

United Nations University
World Institute for Development Economics Research
(UNU-WIDER)

WIDER Annual Lecture 13

The Trade-Development Nexus in Theory and History

Ronald Findlay

UNU-WIDER gratefully acknowledges the support of the Finnish Ministry for Foreign Affairs to the 2009 WIDER Annual Lecture and the financial contributions to the research programme by the governments of Denmark (Royal Ministry of Foreign Affairs), Finland (Ministry for Foreign Affairs), Sweden (Swedish International Development Cooperation Agency—Sida) and the United Kingdom (Department for International Development).

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UNU World Institute for Development Economics Research (UNU-WIDER)

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00160 Helsinki, Finland

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Camera-ready typescript prepared by Janis Vehmaan-Kreula at UNU-WIDER

Cover design by Carita Elshout

Photograph © TopFoto/UNEP/Yeung Tsun Kit

Printed at Libris Oy

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ISSN 1455-3082

ISBN printed version 978-92-9230-270-2

ISBN internet version 978-92-9230-271-9

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FOREWORD

It is with great pleasure that I introduce the thirteenth UNU-WIDER annual lecture entitled ‘The Trade-Development Nexus in Theory and History’, delivered by Professor Ronald Findlay at the Marina Congress Center in Helsinki, Finland on 21 October 2009. One of the highlights in the WIDER calendar of events is the WIDER Annual Lecture – and 2009 was no exception.

Ronald Findlay is the Ragnar Nurkse Professor of Economics at Columbia University. His most recent book (with Kevin H. O’Rourke) is *Power and Plenty: Trade, War and the World Economy in the Second Millennium* (Princeton University Press 2007). Professor Findlay is also the author of *Trade and Specialization* (Penguin 1970); *International Trade and Development Theory* (Columbia University Press 1973); *Trade, Development and Political Economy: Selected Essays of Ronald Findlay* (Edward Elgar 1993); and *Factor Proportions, Trade and Growth* (MIT Press 1995). He has been awarded honorary doctorates from the New University of Lisbon and the Stockholm School of Economics.

Set in the context of a world of plenty – plenty of power and plenty of hunger – the thirteenth UNU-WIDER annual lecture explored the theoretical and empirical links between international trade and economic development over a wide range of space and time, drawing on models and insights emerging from Ronald Findlay’s own previous work and that of others.

Ronald Findlay provides a sprightly synopsis of economic theory before exploring the fascinating links between history and economics, breathing life into theory by juxtaposing it with historical events. Set in this perspective, Ronald Findlay’s discussion moves across three main historical eras (1000-1500; 1500-1870, and 1870-1914), summarizing the major political and cultural events that sometimes by force, at other times by sheer chance, shaped today’s economy and its outlook towards the future.

He pays special attention to topics such as the spice trade, the Silk Road, the ‘triangular trade’ between Europe, Africa and the New World, and the causes and consequences of the Industrial Revolution. As he elucidates the many historical events Ronald Findlay vividly brings home the point that it is impossible to understand the economic juncture at which the world stands today unless we remember that it has been millennia in the making, influenced deeply by inter-connected cultural, political and economic events.

Ronald Findlay finally turns his attention to the current state and future of the world economy, discussing the shifting nature of North-South relations. At a time of immense turmoil in the global economy – and as we go through one of the worst recessions in decades – Ronald Findlay reminds us of the critical importance of sound economics backed by deep historical knowledge. This is pertinent and most welcome advice from a leading scholar in our profession.

Finn Tarp
Director, UNU-WIDER

AUTHOR'S ACKNOWLEDGEMENTS

It is indeed both an honour and a pleasure to deliver this Thirteenth Annual WIDER Lecture before such a large and distinguished audience. I first came to Helsinki and WIDER in the summer of 1986 to participate in a conference to honour the memory of my dear friend and colleague Carlos Diaz-Alejandro, whose untimely death robbed us of one of the most influential and profound scholars on the very topic of this lecture, the nexus between international trade and economic development. I have since then come many times during my two terms as a member of the board of directors of WIDER, each time with a growing affection and appreciation for the country of Finland, the city of Helsinki and the unique institution of WIDER itself and the many friends from all over the world that I have made and met through its auspices. In particular I must mention the directors, from the late Lal Jayawardena to Andrea Cornia, Tony Shorrocks and now Finn Tarp for their unfailing kindness and hospitality. During my eight years on the board my colleagues and I, as well as WIDER itself, all benefited enormously from the wise and gracious leadership of our then chairman, Deepak Nayyar, and I am especially glad that I have the pleasant but challenging task of giving the next lecture in this series after his brilliant 'Developing Countries in the World Economy: The Future in the Past?'. .

ABOUT THE AUTHOR



Ronald Findlay was born in Rangoon, Burma and educated at St. John's Diocesan Boys High School and Rangoon University (BA, 1954), where he was a Tutor in Economics from 1954–57 before going to MIT on a Ford Foundation Fellowship (Ph.D., 1960). After returning to Burma he was a lecturer and then research professor of Economics in Rangoon University. He moved to the United States in 1969 to teach at Columbia University, where he is the Ragnar Nurkse Professor of Economics. He is the author of *Trade and Specialization* (Penguin 1970); *International Trade and Development Theory* (Columbia University Press 1973); *Trade, Development and Political Economy: Selected Essays of Ronald Findlay* (Edward Elgar 1993); *Factor Proportions, Trade and Growth* (MIT Press 1995), based on the *Ohlin Lectures* delivered in Stockholm in 1991; and most recently (with Kevin H. O'Rourke) of *Power and Plenty: Trade, War and the World Economy in the Second Millennium* (Princeton University Press 2007). An outline of the argument of this book was published as: 'The Evolution of the World Economy 1000-2000 AD' in the WIDER Angle 1/2008. He has been awarded honorary doctorates from the New University of Lisbon and the Stockholm School of Economics.

1 THEORY: FROM SMITH AND RICARDO TO SOLOW AND LEWIS

Even though systematic thinking about the trade-development nexus goes back, as I shall argue later, at least to the Mercantilists with their focus on the mutually reinforcing twin objectives of ‘Power and Plenty’ for state policy during their era, let us begin with Adam Smith himself. The ‘engine of growth’ for him was the relentless force of the division of labour which, as he famously said, was ‘limited by the extent of the market’. Trade, both domestic and foreign, had the great virtue of widening the extent of the market and so was a pervasive influence in promoting development by enhancing the scope for specialization and the division of labour. In the opening chapter of Book III of *The Wealth of Nations*, on ‘The Natural Progress of Opulence’, Smith considers the regular sequence of development to be from agriculture to manufacturing and finally to commerce, beginning with the satisfaction of what we would today call ‘basic needs’ of subsistence and shelter in local markets, before ascending to the refinements of luxury for more distant and riskier trades. This development takes place through a pattern of increasingly complex transactions between ‘town’ and ‘country’, with the progress of the former contingent upon the expansion of the subsistence base provided by the latter. Smith at once notes, however, that European history shows the possibility of an ‘unnatural and retrograde order’ in which ‘The foreign commerce of some of their cities has introduced all their finer manufactures, or such as were fit for distant sale; and manufactures and foreign commerce together, have given birth to the principal improvements of agriculture’ (WN, Bk3, ch. 1: 406). If a particular manufacturing industry were to spring up in towns on navigable rivers or sea coasts it could then expand independently of its own agricultural hinterland, and provide a growing market for the latter’s output of foodstuffs and raw materials. The divergence in economic progress between town and country is enhanced further by the tendency of towns to be enclaves of economic freedom due to royal privilege, while the country remains stifled by feudal restrictions. This pattern of development, in which the town led the country, was interestingly seen by Smith to have been characteristic of early Islam, in the time of the Abbasid Caliphate and Spain before the Reconquest, with the Italian cities of the Renaissance as the first examples in Europe. The ‘natural order’ of agriculture preceding industry he finds, also interestingly, in ‘our North American colonies’, cut off from profitable sale to distant foreign markets, and manufacturing therefore serving only their own, admittedly prosperous, hinterlands. It was not until after 1900 that the United States became a significant exporter of manufactured goods.

