GEOGRAPHIC DETERMINANTS OF AUSTRALIAN FOREIGN DIRECT INVESTMENTS

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Abstract

The volume of investment that has flowed from Australia into the outside world, and its implications for economic policy, has attracted substantial policy debate among Australian policy makers, particularly in the context of regionalisation of the world economy. Using hypotheses from investment demand model and new trade theory we investigate if market size, its growth rate, openness, regional economic integration, language and cultural similarity and the availability of knowledge capital have any impact in attracting Australian investments offshore. Our results suggest that countries which are open, have a large domestic market and stable macro-economic environment tend to attract most Australian FDI. Regional integration, and the similarity in langauge and culture do not have any effect in attracting FDI from Australia. This result has a significant policy implications not only for Australia, but also for other countries who are increasingly engaged in forming trading blocs like Australia-US free trade agreements (AUSFTA).

Key words: foreign direct investment, openness, regional economic integration, Australia

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1. Introduction

The Australian economy has witnessed dramatic growth in outward foreign direct investment (FDI) since 1990s. In nominal term, stocks of outward FDI rose more than fivefold from US$1.6 billion in 1990 to US$ 8.2 billion by 2003. Most of these investments have concentrated in developed countries in Europe and America, although countries in Asia and the Pacific have also attracted some investment. Despite significant growth in outward FDI, as yet no study has been conducted to investigate the determinants of Australian outward FDI. Understanding of the determinants of outward FDI is crucial if rational trade and investment decision is to be made, particularly in the context of regionalisation of the world economy. To the best of our knowledge, this is the first study which aims to investigate the geographic determinants of Australian outward FDI, using data for 13 major host nations for the 1994 to 2003 period. Using hypotheses from investment demand model and new trade theory, we investigate if market size, its growth rate, openness, regional economic integration, availability of knowledge capital and the similarity in culture and langue have any impact in attracting Australian investments offshore. If all or some of these hypotheses are significant then our results have significant policy implications for trade and investment.

The paper is organised as follow. Following this introduction, section 2 discusses trends and patterns of Australian outward FDI. Section 3 presents an analytical framework to place our study in context and develops a model. Econometric results are discussed in Section 4. The paper concludes with concluding remarks in Section 5.

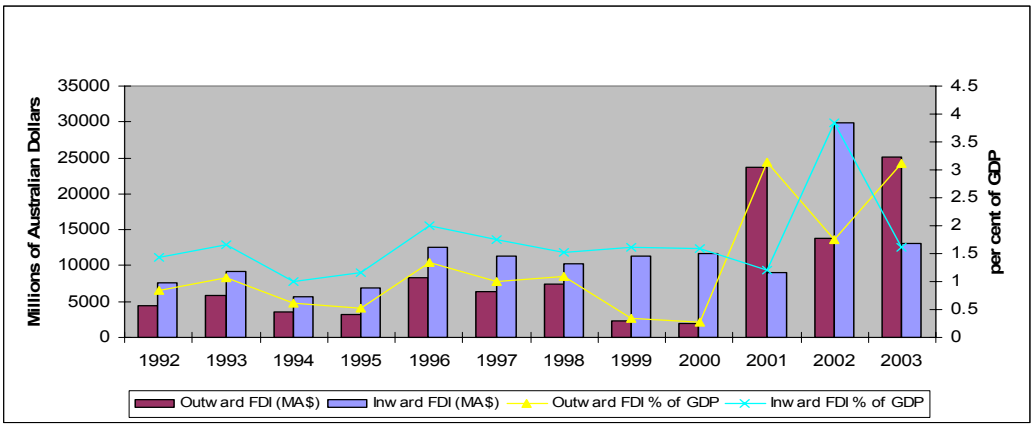
2. Trends and Patterns of Australian outward FDI

Traditionally, Australia was the net recepient of FDI. Up until the early 2000, inward FDI grew much faster than outward FDI both in terms of absolute amount and also in terms of percentage of GDP. However, since 2001 there has been a rapid growth in outward FDI (with the exception of 2002) (Figure 1). Outward FDI— which was less than 1% of GDP by the early 1990— reached over 3% of GDP by 2003. This sharp increase in outward FDI appears to be mainly due to globalisation of the world economy which encouraged Australian investors to tap profitable and growing international markets, particularly in developed countries.

