

## **Globalisation, Multinationals and the BRIICS Countries**

By

*[Philip McCann](#)*<sup>1</sup>

---

<sup>1</sup> Department of Economics, University of Waikato, Hamilton, 3240, New Zealand, E-mail: [pmccann@waikato.ac.nz](mailto:pmccann@waikato.ac.nz) and Department of Economics, University of Reading, RG6 6AW, United Kingdom, E-mail: [p.mccann@reading.ac.uk](mailto:p.mccann@reading.ac.uk)

## TABLE OF CONTENTS

Executive Summary .....	3
1. Introduction.....	4
2. Changes in Global Trade Architecture .....	7
2.1 Institutional Changes: Areas of Economic Integration .....	7
2.2. Technological Changes and Spatial Transactions Costs.....	10
2.3. Organisational Changes .....	14
3. The Economic Geography of Knowledge: Firms, Countries and City-Region Networks.....	17
3.1 Knowledge-Firms, Countries and R&D.....	18
3.2 Knowledge, Cities and Networks.....	19
4. Multinationals and the Global Economic Geography of FDI.....	22
5. Foreign Direct Investment, R&D, and the BRIICS Countries.....	25
6. Globalisation, Development, and the Changing Economic Geography of the BRIICS Countries .....	29
6.1 The Changing Economic Geography of China .....	31
6.2 The Changing Economic Geography of the Other BRIICS Countries .....	33
6.3 Final Comments .....	36
References.....	39

## Executive Summary

The current phase of globalisation is driven by institutional changes, technological changes and organisational changes.

The current phase of globalisation is characterised by international convergence increasing regional divergence.

These changes are due to a combination of falling spatial transactions costs for lower knowledge-intensive and lower value-adding activities, and increasing spatial transactions costs for higher knowledge-intensive and higher value-adding activities.

Multinational firms are becoming increasingly important in determining the nature and geographical patterns of globalisation

In particular, multinational firms dominate the distribution of knowledge-intensive activities at a global scale

Cities, and in particular, large, diverse, and well-connected cities, are playing a critical role in the modern phase of globalisation.

Global FDI outflows and inflows are dominated by advanced economies. However, developing and transition economies are now playing an expanding role in FDI inflows and outflows.

FDI inflows to the BRIICS countries tend to be dominated by large and diverse city-regions with excellent international accessibility.

Urban-rural inequality is increasing due to the geographical concentration of FDI and knowledge-related activities.

The public policy responses to the various issues raised here fall into two groups, namely: intra-regional public policy responses and inter-regional public policy responses.

The *intra*-regional public policy responses centre on the need for improving the quality of urban living, as cities grow. It is essential for the provision urban infrastructure and land-use resources to adapt to rapid population growth.

Of particular importance is the need to maximise the efficiency of the urban transportation and commuting infrastructure, and also to maximise the flexibility of the land-use planning system and regulations.

The *inter*-regional public policy responses centre on the need to improve inter-regional and international connectivity. This is essential in order for all countries, and for all the regions of a country, to benefit from the localised growth processes currently taking place in major global cities.

Improving all forms of transportation and communications infrastructure between hinterland regions and major cities is very important. This includes road, rail, maritime, air-travel and electronic communications infrastructure and facilities.

However, in today's knowledge-driven economy, it is particularly critical that the accessibility of regions to global cities via air-transportation facilities and telecommunications infrastructure is maximised.

## 1. Introduction

1. In order to understand the nature of the contemporary phase of globalisation, this chapter adopts the economists' focus on international trade, international investment and international markets from the particular perspective of economic geography. From the standpoint of economic geography, it explores the explicitly spatial and regional characteristics and impacts of contemporary globalisation. Through the lens of international investment, impacts on individual countries, groups of countries, regions and cities are also analysed. The processes of globalisation which are mediated by the foreign direct investment (FDI) behaviour of multinational enterprises (MNEs) or trans-national corporations (TNCs) form a particular focus of this chapter. Impacts of globalisation on the BRIICS countries of Brazil, Russia, India, Indonesia, China and South Africa are also considered from economic-geographic viewpoint.

2. Since globalisation is a process that has been taking place over several centuries, it might be argued that the current globalising trend, which has lasted for approximately two and half decades, represents nothing new (Steger, 2003). On the other hand, the current era of globalisation is qualitatively different from previous eras of globalisation in that the magnitude of internationalisation is far greater (Steger, 2003; MacGillivray, 2006). If we consider the twentieth century, then this argument clearly has credence. Much of the twentieth century was characterised by long periods of anti-globalisation, most notably during the first half of the century. The ratio of world trade to global GDP fell during the period 1929-1950, while the ratio of foreign assets to global GDP declined from 1914 onwards, and was not attained again until 1980 (Crafts, 2004). In contrast, the most notable feature of the current era of economic globalisation since the 1980s is the extent to which it exceeds the previous peaks (Crafts, 2004). The world is now more open and interconnected than at any other stage in its history.

3. Why, then, is this the subject of so much debate? Economic geography offers us an answer. Over the last three decades, the global economy has undergone three radical types of changes and these have fundamentally altered all of the global economic relations between countries, regions and firms. These changes can be labelled institutional, technological, and organisational. These changes are neither entirely independent of each other nor dependent upon each other, as the mutual causality between these three types of changes is very complex. However, grouping into three broad categories the various forces that have driven and shaped the current era of globalisation allows us to analyse the impacts of globalisation on the world economy as a whole, and then to consider the impacts on individual countries and regions through the behaviour of firms. As such, this approach provides for a bottom-up microeconomic approach to explaining global economic geography phenomena. The chapter thus begins with a brief overview of each of these changes, the nature and logic of which are discussed in detail in the following sections.

4. The collapse of the centrally-planned economic systems in the late 1980s and the opening up of the formerly planned transition economies to the global economic system has led to major changes in the nature and patterns of global trade and investment; such changes may be called institutional changes. With the emergence of transition economies, some 260 million workers entered the global labour market for the first time. Furthermore, the opening up of China released some 760 million workers, and the liberalisation of India, another 440 million into the market (Venables, 2006). These institutional changes, which are essentially internal domestic changes within individual countries, have had dramatic scale effects on the global economic system. Equally important have been the institutional changes wrought by the development of trans-national free trading arenas. The creation of the EU internal market in 1992 and the formation of NAFTA in 1994 have been critical moments in the global trading system. These trans-national institutional changes have lowered tariff barriers across a wide range of trading links. These free trade zones have also prompted smaller developments in other parts of the world, such as ASEAN and MERCOSUR, as well as encouraged many of the emerging transition and developing economies to open up. All of these institutional developments promote trade because they allow goods and services to move more freely across geographical space.

5. Over the last three decades there have been dramatic improvements in information and communications technologies (ICTs) as well as allied improvements in transportation technologies. These technological changes mean that information, goods and services can all move more rapidly across geographical space. These trends have led many commentators to assume that geography is therefore irrelevant as an arbiter of economic logic and performance. This idea can be traced back to the early 1980s (Warf, 1995; Gaspar and Glaeser, 1998). Such arguments were also bolstered by an urban-rural shift that occurred, whereby increasing numbers of people and investments moved away from major cities and into smaller cities and rural areas (Fothergill *et al.* 1985). However, over recent years, communications and transportation technologies have become increasingly sophisticated and have changed rapidly. In 1992, O'Brien (1992) announced the 'end of geography'. Later Cairncross (1997) declared the 'death of distance', and very recently Friedman (2007) argued that 'the world is flat'. Anecdotal evidence of companies 'off-shoring' and relocating to other countries appears on a daily basis. Paradoxically, however, as this chapter demonstrates, there is now also increasing evidence that this modern era of globalisation is in fact associated with the opposite trend, that is, that globalisation leads to a greater spatial concentration of activities across the global economic system. Exactly how these two apparently conflicting observations can be reconciled is crucial to a better understanding of the ever-evolving economic geography of globalisation.

6. Finally, the combination of the institutional and technological changes has also led to organisational changes. In particular, multinational firms have taken advantage of the changing institutional and technological environment in order to achieve economies of scale. This is possible because many activities can be more efficiently coordinated across and time within multinational organisations rather than via market contracting relationships. The origin countries in which the parent companies of the multinational enterprises (MNEs) are located will in general benefit from the profits associated with the outflows of foreign direct investment (FDI), while the host countries of the inward FDI are likely to benefit from both increased domestic competition and also inward technology transfers. However, in terms of economic geography, these organisational changes are not causal phenomena in the quite same way as institutional and technological changes are. The reason is that the technological and institutional changes are generally beyond the control of any individual firm, whereas the organisational responses of firms are largely within their own control. Instead, the organisational changes can be considered rather more as rational responses to the opportunities afforded by the technological and institutional changes in the global economy. As such, we need to consider these organisational changes in a slightly different manner to the technological and institutional changes.

7. A very common rather cursory response to these institutional, technological, and organisational changes is to assume that they will 'flatten out' the world' and make it more even (Friedmann, 2007). The reason for this view is that these changes will allow businesses in general and multinational firms in particular to increasingly out-source and off-shore activities to other lower wage countries. The resulting changes in the geographical patterns of foreign direct investment are assumed to therefore favour lower wage economies. The forecasted outcomes of these globalisation processes are that activities will become more geographically dispersed and the gap between developing and developed economies will be quickly closed. In reality, however, the economic geography impacts of globalisation are far more complex. Such simplistic responses do not consider the complicated inter-relationships that exist between spatial transactions costs, agglomeration economies, and the economic geography of investment and output. As Leamer (2007) points out, the world is not shrinking, but rather economic activity is dispersing. Therefore, what is critical for economic growth and development are the particular spatial patterns of this dispersion process across different types of activities and different countries and regions.

8. In order to estimate the potential impacts of these institutional, technological, and organisational changes on the global distribution of activities, it is useful to employ the approaches and insights gained from models of new trade theory and new economic geography. Krugman and Venables (1995) analyse the situation where economies produce two sets of outputs, one under conditions of constant returns to scale, and the other under increasing returns to scale. Constant returns to scale implies that as an economy increases in

size its level of efficiency stays the same, whereas increasing returns to scale implies that as an economy increases in size it becomes more efficient. Under these assumptions, the model they develop characterises the process of global restructuring under falling distance-transport costs into three distinct phases. In the first phase of global restructuring, Krugman and Venables (1995) demonstrate that with high distance-transport costs all countries have similar production patterns because the high distance-transport costs act in effect as a trade barrier, and this therefore encourages local production. However, in the second phase, as distance-transport costs begin fall, there emerges an increasing centre-periphery divergence and regions in the periphery suffer declines. Finally, in the third phase, as distance-transport costs fall to very low levels, convergence starts to re-occur, such that production takes place in all locations. Where, then, in this Krugman-Venables framework does the global economy currently stand? For those who view the world as increasingly flat (Friedman 2007), we are already in the third stage of the Krugman-Venables framework, where distance-transport costs are extremely low.

9. Obviously, any model makes assumptions so as facilitate the analysis, and the Krugman-Venables (1995) model is no exception. As such, it is not a complete explanation or description of the processes of globalisation. For example, the model ignores the specialisation possibilities associated with comparative advantage, a crucial issue for many developing countries. Yet, the model neatly captures some of the salient features of globalisation. In particular, the evidence to be presented in this chapter demonstrates that on a global scale, the various institutional, technological and organisational changes outlined above suggest that we are currently in the second phase of the Krugman-Venables framework. In other words, the global economy is currently going through a process of restructuring and adjustment, the characteristics of which often lead towards increasing inequality across regions. More specifically, it is argued that we are currently in a phase of global restructuring characterised by an increasing centre-periphery divergence in which the countries in the geographical periphery tend to suffer.

10. However, the argument in this chapter is also rather more nuanced than this. In particular, the evidence presented here suggests that the current phase of globalisation is characterised by an increasing divergence between high knowledge-intensive activities and low knowledge-intensive activities. As we will see, high knowledge-intensive activities are developed and controlled in rapidly growing regions which become increasingly efficient in the production of such activities. In particular, these environments are dominated by urban agglomerations. In contrast, low knowledge intensive activities are produced primarily in low wage environments exhibiting constant returns to scale. At the same time, while global distance-transport costs for many activities have fallen, there is also evidence that they have not fallen by very much. The reason is that the distance-transport costs for many high-value, knowledge-intensive inputs have actually increased, giving further impetus to the role of increasing returns to scale and agglomeration in the generation of high value outputs. As we will see, the combination of these various observations implies that we are currently in the second stage of the Krugman-Venables transition process; that is, one in which countries and regions in the centre tend to benefit, while countries and regions in the periphery tend to suffer.

11. Yet, as we will also see, not all central regions benefit and not all peripheral ones suffer. Rather, it depends on the nature of the economic centres within the countries (Fujita *et al.*, 1999). Countries which include large and diverse agglomerations will tend to benefit from falling distance-transport costs, whereas even centrally-located countries without such diverse agglomerations within them will tend to suffer. The reason is that firms will locate in large and densely populated regions in order to take advantage of the large 'home-market' effects (Krugman, 2007) associated with agglomeration because the higher induced productivity will also allow the firm's output to expand for exports. Locating in a major city therefore not only provides for a large domestic market, but also for a large export capability. Countries or regions without such agglomerations will find it difficult to attract investment from firms wishing to export, whereas agglomeration regions will be increasingly attractive for such investments.

12. These arguments are most applicable to multinational firms, which are focussed on exploiting their knowledge resources so as to access global markets. The means by which knowledge is generated, controlled and transmitted across geographical space are increasingly dominated by the investment behaviour of multinational firms, and the institutional, technological and organisational changes currently taking place which tend to favour these firms. Therefore, understanding the evolving twenty-first century economic geography of growth depends crucially on understanding the location behaviour of multinationals, and the relationship between these firms and agglomeration. As we will see, this is as true for developing or transition economies as it is for developed economies, and the BRIICS countries are no exception.

13. The chapter is organised as follows. Section 2 considers in detail the evidence of the impacts of each of the institutional, technological and organisational changes on global trade and international investment behaviour, and the resulting effects on countries and regions. One of the issues to emerge from the analysis is that dominant city-regions are playing an ever more important role in the growth performance of a country, and that understanding the long-run growth fortunes of a country requires a consideration of the relationships between knowledge, international investment and economic geography. In section 3, the relationships between knowledge, firms, countries and networks of city-regions is therefore considered. In section 4 the focus is specifically on the relationships between multinational investment and economic geography at a global scale, and in section 5, the relationships between foreign direct investment, knowledge-intensive activities, and the BRIICS Countries are discussed. Section 6 explores the emerging evidence regarding the relationships between globalisation, development, and the changing economic geography of the BRIICS Countries.

## **2. Changes in Global Trade Architecture**

14. The recent era of globalisation has been dominated by one major feature: the rise of areas of free trade and economic integration. In relation to free trade, the changes in the architecture of trade have taken place at the very large global and continental scales, such as WTO and APEC. However, many of the more detailed institutional developments have taken place at a smaller scale. The number of preferential trade agreements between countries doubled between 2000 and 2006 (UNCTAD, 2007). At the same time, there has also been a rapid increase in institutional changes which deal not only with free trade issues, but also with the liberalisation of cross-border investment issues. Globally, the number of international investment agreements (IIAs) between countries, which includes both double taxation treaties (DDTs) and bilateral investment treaties (BITs), had reached almost 5,500 by 2006 (UNCTAD, 2007). This number has increased dramatically from 900 in 1980 and just over 3800 in 1999 (UNCTAD, 2000). While the number of such agreements has multiplied, the changing patterns of international investment agreements also suggests that the individual trading blocs are becoming more important in developing the institutional frameworks for facilitating FDI (UNCTAD, 2003). The reason is that the most far-reaching of these institutional developments tend to be between countries in the same geographical region. The institutional architecture surrounding free trade and FDI is therefore becoming both more sophisticated and more widespread. These institutional developments show no sign of slowing down, and even though global business confidence is currently suffering, the long-term trajectory towards increasing international investment appears to be inevitable. Moreover, these trends are encouraged by both technological and organisational changes.

### ***2.1 Institutional Changes: Areas of Economic Integration***

15. In addition to political considerations, the creation of areas of free trade and economic integration has been largely a response to changes in the economic performance and behaviour of groups of countries and the multinational firms emerging from those countries. As we will see shortly, such firms have continued to drive the processes of global economic integration, and to mould the outcomes of such processes. As well as the behaviour of these multinational firms, various other major institutional issues have also acted as catalysts for the creation of such areas. For example, the rise of the Eurodollar markets (Casson and McCann, 1999), the

currency flotations and currency convertibility of the late 1970s, changes in the nature of financial products and the cross-border securitisation of debt in the 1980s, and the 1984 Big Bang in the London financial markets are all pivotal moments in the on-going processes of globalisation. Over the last four decades, these major institutional changes, allied with the many small and incremental institutional changes associated with individual IIAs, DDTs and BITs, have all contributed to the globalising trend. Eventually these multiple minor and major institutional changes have led to the creation of the large free trade and integrated economic areas, the most notable of which were the EU single market in 1992, NAFTA in 1994, and the establishment of smaller organisations such as ASEAN and MERCOSUR. So far, the limit of this cross-border integration process has been the introduction of the Euro as a new global reserve currency in 2002. As such, we can view the rise of these free trade areas and areas of economic integration as being the logical outcomes of the many previous smaller-scale institutional changes outlined above. Notably, there were technological developments which contributed greatly to these institutional changes. Multinational firms took advantage of the new communications and transportations technologies to improve their profitability and, as we will see in the next two sections, such changes in corporate behaviour were a major force for economic integration. However, it is important to note that the relatively recent creation of economic areas of integration and free trade are enormous institutional changes which have built on a multitude of previous smaller-scale institutional changes.

