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Centre for the Analysis of
Regional Integration at Sussex

Qualitative analysis of a potential Free Trade Agreement between the European Union and India

Annex 2:
Projected FDI and economic growth in India

Centre for the Analysis of Regional Integration at Sussex

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Introduction

In this part of the report we consider in some detail the role of FDI in the context of a future FTA between the EU and India, and in the context of the growth of the Indian economy. The aim of this part of the report is to consider carefully the potential role that FDI can play in stimulating trade, investment and economic growth, to evaluate the existing evidence with regard to patterns of FDI into India, and also to provide an empirical evaluation of the potential relationship between RTA[1] formation and FDI flows. This part of the report is therefore divided into two key sections. The first section focuses on the qualitative discussion and statistics, and the second section details the quantitative work undertaken for this project.

[1] In the report the term RTA is employed when referring generically to a preferential trading arrangement between countries. The term FTA is used wherever the arrangement under consideration is that of a free trade area.

1. India: FDI policies and evidence

1.1. Conceptual background

There is considerable discussion in the literature concerning the potential beneficial effects of attracting FDI flows into an economy, and particularly also in the context of developing countries. Typically, the presumption is that (appropriate) FDI is extremely beneficial for the host economy and hence many governments as part of a process of liberalisation frequently employ policies to attract flows of FDI.

The underlying economic principle for offering incentives to attract FDI is primarily based on the idea that FDI produces externalities in the form of technology transfers and spillovers. Romer (1993) describes this phenomenon as the presence of "ideas gap" between developed and developing countries. FDI from the former to the latter can be a channel to transmit technology and management know-how that, in turn, can produce spillovers for the entire economy. In the recent growth literature, technological diffusion plays an important role in explaining the economic development of less-developed countries. According to this, growth rates depend on the state of domestic technology relative to that in the rest of the world. Therefore FDI inflows can generate positive effects for the whole economy of the target country, eventually boosting the growth. This relationship between FDI and externalities is also closely related to the discussion in Annex 1, concerning the relationship between deep integration and externalities.

There we argued that deeper integration expresses itself both in the form of policy measures and market processes. Deeper market integration at the firm level manifests itself in the form of willingness by firms to commit to "niche specialisation" usually with concentration on particular quality characteristics. This can be by the production of a narrower range of products and finer "horizontal" division of labour. It can also occur when the chain of production is chopped up vertically with components being made in one place and assembled elsewhere. What these processes all have in common is a move away from homogeneous "commodity" products to ones whose sale depends on the ability to secure recognition of the standards of the product, both in terms of pure quality and in terms of compatibility with user needs. We could also add, that what many of these processes have in common is the multinationalisation of both their activity frequently stimulated or supported by foreign direct investment flows.

Firm-level studies do not always produce evidence that supports this relationship between FDI and growth (see Levine, 2003) whereas macro-level studies (i.e. based on FDI aggregate flows for a cross section of countries over a period of time) tend to show a positive impact of FDI on economic growth. Using the macro-level framework, some authors found that this positive impact is more likely to happen in particular economic environments. Borensztein, De Gregorio and Lee (1998) show results suggesting that FDI is an important vehicle for the transfer of technology, contributing relatively more to growth than domestic investment. However, the higher productivity of FDI only occurs when the host country has a minimum threshold stock of human capital: this happens because whenever the workforce is highly educated then it is able to absorb and transform technology transfers into broader spillovers.

Balasubriamanyan, Salisu and Dapsoford (1998) found that FDI tends to promote growth in the host country in the presence of a liberal trade regime. Blomstrom, Lipsey and Zejan (1994) argue that FDI can enhance growth only if the host country is sufficiently rich, in other words that it has reached a certain level of income per capita. Finally, according to Beck, Levine and Loyaza (2000), well developed financial systems may improve the allocation of capital inflows and, through this, produce positive effects for the growth of the host country.

These examples of studies evaluating the relationship between FDI and growth suggest therefore that other features of the economy, such as trade policies and investments in education, play an important role and should not be underestimated. To our knowledge there are comparatively few studies that explicitly consider the role of regional integration in stimulating FDI flows, and in looking at the subsequent impact on growth.

Given the preceding, in considering the potential role of FDI, it is important to determine whether or not the economic environment of a country is attractive for foreign investors. In the context of a possible EU-India FTA it is therefore essential to examine different components of India's economy (and not only FDI flows) to have a more comprehensive understanding of the possible role of foreign direct investment.

1.2. Economic performance and FDI in India

Since 1980 the Indian economy grew by an annual average of 5.9, which looks high compared to the world annual rate (3.36%) but not as strong as the Chinese economy, whose average annual rate was 9.8 (see figure 1.1). In the last three years however the average growth rate of Indian economy has been even better, reaching 8.35% even if economic performance varies remarkably between states and industrial sectors (EIU, 2006). GDP per capita has doubled in the last 10 years (see figure 1.3) and as consequence the domestic consumer market has grown remarkably (EIU, 2006).

This high performance followed a long period of very low growth known as the "Hindu rate of growth" (2%-3% annually) and is as surprising as the fact that India is achieving these results with just half of China's level of domestic investment and 10% of its FDI (see figure 1.2). Some observers claim that the explanation for the impressive growth of the Chinese economy is due to a massive accumulation of resources whereas India is growing because of its increasing level of efficiency (see for example Huang, 2006). Table 1.1 reports labour force data and shows estimates of total factor productivity and real capital stock growth, calculated by the Economist Intelligence Unit (Country Data, 2006). From the table we see that real capital accumulation grows at a much higher rate in China than in India whereas the labour force increased by a greater proportion in India than China; finally changes in technology and efficiency represented by the total factor productivity growth are roughly similar. This data supports the idea that China is growing because of the accumulation of resources however it does not provide evidence backing up the proposition that India is growing because of increasing efficiency.

These features, added to a low cost but highly educated workforce, appear to be boosting the flows of international direct investment to India. World FDI inflows

declined significantly after 2000 whereas in China, Brazil, and India there was an opposite trend especially in more recent years (see figures 1.4 and 1.5). As can be seen from figure 1.6 during the 90s engineering, services, electrical equipment and chemicals were the main target of international investments into India whereas in the last five years the transportation and telecommunications industries have been ranked among the sectors attracting the highest FDI inflows and engineering seems to have become more marginal (see table 1.2). It is also worth noting (see Figure 1.7) that a substantial proportion of investment applications are lost during the approval process: only a small part of FDI effectively approved are actually sent to India and implemented. This appears to be true across all sectors, though to a lesser extent with regard to electrical equipment. In terms of source countries (see Table 1.3) we see that between 1991 and 2005 Mauritius and US were the main investor countries whereas European countries held a very small percentage of cumulative FDI inflows (see table 1.3).

1.2.1. The relative attractiveness of India for FDI

According to the FDI confidence index (created by the Global Business Policy Council of A.T. Kearney, 2005), China and India are the 1st and 2nd most attractive FDI locations in the world. In 2005 China held the position for the fourth year in a row and India rose from third to 2nd, surpassing US (see figure 1.8). Most interestingly India was only 15th in 2002. This suggests a very substantial rise in the attractiveness of India as a location for FDI flows in recent years.

Despite this good performance in attractiveness, there are substantial differences between China and India, which might explain the still huge gap in FDI inflows levels. It seems clear that these countries are pursuing somewhat different development paths. China attracts capital-intensive industries via an export manufacturing framework that uses special economic zones. India has traditionally had more of an import-substitution system to attract more technology-oriented FDI – though as detailed earlier this policy is changing and India has become much more outwardly oriented.

However other elements, such as excessive state intervention in the economy, perceived corruption, flexibility of the labour law, cost of starting a business, efficiency of the bureaucracy, are also important in determining whether or not a country can attract foreign investors in the long run. The Economic Freedom Index (see figure 1.9) elaborated by the Heritage Foundation and evaluating the intervention of the state in the economy, shows very close values and a declining trend for both India and China since 2002, indicating a similar pattern in the economic liberalization. However, in contract, the Corruption Perceived Index (see figure 1.10) shows that India is systematically more corrupt than China although the gap between India and China narrowed significantly over 2004-2005.[2] This may constitute an explanation for the lower level of FDI inflows in India if compared to China as well as for the lower amount of actual FDI compared to the approved FDI. It is worth noting however that such indices are aggregate and can mask important differences both sectorally and regionally within economies, which can be important factors in driving FDI flows. I

[2] The higher the value of the index the less corrupted an economy is perceived.

By comparing various "Doing Business" indicators of the World Bank for India and China (see figures 1.11-1.20), it is possible to capture interesting differences in terms of business regulations and their enforcement between these two countries. In terms of the number of procedures required to start a business, both India and China, perform relatively badly (together with Greece and Korea. In China starting a business needs more procedures and obtaining a licence seems to require more time (measured in terms of number of days) than it does in India. The number of actual days spent in order to start a business is the same in India and China – and again both of these economies are among the four worst countries in this regard (together with Greece and Spain). Perhaps significantly, the cost of starting a business is significantly higher in India than it is in China. Indeed Figure 1.12 indicates that the costs in India of starting a business are over 70% of per capita income, whereas the next worst country (Greece) has a cost of under 25% of per capital income. These are very substantial differences.

The evidence also appears to suggest that labour laws are significantly more flexible in China than in India where the difficulty of hiring and the difficulty of firing indices (figures 1.16 and 1.17) are considerably lower. Hence when it comes to hiring China has a very low index in comparison to India, and indeed in comparison to most other countries. Hiring is clearly more difficult in India, though in a number of countries the situation is worse. In contrast, together with the Netherlands, India scores the worst with regard to the difficulty of firing. Figure 1.18 gives an assessment of the rigidity of employment where once again India does not perform well, and considerably worse than China. In India, as well as China, tax payments by enterprises (Figure 1.19) appear high in comparison to all other countries included in the sample, with the number of taxes to be paid being greater in India than China.

The worse Indian business climate, again, can partly explain the gap between Indian and Chinese FDI inflows and may also reduce the enthusiasm of international investors when they have to implement the actual investment after the governmental approval.

Human capital is another important factor in the theoretical framework which analyses host countries' attractiveness for FDI and implications for growth. Unfortunately there are not data on the percentage of population with higher education but only on literacy rate in the adult population (see table 1.4) which increased in the period 1990-2000, but is still much smaller than the Chinese rate. There are data on expenditure per student in secondary and tertiary education (as percentage of GDP per capita) though, which point out a decline in both (see table 1.5) segments in the period 1999-2003. This element might be a determinant in future years, since a highly educated workforce is an important feature of the attractiveness of India for foreign investors. Differences in human capital between India and China may already be the cause of differing performances in terms of labour productivity growth (see table 1.1).

As the literature on FDI and growth has identified, trade openness can be an important determinant of the positive effect of FDI inflows on a host country's economic performance. So far India signed free trade agreements with ASEAN and Mercosur and is pursuing FTA discussion with China. At the same time it concluded the Comprehensive Economic Cooperation Agreement (CECA) with Singapore and

bilateral FTAs with Sri Lanka and Thailand. However, despite these efforts, Table 1.6 shows how firms operating in the territory have to face high barriers to trade, represented by official procedures and the time necessary for completion. These obstacles are reflected by the fact that India is ranked as 139th in the world by trading across border indicators (Doing Business, World Bank 2006).

1.2.2. Outward flow of FDI from India

Indian enterprises have been investing abroad for a long time, but only recently Indian outward FDI (OFDI) has captured international attention because of their magnitude (see figure 1.20). There are several reasons for this new trend: access to new markets, strengthening distribution channels, supporting exports, securing natural resources and access to technologies, skills, management expertise and brand names (UNCTAD, 2004). The liberalization of OFDI policy has been an important determinant in supporting Indian OFDI. Indian OFDI seems to be promising because of the improving competitiveness of Indian enterprises, the encouragement provided by the Government and the desire of Indian firms to internationalize through OFDI (UNCTAD, 2004).

It is possible to identify two different waves of in this phenomenon in terms of the motivation, spread, and entry modes of the Indian FDI. They reflect changes in the liberalization policies of OFDI but also economic features of the economy in different periods. In the first wave, Indian manufacturing enterprises dominated OFDI and the targets of these OFDI were "developing countries with levels of development similar to, or lower than, those of India" (UNCTAD, 2004). In the second wave the share of manufacturing sector involved in these outflows of investment declined, while that of service industries rose. The Indian information and telecommunication (IT) industry emerged as the largest source of Indian services OFDI, followed by media, broadcasting and publishing. Moreover, unlike the first wave, most of the approved OFDI in the second wave were to the developed countries.

The Outward FDI Performance Index of UNCTAD is calculated as the share of a country's outward FDI in world FDI as a ratio of its share in world GDP. The difference in the value of this of performance explores two different dimensions of source countries' OFDI: the "ownership advantages", that is firm-specific competitive strengths exploited abroad; "location factors" which determine where, between host and source countries, the production of goods and services is located. The higher is the value of the index, the better is the performance of the country's OFDI because it means that the share of OFDI grew faster than their share of global GDP: it indicates that their enterprises are improving their advantages rapidly and/or are increasingly choosing to exploit their advantages by establishing operations in foreign locations. As shown in table 1.7 India has historically had high values for this index since 1990, but this index has been declining such that recently India has been overtaken by China. This recent decline can be explained by the fact that Indian GDP has grown rapidly in the last years compared to the low pace of the previous decades.

1.3. Economic Reforms and FDI in India

Major economic reforms in India have typically been associated with crises. For example, in the 60s, as response to severe food crisis, Indian economic policies focussed on the agricultural sector determining the Green Revolution in the early 70s; the Hindu rate growth and the balance of payments crisis were the causes of the more open economic policies implemented in mid 1980s and which aimed to introduce import competition. Another balance of payment crisis was at the origin of new reforms in trade policies and a rationalization of direct and indirect taxation. All over the 1990s tariffs were reduced and the peak tariff rate came down from 350 percent in 1990-91 to 35 percent in 2000-01 (Bhaumik, 2003). Licences and governmental approval were mostly eliminated, OFDI were allowed and also investments in India were made easier for MNCs. Since 1991 the aim of the industrial policy in India has been the integration in the world financial market and this aim has been pursued by (first selective and then broader) liberalization of FDI and decreasing bureaucratic obstacles. In this context FDI are:

"usually preferred over other forms of external finance because they are non-debt creating, non-volatile and their returns depend on the performance of the projects financed by the investors. FDI also facilitates international trade and transfer of knowledge, skills and technology."[3]

The government has claimed that FDI is welcomed in order not only to obtain technology transfers but also to increase foreign-exchange reserves and to make the Indian economy more competitive. FDI is considered particularly beneficial in the areas of infrastructure, energy, telecommunication services and software development and this is reflected particularly in the liberalization of FDI inflows implemented in the last years. In May 2004, unexpectedly it claimed it would raise FDI caps in three key sectors: in some telecommunications services, from 49% to 74%; in civil aviation, from 40% to 49%; and in insurance, from 26% to 49%. The only cap which has not been raised so far is the cap in insurance sector.