Among the developed countries the United Kingdom, the United States of America and New Zealand are the major host. These countries together absorb about 80% of Australian outward FDI— the US being the major host (Appendix I) whose share has been increasing rapidly, from 20% in 1990 to 46% by 2003. In the meantime the shares of United Kingdom and New Zealand have been fluctuating, although they are second and third largest recepients of Australan outward FDI (Appendix II). The heavy concentration of the stock of Australian outward FDI in these economies appears to be partly due to the similarity in culture, language and the legal system between

Australia and these countries, and partly due to the relatively large size of domestic market (with the exception of New Zealand). Gaining access to regional markets created by the formation of EEC and NAFTA through direct investmet in the United Kingdom and the United States of America might also be a motive. Opportunity to produce differentiated products due to higher R&D intensity in the UK and USA may also have played a role in attracting Australian outward investment in such a large magnitutes in these economies.

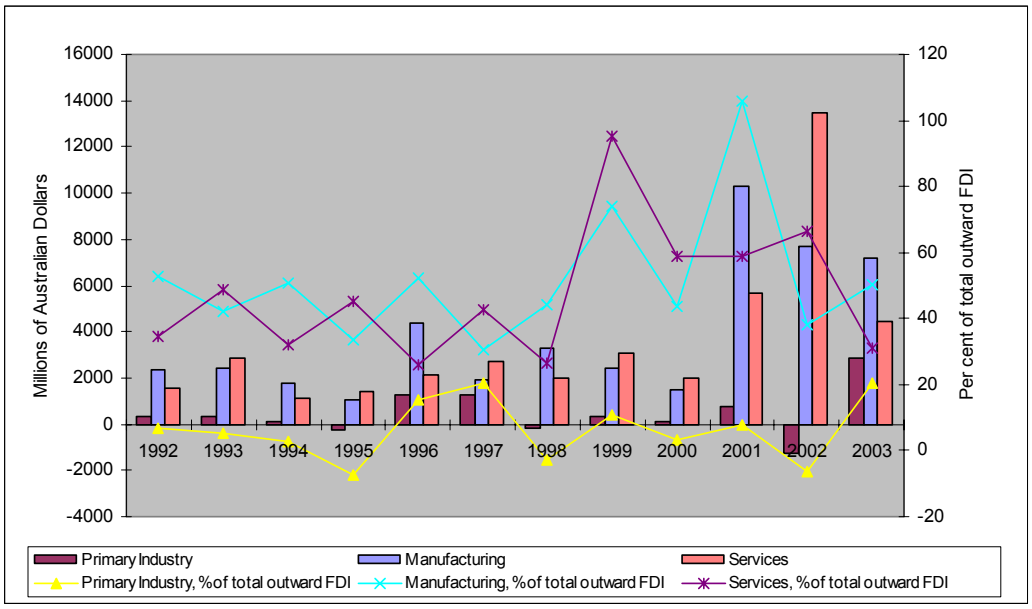
Among the high performing Asian countries, Hong Kong and Singapore are the major recepient of Australian outward FDI, although their shares have significantly declined in recent years. Japan's share remains very low and is less than 1 percent of total Australian outward FDI. China, Indonesia, Malaysia and Thailand remain small players in terms of attracting Australian investment. Among the Pacific island countries Papua New Guinea (PNG) is the major recepient of Australian outward investment, although its share have significantly declined from 6% in 1980 to 3% by 1994 and less than 1% by 2003 (Appendices I and II).