16. The major outcome of these institutional changes has been the increasing relative importance of these super-regions within the global economic system. In particular, by 2005, the three most economically powerful super-regions of NAFTA (USD 14.72 trillion), the European Union (EU) (USD 13.29 trillion) and South and East Asia (USD 10.06 trillion) had roughly comparably sized economies (World Bank, 2007). As shown in Table 1, the gross income of NAFTA represents 32.6% of global income, the EU represents 29.4% of global income, and South and East Asia accounts for 22.3% of global world income. Together these three super-regions account for 84.3% of global income (World Bank 2007). In terms of the scale of output, each of these super-regions is dominated by a core of countries. In the case of NAFTA, the dominant element by far is the US. In the case of the EU, it is the EU-15, and in the case of South and East Asia, it is East Asia (comprising Japan, China and Korea plus the ASEAN 10). If we consider the role of these super-regions and their dominant elements in global trade, we see that by 2000, NAFTA accounted for 35% of world trade, the EU-15, 25% of world trade, and East Asia 23% (Fujita, 2007a). In other words, 83% of global trade in 2000 was accounted for by NAFTA plus the dominant elements within the EU and East Asia, share of global trade which has increased from some 70% of world trade in 1970. The share of global trade accounted for by these countries has increased in line with their share of total global output. Over the last three decades, therefore, as the three super-regions have increasingly dominated global economic activity, the concentration of global trade in these super-regions has also been increasing consistently.

**Table 1. The Scale of Global Regions**

<b>% of Global Income</b>	<b>2005</b>
NAFTA	32.6
EU	29.4
South and East Asia	22.3
<b>% of World Trade</b>	<b>2000</b>
NAFTA	35.0
EU-15	25.0
East Asia	23.0

Source: World Bank 2007; Fujita 2007a.

17. While the US and the EU-15 had grown at similar rates since 1970, East Asia has grown at just over twice the rate of both of these regions (Fujita, 2007a). Over the last decade, the rapid growth in East Asia has been primarily a result of the economic liberalisation of China in the early 1990s, as well as the increasing mutual openness of the ASEAN countries. Yet, the dynamic growth of East Asia predates both of these developments by more than two decades. Initially, the growth in East Asia was facilitated primarily by the global rise of the Japanese multinationals in the 1970s and 1980s. This was followed by the Korean and Chinese Taipei manufacturing multinationals in and the 1980s and 1990s, and the Hong Kong, China and Singaporean service multinationals in the 1980s and 1990s. All of the various waves of multinational firms which emerged from these Asian economies have changed the nature of trade and investment relations within the East Asia region. They have also changed the relations between East Asia and the rest of the industrialised world. As shown in Table 2, between 1980 and 2000 East Asia increased its share of global GDP from 16% to 23%, its share of global exports from 13.4% to 23.4%, and its share of global imports from 13.2% to 18.9% (Fujita, 2007b). In the last decade, the East Asia region has continued on its dynamic growth trajectory. By 2005, economic growth in East Asia was 8.9% and in South Asia, 8.7%, some 2.7 times the equivalent growth rate for USA and 6.7 times the growth rate for the Euro area (World Bank, 2007). By 2004, the share of global exports accounted for by East Asia was 26.4% and the share of global imports in East Asia was 22.1% (Fujita, 2007b). As such, Asia is continuing to play an increasingly important part in the global trading system, while the other dominant regions of the global economy, namely NAFTA and the EU are maintaining their roles.

**Table 2. The Share of East Asia in Global Trade**

	1980	2000	2004
% of Global Exports	13.4	23.4	26.4
% of Global Imports	13.2	18.9	22.1

Source: World Bank 2007; Fujita 2007a,b.

18. On a global scale, domestic private investment dominates foreign direct investment in approximately a four to one ratio. Moreover, in developing or transition countries these ratios are often significantly higher. These observations therefore suggest that domestic rather than international investment issues are dominant factors in determining a country's or region's economic growth, and particularly in the case of developing or transition economies (World Bank, 2005). As such, the reasons for a country's or region's growth and trade performance ought to be sought in terms of internal domestic explanations, rather than in terms of external international issues. However, the situation is far more complex than this, and international investment issues play a crucial role in domestic performance. Three examples serve to highlight this complexity.

19. Firstly, if we consider the case of East Asia, at 20.3% (World Bank, 2007), the share of global income in 2005 is slightly less than the GDP share of East Asia. The reason for this is that there are huge outflows of profits from East Asia to other parts of the world, which are a direct result of the enormous levels of multinational foreign direct investment FDI that have been flowing into the East Asia region from other parts of the global economy over the last two decades. Secondly, currently over half of all Chinese manufactured exports are accounted for by foreign-owned multinational firms (Scheve and Slaughter, 2007) and thirdly, in the Indian ICT sector, multinationals account for two-thirds of all sales (Scheve and Slaughter, 2007). Clearly, the growth and trade performance of these rapidly-emerging regions and countries is fundamentally related to multinational investment.

20. These three examples highlight an important point about globalisation: economic development is intrinsically related to international investment. The spatial patterns of multinational investment therefore play a very important role in the nature of economic development. As such, while it is true that a country's economic growth is to a large extent determined by its domestic competitive conditions, both inward and outward foreign direct investment (FDI) can also play a crucial role in the growth of an economy, which is far

out of proportion to its relative scale. The reason is that international investment opens up an economy to the latest technology, knowledge and learning, all of which are crucial competitive assets. This is just as true for developed economies as it is for developing or transition economies. Moreover, in the case of developing or transitioning economies, the role of international investment may be even more critical than for developed economies. The reason is that developed economies have a much greater capacity to generate such knowledge and technology from within their existing domestic resources. On the other hand, it is often the case that in the short to medium term, and even in the long-term in many cases, such technological and knowledge resources cannot be internally generated by a developing economy. Multinational firms can act as critical conduits for technology transfer. Therefore, identifying the pattern and nature of multinational inward investment flows is crucial for determining the long-run growth trajectories of emerging economies in the modern global economy.

## ***2.2. Technological Changes and Spatial Transactions Costs***

21. The costs associated with engaging in and co-ordinating activities across space can be termed “spatial transactions costs”. In order to understand the ways in which spatial transactions costs have changed over recent years we need to split up spatial transactions costs into three different types. The first type of spatial transactions costs are the transactions costs associated with moving goods across geographical space. These are transportation costs. The second type of spatial transactions costs are the transactions costs associated with moving knowledge and information across geographical space. For the purposes of this paper we will call these knowledge-information transmission costs. Both the first and second types of spatial transactions costs, namely transportation costs and knowledge-information transmission costs are explicitly geographical in their construction in that the costs incurred always depend on the distance covered. The third type of spatial transactions costs are the transactions costs associated with moving across national borders. These tariff costs are institutional costs and the tariffs associated with a particular border crossing are not defined geographically. By this I mean that the tariffs do not vary systematically with the distance travelled before or after arriving at a particular institutional border. As such, from the perspective of economic geography, we can consider these costs to be fundamentally aspatial in construction, although explicitly geographical in terms of their implementation (McCann, 2005). The impacts of falls in the third type of spatial transactions costs, namely the institutional costs, are discussed in section 4. This section considers only the first and second types of spatial transactions costs, which are the transactions costs which are explicitly dependent on distance.

### ***2.2.1 Falling Spatial Transmission Costs***

22. A particular subset of spatial transactions costs are those costs which are directly related to the costs of moving goods or information across space. These costs are dependent on communications and transportation technologies, and as a combined group, we can refer to these as spatial transmission costs.

23. Since the 1980s we have seen dramatic improvements in the ability of decision-makers and planners to co-ordinate activities across space. The primary reason for these improvements has been the enormous technological developments in information and communications technologies. Information technologies employing satellite and fibre-optical technology allow for greater quantities of information to be transmitted at much lower costs than previously possible (McCann, 2007a). These developments have increased market access for individual firms. In addition, they have also allowed for more complex operations across diverse locations to be managed both more efficiently and effectively than was previously possible. For industries trading specifically in information, such as finance, advertising, marketing and tourism, modern information technologies provide new possibilities for the supply of information-based services across a global market space. Market access has therefore increased dramatically for huge numbers of firms trading in knowledge and information-based services (McCann, 2007a, 2008). At the same time, these improved technologies also allow decision-makers to undertake the co-ordination of spatial arrangements of activities which were

previously not possible, and this is most noticeable in the case of the increasing off-shoring and out-sourcing of many types of service industry activities. This is evident in examples such as international accounting, where New York banks transfer their book-keeping requirements overnight to firms in Ireland or India, in order to have them updated in time for opening the money markets the next day. Other examples include Silicon Valley firms which subcontract software development activities to firms in Bangalore India, while still maintaining daily contact and control of the Indian software development process from California. These observations all imply that knowledge-information transmission costs must have fallen dramatically over recent decades (McCann, 2007b, 2008).

24. Similarly, there is also evidence that many of the sectors which have benefited from the geographic dispersal possibilities associated with these technologies are often those which do not specifically trade in information. For example, advanced communications and control technologies have been widely applied to the management of supply chains, to production and inventory scheduling control systems, and to logistics and distribution operations. The types of firms which particularly benefit from these technologies are those requiring the precise co-ordination of complex networks of production and distribution operations across large geographical distances (McCann, 2007a, 2008).

25. Comprehensive evidence across both countries and time pointing towards falling spatial transactions costs associated with the increased usage of information technology usage comes from Ioannides *et al.* (2007). They find that the increasing use of information and communications technologies over time generally allows for an increased dispersion of activities across space, thereby making city sizes more uniform. It appears therefore that the impacts of falling knowledge-information transmission costs have been widely felt across a broad range of sectors.

26. Evidence for falling spatial transmission costs is also mirrored in the case of firms involved in the movement of physical goods and commodities across space. Transportation technologies have improved dramatically over recent years. Examples of this include the rapid growth in roll-on roll-off trucking technology, sophisticated gains in containerisation technology and capacity, rapid-turnaround shipping, and the increased speed and efficiency of air transport technologies (McCann, 2008). Trade in parts and components now accounts for around 30% of world manufacturing trade, and the share of imports to total inputs for US goods producing sectors has doubled to 18% over the last two decades (Venables, 2006). All of these technological developments would imply that the cost of moving goods and commodities across space has fallen significantly over recent decades. Indeed Glaeser and Kohlhase (2004) suggest that the costs of transportation for goods fell by as much as 95% during the twentieth century. Currently, over 80% of US shipments occur in industries where transport costs are less than 4% of the total value (Glaeser and Kohlhase, 2004). However, whether this is primarily due to technology or markets is not entirely clear. Evidence from France (Combes and Lafourcade, 2005) suggests that most of the transport cost reductions of the last three decades appear to be primarily due to deregulation within the transport industries rather than technological changes.

27. These various observations all point to falls in both the costs of transmitting information across space and falls in the costs of moving goods across space (McCann, 2008). According to Friedman's logic, falling spatial transmission costs lead to convergence across space. The reason is that reductions in the real costs of transmitting information and goods across space implies that geographical peripherality is becoming relatively less of a handicap to accessing global markets. Indeed, there is much evidence to suggest that such convergence is already taking place in many parts of the global economy such as Europe (Fingleton, 2003a) and the US (Higgins *et al.* 2006). However, there is also a great deal of evidence which points in the opposite direction (Brakman and van Marrewijk, 2008). Although there are difficult empirical issues associated with measuring convergence (Higgins *et al.*, 2006), the rate of convergence in many arenas of the global economy appears to be either surprisingly slow, non-existent, or even negative. If we follow the Friedman thesis, these observations would appear to be paradoxical, especially when we consider the rate of development of

communications and transportation technologies. Yet, the reason for these apparently paradoxical observations is that Friedman's hypothesis is incorrect. The fact that spatial transmission costs have fallen does not imply that spatial transactions costs have fallen. Indeed, there is much evidence which suggests that while spatial transmission costs have fallen, spatial transactions costs have actually risen.

### 2.2.2 *Rising Spatial Transactions Costs*

28. The argument that spatial transmission costs have fallen while spatial transactions costs have risen is based on one major argument and on three broad sets of empirical evidence.

29. The theoretical argument that spatial transactions costs have increased while spatial transmission costs have fallen is that improvements in information technologies themselves increase the quantity, variety and complexity of the knowledge handled and information produced. The increased quantity, variety and complexity of the knowledge handled and information produced itself increases the costs associated with acquiring and then transacting this knowledge across space (McCann, 2007a). This is because much of the information will originally have emerged from knowledge of a non-standardised tacit nature, and the acquisition and transmission of this type of information increasingly requires greater levels of face-to-face contact in order to maintain mutual trust and understanding (Gaspar and Glaeser, 1998; Storper and Venables, 2004). For many knowledge-intensive activities, the required frequency of face-to-face interaction has increased over recent years (Storper and Venables, 2004; McCann 2007b), because the time (opportunity) costs associated with not having continuous face-to-face contact have increased with the quantity, variety and complexity of the information produced. The outcome is that in equilibrium, the optimised frequency of interaction across space will have increased (Rietveld and Vickerman, 2004) for many knowledge-intensive sectors, thereby increasing the level of spatial transactions costs for any given distance over which communication takes place (McCann, 2007b). The increased importance of face-to-face contact is also manifested in terms of the increasing development of customised products or services. Lower transport costs can be shown to imply that firms increasingly switch to the production of higher quality customised goods (Duranton and Storper, 2007), whose sensitivity to distance is greater than for standardised products. This is because the cost of providing a given level of service quality becomes more costly with distance (Duranton and Storper, 2007). Spatial transactions costs as a whole will therefore have increased because of the growing importance of transacting knowledge via face-to-face contact, even though the spatial transmission costs of information have fallen. This argument is also consistent with the point made by Glaeser and Kohlhase (2004): that while the costs of moving goods have fallen dramatically, the costs of moving people have not.

30. This theoretical argument implies that even though spatial transmission costs have fallen, the relative advantage of proximity and accessibility has increased, and the disadvantages associated with geographical peripherality have also increased (McCann, 2008). This theoretical argument is also consistent with three broad sets of empirical evidence.

31. The first broad set of empirical evidence which suggests that spatial transactions costs have increased while spatial transmission costs have fallen comes from the usage patterns of information and communications technologies. Gaspar and Glaeser (1998) find that the closer people are geographically to each other the more they interact via information technologies. Moreover, the extent of this interaction is also associated with the local density of the urban area, such that large dense urban areas exhibit the greatest internal communications per head (Gaspar and Glaeser, 1998). Additional anecdotal evidence in support of this argument comes from the fact that many of the industries which are most dependent on information technologies, such as the advanced semiconductor-electronics industry (Arita and McCann, 2000; 2006) and the international financial services industry, are themselves amongst the most geographically concentrated industries in the world. Even internet transactions exhibit this localisation behaviour (Blum and Goldfarb, 2006). While for many activities information and communications technologies and face-to-face contact are likely to be substitutes, there are also therefore many activities or roles for which these appear to be primarily

complements (McCann, 2008). Foreign direct investment in high knowledge-intensive activities (Nachum and Zaheer, 2005) appears to be complementary with face-to-face interaction, whereas low knowledge-intensive activities use information technology as substitutes for face-to-face interaction. Even IT-services markets themselves exhibit this dual nature, with some activities being closely related to the need for face-to-face contact, whereas others are largely independent of the need for face-to-face contact (Arora and Forman, 2007). Moreover, those activities for which face-to-face contact and information and communications technologies are complements appear to be those activities located in urban areas with extensive transportation infrastructure (Haynes *et al.* 2006). Further evidence which is suggestive of this comes from the fact that the frequency of airline business travel between major cities has increased more or less in line with the growth in telecommunications usage between such cities (Gaspar and Glaeser, 1998). The fact that cities are increasingly being dominated by high human capital individuals (Berry and Glaeser, 2005) implies that the importance of engaging in face-to-face activities is positively associated with knowledge levels.

32. The second broad set of empirical evidence which suggests that spatial transactions costs have increased while spatial transmission costs have fallen comes from trade modelling (McCann 2008). Empirical research on distance costs finds that distance effects are not only persistent (Disdier and Head, 2007), but also that these persistent effects cannot be explained simply by observing the behaviour of shipping costs. Using a meta-analysis, Disdier and Head (2007) find that bilateral trade exhibits an average elasticity of -0.9 with respect to distance, which implies that on average bilateral trade is nearly inversely proportionate to distance. Given that a 1% rise in the share of GDP accounted for by exports is associated with a per capita income increase of up to 1% (Frankel and Romer, 1999), this average elasticity of trade with respect to distance suggests that there are very large proximity-productivity effects. Moreover, Disdier and Head (2007) find that although distance effects declined slightly between 1870 and 1950, analyses employing recent data suggest that after 1950 they began to rise again. All of these empirical observations are fundamentally at odds with the Friedman 'flat world' thesis.