The following are the main regulations in terms of sectoral caps (Economist Intelligence Unit, 2006):

- *Sectors where FDI is allowed up to 100%*: roads; mass rapid-transit systems; airports, ports and harbours; industrial towns or parks; development of townships; oil and gas exploration; oil refining; pollution control and management; courier services; hotels and tourism; drugs and pharmaceuticals; advertising; film production and distribution; and the exploration, mining (except a few exceptions), processing and metallurgy of minerals; firms setting up in export-processing zones or special economic zones, operating in electronic-hardware or software-technology parks, or operating as 100%-export-oriented.

[3]Planning Commission of India.2002. Report of the Steering Group on Foreign Direct Investment: Foreign Investment India.[government report]. p 11. New Delhi: Planning Commission, Government of India. Accessed on June 10, 2005. Available at http://planningcommission.nic.in/aboutus/committee/strgrp/stgp_fdi.pdf.

- *Telecommunications service:* in 2000, 100% FDI was permitted in Internet service providers not providing gateways, in infrastructure providers of dark fibre and in e-mail and voicemail providers. (the companies then must divest 26% of their equity to the Indian public within five years if they are listed elsewhere in the world; up to 74% of FDI are allowed in Internet service providers, Internet gateways, radio paging services and end-to-end bandwidth providers cellular and value-added telecommunications services.
- *Mining:* FDI up to 100% (raised from 74% in 2006) is permitted for the exploration and mining of diamonds and precious stones; FDI of 100% is permitted for the exploration and mining of gold, silver, and other minerals; metallurgy and processing.
- *Petroleum:* since 2004 FDI up to 100% is permitted in private-sector exploration of small and medium-sized oilfields, petroleum refining, product marketing, and product pipeline companies on the automatic approval route. In 2006, the government allowed 100% FDI on the automatic route for the laying of natural gas or liquefied natural gas pipelines, and market study, investment financing and marketing-related infrastructure in the petroleum and natural gas sector.
- *Trading:* FDI up to 51% is allowed automatically if the company is an export oriented; FDI up to 100% is allowed in some categories of trading, whereas other types of retail trading remain closed to foreign companies. *Civil aviation:* Foreign participation up to 49% is allowed for domestic airlines but none at all for foreign. FDI of 100% is permitted in airports. In 2004, however, the government capped the FDI in companies bidding for the modernisation of the Delhi and Mumbai airports at 49%.
- *Banking:* in March 2004 the government allowed foreign holdings of up to 74% in private Indian banks. In state-owned or controlled banks, however, the FDI limit remains 20%.
- *Newspaper and magazine publishing:* in 2002 the government allowed up to 26% foreign holding in news-based print publications and up to 74% (raised to 100% in January 2004) in publications that are non news based. However in 2001 a ban on investments in Indian print media was issued and still remains in place.
- *Defence sector:* the government permitted 26% of foreign holding only in defence-related firms.
- *Sectors closed to foreign investors*: most retail trading, gambling, the lottery business, agriculture (excluding some segments like floriculture, horticulture and animal husbandry) and plantations (except tea), arms and ammunition, railway transport and atomic energy (both reserved for the public sector).
- *Industrial licences*, which are an important element in FDI decisions, are required for six specific activities: alcohol, cigarettes, industrial explosives, hazardous chemicals, defence aerospace and electronics.

India approves FDI through two routes: automatic and government approval. With the automatic route companies do not need permission from the government or the Reserve Bank of India (RBI) before investing, and documents need only be submitted after the implementation of the investment to the RBI. Where there are sector-specific

caps, proposals for stakes up to those caps are automatically approved, with a few exceptions. Therefore automatic approval is thus available for FDI in most sectors, with a few exceptions. In February 2006, the government put on the automatic route all transfers of shares from residents to non-residents, including acquisition of shares in an existing company, subject to sectoral FDI caps. Until then the approval of the Foreign Investment Promotion Board (FIPB) was required.

The FIB represents the second road and considers, on a case-by-case basis, proposals for foreign-equity stakes in which automatic approval is not permitted, or where investments are above the sector-specific caps. It represents also a contact for the all other investors such as large multinational corporations with extensive investment plans and proposals that do not exactly fit policy norms. These, from February 2006, require proposals in specific cases and in those cases the FIPB may negotiate project terms in the proposals with investors.

Until January 2005, foreign investors with an existing joint-venture or technology-transfer agreement in India needed government approval and a "no-objection" certificate from the Indian partner to set up a new venture in the same or related field. In January 2005, however, the government said that this certificate would no longer be needed and that prior approval would be required only in cases where the foreign investor has an existing venture in the same field. Approval is not needed where the existing joint venture investment by either of the two parties is less than 3%.

The finance minister specifically approves the FIPB's recommendations on proposals involving total investment of up to Rs.6bn. Applications to the FIB are considered within 15 days and a decision is taken within 30 days.

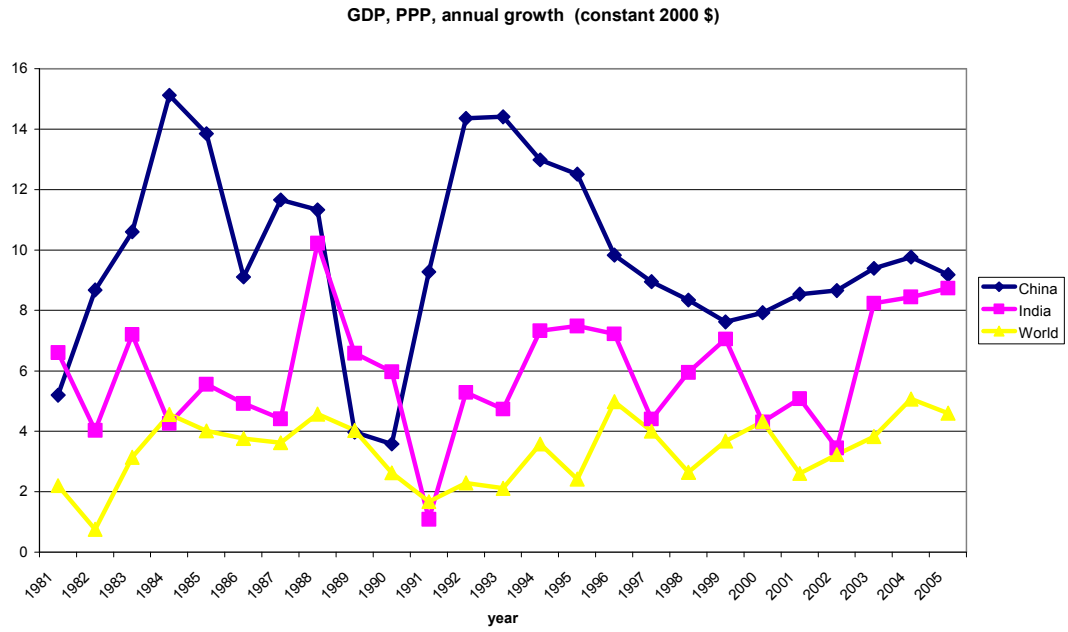
The Secretariat for Industrial Approvals (SIA), which operates within the Ministry of Commerce and Industry, receives and manages applications for industrial licences. It also provides information and assistance to companies and investments. The Foreign Investment Promotion Council in the Ministry of Commerce and Industry has the aim of specifically targets FDI. It identifies Indian sectors or specific regions and state, which requires addressed FDI. The one-stop Foreign Investment Implementation Authority, established in 1999 helps foreign investors to obtain necessary approvals and sort out any kind of problems that might arise in the relationship with the bureaucracy. A strategic management group in the prime minister's office helps resolve problems encountered by large independent projects and the government also set up an Investment Commission to promote FDI in October 2004 (EIU, 2006).

Privatisation usually plays an important role in attracting FDI but in India is politically very sensitive, and progress has been slow. The former government led by the Bharatiya ùJanata Party, had increased the pace of state disinvestment but the current Prime Minister Manmohan Singh put an indefinite hold on all privatisation decisions and proposals in early July 2006: the reason was the threat by one of the government allies to reconsider the support to the government after that this proposed a disinvestment of 10% of shares in the profitable Neyveli Lignite Corporation.

Currently, there are no investment disputes over expropriation or nationalization. Government demands for penalty payments for alleged overcharging by pharmaceutical companies during the 1980's could lead to de-facto expropriation of

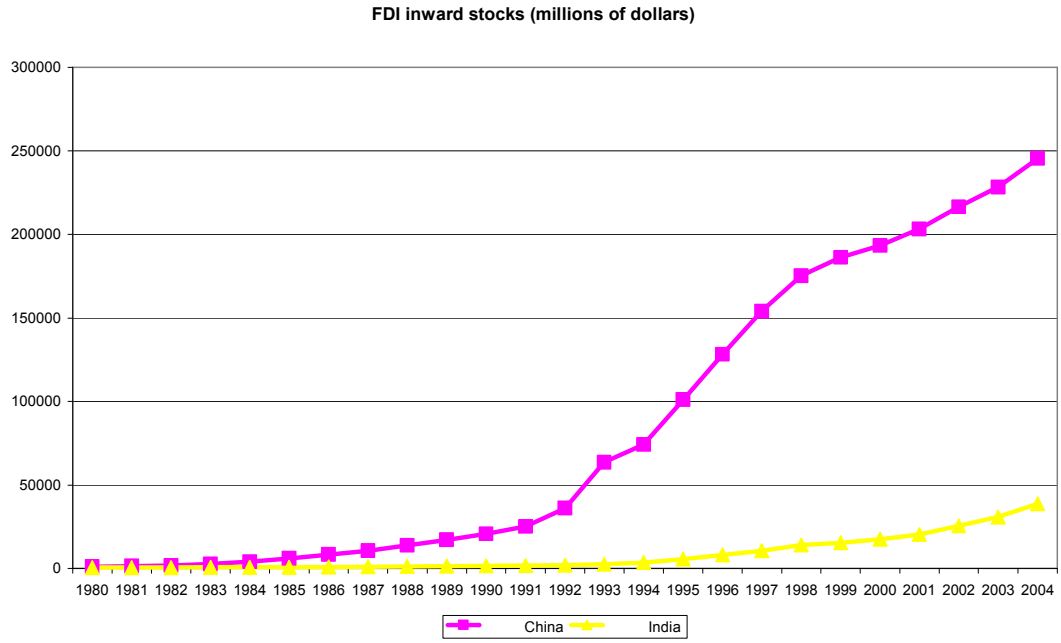
some foreign drug companies' assets in India. A committee has been named to study these longstanding disputes, but the failure of successive governments to produce a swift and transparent resolution has led to a virtual standstill in foreign investment in India's pharmaceutical sector. However, India is not a member of the International Center for the Settlement of Investment Disputes, nor of the New York Convention of 1958 and this may be cause of delay.

Figure 1.1: GDP, PPP, annual growth 1981-2005



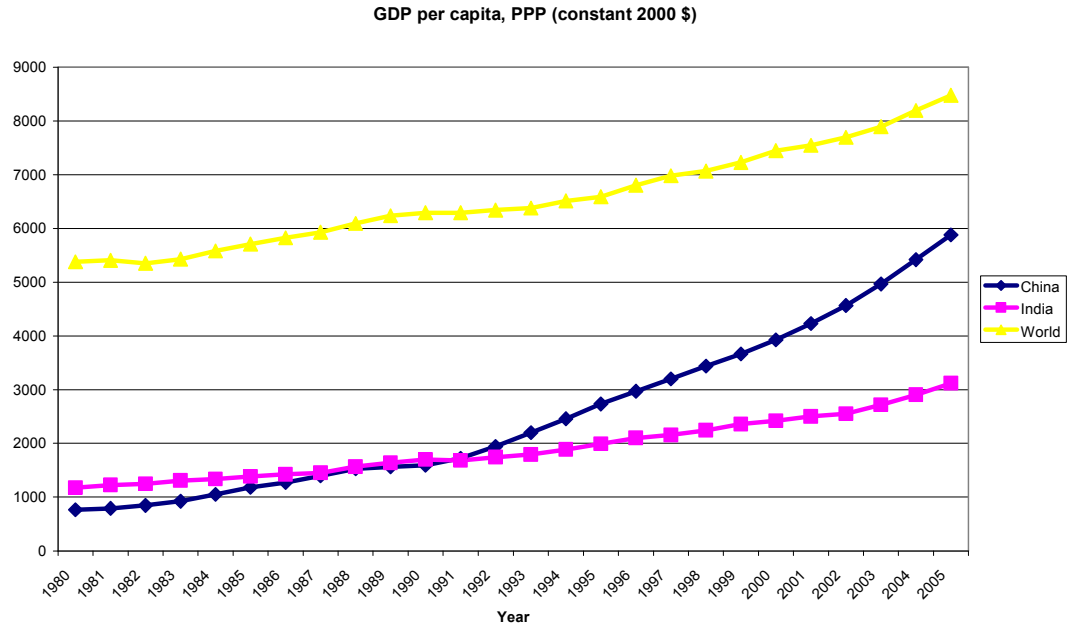
Source: World Development Indicators (2006)

Figure 1.2: FDI Inward stock 1980-2004



Source: calculations based on UNCTAD data

Figure 1.3: GDP per Capita, PPP 1980-2005



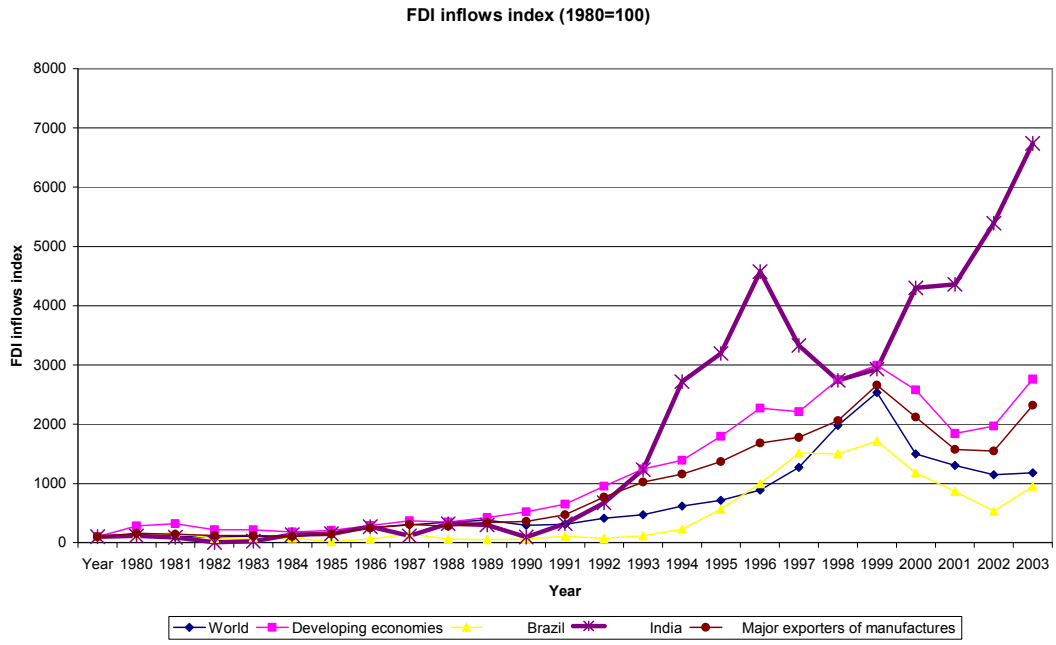
Source: World Development Indicators (2006)