Source: Compiled by the authors from OECD (2003 & 2004) and ABS (2003)

Figure 1: Australia: Inward and outward FDI flows, 1992-2003 (Million A$ and as % of GDP)

As shown in figure 1, most outward FDI has gone into services and manufacturing activities. These two sectors together account for over 80% of investment, while the share of primary sector has been widely fluctuating. By 2003, 50% of Australian outward FDI was in manufacturing followed by 30% in services, although there has been significant variations form year to year basis (figure 2). This composition reflects Australia's intrinsic comparative adavantage in finacial service, print media (which is grouped under manufacturing) and mining. Given the nature of these sectors, Australian investors need to locate physically near the customers (in the case of fincial services, print media and recording) or the source of raw material (in the case of mining) to compete efficiently.



Source: Compiled by the authors from OECD (2003 & 2004).

Figure 2: Australia: Outward FDI by sector, 1992-2003 (Million A$ and as % of GDP).

3. Analytical Context and the Model Formulation

Theoretically, the location determinants of FDI has been developed and modelled within the neoclassical and new trade theory framework in the context of the investment demand model (Krugman, 1991, Markusen and Venables, 1998 and Filippaios, Papanastassiou and Pearce, 2003). The market size, its growth rate, and trade discrimination have been hypothesized as factors explaining the location determinants of FDI (Scaperlanda and Mauer, 1969 and Filippaios, Papanastassiou and Pearce, 2003). Overtime new hypothesis such as the role of knowledge capital has also been added to explain the location determinants of foreign investment, particularly horizontal investment (Markusen, 1998). Cantwell (1992) has argued that cross-border technological differences caused by differences in knowledge capital are the main motives for MNCs to invest in different countries, which allows them to produce differentiated products and remain competitive.[1] Markusen (1998) has theoretically demonstrated that outward FDI from countries with similar resource endowment is strongly influenced by knowledge capital. The fact that the high-income developed countries are both the host and the source of a

[1] Ozawa (1992:37) notes that both Japanese and European multinationals are setting up R&D units in each other's markets with a view to respond to local customers' needs and tastes as well as to capture the locality-specific innovation in order to produce new products and varieties which can not only be sold locally but also exported to other countries.

large proportion of FDI tend to suggest that knowledge capital is a key location determinant of FDI, particularly between developed countries.[2]

According to the market-size hypothesis, FDI in any period is assumed to be a function of the domestic market size (Wang and Swan, 1995). Not only the market size but also its growth rate (in terms of rising purchasing power) is important to attract foreign investment (Scaperlanda and Mauer, 1969, Wang and Swan, 1995 and Filippaios, Papanastassiou and Pearce, 2003). It is increasingly believed that countries with similar language and cultural backgrounds tend to attract more FDI from each other (Dunning 1981). Studies have shown that economic integration of regional markets have led to the growth of FDI in Europe and North America from countries outside the region primarily to secure regional market and remain competitive (Blassa, 1967, Weinstein, 1996 and Markusen, 1998). This indicates that proliferation of regional blocs attract more FDI particularly from non-member nations. While regional blocs tend to attract FDI, there are evidence to suggest that globalisation of the world economy has significantly facilitated movement of FDI between nations. It is increasingly clear that where trade is more freer multinationals have more incentives to produce differentiated goods in different markets, suggesting a link between openness and FDI.

It is important to recongnise that FDI is not a homogenous phenomenon and the motivation for investing off-shore differ between firms, which is often guided by the nature of techology and production processes. The vertical FDI (export-oriented) is motivated by lower production costs arising from cheap labour, tax incentives, lower tariffs and quality of physical infrastructure. For these FDI, the size of the host-country market is not important as their aim is to serve the global market. On the other hand, horizontal FDI is motivated by gaining market access[3] and locate in multiple countries to serve local markets efficiently by locating close to customers. The size of the host country market and its growth rate are crucial for horizontal FDI. Since this type of FDI involves advanced technology, it generally has higher requirement for human capital and physical infrastructure in the host country (Zhang, 2000). Mining sector investment by foreign firms can also be categorised as horizontal FDI, but such investment are primarily guided by availability of natural resources rather than the size of the market and the availability of skilled work force in the host country.[4] Since Australian firms have comparative advantage in service and mining realted activites, it is reaonable to expect that most off-shore investment by Australian frims are horizontal in nature.