One apparently simple but nevertheless extremely powerful insight that Smith had was the crucial importance of relative transport costs, as measured by the ratio of the value to the bulk or weight of the goods carried, in determining the pattern and volume of international trade. ‘Manufactures, as in a small bulk they frequently contain a great value, and can upon that account be transported at less expense from one country to another than most parts of raw produce, are, in almost all countries, the principal support of foreign trade’ (WN, Bk4, ch. 9: 201). In relation to this key passage he notes that while most of the major European nations have followed a policy of favouring manufacturing over agriculture, and thereby promoting foreign trade, China, because of its vast home market and ease of internal water transport, has instead taken the opposite course and discouraged foreign trade systematically, at the same time doing everything possible to support agriculture. After noting that ‘The home market of China is perhaps

in extent not much inferior to the market of all the countries of Europe put together' (p. 202), he goes on immediately to argue that China would still benefit greatly by adding the markets of the rest of the world to its already great internal market and thereby expanding still further the scope for increasing the division of labour within its boundaries, 'especially if any considerable part of this trade was carried in Chinese ships'. Furthermore, he observes that 'By a more extensive navigation the Chinese would naturally learn the art of using and constructing themselves all the different machines made use of in other countries', whereas now they have 'little opportunity of improving themselves by the example of any other nation, *except that of the Japanese*' [my italics], with whom, in his time, their foreign trade was largely confined. It seems that it took two centuries, and the example of the 'Gang of Four', but Deng Xiaoping finally followed Adam Smith's advice, and the rest, one might well say, is history.

The principle of comparative advantage, any rigorous formulation of which eluded Adam Smith, was precisely enunciated by David Ricardo in 1817, in the seventh chapter of his *Principles of Political Economy and Taxation*, with the famous example of trade between England and Portugal in cloth and wine. As it stands this celebrated proposition does not appear to have a direct implication for any link between foreign trade and the rate of economic growth, or the trade-development nexus as we are calling it here, being confined to the increase of consumer welfare or 'utility' in the trading partners, what Ricardo himself referred to as 'an increase in the mass of commodities, or the sum of enjoyments'. This emphatically does not mean, however, that Ricardo had nothing to say about the potential impact of opening or liberalizing foreign trade on raising the rate of growth, which he undoubtedly regarded as the more important issue. It is the central focus of one of his most important but unfortunately relatively neglected contributions, *On the Influence of a Low Price of Corn Upon the Profits of Stock*, or as it is referred to more briefly, the *Essay on Profits*.

This work is essentially a dynamic two-sector growth model, as reformulated by Luigi Pasinetti (1960) and extended to an open economy in Findlay (1974). Population, following Malthus, is stationary at a wage-rate w^* that equalizes the rates of fertility (an increasing function of the wage-rate) and mortality (a decreasing function). Employment at any time t , denoted $L(t)$, is determined by the 'wage fund' $W(t)$ accumulated up to that time by the capitalist class, divided by the wage-rate w^* . Together with the exogenous amount of arable land available, denoted T , $L(t)$ determines the output of 'Corn' by the production function $C(t) = f[L(t), T]$. Rent per acre q is equal to the marginal product of land, and the profit rate r is equal to the marginal product of labour m minus the wage-rate w^* divided by w^* , or the equation $r = (m - w^*)/w^*$. All the profits rW are saved and invested so that the wage fund in the next period is $W(t+1) = (1+r)W(t)$, resulting in an increase in employment $L(t+1)$ and the output of corn $C(t+1)$. Because of the diminishing returns from an increasing labour force applied to a fixed supply of land, m will be falling while q will be rising as time goes on, while the output of corn increases but by increasingly smaller increments. Eventually the famous 'stationary state' will be reached, at which m has fallen all the way to equality with w^* and the rate of profit, and hence the rate of growth as well in this model, is equal to zero. The national income is thus shared solely by the workers, who earn only the w^* necessary to replace themselves by the operation of the Malthusian mechanism, and the landlords, who enjoy the maximum feasible rent per acre in the stationary state.

So far we have considered a pure ‘corn model’, in which there is no manufacturing sector, which in Classical and Physiocratic economics is usually thought of as producing ‘luxury’ goods, consumed only by the landowners out of their rents. Letting the time lag between labour input and emergence of final output be equal to that in agriculture, and assuming that labour in manufacturing is the sole input into production, with v denoting the constant marginal (and average) productivity of labour in this sector, equality in the rates of profit between the two sectors requires p , the relative price of manufactures in terms of corn, to be such that we have $r = (pv - w^*)/w^*$ also equal to $(m - w^*)/w^*$. This gives $p = m/v$ as the equilibrium relative price of manufactures in terms of corn. As the economy grows with an expanding wage fund and hence employment, diminishing returns on the fixed land will lower m and hence p , doubly benefiting the idle landowners by rising corn rents per acre and falling prices of the luxury goods they consume. The rate of profit, as in the pure corn model, continues to fall towards zero as the stationary state is inevitably approached. Manufacturing is thus not able to deliver the economic system from the trap of diminishing returns in agriculture.

Consider now the prospect that the country, say England, can trade with another, say Poland, and that England has a comparative advantage, in the ‘chapter 7’ sense of the *Principles*, in a manufactured good cloth, because of superior industrial technology, and Poland in corn, because of her abundant land relative to her population, so that p rises, inducing England to export cloth and Poland to export corn. In terms of our simple equation $p v$ has risen above m , requiring the latter to rise by an exodus of labour into manufacturing i.e., a rise in the marginal productivity of labour in agriculture, with a consequent fall in rent per acre and a rise in the rate of profit with w^* constant, since as we have seen $r = (m - w^*)/w^*$. This increase in profits expands the wage fund and hence the rate of growth of both employment and corn production. If there was an open frontier in Poland, or anywhere else as say in the New World, at which corn could be grown at relatively constant cost, England could grow indefinitely at this new positive rate. Eventually however the frontier would be approached and diminishing returns would once again set in, now on a ‘global’ scale as world population and output expands, exhausting the limits of the earth, and the rents of the scarce land gobbling up all the surplus above that are necessary to reproduce the world proletariat at the Malthusian equilibrium real wage w^* . Not just England but the world as a whole would now be caught in the coils of the stationary state. Foreign trade thus offers a temporary, and perhaps even long sustained, but not permanent escape from the spectre of diminishing returns in agriculture, with only the owners of the scarce global natural resources enjoying their windfall gains. Note that the commodity terms of trade, denoted here by the variable p , would be falling over time, benefiting the corn exporters, ‘Agraria’, at the expense of the manufactured exporters, ‘Mancunia’, to use the evocative nomenclature of Harry Johnson (1955).