33. The most likely explanation for these persistent distance effects is associated with the issue of time. Hummels (2001) and Deardorff (2003) suggest that the influence of time on trade is increasing. Time in transit is costly, being up to as much as 0.5% of the value of the goods shipped per day (Hummels, 2001). The high cost of time in transit comes partly from the costs of carrying stock and also from the likelihood that long transit times reduce the reliability and predictability of deliveries (McCann, 1998; Venables, 2006; Harrigan and Venables, 2006). It also makes firms slower to respond to changing demand conditions or costs levels (Venables, 2006). Since the early 1980s, the opportunity costs of time appear to have increased for both household and industrial consumers (Piore and Sabel, 1984; Best, 1990). Consumer demand requirements are becoming ever more sophisticated and exhibit an increasing preference for retail services characterised by reliability, timeliness and quality of service. Modern household and industrial consumers now require a level of service customisation and delivery speed which is only possible by employing more frequent shipments of goods (McCann, 1998). This accounts for the almost universal trend towards Just-In-Time (JIT) type systems of shipments, which allow for Total Quality Management (TQM) principles to be applied on the basis of minimum inventory supply chains (Schonberger, 1996). Over the last three decades these JIT logistics and distribution systems have spread progressively from the Japanese automotive industry into almost all modes of global manufacturing, retailing and distribution. Obviously, the increasing sophistication of both consumer preferences and also the advanced logistics systems responding to them are mediated by the advances in communications and transportation technologies. Airfreight accounts for a third of US imports by value and 25% of African exports (Venables, 2006), and for the US, the value of time saved by airfreight and containerisation has been estimated as some 12-13% of the value of the goods (Hummels, 2001).

34. Further empirical evidence suggesting the spatial transaction costs involved in shipping of goods have increased over the last two decades, comes from the analysis of logistics costs as a whole, rather than simply observations of transport costs. Logistics costs are the combined costs of all the transportation, storage, and

inventory-handling costs which are associated with moving goods across geographical space, and these are not only much greater than transport costs, but also are related to the costs of both time and space (McCann, 1998). Firstly, logistics activities accounted for 16% of global GDP in 2000 and 18% of European GDP (Leinbach and Capineri, 2006). Moreover, during the 1990s, the growth rate for the logistics sector as a whole was in the order of 6% *per annum* (Leinbach and Capineri, 2006). Between 1987 and 1995 there was a 60% increase in outsourced dedicated third-party logistics operations (Chatterji and Tsai, 2006). Secondly, relative to the value of output (Schonberger, 1996), the average inventory levels for almost all manufacturing and distribution sectors in the developed world have fallen dramatically since the 1980s. This implies that the average lead times of goods-shipments have fallen over recent years, with a concomitant increase in goods-shipment frequencies. Thirdly, by carefully disentangling the various components of transport costs Hummels (1999) demonstrates that for many sectors, the proportion of global output which is accounted for by the combination of logistics and transportation activities has not fallen over recent decades. More specifically, while the transportation cost component of bulk materials has indeed generally fallen, in the case of manufactured goods there is evidence that this proportion has actually increased over the recent decades, in spite of the improvement in transportation and logistics technologies (Hummels, 1999). Fourthly, industries which are very dependent on JIT shipments have tended to reorganise their trade patterns in favour of geographically close suppliers and customers (McCann and Fingleton, 1996; McCann, 1998). Moreover, this behaviour is even evident in industries in which the product value-weight ratios are extremely high and for which transport costs typically account for less than 1% of value (McCann and Fingleton, 1996). In other words, increasing localisation behaviour is present even in the very industries which proponents of the ‘flat-world’ thesis would have deemed it to be entirely unnecessary (McCann 2007a, 2008).

### 2.3. Organisational Changes

35. One of the major features of the emerging twenty-first century international economic order, is that the increasingly important role played by multinational enterprises (MNEs). The best available evidence (UNCTAD, 2000, 2003, 2005, 2007) suggests that at the end of the 1960s there were approximately 7 000 MNEs, which were accounted for almost entirely by just 15 countries. As shown in Table 3, by 2006, there were an estimated 78 000 MNEs in the global economy with some 780 000 foreign affiliates. The number of MNEs has obviously increased rapidly over recent years. Over the last few years the number of MNEs in the global economy has been increasing at a rate of 1 000-2 000 per annum, while the number of foreign affiliates has been increasing by 10 000-20 000 per annum. The current numbers of MNEs now represent a 23% increase in the number of MNEs operating in the global economy within just a six year period, and a 13% increase in the number of foreign affiliates since 2000.

**Table 3. The Number of MNEs in the Global Economy**

	Number of MNEs
1970	7
2000	63
2002	64
2004	70
2005	77

Source: UNCTAD 2000, 2003, 2005, 2007.

36. Over recent decades, the levels of output, employment and trade which are associated with multinational firms have also increased much more rapidly than the growth of global trade (McCann and Mudambi, 2005). Foreign direct investment has been growing at twice the speed of world trade, which itself has grown at twice the rate of world income. The result is that foreign direct investment grew by almost six-fold between 1970 and 1999 (Bobonis and Shatz, 2007), with 30-40% of US trade currently accounted for by

intra-firm trade flows (Lai and Zhu, 2006). Overseas investment by multinational firms is now the largest single component of worldwide stocks of foreign investment (McCann and Mudambi, 2004). As is clear from Table 4, the 78 000 multinational firms now operating in the global economy currently account for an estimated USD 4.8 trillion in value-added and USD 4.7 trillion in exports. At present, multinational firms account for over 10% of global GDP, and approximately one third of global exports, as well as 12.6% of global domestic fixed capital formation. The 780 000 foreign affiliates of MNEs also currently employ an estimated 73 million workers. This number has not only tripled since 1990, but increased by some 20 million just since 2002. The total number of workers employed in foreign affiliates now represents some 3% of the global workforce.

**Table 4. The Contribution of MNEs to the Global Economy**

	MNEs (2006) World 2006	
Value Added (USD trillions)	4.8	45
Export (USD trillions)	4.7	14.1

Source: UNCTAD 2007; World Bank 2007.

37. Of the global total of 78 000 MNEs, the top 500 multinationals account for over 90% of the world's stock of FDI, and nearly 50% of global trade (Rugman, 2005). The largest 100 MNEs alone account for 10% of the foreign assets of MNEs, 17% of their foreign sales, and 13% of the total employment in affiliates of MNEs. Moreover, both the rankings and composition of the top 100 global firms are relatively stable, and concentrated in industries such as automobiles, pharmaceuticals, telecommunications, electronics, power, and petroleum. This level of concentration of the global foreign assets accounted for by the top 100 firms has remained very stable over the last decade. On the other hand, however, between 2005 and 2006, their total sales and employment grew by 10% and 9% faster than their domestic counterparts, respectively. Moreover, the more rapid overall growth of MNEs than domestic-only firms was also associated with increases in the relative importance of overseas sales and employment.

38. These recent rapid increases in the role played by MNEs in the global economy reflect genuine long-term trends towards the increasing openness and inter-connectivity of countries. More particularly, however, the rapid increase in the number of firms which are internationalising points to one of the major features of globalisation; namely that increasing economic inter-connectedness between countries is being increasingly mediated by multinational enterprises. In terms of sheer numbers and scale, multinational companies are becoming ever more important in the global economy. Evidence for this comes from the fact that during the 1980s and 1990s, both the gross product of international production and also the gross sales of foreign affiliates increased much faster than either global GDP or global exports. The gross product from foreign affiliates in 1980 was approximately 5% of global GDP, whereas by 1999 it was of the order of 10% of global GDP. The value of sales from foreign affiliates was twice that of global exports in 1999, and by 2002 the ratio had increased to two and a quarter to one. Similarly, in 1980 FDI inflows were only 2% of global fixed capital formation, whereas by 1999 they accounted for 14% of global fixed capital formation. Moreover, successful foreign direct investment (FDI) tends to generate further FDI. Much of the recent surge in FDI has been a result of multinational firms reinvesting profits from existing FDI into further foreign investments. As much as 30% of global FDI flows are of this nature. Multinationals are now more important than ever, and there is no sign that this increasing trend is waning.

39. In the short-term, however, multinational growth trends are highly susceptible to the business confidence conditions in the global economy. Global foreign direct investment peaked in 2000, with global FDI inflows reaching a maximum of USD 1 411 billion. However, in the aftermath of the dot.com bust and 9/11, global FDI growth fell sharply. Global FDI inflows halved and FDI flows remained sluggish until 2003-2004, after which global FDI growth once again resumed. During 2005-2006 the global sales, exports and value-added of the foreign affiliates of MNEs also grew by 18%, 16% and 12% in 2006, respectively, growth

rates which were faster than in previous years. The associated annual growth in the foreign assets of MNEs was 20% such that by 2006, total global foreign assets amounted to some USD 51.2 trillion (Table 5). In addition, the confidence engendered by high corporate profits led to very high levels of reinvested earnings, which accounted for some 30% of total global FDI inflows, and 50% of FDI inflows into developing economies.

**Table 5. Global FDI**

	2006
Global FDI Flows	1,306
Global Foreign Assets	51,200
M&As	880

Source: UNCTAD 2007.

40. Part of the reason why FDI flows are so susceptible to short term business confidence fluctuations, is that FDI is increasingly dominated by service industries and mergers and acquisitions (M&As). In 1970 services accounted for one quarter of total global FDI, by 1990, services accounted for almost one half of total global inward FDI, whereas by 2005, services accounted for almost two thirds of global inward FDI. At the same time, manufacturing's share of global FDI inflows fell from 41% in 1990 to approximately 30%. The share of global inward FDI into primary industries is little more than 6%. This share has been falling consistently over the last sixty years, although there has been a slight increase recent years due to cross-border activity in extraction industries. The rapid rise in the importance of service sector FDI has also been accompanied by significant structural changes within the sector. In 1990, 65% of stocks and 59% of flows of global service sector FDI was in trade and finance, whereas by 2002 these shares had fallen to 47% and 35%, respectively. The reason is that there was a rapid growth in service sector FDI in the infrastructure, power generation and telecommunications industries which has now emerged as both the largest and fastest growing component of service sector FDI.

41. The numbers of mergers and acquisitions are also very sensitive to global business confidence. Record numbers and record values of M&As were achieved in 2000. After the collapse of global business confidence in 2001, both the numbers and values of M&As fell to 56% of the previous year's levels. On the other hand, the rise in global business confidence and profits between 2004 and 2007 dramatically increased the value of cross-border M&As. Between 2005 and 2006 international M&As increased by 14% in terms of the number of transactions and by 23% in terms of the value of transactions to some USD 880 billion (Table 5), of which two thirds by value was accounted for by 172 mega-deals of over USD 1 billion. By 2006, M&As thereby accounted for two-thirds of all FDI inflows, although these levels were still slightly below the record levels of 2000.

42. As well as absolute growth in the global economy, part of the reason for the increasing importance of M&As in FDI flows is the increasing relative growth of the service sector in the global economy. During both the last decade of the twentieth century and the first decade of the twenty-first century, the service sector has been the fastest growing component of the global economy (World Bank, 2007). The service sector grew from 61% of the global economy in 1990 to 69% in 2005 (World Bank, 2007), and M&As are the major mode of international market entry for all forms of service sector FDI. By the end of the 1990s service industries accounted for over 60% of all international mergers and acquisitions, with the European Union (EU) alone accounting for 60% of all of service sector international M&As. This reflects the recent rapid increase in European cross-border investments in the infrastructure, power and telecommunications industries.

43. The sensitivity of international M&As to global business confidence may be increased further by the fact that private equity funds are now playing an increasing role in international M&As. Private equity

investments currently account for just under 18% of international M&As by value. Traditionally, private equity investments have tended to resemble shorter time-span portfolio investments with a focus on higher risk higher yield opportunities with time-spans typically between five and ten years, with an average of five to six years. Therefore, the long term effects of these structural changes in international FDI are hard to gauge. If the increasing role of private equity leads to shorter foreign investments time spans, then this may increase the sensitivity and volatility of FDI to changes global business confidence. On the other hand, private equity may allow for a more diversified range of foreign investments to be developed, thereby providing new growth opportunities for many markets.

44. Over the next couple of years, it is likely that the growth of FDI will be somewhat reduced from its 2006-2007 levels. Prior to the appearance of the US sub-prime market problems, expectations for FDI in 2007 were positive, with a 54% increase in the value of M&As in the first half of 2007. However, global business confidence appears to have fallen markedly within a very short time, as uncertainties emerged regarding the levels of exposure of different components of the international financial economy to the US sub-prime mortgage market. The increasing numbers of investment write-downs and profits warnings are likely to lead to a general downward adjustment in global confidence and international investment. In the previous global FDI recession following the loss of business confidence during 2001, the decline in FDI was geographically and sectorally uneven. Flows into manufacturing and services declined, whereas flows into primary sectors increased. Similarly, the flows of FDI via M&As fell by more than greenfield FDI, and the equity and loan components of FDI fell by more than reinvested earnings. However, intra-regional FDI in South East Asia and North East Asia actually remained very strong while global FDI was contracting. A further impact of the global contraction in FDI was that many countries actually increased the pace of their liberalisation policies in order to compete for shrinking stocks of FDI. The result of these observations is that there may well be short to medium term falls in FDI in many parts of the global economy, reflecting the short to medium concerns about global growth, and such falls are likely to be particularly noticeable in M&As and also in high yield foreign investment opportunities.

45. However, in spite of such short to medium term fluctuations, there are strong grounds for believing that the long term trends towards increasing FDI and globalisation will continue over coming decades. Firstly, as we have already seen, technological progress means that international communication and transportation technologies are continuing to be improved, and these improvements are particularly rapid in the case of information and communications technologies (ICTs). Secondly, there has been enormous institutional progress in favour of international investment. Both of these changes imply that accessing wider geographical markets will continue to become easier and easier, thereby fostering further globalisation. Yet, the reasons why multinational firms should be favoured by these globalising developments is because of the knowledge capabilities of multinational firms themselves. In the global competition of the twenty-first century, knowledge and technology are critical assets, and the institutional and technological changes which have facilitated globalisation have also increased the potential returns to such assets. Multinational firms compete primarily on the basis of their internalised knowledge assets. Moreover, they also have organisational capabilities and experience for engaging in the globalisation processes. As such, it is multinational firms which are best placed to reap the potential global rewards from globalisation. In terms of economic geography, the arguments regarding the importance of the knowledge and technological capability of multinational firms in shaping globalisation patterns also imply that the geographical distribution of such assets across the global economy will increasingly depend on the location behaviour of multinational firms. The relationship between knowledge, technology, and economic geography is the subject to which we now turn.

### **3. The Economic Geography of Knowledge: Firms, Countries and City-Region Networks**

46. One of the dominant features of the current wave of globalisation is the emergence of a new set of relationships between the location of knowledge assets, such as technology and skills, the role of particular

city-regions as knowledge centres, and the location behaviour of multinational companies. The emergence of these relationships has been taking place gradually over the last three decades, during exactly the same period in which the institutional, technological and organisation changes facilitating globalisation have also been taking place. However, over the last decade, the nature and ordering of these relationships has become more apparent, as the trends manifested by these emerging relationships appear to be accelerating. In particular, if we consider the economic geography of these relationships, the distinction between the ‘winners’ and ‘losers’, or between those who are either beneficiaries or marginalised by the emerging order, are becoming more marked. These relationships are the focus of this section and the empirical evidence for these issues comes primarily from UNCTAD (UNCTAD, 2005, 2007).

### 3.1 Knowledge-Firms, Countries and R&D

47. Global public plus private sector R&D expenditure grew rapidly during the 1990s to some USD 677 billion in 2002, of which some USD 450 billion is global private R&D expenditure. Multinational firms account for an ever-increasing share of this. As shown in Table 6, by 2005 the 700 largest R&D expenditure MNEs were estimated to account for over USD 310 billion in R&D investment, which represents some 46% of all global R&D expenditure and 69% of the USD 450 billion worth of global private sector business R&D expenditure. More than half of these 700 firms are in just three sectors: IT hardware, automotive, and pharmaceuticals or biotechnology. Not surprisingly, the US is the individual largest source of R&D expenditure, and over 80% of these 700 largest R&D expenditure MNEs come from only five countries: US, Japan, Germany, UK and France. The top nine origin countries for outward FDI together accounted for 87% of both total global R&D expenditure and also total global private sector R&D expenditure in 2002. If we also include Chinese Taipei, Korea, Hong Kong, China and Singapore among developed economies, then this share increases to 88%. If we focus only on private sector R&D the top nine origin countries for outward FDI together account for 87.6% of the total global R&D expenditures in 2002. Once again, if we also include Chinese Taipei, Korea, Hong Kong, China and Singapore among developed economies, then this share increases to 91%. As we will see later, in terms of global shares, the geographical origins of global R&D reflect almost exactly the geographically origins of FDI outflows, and if anything are slightly even more skewed in favour of the developed economies.