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[2] Knowledge capital includes not only human capital of employees, but also patents, blueprints, work procedures, marketing knowledge and trade marks (Markusen, 1998: 753). Since it is difficult to measure these, we use R&D expenditure as percentage of GDP.

[3] Since most Australian firms do not have comparative adavantage in labour intensive production, they are horizontal investment.

[4] Often human capital requirment in the mining sector is met by sending staff from source country or requriting from other countries.

Based on the above discussions we developed the following model. The expected signs are given in parentheses.

$$FDI_{it} = \alpha_i + \underset{(+)}{\beta_1 MS_{it}} + \underset{(+)}{\beta_2 MG_{it}} + \underset{(+)}{\beta_3 KC_{it}} + \underset{(+)}{\beta_4 OP_{it}} + \underset{(+)}{\beta_5 ES_{it}} + \underset{(+)}{\beta_6 RI} + + \underset{(+)}{\beta_7 CL_{it}} + \varepsilon_{it} \quad (1)$$

where i = 1,….,13 represents country i and t = 1994, …., 2003 the time period. FDI = value of outward FDI in real term (US$), MS = market size, represented by real GDP (US$), MG = market growth, measured by real GDP growth, KC = knowledge capital, proxy by R&D expenditure as percentage of GDP, OP = openness measured by tariff rates, ES = economic stability, measured by budget deficit/surplus as percentage of GDP, RI= regional integration dummy, which is 1 for members of the EEC or NAFTA and 0 otherwise, CL = cultural and language similarity dummy, which is 1 for English speaking country and 0 otherwise (data sources are discussed in appendix III).

3. Model Estimation

The model specified above is estimated using panel data (pooled cross-sectional and time series data) for thirteen countries for the period 1994 to 2003.[5] We carried out Hausman Test to select most appropriate model (ie, random effect model (REM) vs fixed effect model (FEM)) for investigating the issue at hand. Hausman Test favoured REM over FEM. We also conducted the test for heteroscadesticity and corrected using the White heteroscadesticity procedures. To judge the robustness of our results we also used alternative definition for some of ours explanatory variables. For example, openness was measured using both trade percentage of GDP as well as tariff rates, while the knowledge capital was measured using R&D expenditure percentage of GDP and dummy variable for knowledge intensive advanced countries. However, this did not change the predictability of our models.

The model as specified above in equation (1) is estimated using Limdep 8.0. We began our modelling exercise with the estimation of the full model. In an attempt to improve the predictability of the model we deleted statistically insignificance variables one by one which produced better results. We have also used the alternative definition for some explanatory variables, such as openness and economic stability to see the sensitivity of our results.[6] The use of alternative measures for these explanatory variables did not improve the result. The results of the full and reduced models are reported in table 1 below.

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[5] The selection of countries is mainly guided by data availability. These include USA, Canada, UK, New Zealand, Japan, Netherlands, Belgium, China, Indonesia, Thailand, Singapore, Malaysia and PNG.

[6] The alternative measure for openness was trade as percentage of GDP and, for economic stability the real exchange rate.

Table1: Determinants of Australian Outward FDI

Results of the Random Effects Models

	Full Model		**Reduced Model**	
Variable	**Coefficient**	**P value**	**Coefficient**	**P value**
Constant	-11758.866*** (4226.294)	0.005	-15133.368*** (4300.465)	0.000
Market Size (MS)	0.011*** (0.001)	0.000	0.014*** (0.001)	0.000
Market Growth (MG)	-159.250 (117.543)	0.175		
Knowledge Capital (KC)	-3856.806** (163.056)	0.018	-3099.635** (1619.181)	0.055
Openness (OP)	411.8728*** (148.409)	0.005	420.621*** (148.602)	0.005
Economic Stability (ES)	698.371*** (171.105)	0.000	573.998*** (163.537)	0.000
Regional Integration (RI)	2657.590 (5661.416)	0.639		
Language & Cultural Similarity (CL)	2838.207 (5939.600)	0.633		
Time Trend (T)	1032.357*** (174.009)	0.000	931.248*** (172.366)	0.000
Baltagi-Li form of LM Statistic	76.73		215.78	

Significance levels are: *** 1%, ** 5%. White/Hetero. Corrected covariance matrix.