Import tariffs on corn, the famous Corn Laws, would clearly, by the same logic, increase employment and output in the corn sector, raise the rent per acre and reduce the rate of profit and hence the wage fund and the rate of growth. This is the ‘dynamic’ argument for free trade and against protection that we find in the *Essay on Profits*, and in the debate on the repeal of the Corn Laws, one that had vastly more significance for Ricardo than the mere ‘sum of enjoyments’ for the parasitic landlord class due to the conventional static gains from trade as expounded in the ‘chapter 7’ doctrine (see Irwin 1988). But of course the same logic again implies that an agricultural exporter would

have its profit rate and growth rate reduced by free trade, thus opening the door to a case for protection of manufacturing in Britain's less developed trading partners, as had been argued earlier on 'infant industry' grounds by Alexander Hamilton and later by Friedrich List.

Consideration of the trade-growth linkages that were of central concern to the Classical School receded with the development of Neoclassical Economics, with its emphasis on the optimal allocation of given resources rather than with change over time. Thus Ricardo was celebrated for his discovery of comparative advantage in the *Principles* but the message of the *Essay on Profits* was ignored. Trade theory was of course developed further, notably by Eli Heckscher and Bertil Ohlin with their factor proportions approach, but still remained static in its focus. The 1950s however saw a renewed interest in the connections between growth and trade, inspired by the inaugural lecture of J. R. Hicks (1953) on the 'Long-run Dollar Shortage'. Papers by Johnson (1955), Rybczynski (1955), Bhagwati (1958) and Findlay and Grubert (1959) examined the effect of increases in factor supplies and technological progress on the terms of trade, with Bhagwati showing that it was possible for economic growth to be 'immiserizing', or welfare-reducing after the terms of trade loss is deducted from the growth gain at constant relative prices. Neoclassical growth models made their appearance at exactly the same time with the seminal contributions of Robert Solow (1956) and Trevor Swan (1956), but these for the most part assumed a strictly closed economy, with the notable exception of the two-sector model of Oniki and Uzawa (1965). It is relatively easy, however, to extend the basic one-sector growth model of a closed economy to the case of a 'small open economy' producing any number of goods with a hierarchy of capital-intensities. The economy initially has its comparative advantage in labour-intensive goods but then switches successively to goods of higher capital-intensity until eventually reaching its steady-state capital-labour ratio, determined by saving behaviour and the growth rate of effective labour. The given world relative prices enable the different tradable goods to be aggregated into a 'surrogate' aggregate production function for the open economy version of the neoclassical growth model (as presented in Findlay 1970; 1973, ch. 6; 1984)

While the neoclassical growth models assumed continuous full employment for an exogenously growing labour force, with real wages rising over time as a result of capital-deepening and labour-augmenting technological progress, appropriate for the already advanced countries, Arthur Lewis (1954) boldly returned to an essentially Ricardian paradigm to apply to the situation of the developing countries with his famous model of 'Economic Development with Unlimited Supplies of Labor'. Here the real wage-rate w^* was set exogenously, not by equalizing the rates of fertility and mortality as in the Malthusian mechanism, but by conditions in a 'traditional' sector of peasant agriculture, at which there was a perfectly elastic supply of labour to a profit-maximizing 'modern' sector, with saving and investment out of these profits driving the capital stock, employment and output in this sector forward at a rate equal to sr^* , where s is the propensity to save out of profits and r^* is the marginal productivity of capital corresponding to the wage-rate w^* . The process of economic development is thus determined by the speed at which the growth of this expanding modern sector can outstrip that of population growth in the traditional sector, eventually exhausting the pool of 'surplus' labour and subsequently driving up the real wage as the supply curve turns upward, at which point we enter the realm of the neoclassical model and economic 'modernity'.

If we accept the Solow model as a stylized representation of the industrialized 'North', and the Lewis model playing the same role for a primary producing 'South', it becomes possible to look at the process of interaction between these two interdependent regions as a 'North-South' model of the world economy as a whole, which I presented in Findlay (1980, 1989). This model was deliberately constructed to reflect the 'asymmetric' character of the world economy after the Industrial Revolution, in which the North grew under its own steam at a rate exogenously determined by population growth and labour-augmenting technological progress, importing from the South only such exotic consumer goods as tea, coffee, cocoa and sugar, while the South depended on the North not just for manufactured consumer goods but for the import of the capital goods necessary for the production of those tropical exports themselves in the 'modern' sector of its economic system. If the South grows faster than n , the growth rate of the North, its terms of trade would deteriorate, making capital goods more expensive. This lowers the growth rate of the South at given levels of capital productivity and the propensity to save out of profits, and pulls it back towards equality with that of the North. It is also important to note that replacing primary exports by labour-intensive manufactured goods such as textiles and footwear does not necessarily free the South from this dependency, though as we will see later it can significantly improve the prospects for the South to successfully catch up with the North.

This original version of the North-South model was extended to allow for international capital movements by Burgstaller and Saavedra-Rivano (1984) and for labour migration by Ian Wooton (1985). The important issue of the diffusion of technological progress through foreign direct investment from North to South was modelled in Findlay (1978), drawing on the insights of Thorstein Veblen on the 'penalty of taking the lead' and of Alexander Gerschenkron on the 'advantages of relative backwardness', and further examined by Wang and Blomstrom (1992).

2 HISTORY 1000-1500: FROM THE PAX MONGOLICA TO THE BLACK DEATH AND THE VOYAGES OF DISCOVERY

Having looked, even if only too briefly, at the 'theory' part of the trade-development nexus, we now turn to the 'history' that is, the historical evolution of the world economy, and attempt to see to what extent it can be illuminated in the light of these and related analytical concepts. For this purpose I will draw mostly on my recent book, Findlay and O'Rourke (2007), entitled *Power and Plenty: Trade, War and the World Economy in the Second Millennium*. We start in the year 1000, and divide the 'world' for our purposes, on the basis of geographical contiguity and cultural similarity, into the following seven regions, namely (i) Western Europe (Roman Catholic) (ii) Eastern Europe (Greek Orthodox) (iii) the Islamic World (iv) Central Asia (v) South Asia (mainly Hindu) (vi) Southeast Asia (Buddhist) and (vii) East Asia (Buddhist and Confucian). The population figures for these regions were estimated at 25, 15, 28, 9, 79, 9 and 67 million respectively by McEvedy and Jones (1978), for a total of 232 million or almost 90 per cent of an estimated global total of 265 million. Excluded on the ground of their relative or even total isolation from this interactive 'Eurasian' sphere are sub-Saharan Africa, Australia, Oceania and the Americas. Long-distance trade links, while severely constrained, as Adam Smith noted, to items of a high ratio of value to bulk and weight, nevertheless existed and persisted, both overland and overseas. In the