**Table 6. Multinational R&D Expenditure**

	USD billion
Global R&D Expenditure 2002	677
Global Private R&D Expenditure 2002	450
MNEs' R&D Expenditure 2005	310
Foreign Affiliates' R&D 2002	67

Source: UNCTAD 2005.

48. The reason for this is that there is a crucial link between the patterns of sales and investments by multinationals and the trade blocs and areas of integration from which these multinationals emerge. As we have already seen, in the current phase of globalisation, the importance of the role played by trade blocs and areas of integration in the global economy has increased. The importance of multinationals has also increased. Yet, multinational firms, rather than being completely global, are actually overwhelmingly regional, in the sense that their sales and investments are dominated by the same trading regions or trade blocs in which their parent companies are located (Rugman, 2000, 2005). In particular, if we take the case of the three major global regions of US, EU and East Asia, we find that the average same-regional sales share of the world's top 500 MNEs, is over 70% (Rugman, 2005). As such, developed economies not only dominate global output, global R&D and global trade, but also are dominated by the trading relationships of the multinationals located in the same region.

49. Over recent decades there have also been some structural changes in the nature of the multinational R&D. The large scale internationalisation of R&D by multinationals began in the 1980s and accelerated in the 1990s. The result of this was that between 1993 and 2002, the total R&D expenditure of all foreign affiliates increased from USD 30 billion to USD 67 billion, or alternatively, from 10% in 1993 to 15% of the 2002 global business R&D expenditure. This growth was more than twice the total growth in R&D spending by MNEs. The share of R&D undertaken by foreign affiliates in developed host economies has also been growing from 11% in 1996 to 16% in 2002. Various pieces of survey evidence suggest that this increase in the role played by foreign affiliates in R&D is occurring for almost all nationalities of MNE and almost all host economies. As such, MNEs appear to be increasingly diversifying their R&D base internationally. However, close to 70% of the 2600 foreign affiliates in the global economy whose primary role is R&D, are still located within the triad of US, EU and Japan.

50. While the overwhelming dominance of developed economies in global R&D is very clear, the role played by developing and transition countries in global R&D is increasing. In 1991, developed countries as a whole accounted for 97% of total global R&D expenditure, whereas as we have seen, by 2002 this share had fallen to 91%. In 1996, the top six developing and transition economies (excluding Korea, Singapore, Chinese Taipei and Hong Kong, China) accounted for just 4.1% of total global R&D expenditure, whereas by 2002 this had risen to over 5%. In terms of private sector business R&D the top six developing and transition economies accounted for 1.2% of global business R&D in 1996 and 3.5% in 2002, respectively.

51. At the same time, there has also been a rise in innovation outputs on the part of MNEs from developing or transition economies. Between the two periods of 1991-1993 and 2001-2003, the share of foreign patenting in the US from developing and transition economies increased from 7% to 17%. Meanwhile, the role played by developing and transition economies in global R&D has also been increased because of the increasing role of R&D by foreign affiliates of MNEs. Although the relative scale is still very much smaller, the evidence suggests that the role played by developing economies in the increasing importance of foreign affiliates for multinationals' R&D is increasing at a faster rate than the R&D role played by foreign affiliates in developed host economies. In terms of the overseas R&D expenditure by US MNEs, the share accounted for by developed countries (including Korea, Chinese Taipei, Hong Kong, China and Singapore) decreased from 95.1% in 1994 to 88.3% in 2002, while the share accounted for by developing and transition economies more than doubled from 4.9% in 1994 to 11.7% in 2002.

52. The foreign affiliates of MNEs are also becoming increasingly important for R&D. Between 1996 and 2002 the share of global business R&D accounted for by foreign affiliates of MNEs increased from 10.1% to 14.9%. The share of global business R&D accounted for by the foreign affiliates of MNEs which are located in developed countries rose during this period from 10% in 1996 to 13.9% in 2002. In other words, in 1996, 98.7% of all multinational R&D undertaken by foreign affiliates took place in developed countries, whereas by 2002 this share had fallen to 93.1%. During the same period, the share of global multinational R&D expenditure undertaken by foreign affiliates located in developing countries increased from 0.8% in 1996 to 6.2% in 2002, while the equivalent figures for transition economies are 0.4% and 0.7%.

53. These figures demonstrate the fact that the global R&D effort of MNEs is becoming more geographically dispersed, and developed economies are still by far the major beneficiaries of this process. However, as developing countries are becoming increasingly attractive locations for FDI, the importance of multinational R&D undertaken in these countries is increasing rapidly.

### **3.2 Knowledge, Cities and Networks**

54. Over the last three decades, the increasing role played by cities as engines of national, regional and global economic growth has been demonstrated by the fact that the proportion of people living in urban areas has increased in all parts of the global economy (Richardson and Bae, 2005). The number of cities in the

world with a population of more than one million went from 115 in 1960 to 416 in 2000; for cities of more than 4 million the increase was from 18 to 53, and for cities of more than 12 million it was from 1 to 11 (Venables, 2006). By 2006, for the first time, more people in the global economy lived in urban areas than in non-urban areas (Mastercard, 2007). This unprecedented urban growth suggests that it is becoming more important for firms and people to be clustered together, and in particular, for high skills and high knowledge workers and firms to do the same. Recent evidence suggests that cities are generally experiencing an increase in the proportion of their population who hold university degrees (Berry and Glaeser, 2005). Moreover, this rate of increase is higher for cities which already have a high proportion of graduates (Berry and Glaeser, 2005). In addition, both the share of a city's population with university degrees and also its rate of growth are higher in faster-growing cities (Glaeser et al., 1995; Glaeser and Shapiro, 2003; Berry and Glaeser, 2005; Shapiro, 2006). In the US there is no evidence of the levels of high school education playing any role whatsoever (Shapiro, 2006), and this supports the argument that it is tertiary educated human capital which is now the crucial from a regional development perspective. Cities are becoming dominated by high human capital individuals as mobile workers respond to the augmenting wage premia associated with high value-added knowledge work in cities. After conditioning on individual characteristics it is clear that wages are indeed higher in high human capital cities (Shapiro 2006). Furthermore, US cities are found to have such great differences in their human capital composition (Berry and Glaeser, 2005) such that regional divergence appears to have superseded previous decades (Berry and Glaeser, 2005).

55. Further evidence in support of the argument that access to cities is becoming more important comes from US counties (Partridge *et al.*, 2007) and European sub-national regions (Caniels and Verspagen, 2003). In both cases, local growth is found to be directly related to an area's proximity to major urban centres. Meanwhile within Europe, investment capital and information have become more concentrated in capital cities and large urban centres, even though the institutional and technological changes might have allowed for more mobility and more even distributions across space (Rodriguez-Pose 1998). As discussed above, the reasons for this appear to be that urban areas are now seen to be sources of productivity growth (Ciccone and Hall, 1996; Fingleton, 2003b) due to their role in facilitating the production of knowledge, human capital interaction (Berry and Glaeser, 2005) and by inspiring innovation (Acs, 2002; Carlino *et al.*, 2007). A doubling of city size is associated with a productivity increase of some 3-8% (Rosenthal and Strange, 2004), such that moving from a city of fifty thousand to one of five million is predicted to increase productivity by more than 50% (Venables, 2006).

56. These changes mean that between-country inequality has been falling over the last three or four decades (Crafts, 2004) while within-country inequality has actually been growing since the 1980s (Brakman and van Marrewijk, 2008). Allied with the fact that the rate of convergence between advanced economies has slowed down since the 1980s (Greunz, 2003; Cappelen *et al.*, 2003), the result of the increasing importance of urban areas is that economic convergence at a continental scale coexists in many cases with increasing divergence at sub-national local and regional scales.

57. As well as urban scale, however, there is also increasing evidence that economic growth at the international scale is also being dominated by networks of particular major urban centres, often referred to as 'global' cities (Sassen, 2001; Button *et al.*, 2006). These urban centres are locations which not only exhibit significant agglomeration advantages but which also primarily interact with other similar globally-oriented cities in other countries, rather than with other smaller urban centres within their own countries, which tend to be oriented more towards the provision of local goods for local markets. In many sectors such as financial services (Col, 2007a,b; Mastercard, 2007) there is already much evidence that global markets are becoming dominated by networks of global cities (Sassen, 2002) such as London, Paris, Tokyo, Sydney and New York. The increasing relative dominance of these global cities appears to be associated with the density of knowledge (Simmie, 2004) and information technology assets in the city (Sassen, 2002; Button *et al.*, 2006). Moreover, empirical evidence suggests that the importance of major urban nodes (Limtanakool *et al.*, 2007) within such networks is also reinforced by the existence of hubs within the global air (Col, 2002; Burghouwt,

2005), rail, and marine transportation systems (Leinbach and Capineri, 2006). There is also evidence that the performance of these dominant global cities is also affecting hinterland national and continental economies (Glaeser, 2005; Col, 2005; 2006; 2007c; HMT-DTI, 2001, 2003, BTRE, 2004).

58. These various arguments and observations strongly imply that the global economy is currently characterised by two opposing trends, namely the trends towards both globalisation and localisation. These apparently conflicting conclusions may be reconciled. Different types of changes in transactions costs have taken place in different sectors, activities and contexts, and there are regularities to the pattern of these changes. Most of the evidence for falling international and geographical transactions costs relates to trade in relatively standardised types of activities and goods. These are the sectors in which the nature and frequency of the spatial transactions have not altered fundamentally over time. Such features are typical in the case of industries producing semi-finished or finished manufactured products at mature stages within the product cycle, or service industries which are characterised by relatively routine activities in which the nature of the information being transacted itself is standardised. In these cases, geographical peripherality is no longer so much a disadvantage and thus the world appears to be becoming more equal. It is exactly these relatively more routine and labour-intensive activities which currently dominate the present off-shoring trends (Col, 2005b), and these are precisely the economic activities which are becoming globally dispersed (Leamer, 2007). In the language of Friedman (2007), the world is getting flatter for these types of activities. On the other hand, in knowledge-intensive sectors where demand lead-times have fallen dramatically, or in industries in which there has been an increasing variety and complexity of information associated with the customisation of products and services, spatial transactions costs appear to have risen. In these knowledge-intensive sectors, the possibilities for international off-shoring or out-sourcing would appear to be even fewer than in earlier times (Col, 2005b). As such, for these knowledge-intensive activities, the world appears to be increasingly uneven, and therefore less equal (Leamer, 2007; McCann, 2008). Rather than the world becoming flatter, for these types of activities the world actually appears to be becoming “spikier” (McCann, 2008).

59. Many of these high knowledge-intensive sectors are also the high value-added sectors whose locational features are dominated by major urban centres. Such centres operate as hubs within global transportation and communication networks. The reasons why high knowledge and high value-added sectors tend to congregate in particular localities are associated primarily with the combined existence of both localised agglomeration economies, key knowledge assets, and transport economies of scale and distance (McCann, 2005). The evidence in favour of the contemporary role played by agglomeration economies in shaping economic geography is now so overwhelming that it is more or less beyond question (Venables, 2006). In terms of long run growth discussions, the critical issue for the emerging economic geography of the twenty-first century is the location and spatial distribution of knowledge-assets. All of the evidence presented so far points to the conclusion that geographical proximity is becoming more important for knowledge-related activities, even as transportation and communications technologies improve. Therefore, the combination of localised agglomeration advantages in key nodal locations, allied with economies of transportation and communication will therefore maximise a firm’s global market potential. More specifically, the firms which are best able to exploit the advantages of these particular combinations of assets will be those particular multinational firms which are also strongly embedded in the global city knowledge networks. Such global firms will increasingly reap the economic rents associated with knowledge assets, through their potential to exploit genuinely global production, communication and financial networks (Coleman, 1996; Cohen, 1998; Zook, 2005). Network analyses of trade and knowledge indicators imply that there is a clear core-periphery hierarchical structure to international trading patterns (Kali and Reyes, 2006). The core location of the firm is therefore critical, and firms already embedded in leading global centres will achieve the major returns from globalisation.

60. The coincidence of high knowledge activities, high value-added activities and a global transport hub are also the same conditions which will best support the R&D investments of multinational firms. The reason is that R&D is a knowledge-intensive activity and requires both strong local knowledge inputs to continue the

R&D process and strong global accessibility to reap the rewards of the R&D. Evidence from patent citation data suggests that firms typically learn 80% of their knowledge within the local region and 89% within the same country, while the knowledge reach of technologically leading regions is far greater than for other regions, (Peri, 2005). Location in knowledge centres is therefore critical for high value knowledge-intensive activities, as well as for high value manufacturing or service industries dependent on trust relations. If multinational firms do indeed locate their R&D and knowledge-related activities in such knowledge regions, then such multinational location behaviour will serve to promote even further the knowledge capabilities of these knowledge centres and knowledge regions. The location behaviour of MNEs is the issue to which we now turn.

#### **4. Multinationals and the Global Economic Geography of FDI**

61. Until as recently as 2006-2007 the volume FDI to countries in all parts of the world were increasing rapidly. This is true for developed economies, transition economies, and also developing economies. However, differences in the scale of flows between varying parts of the global economy are still very marked. Also, the patterns of FDI in different parts of the world exhibit contrasting characteristics. Finally, the nature of FDI also exhibits very particular characteristics in particular countries. Understanding the scale, the geographical patterns, and the nature of FDI in different contexts will allow us to identify how the various BRIICS countries will evolve in terms of their long-term relations with the rest of the global economy. The empirical evidence discussed in this section comes from UNCTAD (UNCTAD, 2000, 2003, 2005, 2006, 2007).

62. Clues to these characteristics come from four observations. Firstly, both the total global output and the global asset value of foreign affiliates have increased by more than their global employment level. Secondly, for each dollar invested, more jobs were created in developing and transition economies than in developed economies. Thirdly, currently 30-40% of US trade is accounted for by intra-firm trade flows (Lai and Zhu, 2006), and fourthly, as we have already seen, over half of all Chinese manufactured exports are accounted for by foreign-owned multinational firms (Scheve and Slaughter, 2007).

63. These four observations provide several important insights as to the current nature of the relationship between developing countries, trade and multinational investment. Firstly, there is a shift in multinational FDI flows towards increasing capital-intensive or knowledge-intensive activities. At the same time, developing or transition economies are more heavily influencing the trade behaviour of multinational firms, which is altering the nature of national trade patterns. The increasing role of developing and transition economies in the current phase of globalisation is therefore intrinsically related to the investment decision of multinational firms. The geographical patterns of both global trade and global FDI are changing, and the reasons for this have to do with the behaviour of multinational firms. However, the movement towards higher capital-intensive and knowledge-intensive investments, and a more prominent role for developing countries in multinational trade flows don't necessarily go together. As we will see here, the empirical evidence suggests that these relationships are complex.

64. Economic geography, and in particular geographical proximity, is very important for trade and FDI. Both the bilateral trade levels and also bilateral FDI stocks between the US and Canada and also between the US and EU are much greater than what would be predicted simply on the basis of the scale of the respective economies (Krugman, 2007). This is also true with regard to the trade flows and FDI stocks between Japan and the other East Asian economies. The reason is that trade and FDI are both highly associated with proximity. Moreover, this association appears to be strengthening as spatial transactions costs increase. Geographical proximity is also of growing significance for shaping bilateral trade and bilateral FDI flows as groups of countries located in the same parts of the world develop stronger relations. The geographical patterns of double taxation treaties and bilateral investment treaties closely resembles the cross-border patterns of FDI. The most striking case of this is that of the EU. In terms of bilateral inward investment

stocks, in 1995, 17 of the top 50 pairs of countries were from Europe, whereas by 2005, this number had increased to 22. This reflects the rapid increase in EU cross-border investment over recent years in all sectors, in particular, in service sectors such as infrastructure, energy, and telecommunications. Similar observations come from other parts of the world.

**Table 7. FDI Inflows 2006**

	USD billion
Developed Economies	857
Developing Economies	379
USA	175.4
UK	139.5
China	69.5
Russia	28.7
India	17

Source: UNCTAD 2005, 2007.

65. As shown in Table 7, in 2006 total FDI inflows to developed economies amounted to USD 857 billion, which is almost exactly two thirds of total global FDI, and up from 59% in 2005. In 2006, with FDI inflows of USD 175.4 billion, the US recovered its top position as the largest destination for FDI inflows from the UK whose inflows amounted to USD 139.5 billion. However, in terms of the world's top 50 financial MNEs, the UK still hosts the largest numbers of affiliates. Meanwhile, across all sectors, the EU alone accounts for 40% of global FDI inflows, rising to over 43% if we include the EFTA countries. The US and Canada combined account for just under 19%.

66. Meanwhile, total inward FDI into developing and transition economies reached USD 379 billion in 2006, thereby accounting for 29% of global FDI inflows, down from 34% in 2005, with 5-6% being accounted for by transition economies. The largest region for FDI inflows is South, East and South East Asia which accounts for 53% of total FDI inflows into developing or transition economies. As shown in Table 7, the largest FDI inflows into a developing country went to China, with USD 69.5 billion, and amongst transition economies, to Russia, with USD 28.7 billion. Although the scale of FDI inflows to India in 2006, at USD 17 billion, are much less than China, this was equivalent to the total inward FDI in India during the three previous years combined, suggesting a rapid increase in FDI investment in India.