As expected the coefficient of market size (MS) variable is statistically significant and has a positive sign in both the full and the reduced models, suggesting that the size of the host country market is a key determinant of attracting Australian FDI. Countries that have large domestic markets tend to attract Australian investment which seems to be mainly due to the benefits of economies of scale. This result is similar to Lunn (1980) who investigated the determinants of US direct investment in the EEC and Moore (1993) who examined the determinants of German FDI. Flippaios et. al (2003) also observed that market size is an important determinant of US outward FDI particularly in the pacific rim countries.

We did not find any statistical evidence in support of the view that growth in the host country market (MG) is a key determinant of attracting Australian FDI. Knowledge capital (KC) —as a determinant of attracting FDI—is statistically significant and has an unexpected negative sign, suggesting that

countries with the higher level of knowledge capital discourage FDI from Australia. This unexpected result is difficult to explain given that most Australian outward FDI has gone to the countries which have a high level of knowledge capital.

As expected the coefficient for openness (OP) variable is statistically significant, suggesting that countries that are more open tend to attract Australian FDI. This is expected because openness facilitates both trade and investment by reducing the cost of doing business in terms of delays caused by bureaucratic red-tapes.

The coefficient of macro-economic stability (ES) variable is statistically significant in both the full and the reduced model. This suggests that countries with stable macro-economic environment tend to attract a significant amount of Australian FDI. This is because, unlike portfolio investment, FDI is not liquid and once investment is made in a country, it is not easy to pull out. Therefore, investors look for the countries that have a sound macro-economic foundation.

Surprisingly, we did not find any statistical evidence to suggest that regional economic integration (RI) and the similarity in language and culture (CL) have any effect in attracting Australian FDI, although it is widely believed that the heavy concentration of Australian investment in Europe and North America is primarily due to the creation of NAFTA and EEC, and the simialrity in language and culture.

5. Conclusion

Since the early 1990s the Australian economy has witnessed dramatic growth in outward foreign direct investment. In nominal term, stocks of outward FDI rose more than fivefold during 1990 to 2003 period. This sharp increase in outward FDI appears to be mainly due to globalisation of the world economy which encouraged Australian investors to tap profitable and growing international markets, particularly in developed countries. Most of these investments have concentrated in developed countries in Europe and North America, although countries in Asia and the Pacific have also attracted some investment. The United Kingdom, the United States of America and New Zealand together absorb about 80% of Australian outward FDI, the US being the major host.

Our results suggest that the countries that have a large domestic market, stable macro-economic environment and open trade and investment policies attract most Australian FDI. Surprisingly, our finding tend to suggest that countries with a high level of knowledge capital does not attract Australian FDI. In fact, statistically significant and a negative coefficent of knowledge capital intend to suggest that Australia has a lower level of FDI in countries which has a high level of knowledge capital. We also have not found any statsitical evidence to suggest that the creation of NAFTA and EEC has positvley contributed to the

growth of Australian outward FDI, particualy in the North America and Europe (which together attract over 60% of Australian outward investment). Nor, have we observed any evidence in support of the hypothesis that the similarity in language and culture have any effect in attracting a significant amount of Australian investment to english speaking countries. These findings have a significant policy implications not only for Australia, but also for other countries increasingly engaged in creating trading blocs with a view to attracting trade and investment.