8 x 8 matrix of these seven regions and sub-Saharan Africa that we present in Table 2.1: 45 of our book the only region that exported to and imported from all the others was the Islamic World, stretching from Spain to Afghanistan, which clearly occupied the central position in the 'world economy' at that time. Along with East Asia it was by far the most highly urbanized and technologically advanced of the seven. Western Europe, while clearly having great potential for the future on the basis of its spacious terrain, long coastline and rich cultural heritage from the Western Roman Empire, was less advanced than these regions and also well behind the Byzantine Empire, then the core component of what we call 'Eastern Europe'. South Asia and Southeast Asia had quite extensive commercial links, not only with each other but with the Islamic World, East Asia and even sub-Saharan Africa as well. Central Asia's economic basis was mainly provided by pastoral nomadism but it was traversed by the fabled 'Silk Road' along the string of oasis cities that served as staging posts for the diffusion of goods and ideas, with a diverse mixture of cultures and religions.

One major contribution that our theoretical models can make is to the question of what determined the relative magnitudes of the population levels of the seven regions, ranging from the 79 million of South Asia (mainly India) and the 67 million of East Asia (mainly China), on the one hand, and the mere nine million of the vast expanse of Central Asia. Here the Classical Malthus-Ricardo model has a clear answer, the fertile river valleys of the Ganges and the Indus, and the Yangtze and Yellow Rivers, raising output per capita to high levels that in turn stimulate population growth to the extent necessary to reduce it down to the magnitude compatible with the Malthusian balance between fertility and mortality, explain why one-third of the world population to this day is Chinese or Indian. Discrete technical innovations, such as 'early-ripening' rice in China, or the horse collar and the water mill in Europe, so vividly described by Marc Bloch, or the introduction of sugarcane, citrus fruits and irrigation in the Islamic World, would each raise per capita income before setting the Malthusian process of adjustment in train, but leaving behind a permanent legacy in a higher population level, 'extensive' as opposed to 'intensive' growth as we might also call it, in these pre-industrial times. Despite the Nile and the Tigris and Euphrates, the surrounding deserts constrained the extent to which the Islamic World could expand in this way. These higher population and output levels at major nodes in turn could stimulate more trade in high-value goods such as silks across Central Asia and spices from the East Indies to the Persian Gulf and the Red Sea.

The tenuous links between the seven regions we have described were given a powerful new thrust towards unification in the early thirteenth century by the conquests of Genghis Khan and his successors and the associated Pax Mongolica. Even though the determinants of empire and conquest may be considered as essentially political and military in character this does not mean that economic analysis has nothing of interest or relevance to say. The founding of any empire clearly requires a charismatic unifying founder, in this case Genghis Khan, but the extent of the territory that can be conquered and held is a function of what Owen Lattimore called the 'military range' of that empire, determined by the quality of its military capacity relative to that of its adversaries. In Findlay (1996) and Findlay and Lundahl (2006), Lattimore's idea is expressed as a relationship $r(A)$ between the radius of a circular domain that an empire can control and the size of its army A , with r increasing as a function of A but at a diminishing rate as one gets further from the commanding center. The optimal size of A , in terms of the final output or 'spoils', depends directly upon the army's 'productivity'

in territorial acquisition, and inversely on its opportunity cost in terms of foregone civilian activity. Pastoral nomadism made the Mongols superb mounted archers, with a very large 'marginal product' in raiding and conquest relative to the opportunity cost of peaceful employment in tending their herds, giving them what Stanislaw Andreski called a very high MPR or 'military participation ratio' that is, the fraction of the adult male population that could be permanently kept under arms. Thus within a few decades Genghis and his successors, with their base at Karakoram in Central Asia, were able to rule a vast area extending from Iran and the borders of Russia in the west to China in the east.

Once established the Mongols wanted to encourage production and trade, both internally and externally, in the interest of maximizing their revenue base. This was done both directly, as in China by Kublai Khan and his successors, and in Iran by the Ilkhans, and indirectly through the extraction of tribute from Russia by the Golden Horde. Hence it is no surprise that the Mongol Peace enabled Marco Polo and a small party of Venetian merchants to travel unmolested all the way to the court of Kublai Khan. As Joseph Needham (1954: 140) said in the first volume of his monumental history 'The roads across Central Asia were busier and safer than ever before or since'. The role of the Pax Mongolica in stimulating trade around the then known world is vividly described by Janet Abu-Lughod (1989) in her well-known book, and is further documented in *Power and Plenty*. Along with trade Needham believed that a number of crucial innovations, such as printing and gunpowder, or at least the essential ideas for them, were transmitted from east to west as a result of the Pax Mongolica. Western Europe, sheltered from the Mongol onslaught, was catching up rapidly with Byzantium and the Islamic World. The land frontier was extended eastward by the use of the heavy plough and the Italian cities began to dominate the commerce of the Mediterranean, while the *Reconquista* reclaimed most of Spain from its Arab and Berber rulers. The Islamic World was dealt a further massive blow by the sack of Baghdad and the overthrow of the Abbasid Caliphate in 1258, but the Mamluks stemmed the further advance of the Mongols at the Battle of Ain Jalut in Palestine in 1260, with the center of gravity of the Muslim realm passing to their capitals in Cairo and Damascus.

Goods and ideas, however, were not the only things that could pass along the east-west trade routes secured by the Pax Mongolica. So could germs, specifically the plague germ *Yersinia Pestis*. The result was the greatest natural catastrophe to ever befall humanity, the Black Death of the mid-fourteenth century, which carried off more than a third of the population of Western Europe and did considerable damage in the Islamic World and Eastern Europe as well. The economic consequences of the Black Death can conveniently be analyzed by the Malthus-Ricardo model, as in Findlay and Lundahl (2002). The initial decline in population raises the per capita income and real wages of the survivors while reducing rents per acre of land. This sets in motion an ongoing revival of population and labour supply, so that per capita incomes and wages start to slowly fall back towards their previous levels from the peaks in the immediate aftermath of the onset of the plague. Unless the fertility and mortality rates shift as functions of the real wage or per capita income, the original equilibrium levels of these variables will eventually be restored. Total population and output will also return to their former equilibrium levels unless technology improves or the supply of arable land is increased. The experience of labour scarcity, however, as argued by the medievalist David Herlihy (1997), stimulated labour-saving technical progress in a number of sectors and also led to a reduction in fertility as a function of per capita income, raising the equilibrium level

of per capita income that equated the rates of fertility and mortality. Western Europe thus returned, after over two centuries, not only to a higher plateau of total population output, but of per capita income as well, than she had enjoyed before the onset of the Black Death around 1350.