67. Inward FDI into developed economies are currently twice the scale of all inward FDI into developing and transition economies combined. Moreover, in 2005 and 2006, the rate of growth of FDI inflows to developed economies, at 34% and 45% respectively, was more than twice that of the rate of growth of FDI inflows (21%) into developing economies. In comparison, Latin America accounts for 6.4% of FDI inflows while the whole of Africa accounts for just 2.7% of global FDI inflows.

68. A similar picture also emerges when we consider FDI outflows. FDI outflows from Western developed economies plus Japan grew by 45% between 2005 and 2006, and now account for 84% of global outward FDI. If Chinese Taipei, Korea, Singapore and Hong Kong, China are also included the share of global outward FDI increases to 89.6%. Comparing these shares with those reported in section 5, we see that the geographical origins of global FDI outflows very closely reflect the geographical origins of R&D.

69. In terms of the sources of these FDI outflows, the US, Canada, Japan, Australia and Hong Kong, China plus 10 European nations are the top 15 sources of FDI. Outflows from the EU account for 47% of global outflows, rising to 55% including EFTA countries. Outflows from the US and Canada together account for

21.5% of global FDI outflows. For a single country, the US exhibits by far the largest FDI outflows. Annual outflows of FDI from the US are typically more than twice that of any other country, with the total foreign employment in US multinational firms currently running at approximately 9 million employees.

70. Global FDI outflows from developing and transition economies grew by 50% in 2006 to 16% of global FDI outflows, although if Hong Kong, China is removed from developing countries and included in developed economies, the growth rate falls to 36.4%. If Hong Kong, China, Korea, Chinese Taipei and Singapore are all included in the group of developed rather than developing economies, total outward FDI flows from developing countries account for just over 10% of global outward FDI flows. Meanwhile, FDI outflows from transition economies grew by 27% in 2006. FDI outflows from developing and transition economies area led by Brazil (28.2 billion)<sup>2</sup>, Russia (17.9 billion) and China (USD 16.1 billion). The aggregate share of foreign investment in developed economies which is accounted for by FDI from developing or transition economies has increased slightly from 7% in 2005 to 9% in 2006. Overall though, in both absolute and relative terms, such outflows are relatively still very small in comparison to global outward FDI flows.

71. That this is the case can be seen from the fact that in 2001, the top 100 non-financial MNEs were all from developed economies, including Hong Kong, China, Singapore and Korea. In 2005, only two out of the world's top 100 non-financial MNEs were from developing economies and only one of the world's top fifty financial MNEs. Similarly, instead of defining MNEs by market capitalisation, if we define them in terms of the geographical spread of their foreign affiliates, still only three of out the world's top one hundred MNEs are from developing or transition economies. The reason is that MNEs from developing countries are still far smaller and far less internationalised in general than those from developed countries.

72. In 2006, 74% of the international policy measures instituted to facilitate FDI came from developing countries. These policy changes focus on issues such as reducing corporate taxes, structural liberalisation and deregulation. The results of this process are that developing countries are also increasing their shares of FDI in other developing countries. This is particularly noticeable in the case of Asian countries. Yet, even though FDI from developing countries into other developing countries is growing quickly, by far the most popular location for the affiliates of the top one hundred MNEs from developing and transition countries is the UK, followed by the US. These two countries have more than twice the number of affiliates of these developing country MNEs than any other country.

73. In terms of economic geography, global FDI flows appear to have certain directional characteristics to them. Firstly, global FDI flows are overwhelmingly dominated by the developed economies, both as destinations for inward FDI and as origins of outward FDI. Moreover, this dominance has been maintained over the recent years during the current phase of globalisation. Secondly, global FDI inflows into developing and transition economies are far more important than the global outflows from these economies. Thirdly, the dominant multinational firms are almost entirely from the developed parts of the global economy. Fourthly, although the flows of FDI from developing and transition countries into the developed countries are increasing markedly, in absolute terms, these flows are still very small in comparison with the outflows from developed economies. Fifthly the destinations for the FDI outflows from developing countries are increasingly orientated towards developed countries. Sixth, greenfield FDI plays a relatively much more important role in developing countries than M&As, and in particular in Asian economies, which are relatively more important in developed economies.

74. It might at first sound rather surprising that FDI outflows from developing and transition economies should seek locations in countries such as the UK and US. However, there is an inherent logic to this

---

<sup>2</sup> This was due primarily to one mega-deal in which a Brazilian mining company purchased a foreign company (UNCTAD 2007).

behaviour. As we have just seen above, the reason is that many aspects of multinational behaviour are related to the creation and dissemination of knowledge. Location choices which allow multinational firms to either access knowledge inputs or to take advantage of knowledge assets is essential for multinational establishments which operate either as decision-making centres or as centres for research and development. On the basis of the previous arguments and observations, regions with access to global city networks are now the preferred locations for multinational investments, and in particular those investments relating to knowledge activities.

## 5. Foreign Direct Investment, R&D, and the BRIICS Countries

75. From the perspective of investment managers and decision-makers, the countries with the highest potential investment returns also tend to be the most risky locations. Therefore, international investment managers and decision-makers have to consider the risk-return profiles of lower labour costs, versus greater communication, co-ordination and transportation costs. UNCTAD (2005, 2007) data provides indicators of the relative attractiveness of different countries as locations for FDI.

76. If all of the structural stability and institutional issues affecting FDI yields are taken into account, it is possible to provide an overall index of the potential returns to FDI. On these criteria, USA is ranked as the number 1 country in terms of its potential as a location for inward FDI, the UK is ranked number 3, Singapore is number 5, Hong Kong, China is number 15, and all the top 25 locations are developed economies.

77. In response to globalising trends, and also to the need to take advantage of both the competitive opportunities and technology transfer possibilities associated with FDI, many developing and transition countries have liberalised international investment policy regimes and promoted themselves as host locations for inward FDI. In general, the policies initiated to achieve these goals focus on issues such as reducing corporate taxes, structural liberalisation and deregulation, or the expansion of promotional efforts, as has been extensively undertaken already in India and Brazil. In contrast, there are a relatively small number of cases where governments have moved to restrict foreign ownership, such as in Russia, where the strategic sectors of the defence and extraction industries only permit minority foreign ownership.

**Table 8. FDI Openness and Performance**

	Openness Ranking	FDI Performance Ranking
Brazil	22	62
Russia	31	88
India	36	112
Indonesia	38	136
China	32	45
South Africa	12	126

Source: UNCTAD 2005, 2007.

78. One of the major outcomes of these general trends towards market liberalisation by developing and transition economies is that these countries are increasingly sought out as locations for FDI from developed economies. Yet, inward FDI exhibits different levels of relative importance in different host economies. As shown in Table 8, amongst developing and transition countries, the trans-nationality index of openness, which indicates the scale of inward multinational investment in terms of FDI inflows, stocks, value-added and employment, relative to total GDP, ranks South Africa 12, Brazil 22, Russia 31, China 32, India 36, and Indonesia 38. In general, across all developing or transition economies, the overall relative trans-nationality

openness of countries to FDI tends to be higher in small countries and lower in the larger economies. This is also broadly true for the BRIICS countries, although Indonesia is relatively more closed than its scale might suggest, while China is relatively more open than its scale would suggest. On the other hand, in terms of the national FDI performance rankings for developing or transition economies, China is ranked 45, Brazil is 62, Russia is 88, Philippines is 100, Thailand is 106, India is 112, South Africa is 126 and Indonesia is 136. Yet, FDI performance rankings are affected by investment yields, and these tend to favour countries dominated by high risk primary, extraction and raw material industries.

79. Recent UNCTAD survey evidence of multinational executives regarding the most attractive locations for FDI over the coming years, finds that China is ranked as the number 1 country in the world, India is ranked number 2, Russia is ranked number 4, and Brazil is ranked as the number 5 country. These perceptions would suggest that outward FDI will continue to flow in very large quantities from developed countries into these developing and transition countries over the foreseeable future. As such, these countries will become increasingly open and integrated into the global economic system. However, while the flows of FDI into particular developing and transition economies are expected to increase over the next few years, the nature of these flows is still likely to remain significantly different to the FDI inflows into developed economies. There are two aspects to these differences, and these relate to the mode of FDI and the relative importance of R&D-related FDI in these countries. The empirical evidence in the rest of this section comes from UNCTAD (2005, 2007).

80. Observation of the increasing levels of FDI in developing and transition economies demonstrates that the dominant mode of FDI entry in these countries is quite different to that in developed economies. In particular, if we consider M&As, developed economies are by far the largest destinations for inward FDI. However, the picture which emerges is very different if we consider so-called ‘greenfield’ projects. Greenfield FDI projects are the foreign affiliate investments whereby a brand new establishment is constructed on a new site, and this mode of FDI obviously represents a very different form of FDI from those undertaken by M&As. The number of such greenfield FDI projects increased globally by 13% to some 11,800 projects in 2005. Manufacturing accounted for 54% of these projects, with the service sector accounting for 42% and primary industries accounting for 4%. In terms of broad regions, South, East and South East Asia accounted for 3515, or some 30% of these greenfield projects. As shown in Table 9, China alone accounted for 1378 greenfield FDI projects, or 11.6% of the global total. India accounted for 981 greenfield projects, representing 8.3% of the global total. For the other BRIICS countries the numbers of greenfield FDI projects are very much lower; for Russia the number is 386, for Brazil it is 145, for Indonesia it is 93 and for South Africa it is 74 (UNCTAD 2007). In order to give a sense of the relative scale of these numbers, in the same year, the number of greenfield inward FDI projects in the US was 723, UK 669, France 582. Asian economies, and in particular China and India, are by far the most important locations for greenfield FDI projects.

**Table 9. Number of Greenfield FDI Projects in 2005**

China	1378
India	981
Russia	386
Brazil	145
Indonesia	93
South Africa	74
US	723
UK	669
France	582

*Source:* UNCTAD 2005, 2007.

81. China now has by far the largest number of domestically located multinational foreign establishments with 42,753 foreign affiliates in 2004 with some 24 million employees. These affiliate establishments are heavily concentrated in manufacturing. The 24 million employed in China in foreign affiliates represents one-third of the global total workforce currently employed in foreign affiliates. This number has increased fivefold from less than five million in 1991, a number which is equivalent to the current total level of domestic US employment in foreign affiliates.

82. If we consider other sectors than manufacturing, the importance of greenfield FDI is seen to be rather different for some other developing economies. Brazil, for example, hosts the ninth largest number of the financial foreign affiliates, as well as hosting by far the largest number of such affiliates amongst developing or transition economies, and even more than Hong Kong, China Singapore or China.

83. These observations all point to the current dominance of greenfield modes of FDI in developing or transition economies. Inward FDI in developing or transition economies is therefore qualitatively quite different in nature to the dominant modes of FDI in developed countries, which are mergers and acquisitions. The reasons for these qualitative differences are that mergers and acquisitions, which are the most popular mode of FDI between developed economies, tend to be successful where there are potentially significant two-way knowledge flows between the acquiring and the acquired organisations. On the other hand, in the case of FDI into developing or transition economies, the potential reverse flows of knowledge and technology from the host country to the origin country are usually relatively low. The flows of knowledge and technology transfer therefore tend to be unidirectional, from the developed economy to the developing or transition economy. As such, MNEs from developed economies prefer to build new greenfield establishments in developing or transition economies, as this best allows these firms to organise, configure and control all aspects of the production process or service delivery process in exactly the desired manner.

84. Following these arguments, it is clear that the modes of FDI in developing and transition economies ought to evolve over time from greenfield investments to increasing numbers of mergers and acquisitions, as the knowledge base of these countries steadily increases, and the possibilities for upgrading R&D and innovation in many BRIICS countries over the long term are obvious. For example, in 2001, China, India and Russia together accounted for one-third of the total global number of tertiary educated technical people, while the Bangalore high technology industries alone have 35,000 people who are US educated or trained. Yet, of all developing economies, it is China's growth in its R&D capacity has been the most remarkable. Between 1996 and 2003 China increased its domestic R&D expenditure by over 3.8 times, such that by 2002 China became the only developing or transition economy in the world's top ten R&D expenditure countries. In 1996 it was outside of the top ten, but by 2002 it was ranked sixth in the world in terms of total R&D expenditure and seventh in the world in terms of business R&D expenditure. Amongst developing or transition economies, China is now ranked number one for both total R&D and also business R&D expenditure. In terms of total R&D, Brazil is ranked number two, Russia is number three, and India is number four. In terms of business R&D, Russia is number two, Brazil is number three. After the US and UK, China is now third in the world for the total number R&D-related foreign affiliates located there.

**Table 10. US Patents and Trademarks 2001-2003**

	Residents	Organisations
Brazil	524	254
Russia	956	163
India	1022	558
Indonesia	108	31
China	1543	475
South Africa	428	167
Chinese Taipei	20,414	12,686
South Korea	12,195	11,152

Source: UNCTAD 2005.

85. However, although the scale of China's growth in both domestic R&D and also its inward FDI-related R&D growth is so notable, we can get a sense of the relative global and regional contribution of China's knowledge sectors by considering other indicators of innovation. For example, the total 2002 R&D expenditure of developing countries in South, East and South East Asia including both China and India is only 14% of the value for Japan and 6.7% of US R&D expenditure. Similarly, if we consider the number of US patents and trademarks granted to the residents of particular countries during 2001-2003, we see that China had 1543, while India had 1022, Russia 956, Brazil 524, South Africa 428, and Indonesia 108. For comparison, the respective figures for Chinese Taipei and Korea are 20,414 and 12 195. Similarly, as shown in Table 10, in terms of US patents and trademarks granted to firms or organisations of particular countries during 2001-2003 we see that India had 558, China 475, Brazil 254, South Africa 167, Russia 163, and Indonesia 31. Once again, for comparison purposes the equivalent figures for Chinese Taipei and Korea are 12 686 and 11 152, respectively. Therefore, although amongst the BRIICS countries China and India appear to be the leading knowledge-generators, their relative contributions are not large in comparison to other advanced Asian economies. Meanwhile, the share of global R&D expenditure accounted for by the BRIICS countries combined is only 4%, of which China accounts for more than half of this level. In contrast, the world's developed economies account for 94.7% of global R&D expenditure.

86. As such, there is still a very long way to go for these countries to catch up with the knowledge base of developed countries. Yet, it is the outward flows of FDI by the multinational firms from developed economies which will facilitate, encourage, and enable this process. In particular, MNEs will play a catalytic role in the knowledge growth of developing and transition countries if their FDI outflows are increasingly associated with knowledge investments. Indeed, there is already some evidence that this process of knowledge transfer is well underway. The share of total domestic business R&D undertaken in developing countries, which is accounted for by the R&D undertaken by multinational affiliates located there, rose from just 2% in 1996 to 17.7% in 2002.

87. Amongst developing regions, it is the countries in South and East Asia which are the major locations for multinational R&D investment. During 2002-2004, of the 1 773 inward FDI projects involving an R&D component, 1 095 (62%) were undertaken in developing or transition economies, of which 861 projects (49%) were undertaken in developing Asia alone. In the case of developing Asia, the share of R&D accounted for by the foreign affiliates of US multinational firms increased from 3% of their total foreign located R&D in 1994 to 10% in 2002. Similar trends are also observable for multinational firms from other developed economies which are locating R&D-related investments in Asia.

88. Within developing Asia itself, it is China in particular which dominates inflows of multinational R&D investment, and the impact on China of these inflows has also been the most marked. Between 1998 and 2002, the share of total domestic business R&D in China accounted for by foreign affiliates located there

increased from 18% to 22%. The R&D expenditure associated with this R&D-related inward FDI now accounts for 13.5% of China's total domestic public sector plus private sector R&D expenditure. To get a sense of how important these multinational R&D investments are to China, we can observe that the 42,000 foreign affiliates located in China are currently employing some 24 million Chinese, and this still only represents 3.1% of the total employed workforce in China. As such, the relative importance of multinational R&D expenditure to China's knowledge-related activities is four times greater than the relative importance of MNEs to China's overall employment.

89. However, the obvious importance of inward FDI to the growth of China's R&D capacity is not a general observation across either all developing Asian economies or even across just the BRIICS countries. For example, in the case of India, the most recent reliable estimates indicate that in 1999, multinational R&D expenditure accounted for just 3.4% of domestic private sector R&D, whereas in Brazil, multinational R&D expenditure accounts for 49% of total domestic business R&D expenditure. This share is increasing slowly in China and India, but is more or less constant in the case of Brazil.

90. The types of R&D undertaken in different countries and regions of the world also appear to vary. In India, over three quarters of R&D expenditure is on services, and primarily on software development, whereas in Brazil the R&D of foreign affiliates located there tends to be adaptive R&D, not only for local markets but also increasingly for exports. In China, most multinational R&D focuses on adaptive innovations for the Chinese market, but there is increasing evidence across Asia that innovative R&D is growing. As such, there is significant variation across the BRIICS countries both in terms of the importance of R&D-related FDI within each country, and also the role of R&D-related FDI in each country. Only a small number of developing economies are significant hosts for inward R&D-related FDI, and amongst the BRIICS countries, for this particular type of FDI, China is by far the most important country.

