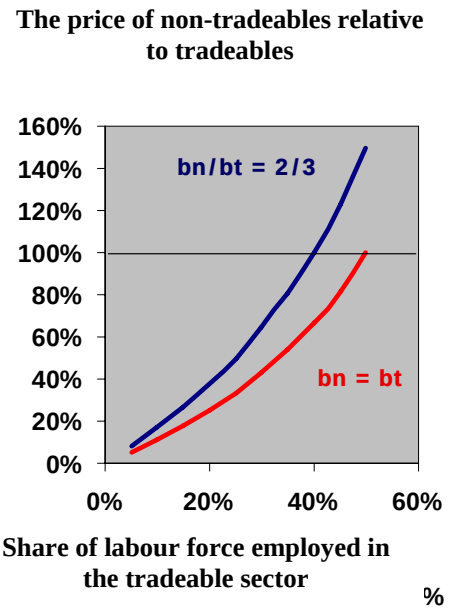
$$s = 1 - u$$

More complex measures of total productivity, taking account of costs of capital, raw materials and intermediate inputs and variations in labour quality and hours worked, do not result in a very different picture. The most significant factor is still the relationship between wage costs on the one hand and productivity on the other.

The analysis of unit labour cost and profitability implies that real exchange rate depreciation would raise the profitability of production of tradeables providing an incentive for increased exports and reducing the domestic market share of competitive imports, thereby correcting balance of payments deficits and promoting faster growth of GDP. The main anxiety is that wages in tradeable sectors would rise, reducing the benefit of devaluation, and that the increase in wages in these sectors together with higher cost of imports in terms of domestic currency will lead to a generalised increase in prices across the economy.

In relatively successful countries it may be preferable to maintain a stable exchange rate and seek to maintain a low level of unit labour cost by encouraging productivity growth through elimination of inefficient producers and measures to inhibit wage increases. Although such policies may cause deflation and unemployment in the short run, it is expected that the eventual benefits to export performance will result in faster GDP growth and reabsorption of unemployed workers in non-tradeable sectors.

For people who believe in the merits of highly-competitive internal markets, devaluation is not a good remedy for problems of external trade performance. Countries like Germany which get the gold medal for export performance do not see any benefit in cheapening their currency or protecting inefficient industries.



Share of labour force employed in the tradeable sector

4. The impact of trade performance on non-tradeable sectors

Incomes in non-tradeable sectors depend on the success of tradeable industries in maintaining a country or region's share of trade. If a proportion *a* of income in each city, region or country is spent on tradeables, the remaining portion (1 - *a*)*Y* is spent on local goods and services generating income in non-tradeable sectors:

$$Y \equiv aY + (1-a)Y \equiv e_t.y_t + e_n.y_n$$

Value-added per capita in each sector depends on the number of people employed:

$$y_n / y_t = \frac{(1-a)}{a}\frac{e_t}{e_n}$$

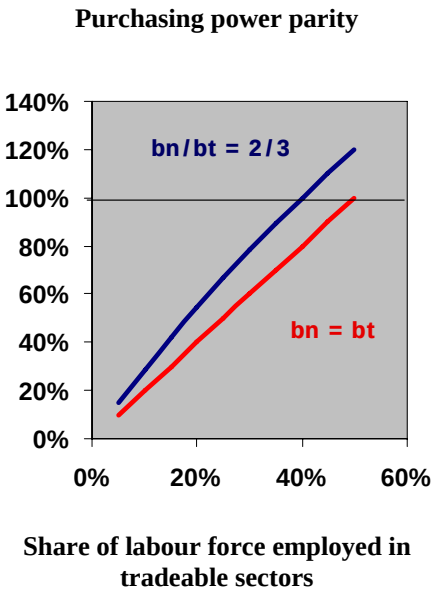
where y_n, y_t denote income per capita of non-tradeable and tradeable sectors and e_n, e_t represent employment in the two sectors.

The chart shows the implied relationship between income per capita in the two sectors and the distribution of employment when expenditure is allocated 50% to each sector. It illustrates an algebraic relationship. If the necessary data can be assembled it would be interesting to see whether the practical effect of this relationship can be identified in cross-section time-series data for value-added and employment in agriculture, extractive industries, manufacturing and services for a sufficient number of countries.

If barriers to entry in non-tradeable sectors are low, most people seeking work will be able to find a local niche. Unless the region is outstandingly successful in trade, drawing a large number of people into export industries, value-added per capita will be lower in non-tradeable sectors as the available income is shared between a large number of small businesses. There may be open unemployment if people who used to work in high-wage tradeable sectors cannot find jobs with equal pay in non-tradeable employment or if there are significant barriers to entry in non-tradeables. There is usually a policy dilemma regarding wages and conditions of work in non-tradeables. Labour legislation to improve wages and conditions in low-income occupations reduces inequality between people employed in different sectors but may also have the side-effect of reducing the number of jobs available if there is not enough income to go round.