Table 1.1: Comparison between China and India productivity 1994-2005

CHINA													
Series name	Unit	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Labour productivity growth (%)	%	12	9.9	8.6	7.9	6.6	6.5	7.4	6.9	8	9	9	9
Total factor productivity growth (%)	%	2.4	2.8	2.8	3	1.8	2	2.9	2.7	3.6	4.3	4.3	3.8
Labour force (millions)		693.437	700.389	710.185	719.844	728.267	736.072	743.196	756.539	766.896	776.326	783.584	790.097
Growth of real capital stock (%)	%	28.7	21.7	18.1	15.6	15	14	13.9	13.6	13.9	14.1	14.6	15.6
INDIA													
Series name	Unit	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Labour productivity growth (%)	%	5.1	5.3	4.9	2.2	3.7	4.7	1.5	3	1.2	5.8	6.1	6.1
Total factor productivity growth (%)	%	3.7	3.4	3.3	0.8	2.2	3.1	0.2	1.8	-0.2	4.3	5	4.9
Labour force (millions)		393.85	402.23	411.34	420.75	430.37	440.4	450.77	460.5	470.2	473.3	490.05	499.88
Growth of real capital stock (%)	%	6.4	8	7.1	6.5	6.8	7.1	6.1	6	6.5	7.1	7	7.4

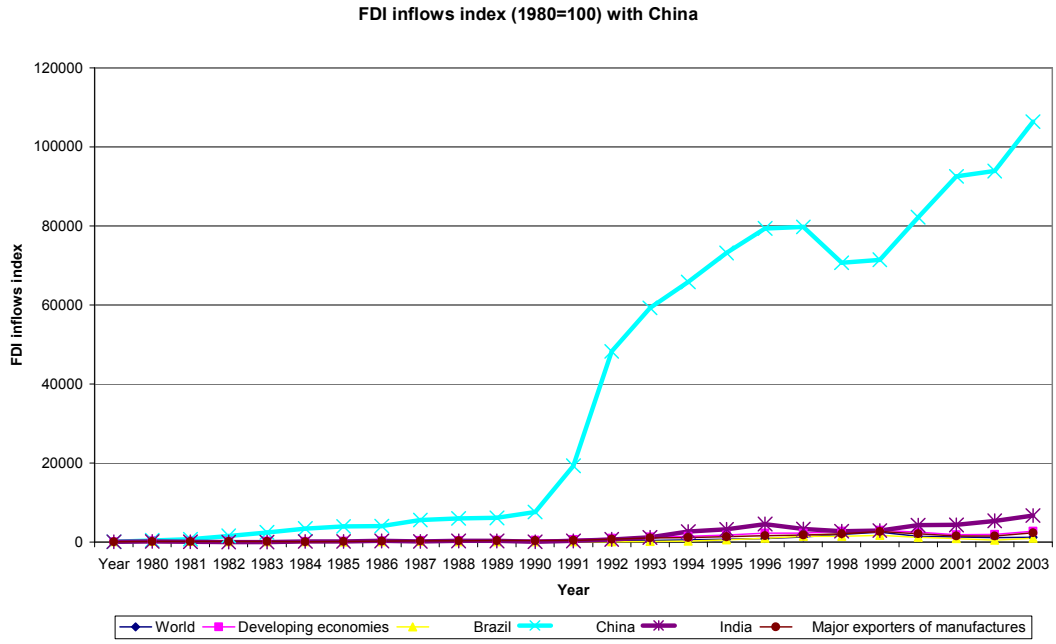
Source: Economist Intelligence Unit, 2006

Figure 1.4: FDI Inflows index 1980-2003



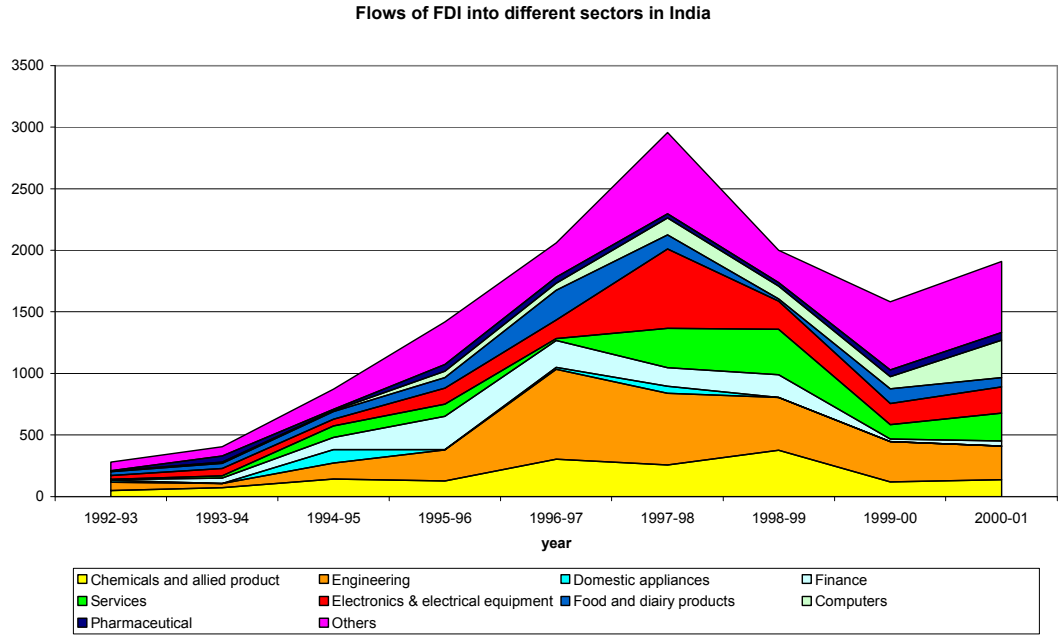
Source: calculations based on UNCTAD data, 2006

Figure 1.5: FDI Inflows index with China



Source: calculation based on UNCTAD data, 2006

Figure 1.6: Flows of FDI into different sectors in India



Source: Planning Commission of India.2002. Report of the Steering Group on Foreign Direct Investment: Foreign Investment India

Table 1.2: Sectors attracting highest FDI inflows 2002-2005

Ranks sector	2002-03	2003-04	2004-05	2005-06	Cumulative inflows FDI from 1991 to 2006	Share of inflows (%)
Electrical equipment	644	532	721	223	4,862	16.62
Transportation industry	455	308	179	168	3,124	10.39
Services Sector	326	269	469	398	2,908	9.53
Telecommunications	223	116	129	156	2,863	9.6
Fuels	118	113	166	19	2,514	8.49
Chemicals	129	20	198	191	1,887	5.92
Food processing industries	37	111	38	36	1,173	3.72
Drugs and Farmaceutical	40	109	292	111	946	3.21
Cement gypsum products	21	10	0	452	746	2.57
Metallurgical industries	47	32	192	122	624	2.13

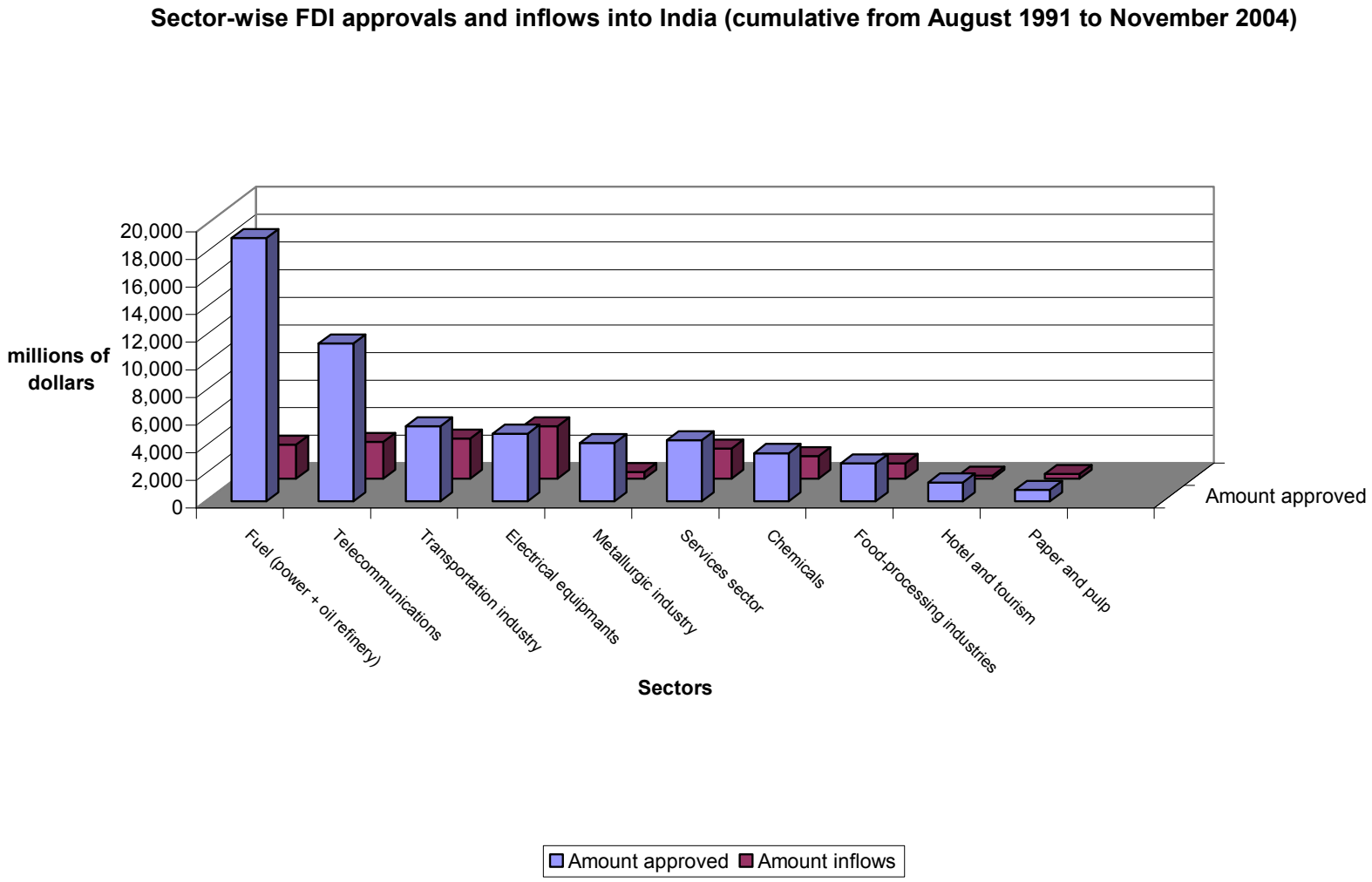
Source: Economic Survey 2004-05, Indian Ministry of Finance

Table 1.3: Share of top investing countries in FDI inflows

RANK	Country	1991-2000	2000-01	2001-02	2002-03	2003-04	2004-05	Total inflows	% of total inflows
1	Mauritius	3,608	942	2,182	788	567	811	8,898	34,49
2	US	2,450	356	382	319	360	522	4,389	17.08
3	Japan	898	224	178	412	78	101	1,891	7.33
4	Netherland	628	162	196	176	489	197	1,847	7.16
5	Uk	670	70	366	340	167	78	1,692	6.56
6	Germany	672	123	113	144	81	120	1,254	4.86
7	France	280	104	108	112	38	36	679	2.63
8	South Korea	572	21	1	39	24	25	682	2.64
9	Singapore	344	117	54	38	37	49	639	2.48
10	Switzerland	269	16	40	93	45	62	525	2.04

Source: Indian Ministry of Commerce and Industry

Figure 1.7: Sector-wise FDI approvals and inflows into India



Source: Economic Survey 2004-05, Indian Ministry of Finance

Table 1.4: Literacy rate in the adult population (%)

	1994	2001
China	78.29493	90,62
India	49.32234	61.3

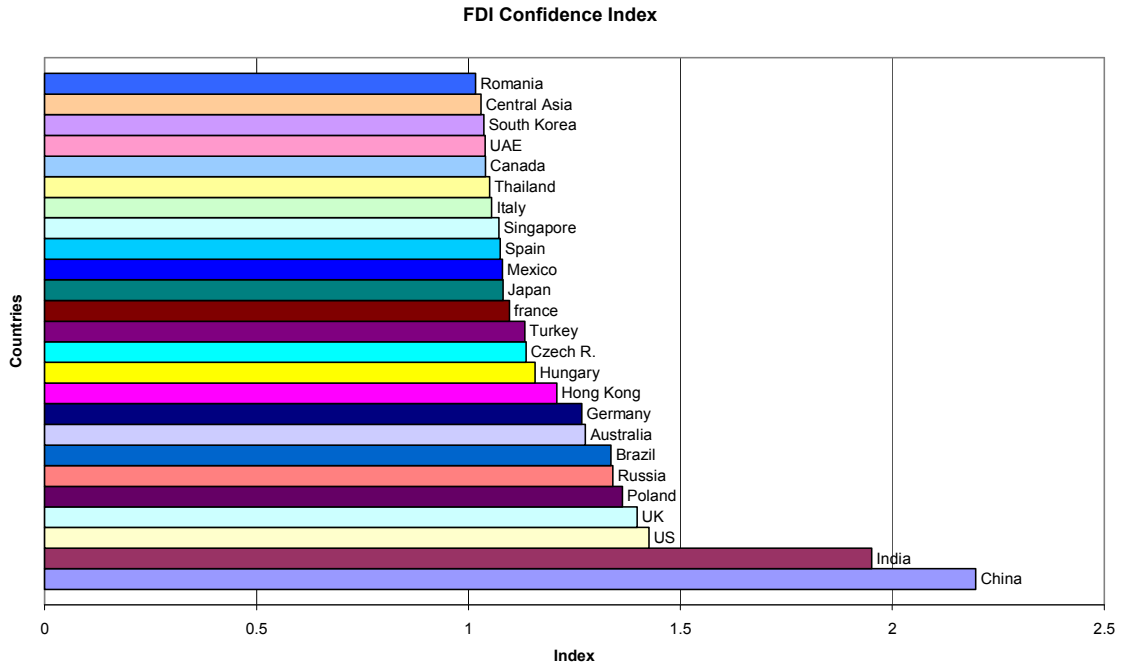
Source: World Development Indicators, 2006