## **6. Globalisation, Development, and the Changing Economic Geography of the BRIICS Countries**

91. It is well-known in development studies that (in terms of the internal economic geography) as countries develop, their employment shares in agriculture tend to fall. Urbanised countries with the lowest proportion of employment in agriculture have higher GDP per capita than transforming countries, which also have higher GDP per capita than agriculture-based countries. Historically, the reasons for this obviously relate to structural effects, and many developing economies which have undergone rapid industrialisation from agriculture to manufacturing have also experienced increasing urbanisation. In countries undergoing this rural to urban transformation, the rate of growth of labour productivity in non-agricultural activities has been on average two-thirds higher than for agriculture in addition to the fact that urban employment has been increasing at nearly five times the rate (World Bank, 2008). This would suggest that agglomeration effects also operate, and urban-rural income disparities have consequently increased in almost all countries undergoing transformation.

92. Yet, the analysis here argues that the global economic transformations currently taking place imply even more radical geographical restructuring than in previous eras. The institutional, technological, and organisational changes currently operating imply that agglomeration economies are becoming more important than ever, and as such, the current phase of globalisation increasingly favours large cities and areas of economic integration. These areas of integration can be considered to be super-regions, and as we have seen, the performance of such super-regions is becoming ever more important to the world economy. As we have also seen, the recent institutional and technological changes allow for freer, more rapid and more efficient access to wider global markets, these changes are driving inter-connection between countries. In terms of sheer scale, the greatest beneficiaries of this enhanced inter-connectedness are the multinational firms, whose contributions to global output and value added are now far more significant than the contributions of international trade.

93. At the same time, however, major qualitative changes are taking place in the nature of economic inter-connectedness between countries. In particular, the knowledge flows between countries are becoming more important, as knowledge assets become crucial to global competition (Porter, 1990). This means that major organisational changes are also taking place in those organisations that are most associated with the development and use of knowledge assets. Once again, these organisations are the multinational firms. As such, the investment decisions made by multinational firms will increasingly determine the shape of the emerging global economic order of the twenty-first century. In particular, the knowledge-investment decisions made by multinational firms are becoming increasingly important in shaping the patterns of globalisation.

94. In the emerging economic geography of the twenty-first century, there appears to be an increasing polarity between different types of activities. High knowledge-intensive activities are now being located in high agglomeration city-regions while low-skill, routine, and low value-added activities are becoming spatially dispersed across the global economy. These movements are particularly noticeable as developed economies turn into developing or transition economies. On the other hand, many knowledge activities are also becoming localised and concentrated in particular types of localities. These localities can be characterised as knowledge-regions, as they are characterised by high levels of knowledge assets, such as human capital, skills and R&D. This tends to occur in large and economically diverse regions that are also well-connected in the global transportation networks. As such, the types of regions with the most rapidly increasing stocks of knowledge assets tend to be the global-city regions. Knowledge assets, global network connectedness, and knowledge-related foreign direct investment are increasingly co-determined nowadays. Where they operate, the local technological spill-over effects associated with multinational knowledge-investments are likely to be in the same locations as those also enjoying the local pecuniary spill-overs discussed by new trade theory and new economic geography (Krugman and Venables, 1995; Fujita *et al.*, 1999). As such, any local knowledge or technological spill-overs will accentuate and exacerbate the local efficiency gains associated with increased local competition. The result of these changes is that there will be an increasing divergence between countries and between regions in terms of the geographical distribution and patterns of growth and investment (Leamer, 2007; McCann, 2008).

95. Until recently, the developed economies, and in particular the multinational firms from the developed economies, were the major beneficiaries of globalisation. However, some of the emerging economies from the developing or transition countries are also now beneficiaries of these globalisation processes. As both their levels of global inter-connectedness improve and while their knowledge-related activities increase, at least partly in response to multinational knowledge-related investments, these emerging economies will play a greater role in the global economy. At a global scale, the long term result of these trends ought to be that emerging countries in general will play a much more important role in the global economy of the twenty-first century than they did in the twentieth century (Lucas, 2000). At the same time, however, these arguments also suggest that not all emerging countries will benefit from these globalising trends, and that vast differences between the winners and losers amongst the developing and transition countries (Leamer, 2007; McCann, 2008) will occur as a result. The developing and transition countries most likely to benefit from globalisation will be those containing regions which most closely resemble global-city regions. These countries will significantly boost their knowledge assets. On the other hand, developing countries without such features will be left behind to specialise only on low value-added activities.

96. If we follow the logic of the above economic geography arguments, it is possible to arrive at similar conclusions when considering the internal economic geography of these countries. In particular, economic growth will become associated with divergence and polarisation, with ever-widening gaps between the winners and losers. Moreover, there is already also mounting evidence that such trends are well underway. Here it is possible to investigate some of this evidence by initially observing the behaviour of by far the largest, the fastest growing, and the most open of BRIICS economies, namely China. The analysis is then

extended to the other BRIICS economies. The empirical evidence in the rest of this section comes from World Bank (2007).

97. The six BRIICS countries of Brazil, Russia, India, Indonesia, China and South Africa appear to be a rather diverse group of nations, although to some extent they share several common economic and structural features. Firstly, these are the world's six largest developing country economies. Ignoring the oil-rich state of Saudi Arabia and also the two large and emerging OECD economies of Mexico and Turkey, the BRIICS countries are by far the largest economies in the developing and transition world, and the only developing or transition countries with gross national incomes of over USD 200 billion *per annum*. For comparison purposes, the smallest of the BRIICS countries, namely South Africa, has an economy which is just slightly larger than that of Greece. Secondly, all six countries have undergone fundamental structural upheavals and transformations over the last two decades. Thirdly, the role played by multinational investment in all six countries has increased over recent years. Finally, as we will see now, the role played by agglomeration processes has also increased in all six countries over recent years. The economic geography of restructuring is very apparent in each case.

98. If we consider the growth performance of the BRIICS countries during the current phase of globalisation it is clear that China and India are currently the two fastest growing large economies in the world, with 2005 growth rates of 10.2% and 9.2% respectively. The third fastest growing large economy is Russia with a growth rate of 6.4% in 2005. Indonesia's growth rate has picked up again to 5.6% in 2005, South Africa's 2005 growth rate was 4.9%, while that of Brazil was 2.3% in 2005. If we consider the scale of the individual BRIICS economies, we also see that the relative rankings are rather similar. China's gross national income in 2005 was USD 2 269.7 billion, which ranked it as the world's fifth largest economy in 2005, almost identical in size to the UK economy; India's economy in 2005 was some USD 804.4 billion, and ranked as the tenth largest economy in the world, just slightly larger than the Korean economy; the economy of Russia at USD 638.1 billion, is ranked 16 in the world, just slightly smaller than the economy of The Netherlands. Brazil, with a 2005 gross national income of USD 662 billion ranks 14 in the world, Indonesia, with an economy of some USD 282.2 billion in 2005 is ranked at 23, and South Africa, with a gross national income of USD 223.5 billion is ranked as the 27. On the other hand, if we consider per capita income rather than the gross income, the rankings are very different. South Africa, with a 2005 per capita income of USD 4 770 is ranked 85 in the world, Russia, with a 2005 per capita income of USD 4 460 is ranked 90, Brazil, with a per capita income of USD 3 550 is ranked 96, China, with a per capita income of USD 1 740 is ranked 128 in the world, Indonesia with a per capita income of USD 1 280 is ranked 139, while India with a per capita income of USD 730 is ranked 158 in the world.

99. From observation of the growth rates of these countries, we see that the growth performance of the three largest BRIICS economies of China, India and Russia has been both higher and also more consistent over a longer period than for the other three BRIICS countries of Indonesia, South Africa and Brazil. These differences in both scale and growth rates suggest that it is the three larger BRIICS countries which are currently benefiting the most from the reordering of global economic relations taking place under the current phase of globalisation, rather than the three smaller BRIICS countries. These growth and scale observations appear to support the Krugman (2007) "home market effect" theory, whereby firms locate in large markets the activities that are subject to increasing returns to scale, and the efficiency gains associated with investing in these localities then allows the firms to export these goods. As we will see now, this argument appears to be particularly appropriate when we consider FDI investments in China. The empirical evidence in the rest of the chapter comes from UNCTAD (2005, 2007), except wherever specified.

### **6.1 The Changing Economic Geography of China**

100. Of all developing or transition economies, the most remarkable transformation has been that of China. Between 1980 and 2000 China increased its share of global exports from 0.9% to 6%, its share of global

imports from 1.1% to 4.1%, and its share of global GDP from 2.9% to 3.4% (Fujita, 2007b). The result of this increasing trade and openness was that between 1980s and 2000, China's GDP per capita increased by ten-fold. However, the initial impetus for China's restructuring and growth came from fairly modest reforms. China began with the introduction of a rudimentary system of property rights in order to create incentives and only recently gave constitutional recognition to private property (World Bank, 2005). However, recognising the need to access global capital, technology and knowledge assets via inward multinational investment, China has subsequently also liberalised many rules regarding services and manufacturing industry ownership. These changes now allow for greater levels of overseas ownership in many advanced sectors and have been instituted because China is aiming to attract both a broader range and a higher quality of inward FDI. In particular, the National Economy and Social Development Plan 2005 emphasised the need to improve the quality of FDI by encouraging it in high-technology industries, advanced manufacturing, modern services, agriculture and environmental protection. The plan encourages the establishment of R&D centres, regional headquarters, and bases of advanced manufacturing. It also welcomes the role of FDI in the reform of state-owned enterprises.

101. The growth in R&D-related FDI investments in China began in 1993 and reached some 700 projects by 2004 amounting to some USD 4 billion in inward FDI. Most projects were implemented after China's accession to WTO in December 2001. These R&D investments are mainly focused on technology-intensive industries such as ICT, automotive and chemicals, and there is clear economic geography logic to these investments which are concentrated in a small number of locations. In 2004, Beijing had 189 foreign-owned R&D centres of which 60% were in ICT, Shanghai had 140 foreign-owned R&D centres of which 91 are in Pudong, and Guangdong and Jiangsu provinces in the south (close to Hong Kong, China) are home to a combined number over 100 R&D centres.

102. The fact that multinational R&D centres were being located in Shanghai, Beijing, Guangdong and Jiangsu provinces displays a clear logic. These locations are the core knowledge regions which are growing quickly, and form the major locations for all types of international investment. Although they cannot yet be described fully as global cities, both Beijing and Shanghai exhibit world city characteristics. At the same time, in 2003 the south eastern provinces of Guangdong and Jiangsu individually accounted for 28% and 19% of FDI, respectively. The reason that FDI in general, and knowledge-related FDI in particular, was being located in these cities and regions, is because these are the major growth regions of China.

103. During the 1970s and 1980s, inequality between provinces and also between urban and rural areas in China fell consistently (Golley, 2007). Until the mid-1980s, the growth in per capita productivity and expenditure per capita was higher in rural than in urban areas, which suggested a slow process of rural-urban convergence (Angang *et al.*, 2005). Between 1978 and 1985, the ratio of per capita disposable income between urban and rural residents had fallen from 2.57 to 1.85, and ratio of per capita consumption had fallen to just over 2.1 (Angang *et al.*, 2005). However, from the mid-1980s onwards this urban-rural ratio has been reversed. By 1990 the ratio of both per capita disposable income and consumption had risen to above 2.0. Since the economic reforms started in earnest, as expected on the basis of the earlier arguments, inequality between provinces in China has risen continuously since 1991 (Golley, 2007). By 1997, the urban-rural ratios of both per capita disposable income and consumption had increased to approximately 2.5 (Angang *et al.*, 2005). By 2001 the urban-rural ratio of both per capita disposable income and consumption had risen to approximately 3.0:1, while the ratio of per capita income had risen to 2.1:1 (Angang *et al.*, 2005).

104. The result of this urban rural divergence was that by 2004, the largest city-regions in China exhibit the highest per capita incomes, with the ratio of per capita province GDP to national per capita GDP being highest for Shanghai 5.0, then for Beijing 3.5, then Tianjin 2.7. The next highest ratio areas are the regions of Zhejiang 2.1 and Jiangsu 1.8, which are the regions close to Shanghai, followed by the regions close to Hong Kong, China of Guangdong 1.8, and then the coastal regions close to the dominant cities of Fujian 1.6,

Liaoning 1.6 and Shandong 1.4 (Golley, 2007). These ratios imply that the dominant cities currently exhibit GDP per capita levels which are approximately 13 times that of the lowest regions (Fujita, 2007b).

105. If the three major city-regions of Shanghai, Beijing and Tianjin are removed then the increase in regional inequality across China is noticeably reduced. On the other hand, however, if we group together all of the Coastal regions including the dominant city-regions, then regional inequality between the coastal and interior regions of China increases even more dramatically (Golley, 2007). This demonstrates the role played by particular city-regions in the dramatic growth of China over the last two decades. In 2000, the Coastal region between Beijing and Hong Kong, China as a whole produced 71% of China's total industrial output. This enormous output accounted for more than 60% of output in all but two sectors and at least 80% of output in close to half of the industry sectors, including 97% of China's cultural, educational and sports outputs (Golley, 2007). The growth of China is a coastal phenomenon. However, even within the Coastal Region of China there is a Core Region, which consists of the South East regions adjacent or close to the major cities, and represents broadly an arc of regions bounded by Shanghai and Hong Kong, China. These Core Region provinces grew by more than the Coastal Region as a whole in almost all of the sectors in which the Coastal Region grew (Golley, 2007).

106. As expected on the basis of earlier arguments, increasing inter-regional inequality is now a general phenomenon in China. However, in terms of economic geography, the escalating growth and wealth of certain regions is also highly associated with the increasing agglomeration of activities in these regions. Once again, this is predicted by economic geography arguments. The Core Regions of the South East are not only the fastest per capita growth regions, but also they are the regions of the most rapidly increasing agglomeration. Golley (2007) calculates that between 1989 and 2000, 26 out of 28 major manufacturing and industrial sectors have become more spatially concentrated, as reflected by increasing spatial Gini coefficients. As such, the general trend towards increasing intra-national inequality across many countries is clearly very evident in China.

107. Regional economic restructuring in China has meant that poverty reduction since the mid-1980s has been most dramatic in the eastern regions, followed by the central regions, with poverty increasing in the Western regions (Angang *et al.*, 2005). However, this is not just an urban phenomenon. The ratio of per capita farming incomes in the east and centre regions relative to the west region have also increased between 1980 and 2000, from 1.27 and 1.05, to 1.92 and 1.30, respectively (Angang *et al.*, 2005). Part of the reason is human capital. The areas of highest growth are broadly the regions with highest rates of literacy (Angang *et al.*, 2005). In addition, disparities in Chinese income per capita are also exacerbated by a fiscal tax and transfer system which significantly benefits urban residents (Angang *et al.*, 2005). More generally, however, the competition and wealth effects associated with buoyant regional growth across a range of local sectors tend to spill over to other local sectors, and agriculture in such buoyant regions also benefits from this.

## **6.2 The Changing Economic Geography of the Other BRIICS Countries**

108. Many of these same economic phenomena evident in China are apparent in countries such as India. Like China, India began its economic restructuring with initially modest reforms by reducing trade barriers and distortions within the economy. In 1991 the average tariff was 83%, and only 13% of goods were importable without a license. By 1998 tariffs had been reduced to 30%, and the range of goods importable without a license was 57%. Since then, its GDP per capita has increased four-fold between 1980 and 2002 (World Bank, 2005). As in the case of China, recognising the need to access global capital, technology and knowledge assets via inward multinational investment, India has also moved to increase its attractiveness as a location for FDI. The Indian Investment Commission aims at drawing FDI as well as domestic investment, while the Foreign Investment Board is intended to act a one-stop service centre and facilitator for FDI. In 2004 foreign equity ceilings in Indian aviation services, private banks, non-news print publications, and the petroleum industry were all adjusted upwards in order to attract more international investment. Yet, even

though China and India are now often compared, there are actually fundamental differences between the two economies and their responses to globalisation. Firstly, one obvious difference is simply sheer scale. The Chinese economy is almost three times the size of the Indian economy, with per capita incomes of well over twice those of India. Secondly, there are major trade performance differences between the two countries. In 1950, China's share of global trade was 1% while that of India's was 2.2%, whereas by 2002, China's share of global trade had increased to 4.8% while India's had actually declined to 0.8% (Lardy, 2005). In part, these trade performance differences are because China's rapid growth began slightly earlier than India's growth, and also because it has been more dramatic than India's, particularly in opening trade. Thirdly, there are also major differences between China and India in terms of their structure of GDP composition.

**Table 11. Size of Sectors in National Output**

	% of National GDP 1980			
	Agriculture	Industry	Manufacturing	Services
China	30.1	48.5	40.5	21.4
India	38.6	24.2	16.3	37.2
	% of National GDP 2002			
	Agriculture	Industry	Manufacturing	Services
China	15.9	50.9	34.5	33.2
India	24.9	26.9	15.8	48.2

Source: Panagariya *et al.*, 2005.