Why did not similar favourable developments occur in the Islamic World, which suffered the same shock with comparable severity? The reason seems to be that in the core area of Egypt, Syria and Palestine ruled by the Mamluk sultans these predatory rulers were able to act in a centralized fashion, unlike the looser feudal structure of Western Europe, to maintain their revenues despite the steep declines in population and output, imposing drastic taxes on agriculture, industry and trade that stifled the possibility of recovery.

The Black Death also had major monetary consequences, also examined in some detail in Findlay and Lundahl (2002). Using the familiar Fisher equation $MV = PQ$ we see that the sharp fall in Q , the initial output slump, led to a rise in P , the price of goods in terms of silver. Thus silver became cheaper in terms of goods, further discouraging the production of silver already lowered by the decline in labour supply and the rise in real wages. Higher per capita incomes led to a rise in luxury imports from the east, which combined with the drop in silver output led to a continuing drain of silver referred to by monetary historians such as John Day (1978) as 'The Great Bullion Famine of the Fifteenth Century'. The movement of silver eastwards from Britain and France through Venice to Egypt was traced by Lopez et al. (1970). The recovery of population and output in the west, however, eventually also led to an eventual reversal of the silver drain and a gradual return towards monetary equilibrium in the west. Traditional economic history has tended to regard demographic and monetary explanations of these medieval crises as competing alternatives but the analysis in our paper integrates both into a unified general equilibrium framework.

The expansion of the east-west trade of silver in one direction and of spices and other oriental goods in the opposite one greatly benefited the two 'middlemen' through whose hand all the goods had to pass in both directions, the Mamluk sultans who controlled the passage between the Red Sea and the Mediterranean, and the commercial republic of Venice that handled transport and distribution at the western end. Together they operated an implicit joint double monopoly or monopoly-monopsony, simultaneously lowering purchase prices from the east and raising selling prices in the west, imposing what amounted to a 'maximum revenue tariff' on the lucrative east-west trade. Monopoly profits of course attract potential rivals, and both Venice and the Mamluks did not lack these. For the Venetians their most bitter rivals were the Genoese, who had long dreamed of doing an 'end run' around Venice and its Muslim allies by circumventing the southern extremity of Africa and sailing directly to the source of the spices in the East Indies. Not surprisingly, it was the Genoese Christopher Columbus who, in pursuit of this objective on a voyage commissioned by the Spanish monarchs Ferdinand and Isabella, wound up 'discovering' an entirely New World in 1492, leaving it to the Portuguese Vasco Da Gama to circumvent the Cape of Good Hope and sail directly to India in 1498. For the Mamluks their main rival was the formidable new empire of the Ottoman Turks. It was again not a mere coincidence that the Ottoman Sultan Selim the Grim was able to destroy the Mamluks as an independent force and capture Egypt in 1516, so soon after the blow delivered to the Mamluk-Venice monopolistic alliance by the voyage of Da Gama.

While the Iberian ‘Voyages of Discovery’ have long been celebrated as the triumph of a rational, adventurous and technologically progressive West as opposed to a more passive and somnolent ‘East’ the truth is both more complicated and interesting. Only more recently has the world come to hear of the remarkable voyages into the Indian Ocean to Southeast Asia, Africa and the Persian Gulf undertaken by the Ming Dynasty during the early decades of the fifteenth century under the leadership of the Muslim eunuch admiral Zheng He. The size and seaworthiness of his vessels greatly exceeded those of the later Iberian mariners. While trade does not appear to have been the primary purpose of the voyages, which seem to have been motivated more by the desire to display the reach and might of the new native dynasty that had driven out the Mongols, the voyages undoubtedly stimulated trade in Southeast Asia and the Indian Ocean, particularly in pepper and spices. Anthony Reid (1990, 1993) considers that the Ming voyages led to the rise of the port-city of Melaka as the hub of an expansive ‘Age of Commerce’ in Southeast Asia that began almost a hundred years before the Portuguese entrance into eastern waters. In contrast to the liberal trading practices of the Asian merchants and states, the Portuguese, followed by the Dutch and East India Companies, used what Douglass North has called the western ‘comparative advantage in violence’ in the attempt to impose, with mixed success, an effective monopoly of the spice trade. The Ming voyages were discontinued in the 1430s and even the technology of building the remarkable vessels seems to have been lost, apparently in the interest of a court faction that preferred to save the resources for frontier defense against the possibility of a return of the Mongol hordes. The Chinese thus clearly had the technological capability to mount long-distance maritime voyages, though not the same strong commercial incentives to expand and sustain them as the relatively resource-deficient Western Europe in the fifteenth century.

3 HISTORY 1500-1870: FROM THE VOYAGES OF DISCOVERY TO THE INDUSTRIAL REVOLUTION AND ITS GLOBAL CONSEQUENCES

The discovery of the New World clearly conferred enormous benefits on Western Europe, multiplying at a stroke the natural resources at its command, given sufficient investment and effort to control the distances and physical obstacles involved. The acquisition of these vast additional resources was made much easier by the tragic decline of the native populations due to the ‘guns, germs and steel’ that the *conquistadores* brought with them. Even after more than 200 years, no one has ever written a better evaluation of the momentous consequences of this event, and the associated discovery of the Cape Route, than Adam Smith (WN, Bk 4, ch. 7: 141-2) himself, so I shall simply quote him directly:

‘The discovery of America, and of a passage to the East Indies by the Cape of Good Hope, are the two greatest and most important events in the history of mankind.....’ and, furthermore:

‘instead of being the manufacturers and the carriers of but a very small part of the world.....the commercial towns of Europe have now become the manufacturers for the numerous and thriving cultivators of America, and the carriers, and in some respects the manufacturers too, for almost all the distant nations of Asia, Africa and America. Two new worlds

have been opened to their industry, each of them much greater and more extensive than the old one, and the market of one of them growing still greater and greater by the day’.

The crucial importance of transport costs, so much emphasized by Smith as we noted, was of course particularly operative here. The first significant commodity to cross all the oceans of the world, including the still yet ‘undiscovered’ (until 1513) Pacific, was silver, which the mines of the New World released in a chain that girdled the world from west to east while ‘loosing in the opposite direction a rich and varied stream of different commodities and precious goods from east to west’ (Braudel 1975: 569). The Dutch and English East India Companies, established at the turn of the seventeenth century, used American (and some Japanese) silver to purchase the Indonesian spices, Chinese silks and porcelain and Indian cotton fabrics that they could sell so profitably in Europe, with the Dutch East India Company in particular inheriting the monopoly rents of the Venetian-Mamluk alliance. Ming China and the great ‘gunpowder empires’ of the Islamic World, the Ottomans, Safavids and Mughals, all used American silver to expand their money supplies and collect their tax revenues. New World plants augmented the food supplies and stimulated population growth all around the world, notably including China.