Table 1.5: Expenditure per student

	1999	2000	2001	2002	2003
Expenditure per student, secondary (% of GDP per capita)	21.59268	23.27052	20.95077	..	17.36212
Expenditure per student, tertiary (% of GDP per capita)	75.69252	86.71964	..	..	59.21928

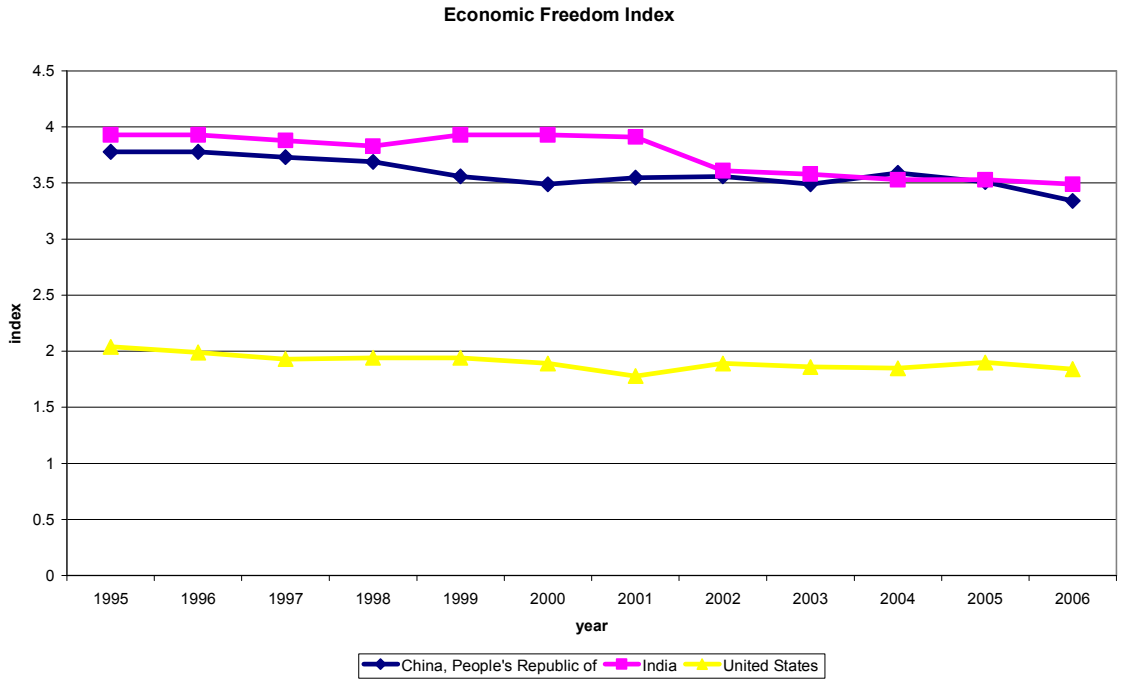
Source: World Development Indicators, 2006