109. The structure of GDP composition by industry in India is still rather different to China; there is a much greater emphasis in India on services than China, where manufacturing is still relatively more dominant (Panagariya *et al.*, 2005). As shown in Table 11, in 1980 in China, agriculture accounted for 30.1% of GDP, industry for 48.5% (of which manufacturing alone accounted for 40.5%) and services for 21.4% of GDP. On the other hand, for India, agriculture accounted for 38.6% of GDP, industry for 24.2% (of which manufacturing accounted for only 16.3%) and services for 37.2%. Even though both countries have undergone enormous changes during the last three decades, the legacy of these inherited structures still remains. In 2002 in China agriculture accounted for 15.9% of GDP, industry for 50.9% (of which manufacturing alone accounted for 34.5%) and services accounted for 33.2% of GDP, whereas for India, agriculture accounted for 24.9% of GDP, industry for 26.9% (of which manufacturing accounted for only 15.8%) and services for 48.2% of 2002 GDP (Panagariya *et al.*, 2005).

110. As a result of its different industrial structure and also its English language advantages, the growth of FDI in India, and particularly the growth of off-shoring FDI, has been dominated by a range of service industries, rather than by manufacturing (Gordon and McCann, 2008), which has been the case for China. Yet, many aspects of the dynamic growth industries of India have similar features to China. Firstly, most of the trade of the Indian and Chinese economies is still in the form of re-exports of finished or semi-finished products or services produced by multinational firms which are based in Europe or the US. Secondly, many of the key growth centres are dominated by external links with multinational companies. In the Indian IT industry, which is dominated by the Bangalore region, two-thirds of all sales are accounted for by foreign owned multinational affiliates located there (Scheve and Slaughter, 2007). Thirdly, as India undergoes continuing regional economic restructuring, firms located in the regions with large home markets earn higher profits (Kambhampati and McCann, 2007). This implies that in terms of economic geography, the large home market effects associated with agglomeration are driving the internal economic growth and restructuring within Indian economy.

111. A similar picture emerges in the case of Indonesia. In terms of internationalisation and globalisation, the current phase of economic restructuring was driven by the Jakarta Declaration, which outlined the Government's vision for infrastructure development, and also its commitment to removing the bureaucracy which was impeding private investment. Bureaucracy is a major problem in Indonesia. Currently, the time taken to start a business in Indonesia is 151 days, which is almost four times as long as in China. The Government has also introduced a one-stop investment service for FDI. Other initiatives proposed at the time included abolishing the requirement for foreign affiliates to sell part of their shares to local investors after a certain number of years and the abolition of the 30 year limit on business licenses for foreign investors. These initiatives are all aimed at opening up the country to further foreign investment, with the aim of promoting internal competition and technology transfer. However, increasing trade and investment openness is likely also to lead to greater disparities among Indonesia's regions, as inward investing firms seek out the pecuniary advantages of associated agglomeration. This is particularly the case in the apparel and textiles industries, which is the sector in Indonesia that has exhibited the greatest revealed comparative advantage since the 1980s (James, 2007). If inward technology spill over effects also operate in these sectors, these are likely to exacerbate the existing advantages of agglomeration in the dominant urban regions of Java (Amiti and Cameron, 2007). Like China, GDP per capita in Indonesia is closely related to city size, with the dominant city of Java exhibiting GDP per capital levels which are approximately 13 times that of the lowest regions (Fujita, 2007b). The opening up of the country is likely to accentuate these differences, except for the case where multinationals are engaged in primary sector activities located in other outlying regions.

112. Brazil is by far the largest recipient of inward FDI in the South American region, receiving approximately USD 19 billion of annual inward FDI, which represents over 40% in FDI in South America. However, although inward FDI in South America grew by 18.5% between 2004 and 2006, annual inward FDI inflows into Brazil remained fairly static. This is in contrast to Brazil's FDI outflows which rose dramatically becoming the largest in the region in 2006, reaching a record level of USD 28 billion. For the first time, Brazil's FDI outflows surpassed its FDI inflows. However, this was mainly due to one mega-deal in which a Brazilian mining company purchased a foreign company. Apart from this one case, however, over the medium term it is still likely that FDI inflows into Brazil will continue to significantly outweigh the FDI outflows, which previously were typically between USD 3 billion and USD 9 billion *per annum*. Both inward and outward FDI flows from Brazil region tend to be concentrated in extractive industries, resource-based manufacturing industries, and also in the infrastructure and telecommunications sector. However, foreign investments in various key sectors of the Brazilian economy, such as the automotive industry, sugar refining, and the steel industry, have increased over recent years. During the 1990s and early 2000s, foreign MNEs made USD 20-25 billion of investments in the MERCOSUR automotive industries, 80% of which were in Brazil. These investments were primarily of a market-seeking nature, focused on the domestic markets. More recently, however, FDI in the automotive industry of MERCOSUR, which is dominated by Brazil, is increasingly focused on export markets such as Mexico, rather than on domestic consumption, and this has been helped in part by major currency devaluations. These developments are likely to continue many of the current regional inequalities in Brazil. Very significant regional disparities continue to exist in Brazil, a country which exhibits very clear centre-periphery features. Moreover, the increasing relative dominance of primarily Sao Paulo and Rio de Janeiro, along with the cities of the south and east coastal regions (Monteiro Monasterio, 2008), means that the economic fortunes of the peripheral regions are increasingly dependent on the behaviour of the core regions, whose own performance is largely independent of the peripheral regions (Perobelli *et al.*, 2008).

113. In the case of Russia, regional transformation has been rapid. Apart from the major natural resource extraction regions, economic growth in Russia is now localised in a small number of regions, dominated by the major cities of Moscow and St Petersburg (Hanson and Bradshaw, 2000). FDI inflows to the Russian federation doubled between 2005 and 2006 to USD 28.7 billion, where natural-resource-based activities lead the way. However, the Russian Government has moved to restrict foreign ownership in the strategic sectors of the defence and extraction industries, only permitting minority levels of foreign ownership for firms in

these industries. Meanwhile FDI outflows from Russia have continued to increase between 2005 and 2006 by 41% to USD 18 billion. This was particularly in resource-based firms attempting to globalise, as well as in banking FDI outflows into other former CIS countries.

114. South Africa opened up its economy to the global market in 1994. Trade liberalisation had a very significant impact, with exports and imports rising from 47% in 1996 to approximately 60% of GDP in 2004. In terms of inward investment, South Africa in 2005 accounted for 21% of all FDI inflows into the continent of Africa. South Africa itself actually witnessed a fall in FDI inflows due to the sale of a foreign equity stake in a domestic gold-mining firm to a domestic firm, although South Africa remains Africa's major location for both inward FDI and a major source of outward FDI. As well as the traditional investors in South Africa from UK and USA, there is now also increasing interest from Asia, a trend which reflects the overall growing interest in Africa from Asia in general. As South Africa's trade, and in particular its manufacturing exports, have increased dramatically over the last two decades, the relationship between trade and economic geography has become much clearer. Economic growth in South Africa is being increasingly dominated by the urban centres, and particularly those with major transportation infrastructures (Naude and Krugell, 2003). In 2000, some 84% of South Africa's manufacturing exports are now accounted for by only 6% of the magisterial districts (Naude and Krugell, 2003).

### **6.3 Final Comments**

115. In order to understand the long-run global evolution of the economic geography of trade and growth, it is necessary to understand the role played by both agglomeration economies, and multinational firms as mediators of the physical and human capital investments on which such growth is built. In explicitly spatial terms, at the global level, the current phase of globalisation intensifies the mutual interdependencies between countries, strengthens the importance of local trade blocs and areas of economic integration, and also tends to reinforce the dominant urban hierarchies (Geyer, 2006). Economic geography, defined both in terms of a country's physical location and also its access to markets and supply sources, plays a statistically significant role in determining the levels of a country's productivity and income per capita. A country's trade performance is closely related to its economic geography (Redding and Venables, 2004). These geography-trade structural issues are exacerbated by the location behaviour of multinational firms. As we have seen, the reason for this is that multinational firms will locate the types of investments which benefit from agglomeration effects in large and diversified city-regions, and in the current phase of globalisation, the types of investments which benefit from agglomeration effects are increasingly the knowledge-intensive activities. While the original new economic geography and new trade theory predictions (Krugman and Venables, 1995) were based solely on the advantages associated with local pecuniary spill-over effects, what is argued here is that knowledge and the technology spill over effects exhibit primarily the same locational logic. As such, multinational firms will not only contribute to, but will also accentuate and exacerbate the tendency towards centre-periphery divergence between countries and between regions within the same countries. All these features are characteristic of the second Krugman-Venables phase of globalisation.

116. There is also one final issue that we have not yet discussed, but which also points in exactly the same directions as our conclusions. This is the question of the migration of highly skilled human capital. In the current phase of globalisation, highly educated and skilled individuals are now better able than ever to exploit their knowledge assets via mobility. This is because the institutional and technological changes driving the current processes of globalisation also allow highly skilled individuals to move internationally in order to reap the rewards of their human capital. If both pecuniary and technological spill-overs are becoming more localised in global city-regions, such regions will also become the dominant employment destinations for highly skilled labour. There is already plenty of evidence that this process is occurring. It is well documented that the gap between the wealthiest and poorest countries has steadily grown over the last two centuries, and most of this has taken place during the periods in which shipping costs and global trade have expanded at their fastest rates (Venables, 2006). This phenomenon has occurred in particular over the last two decades

(Leamer, 2007). These arguments also apply to individual countries. A rapidly widening income gap between high and low skilled individuals has already emerged within advanced economies (Scheve and Slaughter 2007), intra-national regional inequality is increasing all over the world (Brakman and van Marrewijk, 2008), and internal labour migration and enlarging regional inequality is a major feature of the restructuring of the BRIICS countries. The local coexistence of pecuniary spill-overs, technological spill-overs and human capital inflows, will therefore continue the trends towards regional inequality described in this chapter. This is true both for regions and countries within advanced areas of integration, such as those in the EU or NAFTA, and also for developing regions and countries (Venables, 2005), such as China, ASEAN, or Mercosur.

117. That this is the case can be seen from the fact that all the BRIICS countries exhibit broadly similar economic geography features. As they are more open to trade and investment, their internal economic geography becomes increasingly focused on the particular major city-regions which exhibit marked agglomeration features, as well as the best access to global transportation networks. While it is true that over time these emerging economies will obviously generate more of their own multinational knowledge outputs, in the current phase of globalisation the knowledge centres controlling much of their outputs are still almost entirely located in other arenas, such as the EU, Japan and US. Allied with the fact that in both absolute and per capita terms the EU and US economies still dwarf the combined economies of all the BRIICS countries, these observations suggest that the processes of convergence between the developed and emerging BRIICS countries still have many decades to run (Stiglitz, 2006). As such, access to not only the capital, but more importantly, the knowledge resources and technology controlled by multinational firms from developed economies will continue to be critically important for the development of all the BRIICS countries and regions.

118. While these arguments may appear to imply a rather stark distinction between regional winners and losers, they still leave open a variety of opportunities for much creative policy-thinking and policy-making. One of these opportunities is intra-regional in nature and one is inter-regional in nature.

119. In terms of *intra*-regional policy issues, in order for localised growth processes to continue efficiently in the dominant city-regions, it is essential that the infrastructure and land-use resources in these locations are adapted and developed so that they are able to cope with the increasing population pressures. Otherwise, the increasing growth of the city-region will be associated with rising costs and falling efficiency, and such centres will lose out to growth centres in other regions or other countries. Of particular importance here is the quality and efficiency of the urban transportation and commuting infrastructure, and also the availability, flexibility, and strategy of land-use planning regulations. Knowledge-workers require transportation facilities, housing availability and urban services which are consistent with their work-life aspirations. Cities which are best able to maintain increasing efficiency alongside population growth therefore require a level and quality of built environment infrastructure which is sufficient to facilitate and provide for the living and moving patterns of highly educated workers.

120. In terms of *inter*-regional policy issues, in order for hinterland cities and regions to gain access to, and take advantage of, the localised growth processes currently taking place in the dominant city-regions, it is essential that countries improve their levels of inter-regional connectivity. While this true for developed economies, it is even more important for developing and transition economies. In particular, inter-regional transportation and communications networks should be made as extensive and comprehensive as possible, so that businesses and entrepreneurs in hinterland regions are able to easily access the dominant city-regions. Of particular importance, here, is the case of air-transport facilities. Air-transport connectivity between regions facilitates the movement of ideas and knowledge embodied in business executives, and as we have seen, these flows of knowledge via face-to-face contact are critical. The reason this is so important in the case of BRIICS countries, and in all developing and transition economies in general, is that the dominant city-regions in these countries are able to act as sources and conduits of knowledge regarding new technologies, new techniques, new markets and new supply opportunities for the hinterland regions. As such, the central and hinterland

regions play a rather different role in the growth processes of developing and transition countries. The dominant city-regions tend to compete on the basis of the competitive scale advantages afforded by the agglomeration economies, while the hinterland regions are still better able to compete on the basis of comparative advantage, particularly in the agricultural sector and also in the lower knowledge-intensive and lower value-added manufacturing industries. The same arguments for air-transportation systems also apply in general to inter-regional telecommunications networks.

121. Policy-making therefore needs to balance intra-regional needs with inter-regional needs. Intra-regional infrastructure investment and planning is required in order to foster localised growth, while inter-regional planning and investment is required in order to promote the dissemination of growth benefits across all regions. These issues pose major challenges for policy-makers.

122. The globalisation analysis here has been conducted from the standpoint of economic geography, in which the issues of agglomeration, knowledge, and networks are argued to play a pivotal role in the development processes of the twenty-first century. However, the implications of these arguments do not necessarily imply that wholesale liberalisation is the simple answer to all knowledge-transfer, technology-transfer and growth problems (Stiglitz, 2002, 2006). Indeed, rather than being very open, the two fastest growing BRIICS countries, namely China and India, are still highly restrictive in terms of the control of inward non-FDI international capital flows (Anderson, 2005). These issues obviously need to be seen in a much broader political economy light, in which the management and governance of the processes of globalisation need to be made as transparent as possible (Stiglitz, 2002, 2006). While policy uncertainty, macroeconomic instability, security of property rights, taxes and corruption are all major issues inhibiting the benefits of globalisation accruing to developing and transition countries (World Bank, 2005), protectionism on the part of advanced economies can be at least as damaging (Stiglitz, 2006). The long run growth prospects for some of the BRIICS countries look particularly positive. However, whether all parts of the developing world will benefit from the third stage of the Krugman-Venables transition, as implied by Lucas (2000), in which growth spreads dramatically from developed to developing countries, is still rather unclear (Crafts, 2004). It depends in part on how the local growth processes are managed.

## REFERENCES

- Acs, Z.J. (2002) *Innovation and the Growth of Cities*, Edward Elgar, Cheltenham.
- Amiti, M. and L. Cameron (2007), “Economic Geography and Wages”, *Review of Economics and Statistics*, 89.1, 15-29.
- Anderson, J. (2005), “Capital Account Controls and Liberalisation: Lessons for India and China”, in Tseng, W. and D. Cowen, (eds.), *India and China’s Recent Experience with Reform and Growth*, International Monetary Fund and Palgrave, Basingstoke.
- Angang, H., H. Linlin and C. Zhixiao (2005), “China’s Economic Growth and poverty Reduction”, in Tseng, W. and D. Cowen, (eds.), *India and China’s Recent Experience with Reform and Growth*, International Monetary Fund and Palgrave, Basingstoke.
- Arita, T. and P. McCann, (2000), “Industrial Alliances and Firm Location Behaviour: Some Evidence from the US Semiconductor Industry”, *Applied Economics*, 32, 1391-1403.
- Arita, T. and P. McCann (2006), “Clusters and Regional Development: Some Cautionary Observations from the Semiconductor Industry”, *Information Economics and Policy*, 18.2, 157-180.
- Arora, A. and C. Forman (2007), “How Local are IT Services Markets: Proximity and IT Outsourcing”, *Journal of Management Information Systems*, 24.2, 73-102.
- Badinger, H. and G. Tondl (2003), “Trade, Human Capital and Innovation”, in Fingleton, B. (ed.), *European Regional Growth*, Springer, Heidelberg.
- Berry, C.L., and Glaeser, E.L. (2005), “The Divergence of Human Capital Levels across Cities”, *Papers in Regional Science*, 84.3, 407-444.
- Best, M.H. (1990), *The New Competition: Institutions of Industrial Restructuring*, Polity Press, Cambridge.
- Blum, B.B. and A. Goldfarb (2006), “Does the Internet Defy the Law of Gravity”, *Journal of International Economics*, 70.2, 384-405.
- Bobonis, G.J. and H.J. Shatz (2007), “Agglomeration, Adjustment, and State Policies in the Location of Foreign Direct Investment in the United States”, *Review of Economics and Statistics*, 89.1, 30-43.
- Brakman, S. and C. van Marrewijk (2008), “It’s a Big World After All: On the Economic Impact of Location and Distance”, *Cambridge Journals of Regions*, Economy and Society, Forthcoming.
- Burghouwt, G. (2005), *Airline Network Development in Europe and its Implications for Airport Planning*, Utrecht University Press, Netherlands.
- Button, K., R. Stough, M. Bragg and S. Taylor (2006), *Telecommunications, Transportation and Location*, Edward Elgar, Cheltenham.