Differences in wage rates between the two sectors depend on the share of profits as well as value-added. If, as may be expected in a low income economy, the profit share is higher in tradeables, the wage differential will be less than the value-added differential.

The price of non-tradeables depends on productivity as well as the shares of each sector in income and employment.



Taking the price of tradeables as 1

$$p_n = \frac{(1-a)}{a}\frac{e_t}{e_n}\frac{b_t}{b_n}$$

where p_n denotes the price of non-tradeables, and b_t, b_n denote output per person in each sector.

The chart shows how the relative price of non-tradeables would vary relative to tradeables when expenditure is allocated 50% to each sector.

This relationship is important for comparisons of purchasing power between regions and countries. Again it would be interesting to see how this relationship works out using cross-section time-series data for broad sectors for a large sample of countries.

5. Purchasing power parity (PPP)

GDP comparisons of income across regions and countries do not take account of differences in price levels. The purpose of purchasing power parity estimates is to correct for the differences in price levels (UN Statistical Division 1992).

The main difficulty in constructing PPP estimates is the comparison of price levels or quantities produced when there are large qualitative differences in the products and services consumed in each country or region.

It may be asssumed that tradeable products are relatively uniform and that, in the absence of export taxes or import tariffs, their prices are relatively uniform in money terms when measured in common currency at current exchange rates. This is the more true, the greater the degree of openness or integration of the different economies and the lower the cost of transport between them. Thus it may be expected that globalisation tends to bring prices of tradeables closer together.

If the price of tradeables is more or less equalised, differences in price levels are dominated by the price of non-tradeables discussed previously. Retaining the convention that the price of tradeables is 1, purchasing power parity must satisfy the following relationship:

$$ppp = \frac{1}{a(1+\frac{e_n}{e_t}\frac{b_n}{b_t})}$$

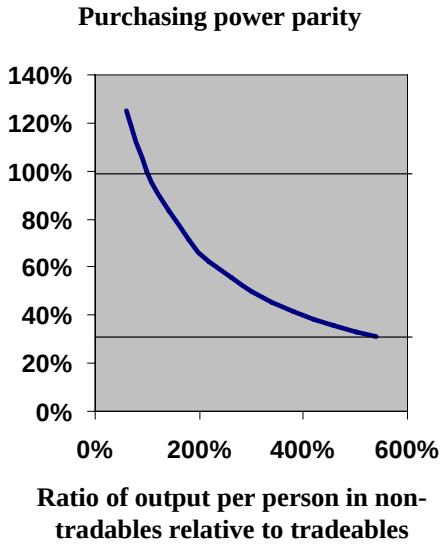
As noted at the beginning of this paper, PPP is typically much lower in low income countries than in high income countries. Taking PPP as 1 in high income countries such as the USA, the figure for most low income countries is around 0.3 - in extreme cases it has been reported in UN statistics as around 0.2.

The explanation of this phenomenon implied by the relationship above is that in low income countries employment and output per person are relatively high in non-tradeable sectors compared with tradeable sectors in the same country and compared

with the share of income spent on tradeables. In principle a low income country may not have a low PPP if very little income is spent on tradeables and a sufficient number of people are employed in tradeable sectors. But typically when low income countries open up to external trade, there is a strong demand for imports of tradeables while a relatively small share of the labour force is able to gain employment in high wage or high profit export industries. In this case money GDP converted at the current exchange rate will remain low as income is diverted to tradeables. Profits and wages in non-tradeable sectors will be correspondingly low in foreign currency terms. Whether productivity in non-tradeables suffers, or to what degree, will determine whether real output and income can be maintained in the face of diversion of income to tradeables. If productivity falls too, not only money income but also real income will be depressed by such diversion.

6. The neo-classical explanation of the exchange rate paradox

The optimistic expectation of many neo-classical economists is that the world does tend to conform with the market equilibrium model. Since free trade is expected to lead to factor price equalisation with similar levels of per capita value-added in tradeables and non-tradeables, low PPP rates observed in the real world present something of a paradox. The explanation proposed by Balassa and Samuelson many years ago is that productivity in non-tradeables is much more uniform across countries than productivity in tradeables (Samuelson 1964). Using the same notation as before and taking the price of tradeables as the numeraire, the PPP rate should be given by