Figure 1.8: FDI confidence Index



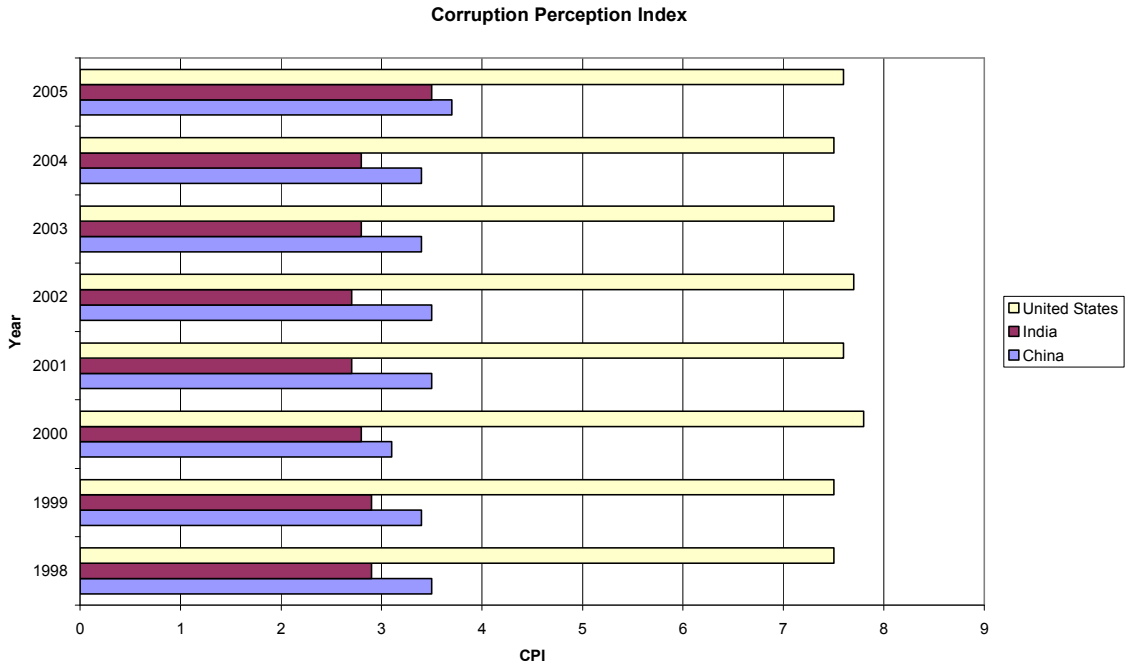
Source: AT Kearney

Figure 1.9: Economic Freedom Index



Source: The Heritage Foundation, 2006

Figure 1.10: Corruption Perception Index



Source: Transparency International, 2006

Figure 1.11: Number of procedures in order to start a business

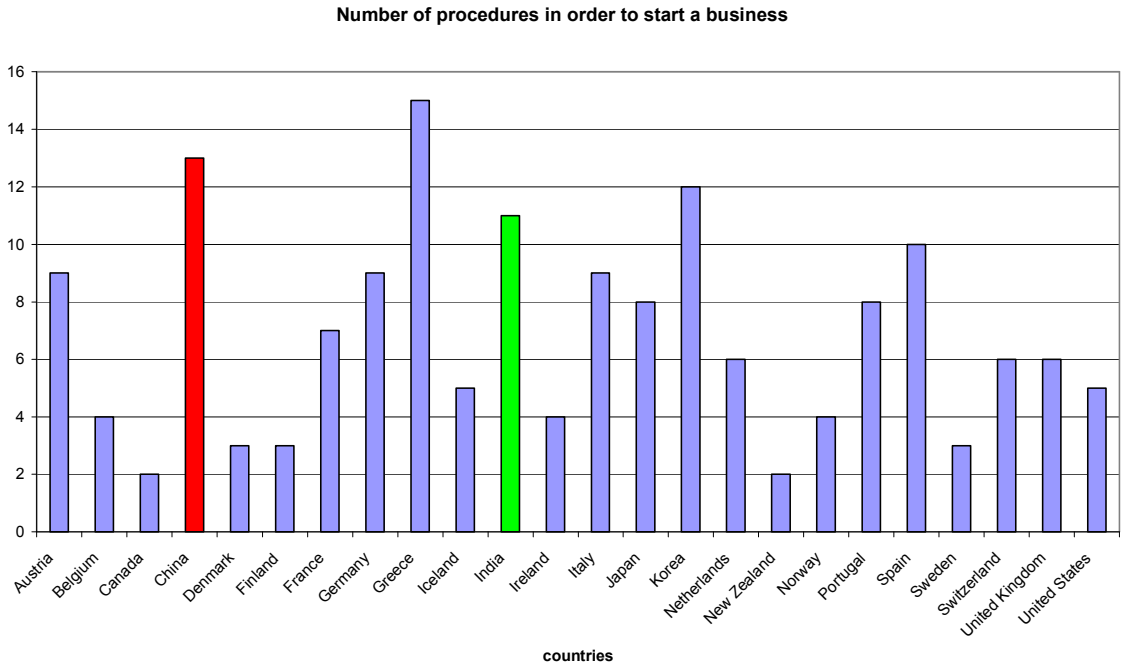


Figure 1.12: Cost of starting a business

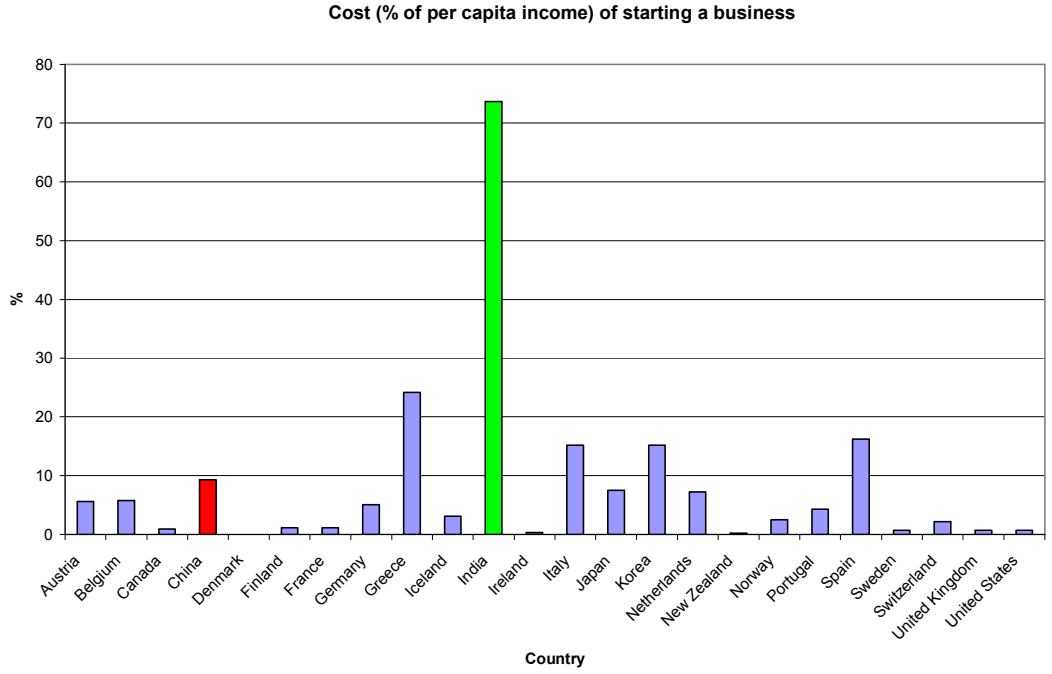


Figure 1.13: Time spent in order to start a business

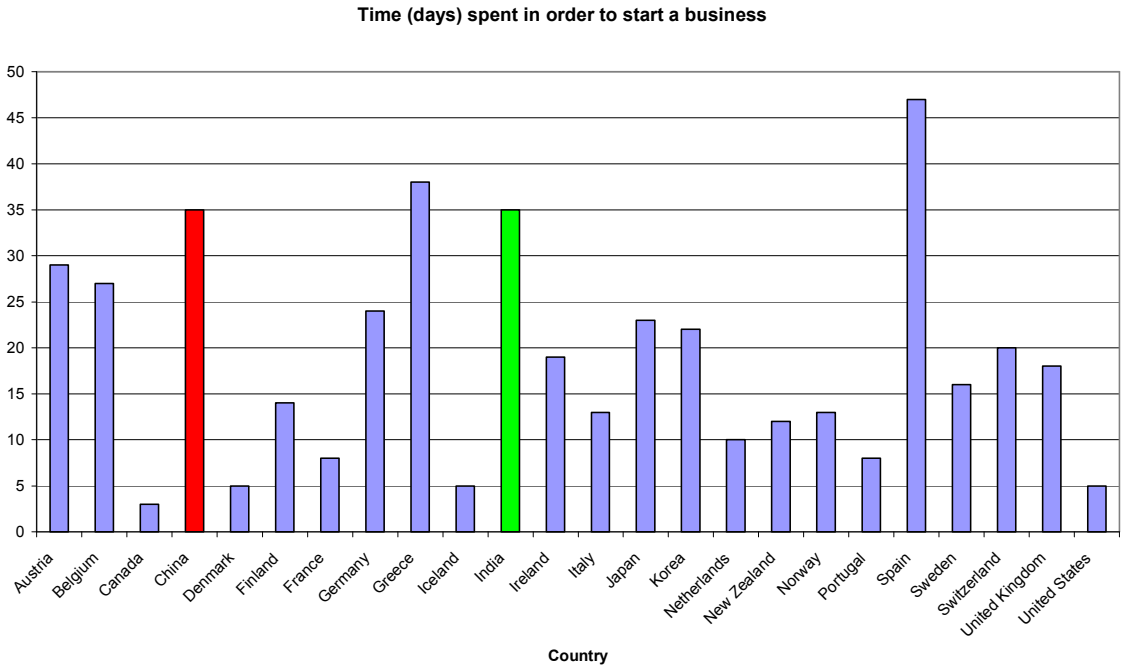


Figure 1.14: Number of days to get a licence

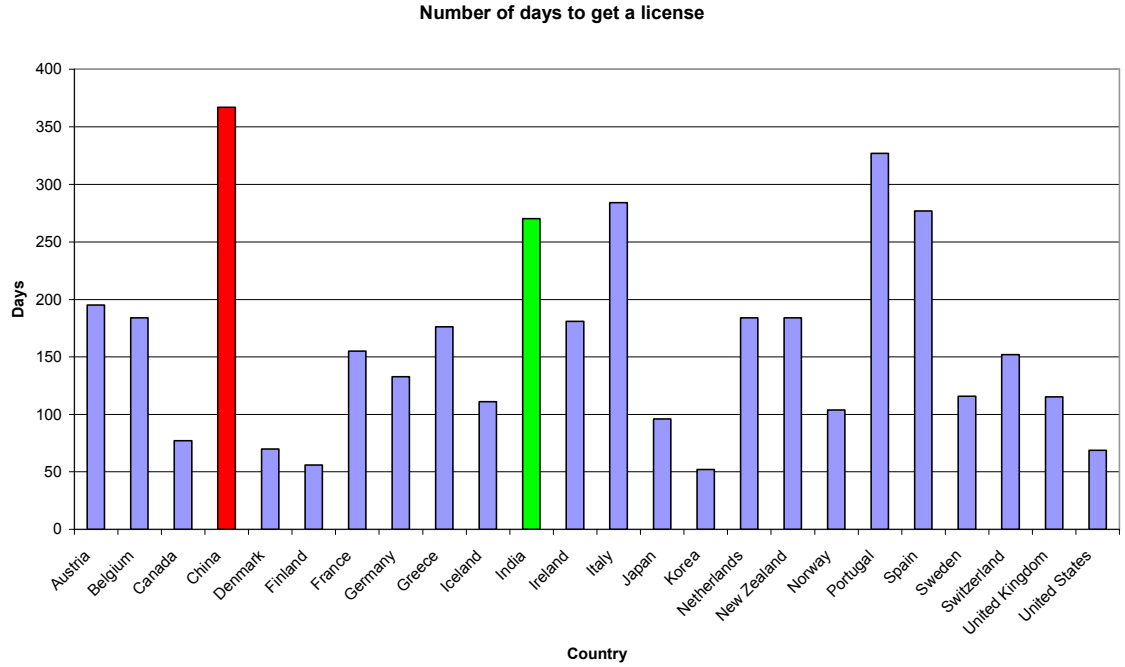


Figure 1.15: Difficulty of Hiring index

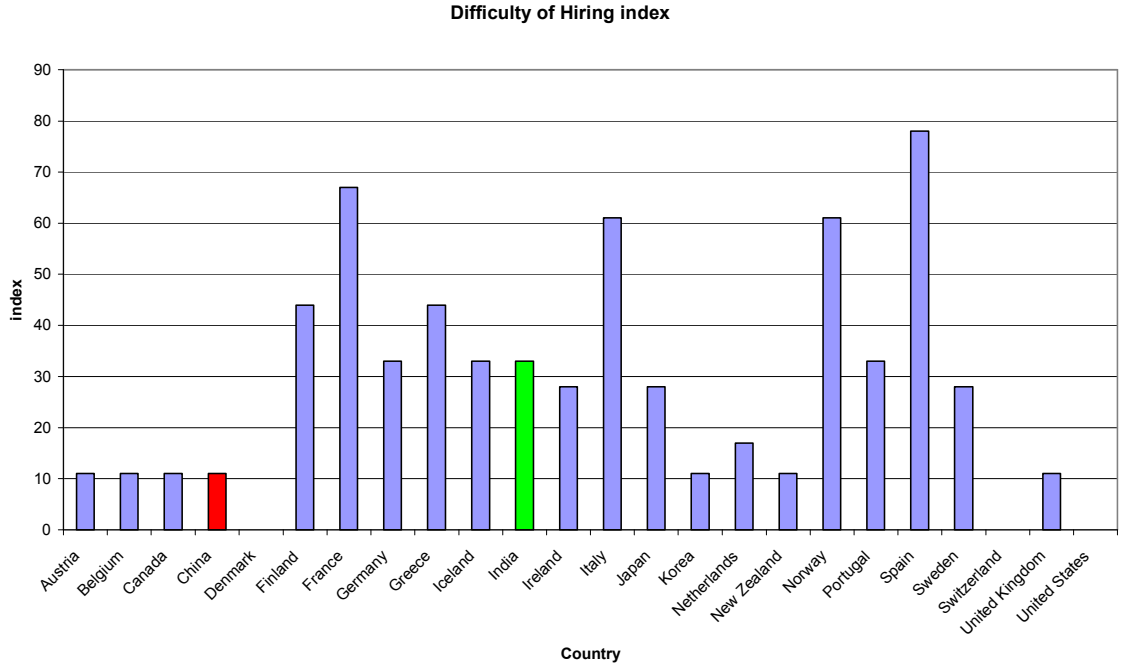


Figure 1.16: Difficulty of firing index

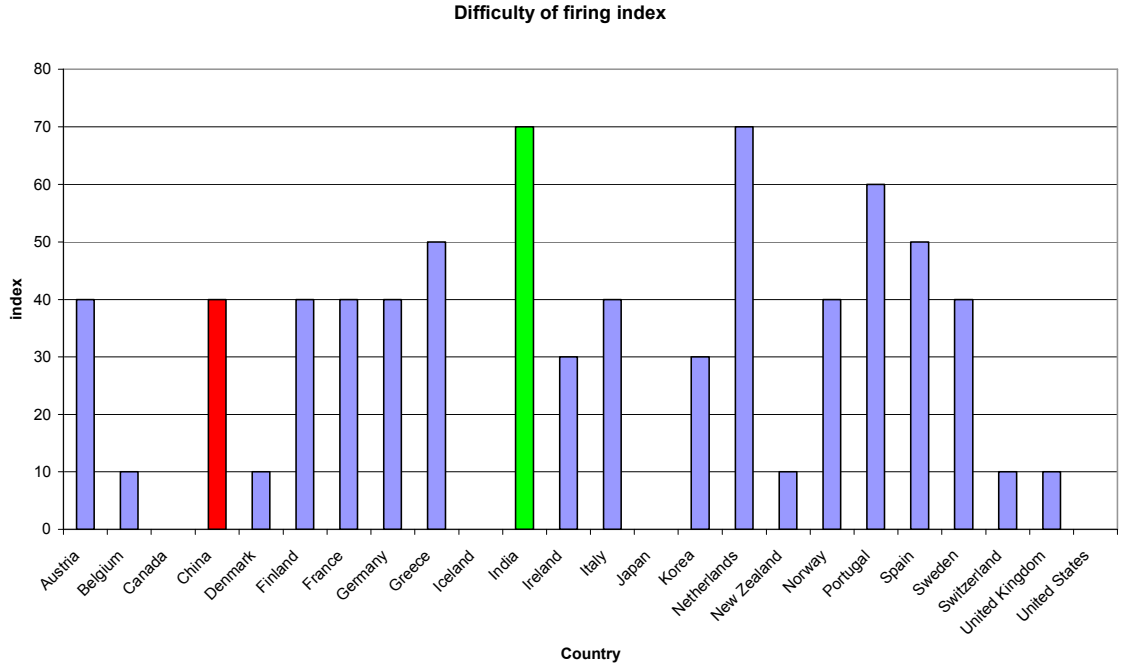


Figure 1.17: Rigidity of employment index

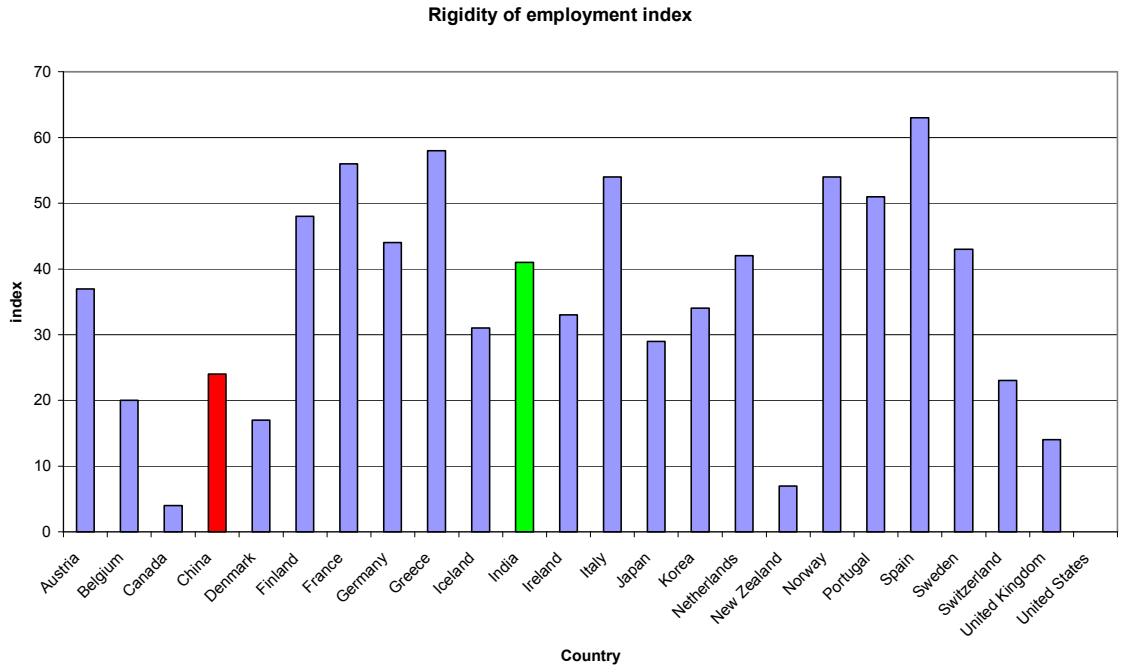


Figure 1.18: Tax Payments

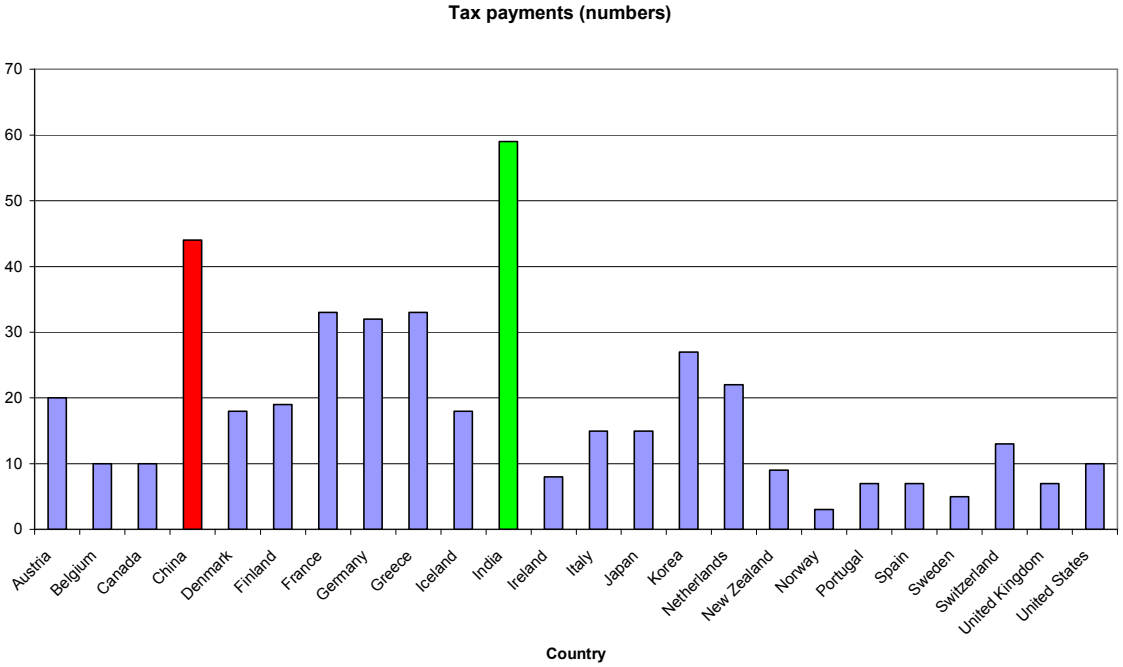


Figure 1.19: Total payment of taxes

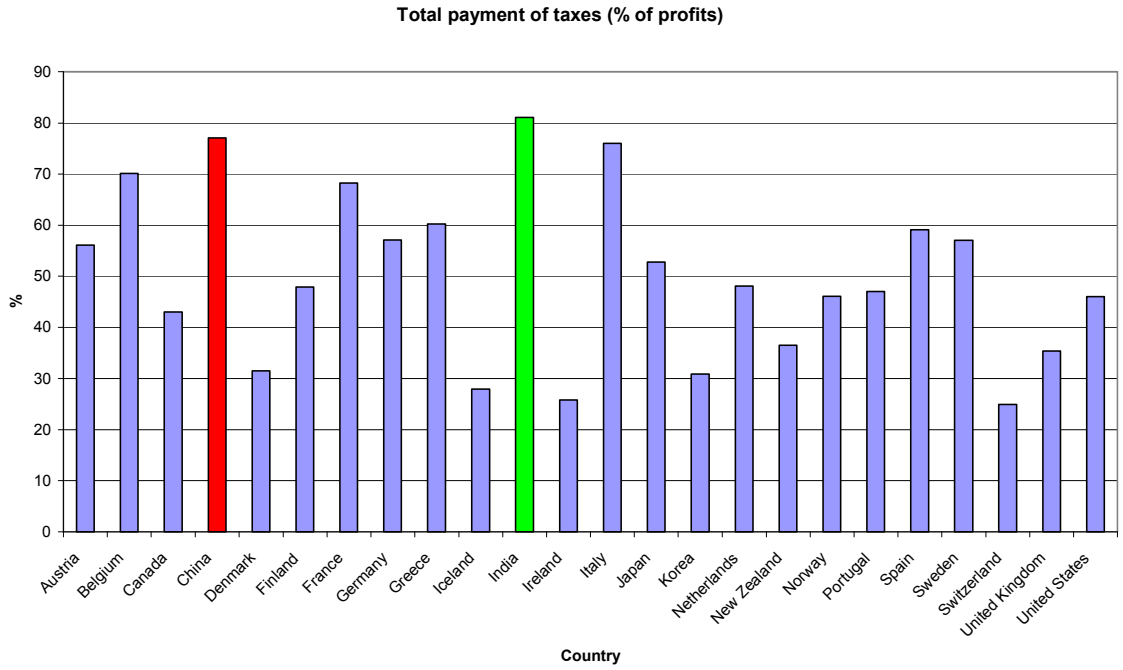


Table 1.6: Trading Across Borders

Country	Year	Rank	Documents for export (number)	Time for export (days)	Cost to export (US$ per container)	Documents for import (number)	Time for import (days)	Cost to import (US$ per container)
Finland	2006	2	4	7	420	3	7	420
Denmark	2006	3	3	5	540	3	5	540
Norway	2006	5	4	7	518	4	7	468
Germany	2006	7	4	6	731	4	6	750
Canada	2006	8	3	7	700	4	10	850
Sweden	2006	9	4	6	831	3	6	831
United States	2006	11	6	9	625	5	9	625
New Zealand	2006	12	5	8	355	9	13	555
United Kingdom	2006	14	5	12	676	4	12	756
Austria	2006	15	4	8	803	5	9	843
Netherlands	2006	16	5	7	875	4	8	950
Iceland	2006	18	7	15	469	6	15	443
Japan	2006	19	5	11	789	7	11	847
Spain	2006	25	4	9	1,050	5	10	1,050
France	2006	26	4	15	886	5	15	886
Portugal	2006	27	4	14	495	9	17	994
Korea	2006	28	5	12	780	8	12	1,040
Ireland	2006	30	5	7	1,146	4	14	1,139
Belgium	2006	36	5	7	1,350	6	9	1,300
China	2006	38	6	18	335	12	22	375
Switzerland	2006	49	4	17	1,238	5	18	1,333
Italy	2006	110	8	15	1,253	16	21	1,291
Greece	2006	123	7	29	1,328	11	34	1,443
India	2006	139	10	27	864	15	41	1,244

Source: “Doing Business”, World Bank 2006.