Africa, tragically, was drawn inextricably into the growing trade across the Atlantic by the export of slaves to the sugar plantations of the New World. This was the ‘base’ of the infamous ‘Triangular Trade’, the other two sides being the export of sugar, indigo, tobacco and later cotton from the New World to Europe for further processing and sale, and the export of manufactures from Europe to Africa for the purchase of the slaves. Britain and France relied increasingly on their New World colonies as sources for imports and re-exports of lucrative primary products, and as markets for their manufactured exports, with slave populations and sugar production both increasing from five to six fold in the course of the eighteenth century. Saint Domingue, the present Haiti, had a slave population of almost half a million in 1791 on the eve of the great uprising that established the first black republic in the world, and only the second in the New World after the United States, whose own slave-owning founders did not look upon the new State with a friendly eye.

It is against this background of expanding trade with Asia, Africa and the New World that Kevin O’Rourke and I argue that the phenomenon of the British Industrial Revolution of the eighteenth century has to be seen. The key economic relationships involved can be analyzed by the model of the Triangular Trade presented in my Graham Lecture at Princeton, Findlay (1990), which drew on an earlier contribution by Darity (1982). In this model Britain produces manufactured goods (cotton textiles), using its own capital and labour and imported raw materials (raw cotton). These manufactures are exchanged for slaves from Africa, who are then sold across the Atlantic to planters in the Americas, who produce raw cotton using land and the labour of the slaves, and then sell the raw cotton to Britain where they also purchase manufactured goods after paying for their slave imports, thus completing the circuit of the three-cornered exchange. Taking the production functions for British manufactures and American raw cotton as given, along with the supply function for slaves from Africa, the model then determines the output of manufactures in Britain, the size of the slave labour force necessary to produce the raw cotton required by this output, the relative price of cotton in terms of manufactures, the asset price of slaves as the present discounted value of

their future marginal products net of their maintenance costs, and the amount of slave imports from Africa needed to maintain the slave labour force constant, since the net rate of reproduction of a slave population is generally negative.

Suppose now that there is a technical innovation, or a series of related innovations, that substantially increases the final output obtained by a given combination of capital and labour, while, for simplicity, keeping the ratio of raw material input to final output constant. The effect is to raise the outputs of both the final output and raw cotton, along with the relative price of both raw cotton and slaves in terms of manufactures, as well as the size of the slave labour force and therefore also the annual flow across the Atlantic necessary for its reproduction. All of these 'predictions' of the model are borne out by the data, as documented in Findlay (1990) and subsequently, thus establishing the 'inconvenient truth' of the linkage between Atlantic slavery and the Industrial Revolution. In particular the volume of slave imports into the New World rose sharply in the decades of the 1780s and 1790s, as the Industrial Revolution was beginning to get underway, and would no doubt have continued increasing even further had it not been for the British abolition of the slave trade in 1807. As Fogel and Engerman (1974) demonstrated in their seminal work *Time on the Cross* slavery by no means faded away as a result of inherent institutional inefficiency in the modern world, as argued by Adam Smith and J. E. Cairnes, but continued to flourish as a highly profitable source of supply for the Lancashire cotton textile industry until the Civil War in the 1860s.

The link between slavery and the Industrial Revolution was first drawn in the pioneering study by Eric Williams (1944), and the 'Williams Thesis' has been controversial ever since. Williams narrowed the focus of the linkage to profits from the slave trade as a source of the financing for the investment involved in the Industrial Revolution, drawing criticism from many quarters, with the most cogent perhaps being that of Engerman (1972). Williams is vigorously defended, however, by Barbara Solow (1985, 1987) and Joseph Inikori (2002), in addition to Findlay (1990) and Findlay and O'Rourke (2007: 335-7). As in the case of most controversial 'theses' in history, it would be safe to say that the 'jury is still out' on this one. Some diehard members of the 'counterfactual' Cliometric school are still inclined to argue that the whole discussion is irrelevant, since if not in cotton textiles the Industrial Revolution would just as well have occurred in some other sector of the British, or some other, presumably European, economy.

The role of international trade itself in relation to the Industrial Revolution has been a subject of long-standing interest, also not unaccompanied by controversy. There is no doubt of course that the early stages of the Revolution were associated with an export boom, particularly in the Lancashire cotton textiles industry. But was the boom a response to an exogenous increase in overseas demand, or did it reflect instead a 'supply shock' resulting from a surge of technical innovations in cotton spinning and weaving. I argued in Findlay (1982) that the sharp fall in Britain's terms of trade was what we would expect if the exogenous shock was a technical innovation in the export sector, as examined in Findlay and Grubert (1959), and this was indeed exactly what seems to have happened, whereas an increase in overseas demand would have led to an improvement in Britain's terms of trade. The fact that such a substantial portion of cotton textile output could be sold abroad reflected an expanding and highly elastic world demand for Britain's exports, and a correspondingly elastic supply of imports of both food and raw materials, both in turn arising from and being sustained by the

commercial penetration and growth of empire in the Americas and Asia. The world as a whole would of course have been much better off with universal peace and free trade, but Britain's success in the global warfare of the Age of Mercantilism created the background for the emergence and sustained progress of the Industrial Revolution, as we argue at length in Findlay and O'Rourke (2007: ch. 6).

As has long been recognized, the Industrial Revolution was accompanied, and to some extent preceded, by a substantial rise in the productivity of the British agricultural sector as well. Despite this, however, it took the eventual repeal of the Corn Laws in 1846 to lead to a sufficient increase in imported grain to feed the expanding population, enabling Britain to become the 'Workshop of the World', concentrating on the export of cotton textiles from Lancashire and iron and steel products from Birmingham and Sheffield. Rents per acre fell, real wages were at least sustained and the profit rate rose, just as predicted by the Ricardian model of the *Essay on Profits*, as expounded in Findlay (1974). The energy requirements for the unprecedented industrial growth were provided by coal to fuel the steam engines, which were being applied in rapid succession to a number of industries including railways and later steam ships. The economic system was thus freed from dependence on renewable resources on the surface of the earth, to an apparently unlimited supply of fossil fuels from the interior, as Anthony Wrigley (1988) has emphasized, replacing what he called the 'advanced organic economy' of earlier times by the 'mineral-based energy economy' that we have been running on ever since. Abundant supplies of coal and iron ore in Britain, France, Belgium and Germany made the Industrial Revolution diffuse rapidly in Northwestern Europe, before eventually spreading eastwards to Russia and Japan and westwards to the United States.

The discovery of the New World and the Cape Route generated the possibility of enormous potential windfall gains to whichever of the rising nation-states of Europe, the only ones in the game, for access to and control over the immense natural resources involved. This ushered in the 'Age of Mercantilism' from the turn of the seventeenth century to the first quarter of the nineteenth century. Spain and Portugal dropped out early in the game, while the Dutch, despite their splendid mercantile and maritime resources, were too small to compete against the only heavyweights, France and Britain. These two powers engaged in a global struggle on all continents in the course of what has aptly been called a 'Second Hundred Years War', with notable British victories in the Seven Years War of 1756-63 and finally the Napoleonic Wars ending in 1815, leaving the Royal Navy in command of the oceans of the world. The convergence of the onset of the Industrial Revolution with the establishment of the *Pax Britannica* led to an increasingly liberalized global trading system with falling tariffs and transport costs. The darker side of the story was the penetration and incorporation of recalcitrant Asian and African peoples and nations into the colonial empires or zones of influence of the European powers and the United States. The result was what D. H. Robertson (1938) referred to as the 'Great Specialization', with Western Europe, later followed by the United States and Japan, concentrating on the production and export of manufactures and the rest of the world on raw materials and foodstuff. The primary producers and exporters were of two kinds, the relatively densely populated tropical zones on the one hand, and the labour-scarce, land-abundant, temperate zone 'Regions of Recent Settlement' as the League of Nations used to refer to them, on the other, essentially Canada, the United States, the Southern Cone of Latin America, Australia and New Zealand, populated largely by European settlers.