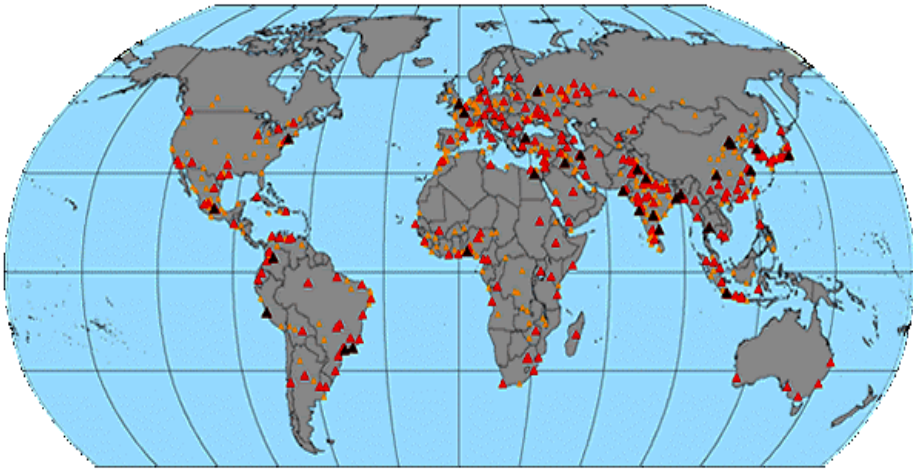


$$ppp = \frac{1}{(a + (1-a)\frac{b_n}{b_t})}$$

A possible explanation is that productivity in tradeables increases as an economy modernises while productivity in non-tradeables stagnates. This explanation is not so convincing today given the success of automation in service industries in high income countries. There is also the issue that under-employment in low income countries often depressses productivity in non-tradeable sectors.

7. Inequality and migration

Income generated by oligopolistic tradeable sectors is concentrated in specific locations, typically large cities. This has caused massive inter-regional and rural-urban migration



Historically there is an end to this story. In many parts of the USA and Europe income in non-tradeable sectors is high and may sometimes be higher than income in tradeable sectors. High labour force participation rates imply that most people who want to work were able to find jobs. People have started to move away from large cities because of problems of congestion.

There are many factors behind improvements in internal income distribution as countries reach high levels of income per capita. For example, we may expect that

- a larger proportion of income is spent on services
- internal income transfer systems become more effective
- tradeable production is more geographically dispersed.

Citizens in most rich countries have improved their security through public investments in infrastructure, education and health that promote social cohesion - financed by proportionate taxation.

8. Does a global economy require global government ?

Middle and low income countries face a dilemma. On the one hand opening the economy may provide opportunities for export-led growth and rapid growth of GDP. On the other hand it tends to exacerbate internal inequalities. Countries with very effective systems of government can hope to encourage export-led growth through investment in physical and social infrastructure and at the same time resolve the dilemma, or at least mitigate the impact, through internal redistribution. Countries that fail to make the grade may find everything going into reverse. Unequal internal distribution erodes the efficiency and legitimacy of government and discourages location of tradeable production in the country. This suggests that international rules need adjustment to support development strategies that give priority to internal development as a necessary precursor to integration with global markets.

In any case it is clearly necessary to reach an improved understanding of linkages between external policies and internal income distribution. This paper has suggested a pattern of linkages but considerable empirical research is required to determine their practical significance.

Finally, we may observe that international institutions have increasingly emphasised standards of governance as a pre-requisite for success in each country. Governments

should be representative of people, not market power. Executive bodies must be subordinate to and accountable to the legislature. Compliance with the law must be enforced by the judiciary, applying the law in an even-handed way. If these requirements are not met it is difficult for governments to be effective and, ultimately, to maintain their legitimacy.

There has not been so much public discussion of standards of governance at the global level as applying, for example, to the UN itself and institutions in the UN family including the IMF, World Bank and WTO. Despite the universalist language of their charters, these institutions have tended to act as power brokers seeking compromise rather than ensuring justice and equal treatment.

The weakness of global government is a serious matter when market-led globalisation exerts a powerful influence on internal developments in almost every country. Without common standards and generalised preferences in support of lower income countries and regions it is hard to imagine how imbalances in the world economy can be resolved.

The UN system would arguably be more effective if UN agencies were accountable to the General Assembly with financial contributions assessed on the basis of ability to pay and if the conduct of international business were subject to international law rather than weak and uneven supervision by governments of countries where the companies are registered.

References

Balassa B. 1964, "The Purchasing Power Parity Doctrine: A Reappraisal", Journal of Political Economy, vol. 72, December, pp. 584-596

Bergin P., R. Glick and A. Taylor 2004, "Productivity, Tradability and the Long-Run Price Puzzle", FRBSF Working Paper #2004-08

Cripps F. and N. Khurasee 2007, "Introduction to the SOWE Database and Model of the World Economy", version 2.0, IPC Brasilia

McCombie J. and A. Thirlwall 1993, "Economic Growth and the Balance-of-Payments Constraint", New York: Macmillan

Ohlin, B. 1933, "Interregional and International Trade"

Samuelson P. 1964 "Theoretical Notes on Trade Problems", Review of Economics and Statistics, volume 23

Taylor, L. and R. von Arnim. 2006. Computable General Equilibrium Models of Trade Liberalization: The Doha Debate. Oxfam Policy Paper. June.

UN Statistical Division 1992, "Annex II Methods of Aggregation", Handbook of the International Comparison Program, Studies in Methods, Series F No. 62.