Figure 1.20: FDI outward stocks 1980-2004

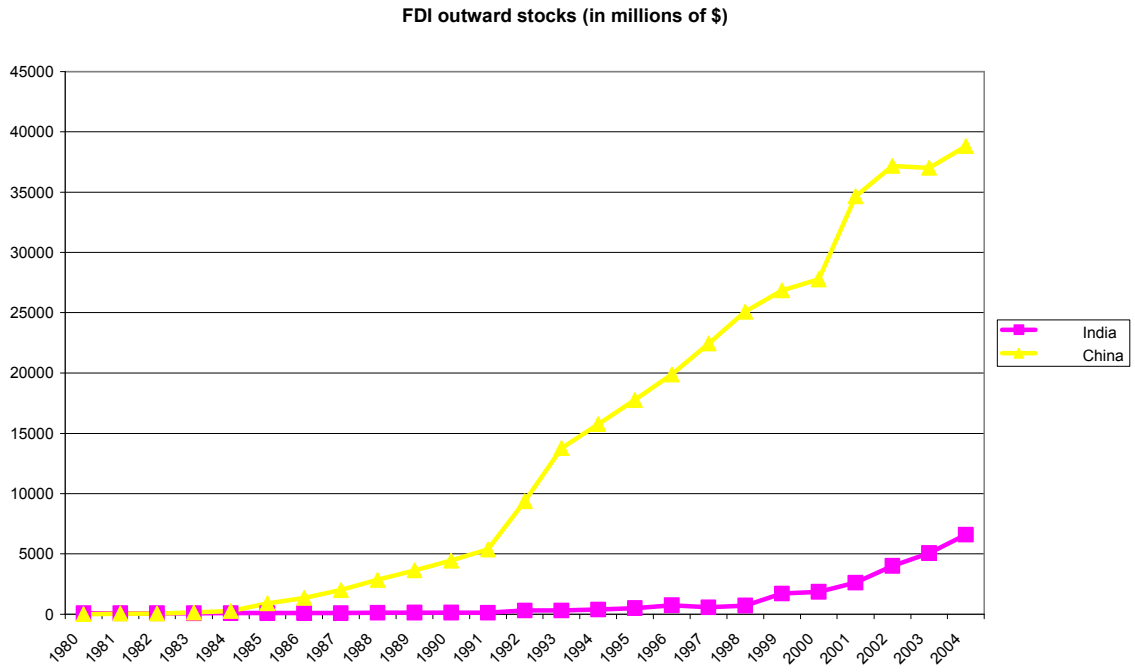


Table 1.7: Outward FDI Performance Index

	1990	1995	2000	2001	2002	2003	2004
India	80	87	94	67	63	62	54
China	36	41	63	57	53	59	72

2. Gravity modelling of bilateral FDI flows

2.1. Introduction

In the last 25 years there has been a proliferation and extension of Regional Trade Agreements (RTAs). This includes the recent enlargement of the EU, discussions in North America, concerning the possible implementation of a Free Trade Area of the Americas, as well as numerous North-South and South-South preferential trading arrangements. This diffusion of RTAs has seen the involvement of s an increasing number of developing countries.

The implications of this new wave of regional initiatives has resulted in an increasing focus on both what is driving these processes, and of the welfare implications, with a number of attempts being made to model and quantify the possible consequence for the country members and the world as a whole. Although economic theory suggests that the net welfare impact in terms of the shallow integration effects is likely to be ambiguous (arising from the balance between trade creation and trade diversion), there is also an increasingly widespread view which suggests that RTAs lead to the exploitation of comparative advantage with partner countries, increased competition and therefore efficiency gains, economies of scale that follow the creation of a bigger market with no (or lower) barriers to trade, as well as numerous possible externalities. Much of the preceding occurs direct and indirectly as a result of increased trade flows, and increased FDI flows.

In this section of the report the objective is to formally assess the impact of the reduction/elimination of tariff and non-tariff barriers between RTA members, and the imposition of a common external tariff on intraregional bilateral FDI flows. We also try to investigate the underlying relationship between FDI flows and bilateral trade in two directions: imports from the source country to the host and exports from the host to the source country. Here, the aim is to evaluate the consistency of the "classical" theories on FDI and trade which consider them either complements or substitutes. In the first case vertical FDI seek to exploit international differential in price factors: the FDI is located in the unskilled labour-abundant host and serves the parent market via foreign affiliate exports (Helpman and Krugman, 1985). In the second case horizontal FDI are located abroad in order to save on trade costs by serving the overseas market locally (Markusen and Venables, 2000).

We carry out this analysis with a commonly used instrument for the empirical investigation of bilateral trade determinants, the *gravity model*. This choice is the consequence of the important relationship existing between these two dynamic phenomena, trade and FDI, and of their parallel evolution in recent years. After describing the model and trying to assess some issues that arise from it, we provide the results of our empirical analysis and the economic intuitions behind these results.

2.2. The target model

The classical gravity equation constitutes a device commonly used to estimate the effects of many different phenomena in international trade. Timbergen (1962) and Poyhonen (1963) developed its first applications in international economics.

In its most elementary version, the equation establishes that the volume of trade flows between two countries depends positively on their economic dimensions, measured by the level of their GDP and population, and negatively by the transport costs captured by the absolute distance between their biggest economic centres.

The name of the model derives from the analogy with Isaac Newton's theory on the gravitational attraction of two masses according to which the bigger the sizes of the masses and the smaller the distance, the greater will be the attraction. Linnemann (1966) added population as a further element of the dimension of the country, specifying his model as the following:

$$\ln(X_{ij}) = \alpha + \beta_1 \ln(Y_i) + \beta_2 \ln(Y_j) + \beta_3 \ln(P_i) + \beta_4 \ln(P_j) + \beta_5 \ln(Dist_{ij}) + \varepsilon_{ij}$$

where X_{ij} is the value in dollars of the aggregate trade flows from country i to country j; Y_i and Y_j are the GDP of these countries; P_i and P_j are their populations and $Dist_{ij}$ is the absolute distance in kilometres between them; ε_{ij} is the error with distribution $N(0,\sigma^2)$ according to our parametric assumption.

In subsequent versions of the model dummy variables are introduced with the aim to capture the effects of either geographical or institutional factors, which increase or shrink the distance between two countries. The result is an augmented gravity equation which includes three types of determinants of bilateral trade flows: characteristics of supply in the exporter country, characteristics of demand in the importer country and elements which favour or obstruct the specific trade flows (common border, common language, past colonial links and geographical characteristics).

The most common way of including the effects of regional integration into the extended gravity equation is to include dummy variables for the RTAs in force during the sample period. Each dummy takes the value of one if the bilateral trade in the dependent variable is between two countries, which are in the same RTA, zero otherwise. With this specification of the model, the effects of preferential trade policies are defined as deviations from the volume of trade predicted by the baseline extended gravity equation.

Multiple theoretical approximations exist in order to justify the gravity equation. Anderson (1979) proposed a theoretical foundation based on the Armington hypothesis: that is consumers differentiate the products on the basis of their origin. In its more complete versions this model includes non-tradable goods, tariffs and transportation costs. The preferences about tradable goods are represented by a CES utility function with constant elasticity of substitution and non-homothetic preferences between tradable and non-tradable goods. Bergstrand (1985) developed a general equilibrium model of world trade with products differentiated on the basis of their country origin. The

preferences of the consumers are described with a CES utility function, with the possibility that the elasticity of substitution between imported goods differs from that existing between imported and domestic goods. In the supply side there is only one production factor, which is not internationally mobile and whose allocation between different markets depends on the production function with constant transformation elasticity, such that the transformation elasticity between the domestic and foreign production is different from that defined between distinct foreign productions. The traditional gravity equation is achieved after assuming that each market in question is small compared to the rest of the world and technologies and preferences are the same in the rest of the world. These conditions give the "generalized gravity equation" i.e. a gravity equation without restrictions on the parameters.

Bergstrand (1989) developed another general equilibrium model which he called "H-O-Chamberlin-Linder" and used it to derive a new version of the generalized gravity equation. The economies have two sectors in a context of monopolistic competition and there are two production factors, labour and capital, whose relative endowments differ across countries. This theoretical structure is a conjunction point between the Hecksher-Olin (H-O) model, which implies a context of perfect competition, and the models with one sector based on monopolistic competition. The aim of this work was showing that the gravity equation could be either compatible with the inter-industry trade described by the H-O model and the intra-industry trade described instead in the Helpman-Krugman model.

Bergstrand also provided an alternative interpretation of the explanatory variables: the GDP of the exporter country can be seen as an approximation of the product in terms of unities of capital whereas its per-capita GDP is an approximation of the capital/labour ratio; on the other hand, GDP and GDP per capita of the importer country can be seen as its expenditure capability and non-homothetic preferences. Anderson and Wincoop (2003) show theoretically that the gravity equation should include an implicit price index, given by the level of prices in both countries and the trade costs, that they call it "multilateral trade resistance"[4]: this term reflects the openness of the importer country to all goods and the openness of the world to the exporter country's goods. Indeed, Deardorff (1998) argues that the gravity equation does not prove the validity of one theory or another, but it just confirms a 'fact of life'

We generalize the gravity equation in order to explain with this economic device bilateral FDI flows and stocks existing between countries. FDI outflows (or outward stocks) and inflows (or inward stocks) are treated as exports and imports in the original version of the model and explained by geographical and institutional distance and economic size of the country partners: bilateral FDI flows are positively determined by the economic size of the partners and negatively by the distance (geographical, cultural and institutional) which separates them. This generalization of the gravity equation, already used in some recent application (see Brenton et al.1999, Eaton and Tamura 1997, Bevan and Estrin,

[4] Other authors call the same term "*remoteness"*.

2000) derives from a small part of the theoretical literature on international trade based on general equilibrium models (see Markusen and Venables 1995,1996). In these models multinational activity is endogenous and driven by the trade off between costs of establishing a new plant abroad in order to supply the domestic market and costs of exporting in that market. Trade and FDI are therefore substitute in this theoretical context and the choice made by the firms is a function of the specific characteristics of the two countries that can be captured by their economic size and relative costs of transaction (such as transport costs or costs determined by institutional differences).

Our further aim is to control for the impact of RTAs in force. In particular our interest focuses on the impact of North-South RTAs on FDI bilateral flows. We consider the intrinsic difference between symmetric and asymmetric North-South RTAs: the former are agreements in which the formal entry in force corresponds to a reciprocal implementation of the arrangements; in the latter there is a non reciprocal implementation as less developed countries tend to delay opening up to their developed country partners. We pursue this analysis by introducing four dummy variables in the augmented gravity equation, each representing a different category:

- the South-South RTA dummy takes value one if the two countries are both developing and in the same preferential agreement, zero otherwise;
- the symmetric North-South RTA dummy takes value one if one country partner is developed, the other is developing and both countries are in the same agreement characterised by a perfectly reciprocal implementation, zero otherwise;
- the asymmetric North-South RTA dummy takes value one if one country partner is developed, the other is developing and both countries are in the same agreement characterised by a less than reciprocal implementation, zero otherwise;
- finally, North-North RTA dummy takes value one if the two countries are both developed and in the same preferential agreement, zero otherwise.

For the purposes of this study we are particularly interested in the coefficient on the symmetric North-South variable, as this corresponds most closely to the case of an EU-India FTA – should one be signed. However, it is important to stress, at the outset, that one has to be extremely careful in the conclusions that can be drawn from this coefficient for any given RTA. The sign and size of the coefficient will inevitably be strongly determined by the countries, which are included in the relevant bilateral pairings. In our sample the North-South symmetric pairings are heavily dominated by the former Central and Eastern European Countries who were signing and implementing Association Agreements with the EU. In addition to these we have several other countries which include Turkey, Tunisia, Israel and South Africa. Clearly it is possible that FDI flows towards the CEECs may have also been influenced by other factors such the likelihood of future accession to the EU. We have therefore, divided the North-South symmetric dummy into two parts. This enables us to isolate the impact of trade agreements between

EU/EFTA and Central and Eastern European (CEE) countries, as we expect FDI to these countries to have been affected more over time.

The specification of the gravity model is the following:

$$\ln X_{ijt} = \alpha + \beta_1 \ln pop_{it} + \beta_2 \ln pop_{jt} + \beta_3 \ln Y_{it} + \beta_4 \ln Y_{jt} + \beta_5 \ln dist_{ij} + \beta_6 bord_{ij} +$$
$$+ \beta_7 comlang_{ij} + \beta_8 island_{ij} + \beta_9 \ln imports_{ij} + \beta_{10} \ln \exp orts_{ij} + \sum_n \beta_n RTA_{ijt}^n + \sum_t \beta_t year^t + \varepsilon_{ijt}$$

where i is the country that receives the foreign investment, j is the investing country, t denotes time and the variables are defined as:

- X_{ijt} is the value of deflated FDI inflows to i from j (or inward deflated stocks existing between j and i) and outflows from j to i at time t[5] (or outward deflated stocks existing between j and i) ;
- Y is the real GDP at time t;
- *pop* is population at time t;
- *imports* is the value of bilateral imports from i to j at time t;
- *exports* is the value of bilateral exports from i to j at time t,
- *dist* is the distance between i and j;
- *lang* is a dummy taking the value of one when i and j have a common language, zero otherwise;
- *bord* is a dummy taking the value of one if i and j share a border;
- *island* is the number of island nations in the pair (0, 1 or 2)[6];
- $\sum_n RTA_{ijt}^n$ is the set of 5 dummy variables as above specified. Each of those dummies, takes the value of one if i and j are both in the kind of regional trading bloc that the dummy identifies, zero otherwise,
- $\sum_t year^t$ is a set of 10 dummy variables which captures time specific effects,
- ε_{ijt} is the error, normally distributed and with zero mean.

2.3. Data

The nominal FDI data for the regressand comes from the OECD International Investment statistics on-line dataset. The dataset covers eleven years of observations (with many gaps) of bilateral FDI flows and stocks between OECD countries and their international

[5] Country i in the case of inflows and country j in the case of outflows is always an OECD country.
[6] We suppose that the impact of this geographical condition on FDI flows has the same size for both parent and host country and is additive.

partners. The annually reported values are in US dollars and this should approximate a correction for the differential in exchange rates across countries. We have then deflated these values by using the US GDP deflator provided by World Bank's Global Development Finance database whose base year (GDP deflator=100) is 2000. We have done so in order to obtain real figures. The trade data comes from the "Direction of Trade" data set developed by the International Monetary Fund (IMF) It covers bilateral merchandise trade between over 180 IMF trading entities between 1948 and 2004 (with gaps): this data as well are annually reported in US dollars and have been deflated with the same US GDP deflator as the FDI bilateral flows. Bilateral trade on FOB exports and CIF imports is recorded in US dollars. Population and real GDP data have been obtained from a standard source: the World Bank's *World Development Indicators*. Considering the missing values in any of these series, we come up with 15,401 and 16,877 observations respectively in the estimation of the gravity model for bilateral FDI flows and stocks.

We used CIA's *World Factbook* for the country-specific variables: island status, physically contiguous neighbours and language. Absolute distance data refers to the distance between the capitals of each pair of countries is expressed in miles and comes from the website http://www.mapcrow.info. The list of RTAs entered into force before December 2004 has been derived from the WTO web site (www.wto.org). Information on international investment agreements signed before 2004 comes from the UNCTAD web site, which provides date of entry into force of Bilateral Investment Treaties for 177 economies.