Findlay and Lundahl (1999), drawing on the classic works of Arthur Lewis, Ragnar Nurkse and others, provides a description and analysis of the relations between trade and development during this era of the evolution of the world economy, which reached its zenith in the 1870-1914 period, demarcated by the opening of the Suez Canal and the outbreak of the First World War. For the links between the industrial countries and the exporters of tropical produce we use the North-South models described earlier, with the movement of the terms of trade essentially tying the growth rate of the South to that of the North and not permitting any sustained rise in real wages or per capita incomes because of the 'unlimited' supplies of labour. For the temperate zone countries we use what we called the 'Christopher Columbus' model, based on Findlay (1993; 1995: ch. 5). The key concept here is that of an 'endogenous land frontier', based on the work of the economic historians Guido Di Tella (1982) of Argentina and Knick Harley (1978) of Canada. The idea is that the pristine lands of the New World had to be made accessible and cultivable by a costly process of investment at increasing marginal cost per acre as the open frontier was extended. The Old World produces manufactures and food, the New World food and raw materials, the intermediate inputs of the manufacturing sector of the Old World. The total labour supply is fixed and allocates itself between the two worlds by migration that equalizes wage-rates on both sides of the Atlantic. The interest rate, equal to a given rate of time preference, supports and elicits whatever supply of capital is required for use in manufacturing and the opening up of new lands in the overseas territories, the extent of which is determined by equality between the rate of interest and the ratio of the rent per acre to the marginal cost of land at the limit of the frontier. The model determines the relative prices and outputs of the three goods along with the real wage and rents per acre, the allocation of the labour force between the two 'worlds', and the extent of the frontier. Technological progress in manufacturing raises the demand for food and raw materials, raising their relative prices and extending the frontier. The impact of crucial innovations in transport, such as the railway, the substitution of steam for sail, and the refrigerator ship, all together resulting in what Kevin O'Rourke (1997) termed the 'European grain invasion' from the New World into the Old, thereby prompting an exodus of population across the Atlantic in the late nineteenth century, are also readily analyzed within this theoretical framework.

4 HISTORY 1870-1914: THE GOLDEN AGE OF GLOBALIZATION

The period from 1870-1914 was undoubtedly a 'Golden Age of Globalization'. It was marked not only by an unprecedented expansion of trade but of capital movements and labour migration as well, all under the aegis of the *Pax Britannica* and the pound sterling. What Kindleberger (1996) called the 'world economic primacy' of Great Britain was already being contested by the emergence as industrial powers of Germany and the United States, while Japan also began its remarkable modernization at the outset of this period. The seeds for the eventual undoing of the golden age were being laid by the unseemly 'scramble for Africa' by the European powers and the competition between Russia, Japan and the United States for influence and control in the Pacific. The Manchu Qing Dynasty in China, already severely weakened by the Opium Wars and the catastrophic Taiping Rebellion, was humiliated further by the loss of Taiwan as a result of the Sino-Japanese war of 1895, and finally overthrown by internal rebellion in 1911. The Great War of 1914-18 swept away these and other ancient empires and the 1919 Treaty of Versailles marked the emergence of an entirely new world order, or

rather the lack of one, for the next two decades. The trade-development nexus, which had been operating so smoothly, even if so inequitably, during the 1870-1914 era, went into reverse during the unstable years between 1919 and 1939, marked as they were by hyperinflation in the 1920s and massive unemployment in the 1930s, reflected in pronounced volatility of trade flows and declining international capital and labour mobility.

The end of the Second World War was soon followed by the emergence – as independent nation-states – of the former colonies of European powers in Asia and Africa, joining Latin America to form a ‘Third World’ of developing economies alongside the already industrialized nations of Europe and North America. Not surprisingly, most of these nations were not eager to continue their past colonial role as specialized exporters of primary products. The work of Hans Singer (1950) and Raul Prebisch (1950) seemed to indicate that there was a secular tendency for the terms of trade to turn adversely against primary producers, and so ‘import substitution’ for manufactured goods appeared to be an attractive development strategy. The apparent success of the Soviet Union in creating a model of centrally planned industrialization also strongly reinforced this tendency. Two sets of highly influential empirical studies, led by Little et al. (1970) for the OECD, and by Jagdish Bhagwati (1978) and Anne Krueger (1978) for the NBER, evaluating the relative performance of a large number of developing countries, clearly showed, however, that a more export-oriented, or ‘outward-looking’ development strategy tended to lead to higher growth rates of national income and better economic outcomes overall. The star performers in export-led growth were the so-called ‘Gang of Four’ of South Korea, Taiwan, Hong Kong and Singapore, all of which attained close to double-digit GDP growth rates coupled with even higher export growth rates for several decades starting in the early 1960s. The lead of these four was accompanied by a further turn towards outward orientation by Thailand, Malaysia and Indonesia, classic export economies of the preceding era. The success of these Asian economies seems to have been an important factor in convincing Deng Xiaoping to make his momentous decision to open China to the world economy shortly after the death of Chairman Mao Zedong in 1976, exactly two centuries after Adam Smith’s recommendation of the benefits to China of a more active involvement in foreign trade, as we have noted above. After a decade of surging export-led growth in China it was not long before the other Asian demographic giant India also followed suit in availing itself more actively of the plentiful opportunities offered to it by the rapidly expanding world economy of the late twentieth century, with almost comparably remarkable results. These events, coinciding with the collapse of the Soviet Union and of its satellite regimes in Eastern Europe in 1989, led to the declaration of the so-called ‘Washington Consensus’ on development policy, marked by reliance on the free market and the price mechanism as the main avenues to the achievement of sustained growth of living standards in the Third World, and a substantial dismantling of the role of the state in the economic system beyond the maintenance of law and order and the provision of basic infrastructure. Despite a substantial setback as a result of the Asian financial crisis of the late 1990s, the developing countries led by Asia – but followed as well by Brazil and Chile in Latin America, and even to some extent by Africa – together with the countries of the former Soviet bloc, achieved rapid growth rates of GDP and trade volumes during the global boom stimulated by the revolution in information technology that began in the early 1990s.