- Cairncross, F. (1997), *The Death of Distance: How Communications revolution will Change our Lives*, Orion Business Books, London.
- Caniels, M. and B. Verspagen (2003), "Spatial Distance in a Technology Gap Model", in Fingleton, B., (ed.), *European Regional Growth*, Springer, Heidelberg.
- Cappelen, A., F. Castellacci, J Fagerberg and B. Verspagen (2003), "Regional Disparities in Income and Unemployment in Europe", in Fingleton, B., (ed.), *European Regional Growth*, Springer, Heidelberg.
- Carlino, G.A., S. Chatterjee and R.M. Hunt (2007), "Urban Density and the Rate of Invention", *Journal of Urban Economics*, 61.3, 389-419.
- Casson, M.C. and P. McCann (1999), "Globalisation, Competition, and the Corporation: The UK Experience" in Whitman M. (ed.), *The Evolving Corporation: Global Imperatives and National Responses*, Group of Thirty, Washington DC.
- Chatterji, L. and C.M. Tsai (2006), "Transport Logistics in the Global Economy: Spatial Implications", in Kobayashi, K., T.R. Lakshmanan and W.P. Anderson, *Structural Change in Transportation and Communications in the Knowledge Society*, Edward Elgar, Cheltenham.
- Ciccone, A. and R.E. Hall (1996), "Productivity and the Density of Economic Activity", *American Economic Review*, 86, 54-70.
- COL (2002), *Aviation Services for London*, Corporation of London, London.
- COL (2005a), *The Competitive Position of London as a Global Financial Centre*, Corporation of London, London.
- COL (2005b), *Off-shoring and the City of London*, Corporation of London, London.
- COL (2006a), *London's Place in the UK Economy 2006-07*, Corporation of London, London.
- COL (2006b), *The Importance of Wholesale Financial Services to the EU Economy 2006*, Corporation of London, London.
- COL (2007a), *The Global Financial Centres Index 1*, Corporation of London, London.
- COL (2007b), *The Global Financial Centres Index 2*, Corporation of London, London.
- COL (2007c), *The Impact of Recent Immigration on the London Economy*, Corporation of London, London.
- Combes, P. P. and M. Lafourcade (2005), "Transport Costs: Measures, Determinants, and Regional Policy Implications for France", *Journal of Economic Geography*, 319-349.
- Crafts, N. (2004), "Globalisation and Economic Growth: A Historical Perspective", *The World Economy*, 27.1, 45-58.
- Deardorff, A. (2003), "Time and Trade: The Role of Time in Determining the Structure and Effects of International Trade with an Application to Japan", in Stern, R.M., (ed.), *Analytical Studies in US-Japan International Economic Relations*, Edward Elgar, Cheltenham.

- Disdier, A. C. and K. Head (2008), "The Puzzling Persistence of the Distance Effect on Bilateral Trade", *Review of Economics and Statistics*, Forthcoming
- Duranton, G. and M. Storper (2007), "Rising Trade Costs? Agglomeration and Trade with Endogenous Transaction Costs", *Canadian Journal of Economics*, 41.1, 292-319
- Fingleton, B. (2003a), (ed.), *European Regional Growth*, Springer, Heidelberg.
- Fingleton, B. (2003b), "Increasing Returns: Evidence from Local Wage Rates in Great Britain", *Oxford Economic Papers*, 55, 716-739.
- Frankel, J.A. and D. Romer (1999), "Does Trade Cause Growth", *American Economic Review*, 89.3, 379-399.
- Friedman, T.L. (2007), *The World is Flat: A Brief History of the Twenty-First Century*, 3rd edition, Picador, New York.
- Fujita, M., (2007a), "Globalisation, Regional Integration, and Spatial Economics: An Introduction", in Fujita, M., *Regional Integration in East Asia from the Viewpoint of Spatial Economics*, Palgrave, Basingstoke, United Kingdom.
- Fujita, M. (2007b), "Development of East Asian Regional Economies: A View from Spatial Economics", in Fujita, M., *Regional Integration in East Asia from the Viewpoint of Spatial Economics*, Palgrave, Basingstoke, United Kingdom.
- Fujita, M., P. Krugman, and A.J. Venables (1999), *The Spatial Economy: Cities Regions and International Trade*, MIT Press, Cambridge MA.
- Gaspar, J. and E.L. Glaeser (1998), "Information Technology and the Future of Cities", *Journal of Urban Economics*, 43, 136-156.
- Geyer, H. (2006), "Introduction: The Changing Global Economic Landscape", in Geyer, H.S., (ed.), *Global Regionalisation: Core Peripheral Trends*, Edward Elgar, Cheltenham
- Ghemawat, P. (2001), "Distance Still Matters: The Hard Reality of Global Expansion", *Harvard Business Review*, 79.9, 137-147.
- Glaeser, E.L. (2005), "Urban Colossus: Why is New York America's Largest City?", *Economic Policy Review: Urban Dynamics in New York*, Federal Reserve Bank of New York, New York.
- Glaeser, E.L., J.A. Scheinkman and A. Shleifer (1995), Economic Growth in a Cross Section of Cities, *Journal of Monetary Economics*, 36, 117-143.
- Glaeser, E.L. and J.M. Shapiro (2003), "Urban Growth in the 1990s: Is City Living Back?", *Journal of Regional Science*, 43.1, 139-165.
- Glaeser, E.L. and J. Kohhase (2004), "Cities, Regions and the Decline of Transport Costs", *Papers in Regional Science*, 83.1, 197-228.
- Golley, J. (2007), *The Dynamics of Chinese Regional Development*, Edward Elgar, Cheltenham.

- Gordon, I.R. and P. McCann (2008), "Off-Shoring of Work and London's Sustainability as an International Financial Centre", in Andersson, A.E., P.C. Cheshire, C. Karlsson and R. Stough, (eds.), *Innovation, Dynamic Regions and Regional Dynamics*, Springer, Heidelberg, Forthcoming.
- Greunz, L. (2003), "The Technology Gap and European Regional Growth Dynamics", in Fingleton, B., (ed.), *European Regional Growth*, Springer, Heidelberg.
- Hanson, P. and M. Bradshaw (2000), (eds.), *Regional Economic Change in Russia*, Edward Elgar, Cheltenham.
- Harrigan, J. and A.J. Venables (2004), "Timeliness and Agglomeration", *Journal of Urban Economics*, 59, 300-316.
- Haynes, K., S. Lall, R. Stough, and S. Yilmaz (2006), "Network Usage Patterns and the Substitution and Complementarity Effects between Telecommunications and Transportation: A Demand-Side Approach", in Kobayashi, K., T.R. Lakshmanan and W.P. Anderson, *Structural Change in Transportation and Communications in the Knowledge Society*, Edward Elgar, Cheltenham.
- Higgins, M.J., D. Levy and A. T. Young (2006), "Growth and Convergence across the United States: Evidence from County-Level Data", *Review of Economics and Statistics*, 2006, 88.4, 671-681.
- HMT-DTI (2001), *Productivity in the UK: The Regional Dimension*, H.M. Treasury and Department of Trade and Industry, London.
- HMT-DTI (2003), *Productivity in the UK: The Local Dimension*, H.M. Treasury and Department of Trade and Industry, London.
- Hummels, D. (1999), "Toward a Geography of Trade Costs", Mimeo, University of Chicago.
- Hummels, D. (2001), "Time as a Trade Barrier", Mimeo, Purdue University.
- Ioannides, Y.M., H.G. Overman, E. Rossi-Hansberg and K. Schmidheiny (2007), "*The Effect of Information and Communication Technologies on Urban Structure*", Paper presented at 54th North American Meeting of the Regional Science Association International, Savannah, Georgia USA, 7-10 November.
- James, W.E. (2007), "Comparative Advantage in Thailand and Indonesia and Potential Free Trade Agreements: Implications for Trade Diversion", Siddique, M.A.B., (ed.), *Regionalism, Trade and Economic Development in the Asia-Pacific Region*, Edward Elgar, Cheltenham.
- Kali, R. and J. Reyes (2006), "The Architecture of Globalisation: A Network Approach to International Economic Integration", Working Paper: Department of Economics, University of Arkansas.
- Kambhampati, U.S. and P. McCann (2007), "The Regional Performance and Characteristics of Indian Manufacturing Industry", *Regional Studies*, 41.3, 281-294.
- Krugman, P. (2007), "The 'New' Economic Geography: Where Are We?", in Fujita, M., *Regional Integration in East Asia from the Viewpoint of Spatial Economics*, Palgrave, Basingstoke, United Kingdom.
- Krugman, P. and A.J. Venables (1995), "Globalisation and the Inequality of Nations", *Quarterly Journal of Economics*, 110.4, 857-880.

- Lai, H. and S.C. Zhu (2006), "US Exports and Multinational Production", *Review of Economics and Statistics*, 2006, 88.3, 531-548.
- Lardy, N. (2005), "Trade Liberalisation and its Role in Chinese Economic Growth", in Tseng, W. and D. Cowen, (eds.), *India and China's Recent Experience with Reform and Growth*, International Monetary Fund and Palgrave, Basingstoke.
- Leamer, E. (2007), "A Flat World, a Level Playing Field, a Small World After All, or None of the Above? A Review of Thomas L. Friedman's *The World is Flat*", *Journal of Economic Literature*, 83-126.
- Leinbach, T.R. and C. Capineri (2007), *Globalised Freight Transport: Intermodality, E-Commerce, Logistics and Sustainability*, Edward Elgar, Cheltenham.
- Limtanakool, N., T. Schwanen and M. Dijst (2007), "Ranking Functional Urban Regions: A Comparison of Interaction and Node Attribution Data", *Cities*, 24.5, 2007, 26-42.
- Lucas, R.E. (2000), "Some Macroeconomics for the Twenty-First Century", *Journal of Economic Perspectives*, 14.1, 159-178.
- MacGillivray, A. (2006), *A Brief History of Globalisation*, Robinson, London.
- Mastercard (2007), *Worldwide Centers of Commerce Index*, [www.mastercardworldwide.com](http://www.mastercardworldwide.com)
- McCann, P. (1998), *The Economics of Industrial Location: A Logistics Costs Approach*, Springer, Heidelberg.
- McCann, P. (2005), "Transport Costs and New Economic Geography", *Journal of Economic Geography*, 5.3, 305-318.
- McCann, P. (2007a), "Technology, Information and the Geography of Global and Regional Trade", in Cooper, R., K. Donaghy and G. Hewings (eds.), *Globalisation and Regional Economic Modelling*, Springer.
- McCann, P. (2007b), "Sketching out a Model of Innovation, Face-to-Face Interaction and Economic Geography", *Spatial Economic Analysis*, 2.2, 117-134.
- McCann, P. (2008), "Globalisation and Economic Geography: The World is Curved, Not Flat", *Cambridge Journal of Regions, Economy and Society*, Forthcoming.
- McCann, P. and B. Fingleton (1996), "The Regional Agglomeration Impact of Just-In-Time Input Linkages: Evidence from the Scottish Electronics Industry", *Scottish Journal of Political Economy*, 43.5, 493-518.
- McCann, P. and R. Mudambi (2004), "The Location Decision of the Multinational Enterprise: Some Theoretical and Empirical Issues", *Growth & Change*, 35.4, 491-524.
- McCann, P. and R. Mudambi (2005), "Analytical Differences in the Economics of Geography: The Case of the Multinational Firm", *Environment and Planning A*, 37.10, 1857-1876.
- Monteiro Monasterio, L. (2008), "Clusters and the Spatial Structure of wages in Rio Grande do Sul (Brazil): A Multilevel Approach", in Blien, U. and G. Maier, (eds.), *The Economics of Regional Clusters: Networks, Technology and Policy*, Edward Elgar, Cheltenham, Forthcoming.

- Nachum, L. and S. Zaheer (2005), "The Persistence of Distance? The Impact of Technology on MNE Motivations for Foreign Investment", *Strategic Management Journal*, 26, 747-767.
- Naude, W.A. and W.F. Krugell (2003), "An Inquiry into Cities and the Role in Subnational Economic Growth in South Africa", *Journal of African Economies*, 12.4, 476-499.
- O'Brien, R. (1992), *Global Financial Integration: The End of Geography*, Council on Foreign Relations Press, New York.
- Panagariya, A. (2005), "India in the 1980s and the 1990s: A Triumph of Reforms", in Tseng, W. and D. Cowen, (eds.), *India and China's Recent Experience with Reform and Growth*, International Monetary Fund and Palgrave, Basingstoke.
- Partridge, M.D., D.S. Rickman, K. Ali, and M.R. Olfert (2007), "Employment Growth in the American Urban Hierarchy: Long Live Distance", paper presented at the 47th Congress of the European Regional Science Association, Paris, August.
- Peri, G. (2005), "Determinants of Knowledge Flows and their Effect on Innovation", *Review of Economics and Statistics*, 87.2, 308-322.
- Perobelli, F.S., E.A. Haddad and E.P. Domingues (2008), "Interdependence among the Brazilian States: An Input-Output Approach", in Farshchi, M., O.E.M. Janne, and P. McCann (2008), *Technological Change and Mature Industrial Regions: Firms, Knowledge, and Policy*, (eds.), Edward Elgar, Forthcoming.
- Piore, M.J. and C.F. Sabel (1984), *The Second Industrial Divide: Possibilities for Prosperity*, Basic Books, New York.
- Richardson, H. and C.H.C. Bae (YEAR), *Globalisation and Urban Development*, (eds.), Springer, Heidelberg.
- Redding, S. and A.J. Venables (2004), "Economic Geography and International Inequality", *Journal of International Economics*, 62, 53-82.
- Rietveld, P. and R. Vickerman (2004), "Transport in Regional Science: The "Death of Distance" is Premature", *Papers in Regional Science*, 83, 229-248.
- Rodriguez-Pose, A. (1998), *Dynamics of Regional Growth in Europe: Social and Political Factors*, Oxford University Press, Oxford.
- Rosenthal, S.S. and W.C. Strange (2004), "Evidence on the Nature and Sources of Agglomeration Economics", in Henderson, V. and J.F. Thisse, (eds.), *Handbook of Urban and Regional Economics* Vol 4, North-Holland, Amsterdam.
- Rugman, A. (2000), *The End of Globalisation*, Random House, New York.
- Rugman, A. (2005), *The Regional Multinationals*, Cambridge University Press, Cambridge.
- Sassen, S. (2001), *The Global City*, Princeton University Press, Princeton NJ.
- Sassen, S. (2002), (ed.), *Global Networks: Linked Cities*, Routledge, London.

- Scheve, K.V. and M.J. Slaughter (2007), "A New Deal for Globalisation", *Foreign Affairs*, 34-47, July-August.
- Schonberger, R.J. (YEAR), *World Class Manufacturing: The Next Decade*, Free Press, New York.
- Shapiro, J.M. (2006), "Smart Cities: Quality of Life, Productivity, and the Growth Effects of Human Capital", *Review of Economics and Statistics*, 88.2, 324-335.
- Simmie, J. (2004), "Innovation and Clustering in the Globalised International Economy", *Urban Studies*, 41.5-6, 1095-1112.
- Steger, M.B. (2003), *Globalisation: A Very Short Introduction*, Oxford University Press, Oxford.
- Stiglitz, J.E. (2002), *Globalisation and its Discontents*, Penguin Books, London.
- Stiglitz, J.E. (2006), *Making Globalisation Work*, Allen lane, London.
- Storper, M. and A.J. Venables (2004), "Buzz: Face-to-Face Contact and the Urban Economy", *Journal of Economic Geography*, 4, 351-370.
- UNCTAD (2000), *World Investment Report: Cross-border Mergers and Acquisitions and Development*, United Nations Conference on Trade and Development, United Nations, New York and Geneva.
- UNCTAD (2003), *World Investment Report: FDI Policies for Development: National and International Perspectives*, United Nations Conference on Trade and Development, United Nations, New York and Geneva.
- UNCTAD (2004), *World Investment Report: The Shift Toward Services*, United Nations Conference on Trade and Development, United Nations, New York and Geneva.
- UNCTAD (2005), *World Investment Report: Transnational Corporations and the Internationalisation of R&D*, United Nations Conference on Trade and Development, United Nations, New York and Geneva.
- UNCTAD (2006), *World Investment Report: FDI from Developing and Transition Economies: Implications for Development*, United Nations Conference on Trade and Development, United Nations, New York and Geneva.
- UNCTAD (2007), *World Investment Report: Transnational Corporations, Extractive Industries and Development*, United Nations Conference on Trade and Development, United Nations, New York and Geneva.
- Venables, A.J. (2005), "Spatial Disparities in Developing Countries: Cities, Regions and International Trade", *Journal of Economic Geography*, 5.1, 3-21.
- Venables, A.J. (2006), "Shifts in Economic Geography and their Causes", *Federal Reserve Bank of Kansas City Economic Review*, 91.4, 61-85.
- Warf, B. (1995), "Telecommunications and the Clustering Geographies of Knowledge Transmission in the Late 20th Century", *Urban Studies*, 32.2, 361-378.
- World Bank (2005), *World Development Report 2005: A Better Investment Climate for Everyone*, Washington DC.

World Bank (2007), *2007 World Development Indicators*, Washington DC

World Bank (2008), *World Development Report 2008: Agriculture for Development*, Washington DC.

Zook, M.A. (2005), *The Geography of the Internet*, Blackwell, Oxford.