2.4. Econometric issues: modelling bilateral FDI flows by correcting for sample selection in a panel data framework

In the specification of the gravity model we followed the empirical strategy of controlling for as many natural and institutional causes as possible, and then looking for the effects of the RTAs through the appropriate use of dummies. However, after specifying the model and the empirical strategy, we faced a problem concerning the actual estimation of the model. As Cheng and Wall (2004) point out, the perceived success of the gravity model has always been stated on the basis of goodness of fit, the R^2, which is usually high, without any further analysis regarding its econometric properties.

Most studies using the gravity equation implement the estimation with ordinary least squares (OLS) either on cross-sectional or pooled cross-sectional data. However, some analysts have recently recognized a bias in this estimation technique of the gravity equation, by basing their assessment on its theoretical derivation (Cheng and Wall, 2004). The theory behind the model, in fact, seems to have shed light on specific factors (also said *unobserved heterogeneity*), which characterize bilateral relationships and are omitted in the standard augmented gravity equation. These factors can be captured by fixed effects estimators[7]. Therefore this suggests that the right way to carry out our analysis would be a panel estimation of the gravity equation in which country-pair effects differ

[7] See Anderson and Wincoop (2003), Glick and Rose (2001) and Mátyás (1997).

along with the direction of FDI. This model is the least unrestricted possible because it allows the unobserved heterogeneity effect to vary across country pairs and direction of FDI. After this we check for robustness of our model with an F-test comparing our estimates with pooled OLS estimates.

However this generalization of the gravity equation, which aims to explain FDI bilateral flows and stocks instead of trade, gives rise to some important econometric issues, as discussed in the following section.

The aim of this gravity modelling exercise is to find the determinants of bilateral FDI flows and quantify the impact of such determinants on the size of the investments. The theoretical derivation of the gravity model has an exponential functional form and therefore has to be estimated in a log-log form (that is, the monotonic variables in both sides of the equation have logarithmic form). What makes this empirical exercise different in the context of bilateral FDI flows (and stocks) is the actual range of values taken by these financial elements which does not always allow the logarithmic transformation. FDI flows (and stocks) can in fact be negative as consequence of dis-investments. They also can be zero if the domestic investors do not want to invest in the country partner. Both these cases do not allow the logarithmic transformation but also they are not of central interest for our study.

The decisions to investing, not invest or dis-invest is likely to be the result of specific choices which firms make and where the driving forces of those decisions may well differ. Simply focussing on the positive flows therefore may yield incorrect coefficients unless we control for the selection process which drives firms to invest, non invest or disinvest. More formally these are likely to be the outcome of a selection mechanism which should be explained by a separate equation although still part of the same model, and therefore far from being random. Studying the determinants of international bilateral investment by using a gravity model would imply a focus only on positive values without taking into account the selection mechanism of the outcomes. A problem of sample selection bias arises if some component of the investment decision is relevant to the investment determining process but it is not taken into consideration in the regression analysis: controlling for the observable characteristics when explaining investments with the gravity equation is insufficient as some additional process is influencing the level of investment, namely, the process determining whether a country invests in its partner, not invest at all or dis-invest.

If these unobservable characteristics are correlated with the observables then the failure to include an estimate of the unobservables will lead to incorrect inference regarding the impact of the observables on investment (Vella, 1999). The probable non-randomness of the sub-sample chosen (that is, in this case, only positive values of bilateral FDI flows) if ignored in the context of an econometric estimation, can create problems of misspecification and therefore inconsistent estimates. The underlying idea is that important information, derived from the selection process, would be excluded by running a regression only on positive values (that is proper investments). Following the

Heckman's approach (1979) in fact, it is possible to demonstrate that the conditional mean we are interested in obtaining with our application is actually:

$E[\ln X|Z, X>0] = Z'\beta + \sigma\lambda(X'\beta)$ instead of $E[\ln X|Z, X>0] = Z'\beta$, that is what we would get by carrying out a least square regression analysis (where lnX is the natural logarithm of bilateral FDI flows, Z is the set of our exogenous regressors and $\lambda(X'\beta/\sigma)$ is the term which corrects for the presence of unobservables which affect both the investment decision and the level of investments and is called the inverse Mills ratio in the theoretical literature). As explained by Heckman, estimating the model without the correction term would mean to omit a regressor and commit a misspecification error which generates inconsistent estimates of our parameters of interest.

It is then necessary to test for the presence of selection using a Heckman two-step procedure. This procedure augments the regression of the variable of interest on its exogenous regressors by an estimate of the omitted term. This estimate is obtained by a first-step probit regression, which represent the selection equation and gives the probability of positive outcome (that is participation) happening. In order to identify the parameter of interest in the second stage, the first-step probit equation should contain at least one instrument that is one variable, which does not then appear in the model of interest[8]. This two-stage estimation is complicated by the longitudinal dimension of the available data. This implies that for each country we have repeated annual observations of FDI inflows and outflows from and towards their country partners. This form of the data, if exploited with a panel estimation in the second stage, allows us to take into account the presence of unobserved individual heterogeneity, if additive and time invariant, that may or may not be correlated with the regressors. In the former case such unobserved heterogeneity leads to omitted variable bias if neglected.

Therefore in order to test for the presence of sample selection the longitudinal dimension of the data has to be considered in the second stage and this leads to the test proposed by Wooldridge (1995). This is explained in more detail in the Appendix to this part of the report. It turned out that the results of the test reject the hypothesis of selection in the data. Therefore we can carry out the analysis of the impact of RTA on bilateral FDI flows by exploiting the data with a panel estimation without correcting for selection.

The first column of Tables 2.1 and 2.2 shows the estimates obtained with least square dummy variable estimation of the panel: this fixed effect estimator is obtained by estimating the OLS regression of natural logarithm of bilateral FDI flows and stocks on our set of variables and a set of N indicator variables $d_{1,it},\ldots d_{N,jt}$, one for each individual in the sample. Each indicator variable takes values of one if the observation refers to the

[8]However, Heckman described a model in which the possible outcomes in the selection are only two (participation or non-participation). Therefore we need to extend his procedure to a more general case in which the outcomes can be more than two. In our application the outcomes are three, as already noted: investment, non-investment and dis-investment. This leads to a first stage that implies the estimation of a multinomial logit (instead of a probit) to model the decision mechanism which produces three outcomes (investing, not investing or disinvesting) and the second stage models the investments with a gravity equation which includes a correction term for the selection. This two- stage estimation is complicated by the longitudinal dimension of the available data.

individual represented by it, zero otherwise. As already said, the individuals in our sample are asymmetric country pairs (the same country pair is considered different according to the direction of the investment). In Table 2.1 we report the results with respect to FDI flow, and in Table 2.2 we report the results with respect to FDI stocks. The regressions include also specific time effects to control for the specificity of each period in the sample, but the estimates of their coefficients are here omitted.

Table 2.1 Fixed effect estimation for asymmetric country pairs

Variable	FDI flows[9]	fixed effects
RTA_NN	0.103	
	(0.091)	
RTA_NS asymmetric	-0.128	
	(0.188)	
RTA_NN symmetric: CEE	0.281	
	(0.095)**	
RTA_NN symmetric: Other	0.240	
	(0.136)+	
RTA_SS	-0.805	
	(0.441)+	
lpopin	-3.182	
	(0.493)**	
lpopout	-0.893	
	(0.565)	
ltradeindefl	0.118	
	(0.046)*	
ltradeoutdefl	0.051	
	(0.041)	
lgdpout	1.606	
	(0.274)**	
lgdpin	1.021	
	(0.250)**	
island	0.000	-1.512
	(0.000)	(0.096)**
border	0.000	2.301
	(0.000)	(0.128)**
comlang	0.000	1.001
	(0.000)	(0.097)**
ldist	0.000	0.875
	(0.000)	(0.038)**
Constant	12.740	-6.697
	(14.291)	(0.287)**
Observations	15401	15401
Number of pairid	3307	
R-squared	0.08	0.05

Robust standard errors in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%

Source: Own Calculations

[9] The robustness of the model is tested against the alternatives of pooled OLS and random effects estimation. The values of these tests are respectively:
- F(3306, 12073) = 7.69 Prob > F = 0.0000;
- chi2(20) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 144.28 Prob>chi2 = 0.0000

Table 2.2 Fixed effect estimation for asymmetric country pairs - Stocks

	Deflated FDI stocks[10]	Fixed effects
RTA_NN	-0.041	
	(0.046)	
RTA_NSa	0.493	
	(0.251)*	
CEE	0.369	
	(0.063)**	
Other symmetric North-South RTA	0.167	
	(0.098)+	
RTA_SS	-0.199	
	(0.392)	
lpopin	-2.331	
	(0.297)**	
lpopout	-3.861	
	(0.446)**	
ltradeindefl	0.068	
	(0.022)**	
ltradeoutdefl	0.046	
	(0.021)*	
lgdpout	1.174	
	(0.184)**	
lgdpin	0.500	
	(0.123)**	
island	0.000	-3.450
	(0.000)	(0.142)**
border	0.000	4.482
	(0.000)	(0.182)**
ldist	0.000	2.358
	(0.000)	(0.051)**
comlang		1.069
		(0.122)**
Constant	63.065	-18.022
	(9.387)**	(0.389)**
Observations	16877	16877
Number of pairid	3033	
R-squared	0.22	0.14

Robust standard errors in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%

Source: Own calculations

[10] The robustness of the model is tested against the alternatives of pooled OLS and random effects estimation. The values of these tests are respectively:
- F(3032, 13823) = 45.90 Prob > F = 0.0000;
- chi2(21) = (b-B)'[(V_b-V_B)^(-1)](b-B)= 290.3 Prob>chi2 = 0.0000

The coefficients in the first column represent the elasticities[11] of FDI flows and stocks to source country and host country's GDPs and populations and to the level of trade. The signs of these coefficients for the standard variables are coherent with other studies, which employed the gravity equation for trade. This can be explained by the fact that in the last years the evolution of FDI seems to have shared a similar pattern with the evolution of trade[12]. Both increased between richer countries and relatively more than their income. As we would expect international investments tend to be sourced by richer countries and attracted by larger domestic markets, whereas populous countries are expected to be self-sufficient, the same as for trade. The coefficients confirm this: 1.606 and 1.021 are respectively the elasticities of FDI flows to source and host country's GDP while 1.174 and 0.5 is those of FDI stocks; the elasticity for either FDI flows and stocks to source and host country's populations is always negative (-0.893 and -3.182 for the former and -2.33 and 3.861 for the latter).

The elasticities of FDI (again either for flows and stocks) to the flows of trade towards the host country are less than unitary but positive: FDI increases less than proportionally along with the level towards the host country. This is interesting since it seems to show that countries do not substitute exports to the partner's market by localizing the production in that country ("horizontal" FDI). Instead trade and FDI appear to be complementary from this analysis. The coefficient for trade flows from the host country to the source is not significant in the panel regression for flows of investment but is positive (even if small) and significant in the regression for stocks: this may be a sign of the presence of "vertical" FDI, located abroad to seek the international differential in factor prices but designed to supply the parent's market. The coefficients for the RTA dummy variables have to be interpreted as deviations from the prediction of the baseline gravity model (that is the deviation from all observations not represented by them) and they imply a percentage variation given, on average and *ceteris paribus*, by [exp(coefficient)-1]*100. The size of these deviations in terms of percentage variations is listed below, in Table 2.3.

Table 2.3: Summary impact of RTA formation on FDI flows

Coefficient for:	Percentage increase in FDI bilateral flows if compared with the baseline model:	Percentage increase in FDI bilateral stocks if compared with the baseline model:
North –North RTA	None	None
Asymmetric North-South RTA	None	+63%
CEE	+32%	+44%
Other symmetric North-South RTA	+27%	+18%
South-South RTA	-0.55%	-17%

[11] The elasticity is the ratio of the incremental percentage change in one variable with respect to an incremental percentage change in another variable

[12] Brenton et al, 1999

The coefficients for the North–North RTA dummies are not significantly different from zero in both regressions. Asymmetric North-South RTAs seems to have a high impact on FDI stocks: the coefficients indicate that the level of bilateral FDI between members in these blocs is 63% higher than predicted by their national incomes, populations, bilateral trade. The coefficient for the South–South RTA dummy is negative and therefore show that either FDI flows and stocks within members belonging to these trade blocs are lower than predicted by the basic gravity model. FDI flows and stocks existing between EU/EFTA and CEE countries engaged in trade agreements are higher than predicted by the baseline model, as already described by several studies. The most relevant result for our analysis is the coefficient for the dummy capturing other Symmetric North-North RTAs which shows that FDI flows have increased by 27% and stocks by 18% with the implementation of these trade agreements.

The absolute distance between countries and the variables capturing physical and institutional contiguity have been swept out by the fixed effect estimation because constant across country pairs and over time. The predicted country pair effects (obtained with the panel estimation) are then regressed on them to recover the effect of all these variables dropped in the original estimation. The coefficient associated with the categorical variable representing the geographic status of island for one of the countries or both is negative: this coefficient can stand for the impact of greater transaction costs associated with this status (costs which are even bigger if both countries are islands). Opposite explanation can be given for the positive coefficient associated with common borders dummy. The coefficient for the dummy language is positive which indicates that institutional contiguity has a positive effect on international investments: it should decrease transaction costs encouraging the decisions of international investments. The coefficient for distance is surprisingly positive: it may pick up the bigger amount of FDI from developed countries towards partners located in other areas of the world with lower labour costs but its interpretation remains ambiguous.

The same estimation procedure as before is used in order to obtain the estimates presented in Tables 2.4 and 2.5 but here the sample is split into two sub-samples following the direction of the investment: one for FDI inflows (and inward stocks) towards OECD countries and another for FDI outflows (and outward stocks) from them to their partners.