This remarkable global expansion however was marked by a historically and economically perverse pattern of international payments imbalances, with massive capital exports from what was still a very poor country, China, to the richest country in the world, the United States. This so-called 'global savings glut', together with the low interest rate policy of the Federal Reserve Bank and a lack of sufficient regulation contributed to the extravagant sub-prime mortgage lending mania in the United States, the unsustainable nature of which was eventually revealed in the current global financial crisis, setting off a steep fall in global output and an even steeper one in world trade in late 2008 and 2009, from which we are as yet to even begin to fully emerge. Contrary once again to the established pattern of historical experience, the developing countries led by China and India are still maintaining relatively strong if reduced growth rates of GDP during the current 'Great Recession', while the advanced economies of the United States, the European Union and Japan are barely beginning to recover in terms of output while still experiencing rising unemployment, despite continued monetary expansion and fiscal stimulus. This has led to a controversy on whether, and if so to what extent, the world economy has experienced a 'decoupling' of growth in the South from that in the North, or as Arthur Lewis used to put it, has the South managed at last to 'internalize the engine of growth' from exports driven by growth of demand in the North to its own investment, consumption and government expenditure?

5 THE WORLD ECONOMY IN THE LAST CENTURY

How are we to account for the structural basis of the contemporary world economy that is undergoing these violent and unprecedented gyrations and transformations? Another way of posing this same question is to enquire what, if anything, has changed in the basic pattern of the North-South relationship that prevailed during the 1870-1914 golden age and was so severely battered during the interwar years. Put it this way, the answer is not hard to find. It lies in the fact that the composition of the South's exports has changed dramatically since about 1960, when the four East Asian economies began their export-led surge. The tropical primary products such as sugar, tea, coffee, cocoa, rubber and so on continue to be exported but they have been vastly outstripped by the expansion of manufactured exports. While initially of a strongly labour-intensive nature, such as apparel and footwear, these exports have not only grown remarkably in volume but have been steadily upgraded as well, displaying increasing capital-intensity and technological sophistication. But is it not true, as Arthur Lewis (1977: 70) said, 'When the LDCs switch from exporting primary products to exporting manufactures to the rich countries, they exchange one dependence for another'? The difference however, as Lewis himself was of course well aware, is that these exotic tropical products are non-competing imports of the developed countries, and so the markets for them were easily saturated, whereas in the case of even labour-intensive manufactured exports there is substantial import-competing domestic production in the developed countries that can be replaced. This would provoke successful attempts at protection unless, as was the case for most of the last fifty to sixty years, the North has itself been enjoying a prolonged boom, powered by rapid technological change and a generally stable macroeconomic framework, which has enabled the displaced workers from these sectors to find as good or better jobs in higher value added manufacturing or services. This means that instead of being tied, as on a leash, to the North's own growth rate, the South can begin to sustain a higher growth rate than the North without being choked off by the

inevitable adverse shift of the terms of trade against primary commodities that it experienced in earlier periods.

In terms of theory, this momentous historical shift in the North-South relationship can be expressed by structural change of the South's underlying economic model from complete dependence on primary production to increasing reliance on labour-intensive manufactured exports while still in the Lewisian 'dual economy' phase of its development, with unskilled wages remaining basically flat, followed by a transition to a Solovian phase of rising capital-labour ratios and real wages while 'climbing the ladder of comparative advantage' by exporting manufactures of increasing capital-intensity. The rather complex technical details of this process are expounded in Findlay (1973, chapters 5 and 6; 1984). The basic intuition lies in the difference between specializing on an export market that only grows at some fixed rate, resulting, if this is exceeded, in falling terms of trade and hence a lower rate of profit, and therefore also the rate of growth as a consequence of the Ricardian link between the two, and instead on the more or less unlimited market for manufactures that permits expansion at more or less constant terms of trade and hence rates of profit and growth. Thus, as was the case with the 'Gang of Four' and China today, the combination of a relatively low wage rate because of an underemployed agricultural hinterland and the ready availability of modern industrial technology through foreign direct investment or licensing agreements results in a high rate of profit accompanied by a very high rate of saving, so that the growth rate $g = sr$ can itself rise into the double-digit range over one or even more decades before rising wage-rates and diminishing returns to capital begin to slow it down after the horizontal supply curve of labour starts to slope upwards and the Solovian phase is entered, marking the structural convergence of the developing to the already developed countries.

Ultimately, of course, each of the South's economies will also need to raise the productivity of its relatively backward agricultural sector to further raise living standards and reduce poverty, while also reducing the dependence on foreign trade as the engine of growth. The developed world could easily absorb the exports of the four pioneering East Asian manufactured exporters, but it will certainly not be as easy to do the same with the 1.3 billion Chinese and almost as many Indians waiting in the wings without experiencing some strong protectionist backlash. In this respect an 'inward' turn to China's development efforts by building up infrastructure and promoting investment in the central and western provinces and regions would be salutary, rather than the continued 'invasion' of overseas markets. In a very interesting WIDER Research Paper, Fang Cai (2008) of the Chinese Academy of Social Sciences has applied the Lewis model to China and argues that the critical upward turning point of the labour supply curve will soon be reached, requiring profound changes in the institutional framework and development strategy.

Nothing said here implies that specialization on primary production and exports, if in accordance with a country's comparative advantage, would be somehow detrimental to development and should be countered by protection to industry. History abounds with examples of initial primary specialization, often leading eventually to a greater reliance on manufactured exports. Britain after all was long an exporter of raw wool before Edward III's export tax on that commodity to finance the Hundred Years War gave 'effective protection' to the nascent woollen cloth industry. Germany and the United States were mainly agricultural exporters until quite late in the nineteenth century, if not

even later in the latter case. Sweden and Finland with timber and Japan with raw silk are other notable examples of beneficial initial primary specialization prior to reliance on manufacturing. In the contemporary world countries like Brazil, Thailand and Malaysia have all initially prospered through primary exports before emerging as substantial exporters of manufactures as well. Primary exports can not only be sustained, but grow absolutely in volume and value, even if they are eventually outstripped by a wider and more diverse range of manufactured goods in the export lists. On the other hand China and India were very early leading world exporters of manufactures with their silk and cottons, before they exported tea and jute, so that their current emerging roles in the world economy are to some extent a reversion to past historical patterns.

Pride of place among all contemporary primary exports must of course go to petroleum and natural gas, the fossil fuels along with coal that have been the foundation of the 'mineral-based energy economy' ushered in by the Industrial Revolution. Coal, because of its bulk and weight relative to its value, has usually been used as an essential industrial input close to the source rather than exported over long distances to provide energy elsewhere. The same was the case with iron ore before the advent of the container ship. Oil however has long been exported from the vast oilfields of the Middle East to the industrial world, now increasingly including China and India, as the Industrial Revolution that began in Britain around 1800 has eventually made its way around most of the globe, raising living standards and reducing poverty on an unprecedented scale, but also increasing in even greater proportion the demands on already scarce global natural resources.

As pointed out by Wrigley (1988), this vast increase in the energy resources available to humanity made possible the exponential growth of the world economy over the past two centuries and the release from the spectre of the stationary state that so haunted the Classical economists from Malthus and Ricardo to John Stuart Mill. As we now know all too well, however, the cost of this reliance on fossil fuels in terms of the ongoing and seemingly irreversible damage to the global climate and environment has made this a crucial aspect of the trade-development nexus, marking more sharply than anything else the advent of 'modernity', perhaps the ultimate Faustian bargain that the human race will ever engage in.

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