Table 2.4: Fixed effect estimation for asymmetric country pairs

	FDI inflows	FDI outflows
RTA_NN	0.135	0.023
	(0.135)	(0.124)
RTA_NSa	-0.030	-0.089
	(0.286)	(0.241)
CEE	0.254	0.253
	(0.180)	(0.111)*
Other symmetric North-South RTA	0.139	0.337
	(0.206)	(0.180)+
RTA_SS	-0.817	-1.580
	(0.478)+	(1.058)
lpopin	-2.217	-2.948
	(1.198)+	(0.560)**
lpopout	-1.379	-1.363
	(0.701)*	(1.082)
ltradeindefl	0.051	0.176
	(0.063)	(0.062)**
ltradeoutdefl	0.039	0.044
	(0.078)	(0.048)
lgdpout	0.659	3.675
	(0.328)*	(0.512)**
lgdpin	3.776	0.225
	(0.525)**	(0.262)
island	0.000	0.000
	(0.000)	(0.000)
border	0.000	0.000
	(0.000)	(0.000)
comlang	0.000	0.000
	(0.000)	(0.000)
ldist	0.000	0.000
	(0.000)	(0.000)
Constant	-43.137	-19.922
	(24.912)+	(21.321)
Observations	6656	8745
Number of pairid	1523	1784
R-squared	0.10	0.07

Robust standard errors in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%

Source: Own Calculations

Table 2.5: Fixed effect estimation for asymmetric country pairs

	Inward stocks	Outward stocks
RTA_NN	-0.016	-0.048
	(0.066)	(0.063)
RTA_NSa	0.878	0.414
	(0.497)+	(0.288)
CEE	0.069	0.613
	(0.091)	(0.081)**
Other symmetric North-South RTA	0.367	0.035
	(0.171)*	(0.115)
RTA_SS	0.058	-1.722
	(0.396)	(0.519)**
lpopin	-4.347	-2.581
	(0.843)**	(0.350)**
lpopout	-3.576	-2.143
	(0.561)**	(0.653)**
ltradeindefl	0.045	0.100
	(0.032)	(0.031)**
ltradeoutdefl	0.124	0.011
	(0.045)**	(0.023)
lgdpout	0.954	1.447
	(0.223)**	(0.330)**
lgdpin	0.641	0.513
	(0.417)	(0.127)**
island	0.000	0.000
	(0.000)	(0.000)
border	0.000	0.000
	(0.000)	(0.000)
ldist	0.000	0.000
	(0.000)	(0.000)
Constant	92.429	30.345
	(19.452)**	(12.389)*
Observations	7270	9607
Number of pairid	1344	1689
R-squared	0.18	0.28

Robust standard errors in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%

Source:Own Calculations

FDI outflows and outward stocks from western European countries to CEE countries have increased after the implementation of symmetric regional agreements. Considering that the dummy for other symmetric North-South RTAs contains mainly observations concerning agreements between European countries and Tunisia, Turkey, Israel and

South Africa, we can also infer from these subsets of regressions that, inwards stocks from developing partners towards western European countries increased by 44%, after the implementation of a symmetric regional agreement. This is interesting in the context of negotiations between India and EU, and considering the increase in outward international investments that the former has carried in recent years. According to the UN Investment Report, India is the 14th in the ranking of developing economies investing abroad and is becoming an important investor for the United Kingdom and France. The UK Department of Enterprise, Trade and Investment, during 2003-2004 India ranked seventh in terms of both jobs created from its investments in the United Kingdom and number of FDI projects. Investments there are largely in IT, but also in biotech, food and drink, and film production. In France, India was ranked thirteenth in terms of number of projects in 2003.

2.5. Projection of the results in the long term

The last available aggregate data on EU15 FDI outflows towards India is provided by Eurostat New Cronos database and it refers to 2004. According to this data, the outflows for that year were 1.076 billions of Euros. We can expect this level of FDI to have been stable or even increasing in the last two years as an effect of the effort made by the Indian government through several reforms to encourage foreign investment in the country. Employing on this data the results obtained with the previous estimation we would expect a symmetric FTA agreement signed between India and EU to increase the actual level of outward investment by 18%, that is by 193,68 millions of Euros. The latter instead, seems to determine a consistent deviation from a decision based only on this specific characteristics and this is even more essential if we consider that among the ten top investing countries in India there are four members of the European Community as shown in table 1.4. That is why the international effect of a trade agreement should be considered as an important component in phase of negotiations.

Table 2.6: Share of top investing countries in FDI inflows

RANK	Country	1991-2000	2000-01	2001-02	2002-03	2003-04	2004-05	Total inflows	% of total inflows
1	Mauritius	3,608	942	2,182	788	567	811	8,898	34,49
2	US	2,450	356	382	319	360	522	4,389	17.08
3	Japan	898	224	178	412	78	101	1,891	7.33
4	Netherlands	628	162	196	176	489	197	1,847	7.16
5	Uk	670	70	366	340	167	78	1,692	6.56
6	Germany	672	123	113	144	81	120	1,254	4.86
7	France	280	104	108	112	38	36	679	2.63
8	South Korea	572	21	1	39	24	25	682	2.64
9	Singapore	344	117	54	38	37	49	639	2.48
10	Switzerland	269	16	40	93	45	62	525	2.04

Source: Indian Ministry of Commerce and Industry

4. Appendix

In many problems of applied econometrics, the equation of interest is only defined for a subset of the overall population, while the parameters of interest are the parameters that refer to the whole population. If the sample is non-randomly drawn from the overall population, straightforward regression analysis leads to inconsistent parameter estimates. This is the problem of sample selection bias, and economists normally implement selectivity bias correction methods, following Heckman's insight, when they estimate an equation of interest over an endogenously selected population. If the selection is over a wide range of exclusive choice, as it is in our case, the multinomial logit specification seems to be the most used in applied work because of its simplicity. This specification requires a parametric assumption, that is the underlying selection process is assumed to follow a multinomial logit distribution. However new assumptions have to be imposed in order to embed the multinomial into the original selection bias correction model. We will follow a widely quoted paper in which Lee (1983) proposed a generalization of the two-step selection bias correction method introduced by Heckman that allows for any parametrized error distribution. His method extends to the case where selectivity is modelled as a multinomial logit. This approach is simple and requires the estimation of only one parameter in the correction term. This is however achieved at the cost of fairly restrictive assumptions. The idea behind Lee's technique involves a transformation of the selection term in something with the functional form of the inverse Mills ratio proposed by Heckman.

Another problem is the presence of unobserved heterogeneity in the equation of interest. Economic theory often suggests estimation equations that contain an individual specific effect, which is unobserved, but correlated with the model regressors. In our sample, country pairs can be considered individuals with unobserved idiosyncratic characteristics which are correlated with the explanatory variables and affect the outcome. If these unobserved individual specific (and time constant) effects affecting the outcome variable and correlated with the model regressors, are not taken into account simple regression analysis does not produce consistent parameters of interest. For the estimation of coefficients on variables which vary over time, panel data provide a solution to this latter problem, and a number of straightforward estimators are available such as the within estimator, the first difference estimator, the least square dummy variable (LSDV) estimator and the conditional maximum likelihood estimator.

In many applications, both problems (sample selection and individual specific effects) occur simultaneously. If the selection process is time constant, panel estimators solve both problems. But often this is not the case. Recently, a test for selection in panel data has been proposed by Wooldridge (1995).

The econometric issues delineated above lead to a final model in which there is a categorical selection rule, which depends on a linear index, and an unobserved (time constant) additive individual effect, which may be correlated with the model regressors. The selection rule assigns individuals in the overall sample population to three different regimes (again, by determining the decision of investing, not investing or disinvesting).

For the regime of interest, a linear regression equation is defined, which again has an additive unobserved individual component, correlated with the model regressors. The slope parameters of this equation, that is β_1, are the parameters of interest.

The model will be:

$$X_{1it}^{*} = Z_{it}\beta_1 + \alpha_i + \varepsilon_{1it} \qquad i = 1\ldots N;\ t = 1\ldots T;\ j = 1,2,3 \qquad (2)$$

$$d_{jit}^{*} = W_{it}\gamma_j + \eta_i + u_{jit}, \qquad i = 1\ldots N;\ t = 1\ldots T;\ j = 1,2,3 \qquad (3)$$

$d_{it} = 1$ if j 1= 1 (that is $d_{it}^{*} > 0$), $d_{it} = 0$ otherwise. (4)

$$X_{it} = X_{1it}^{*} * d_{it} \qquad (5)$$

j is a categorical variable that describes the choice of the investor country among the three possible alternatives. The vector W represents the maximum set of explanatory variables for all alternatives and the vector Z contains all determinants of the variable of interest. W and Z have common elements including both time variant and time invariant variables. α_i and η_i are unobservable and time invariant individual specific effects, which are possibly correlated with W_{it} and Z_{it}. The ε_{it} and u_{it} are unobserved disturbances and disturbance ε_{1it} is not parametrically specified. The variable W_{it} is only observable if $d_{it} = 1$.

We assume that the model is non parametrically identified from exclusion of some of the variables in W from the variables in Z. Without loss of generality, the outcome variable X_{1it} is observed if and only if category 1 is chosen, which happens when there is a positive direct investment within the country pair.

Given this model, equation 5 could be estimated in levels by pooled ordinary least squares (OLS). This leads to consistent estimates of □if:

$$E(\alpha_i + \varepsilon_{1it} | Z_{it}, d_{it} = 1) = E(\alpha_i | Z_{it}, d_{it} = 1) + E(\varepsilon_{1it} | Z_{it}, d_{it} = 1) = 0 \quad \square\square\forall t \qquad (6)$$

However, if selection is non-random, and/or if correlated individual heterogeneity is present, last conditional expectation is not zero.

One way to eliminate the fixed effects α_i is to use some type of difference estimator. Given identification[13], the consistency condition for a difference estimator is described by the following expression:

$$E(\square_t - \square_s | x_t, x_s, d_t = d_s = 1) = 0 \qquad s \neq t \qquad (7)$$

Here t and s are time periods.

[13] To obtain the identification of the parameter the matrix we require the matrix $E[(x_t - x_s)'(x_t - x_s) | x_t, x_s, d_t = d_s = 1]$ to be finite and non-singular.

Since the last condition does not impose a restriction on the relation between selection process or the regressors and individual effects, correlated individual heterogeneity and also any potential selection problem operating through α_i are eliminated by differencing equation 5 across time. If any of the conditions 6 or 7 is violated, correct inference needs the selection process to be modelled.

Given this model, Wooldridge proposed a test for selection bias based on fixed effects estimation using an unbalanced panel. This test allows for the possible correlation between unobserved heterogeneity and regressors; further, selection may depend on the unobserved effect.

Wooldridge assumes the errors of the selection equation to be normal. In our application there is not marginal normality of the original errors but we work with a transformation of their distribution which makes the normality a plausible assumption (Cameron and Trivedi, 2006).The method is semiparametric with respect to the main equation, in the sense that it does not require them to have a known distribution but they can have serial dependence of unspecified form. The time dimension allows controlling for individual effects in addition, which requires further assumptions for the conditional means of the individual effects in both equations. The key assumptions which lead to estimable equations and that identify the structural parameters are much weaker than full joint distributional assumptions on the time constant unobservables of the first stage and the idiosyncratic errors in the second stage, such as in the Heckman two selection correction model. Wooldridge imposes four assumptions in order to derive a test: for selection

- the conditional mean of the individual effects in the selection equation can be expressed as a linear projection on the leads and lags of the observable variables: $\eta_i = W_{i1}\delta_1 + \ldots + W_{i2}\delta_2 + ci$, where *ci* is a random component independent of W_i.
- $v_{it} \equiv u_{it} + c_i$ are independent of $(W_{i1} \ldots W_{i2}, Z_{i1} \ldots Z_{i2})$

Further he imposes an assumption about the relationship between α_i and the resulting error term in the selection equation:

- $E[\varepsilon_{1it} \mid (\alpha_i, W_{i1} \ldots W_{iT}, Z_{i1} \ldots Z_{iT}, v_{it})] = E[\varepsilon_{1it} \mid v_{it}] = \rho v_{it}$

This is an alternative assumption to the hypothesis of consistency of fixed effects estimator, contained in 6. However we do not observe d_{jit}^*, and therefore v_{it}, but only d_{it}. The alternative becomes, using iterated expectations:

$$E[\varepsilon_{1it} \mid (\alpha_i, W_{i1} \ldots W_{iT}, Z_{i1} \ldots Z_{iT}, d_{it})] = \rho E[v_{it} \mid W_{i1} \ldots W_{iT}, Z_{i1} \ldots Z_{iT}, d_{it}]$$

Under the assumption that v_i is independent of α_i, W_1 and Z_i

$$E(X_{1it} \mid \eta_i, W_{i1} \ldots W_{iT}, Z_{i1} \ldots Z_{iT}, v_{it}, d_{it}) = \alpha_i + Z_{it}\beta_1 + \rho E[v_{it} \mid Z_i, d_i]$$

For computational reasons, in the procedure to calculate the test $E[v_{it} \mid Z_i, d_i]$ is substituted with $E[v_{it} \mid Z_i, d_{it}]$ which imply that v_{it} are independent across t. Then the conditional expectation we need to estimate for the purpose of the test is:

$E[v_{it} \mid Z_i, d_{it}=1] = E[v_{it} \mid Z_i, v_{it} > - W_{it}\gamma_j] = \lambda(W_{it}\gamma_j)$

This expression, in the context of a Heckman two-step procedure with a bivariate selection process estimated with a probit, would equal the inverse Mills ratio (assuming that the variance of v_{it}). Our selection process produces three possible alternatives and has to be estimated with a multinomial logit. The generalization of the Heckman two-step procedure proposed by Lee (1982) allows us to obtain, through a transformation of the multinomial residuals, a term which approximates the estimation of the inverse Mills ratio.

This theoretical derivation of the test leads to the actual procedure that we followed to test out the null hypothesis of selection:

1. for each t we estimate the equation $P(d_{it}=1 \mid W_i) =$ with a multinomial logit. For $d_{it}=1$ we compute $\hat{\lambda}(W_{it}\hat{\gamma}_j)$ using the transformation of the residuals proposed by Lee, where $W_{it}\hat{\gamma}_j$ is the estimate of the probability of positive investment;
2. we estimate $\dot{\dot{X}}_{it} = \dot{\dot{Z}}_{it}\beta + \rho\dot{\dot{\lambda}}(Z_{it}\hat{\gamma}_j) + error_{it}$ with pooled OLS, where $\dot{\dot{X}}_{it}, \dot{\dot{Z}}_{it}$ *and* $\dot{\dot{\lambda}}(W_{it}\hat{\gamma}_j)$ are the deviations of the individual means;
3. we test H_0: $\rho = 0$ using the t-statistic for ρ using robust standard errors.

Following this procedure we obtain the following estimates for the model $\dot{\dot{X}}_{it} = \dot{\dot{Z}}_{it}\beta + \rho\dot{\dot{\lambda}}(Z_{it}\hat{\gamma}_j) + error_{it}$:

Table A1: Wooldridge 2 steps with deflated fdi

	fdideflated
RTA_NN	1.404
	(0.065)**
RTA_NSa	-1.192
	(0.159)**
RTA_NSs	-0.32
	(0.066)**
RTA_SS	-2.093
	(0.180)**
lpopin	0.13
	-0.079
lpopout	-0.85
	(0.080)**
ltrade	1.127
	(0.042)**
lgdpout	0.259
	(0.059)**
lgdpin	-0.787
	(0.063)**
landl	-0.198
	(0.044)**
island	-0.086
	(0.050)+
border	0.821
	(0.081)**
comlang	0.59
	(0.061)**
colony	-0.244
	(0.092)**
lareap	0.179
	(0.009)**
ldist	0.058
	(0.030)+
IMR	-0.054
	-0.051
Constant	13.097
	(0.277)**
Observations	13634
R-squared	0.35

Robust standard errors in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%

As we can see from the values of the robust standard errors the null hypothesis of no selection in the sample used is accepted. The coefficient of IMR (inverse Mills ratio) has

a t-statistic value of -1.07 and a P-value[14] of 0.285. This result allows us to consider the fixed effect estimator as consistent in the context of our data.

[14] This is, intuitively, the probability of observing under the null hypothesis, a value less likely than that of the statistic test.