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Appendix I: Country Composition of Australian Direct Investment Abroad (ADIA) stock, 1994 to 2003 (per cent)

Year Ending	United States	United Kingdom	New Zealand	PNG	China	Canada	Belgium-Luxem-bourg	Japan	Nether-lands	Hong Kong	Indo-nesia	Malaysia	Sing-apore	Thailand	Other
1994	23.86	34.32	12.34	2.88	0.13	1.13	0.22	0.20	1.50	7.86	0.50	1.12	2.68	0.14	11.11
1995	25.92	34.46	13.11	2.48	0.15	0.95	0.19	0.45	1.38	6.40	0.57	0.96	2.21	0.12	10.64
1996	30.26	29.51	12.29	2.79	0.23	0.83	0.16	0.30	1.59	5.61	0.67	1.10	1.91	0.12	12.62
1997	27.61	32.74	10.11	2.41	0.53	0.85	0.13	0.27	2.02	6.16	0.87	0.69	1.39	0.20	14.02
1998	37.74	31.56	6.75	1.68	0.27	0.66	0.07	0.12	0.83	5.39	0.54	0.40	1.04	0.14	12.81
1999	43.61	28.29	7.88	2.39	0.29	0.41	0.07	0.16	2.04	3.71	0.60	0.61	0.34	0.16	9.44
2000	51.33	23.24	6.68	0.79	0.20	0.76	0.17	0.14	1.28	2.41	0.35	0.22	1.04	0.12	11.26
2001	49.99	17.34	9.15	0.74	0.22	1.35	0.26	0.19	1.54	2.78	0.29	0.21	1.05	0.03	14.85
2002	43.34	24.29	10.88	0.87	0.18	0.70	0.39	0.23	1.73	2.09	0.25	0.18	0.83	0.08	13.96
2003	46.05	20.23	12.88	0.74	0.15	0.97	0.32	0.20	1.34	2.01	0.26	0.16	1.07	0.12	13.52

Sources: OECD International Direct Investment Statistics Handbook, 1992-2003 (2004)
INTERNATIONAL INVESTMENT POSITION, AUSTRALIA: SUPPLEMENTARY COUNTRY STATISTICS, 2000-2001
ABS Cat No. 5352.0, and INTERNATIONAL INVESTMENT POSITION, AUSTRALIA: SUPPLEMENTARY COUNTRY STATISTICS, 2004

Appendix II: The Stock of ADIA in Selected Country and Region, 1980 to 2003 (per cent)

Year Ending	United States	United Kingdom	New Zealand	ASEAN	PNG	China	Other	Total
1980	13.11	11.83	8.06	28.28	5.78	0.00	32.95	100.00
1981	14.36	10.28	9.67	38.89	9.60	0.00	17.21	100.00
1982	13.05	12.57	9.31	34.61	12.69	0.00	17.76	100.00
1983	13.90	11.60	10.23	23.99	8.19	0.00	32.09	100.00
1984	17.66	16.37	10.48	14.89	7.34	0.00	33.26	100.00
1985	24.84	20.04	8.10	6.92	5.16	0.00	34.95	100.00
1986	31.05	18.73	11.69	2.37	5.53	0.00	30.63	100.00
1987	24.48	15.96	14.48	4.29	6.35	0.00	34.44	100.00
1988	17.87	30.54	14.46	2.73	5.38	0.00	29.02	100.00
1989	26.26	26.83	11.87	5.68	3.61	0.00	25.75	100.00
1990	20.61	32.53	14.66	7.51	3.56	0.00	21.13	100.00
1991	19.59	36.77	16.18	7.23	3.93	0.00	16.30	100.00
1992	27.48	30.48	13.94	4.17	3.77	0.00	20.17	100.00
1993	27.35	25.94	13.65	4.01	3.66	0.00	25.40	100.00
1994	23.86	34.32	12.34	4.35	2.88	0.13	22.12	100.00
1995	25.92	34.46	13.11	3.89	2.48	0.15	19.99	100.00
1996	30.26	29.51	12.29	4.18	2.79	0.23	20.73	100.00
1997	27.61	32.74	10.11	3.56	2.41	0.53	23.03	100.00
1998	37.74	31.56	6.75	2.55	1.68	0.27	19.44	100.00
1999	43.61	28.29	7.88	2.22	2.39	0.29	15.33	100.00
2000	51.33	23.24	6.68	2.16	0.79	0.20	15.60	100.00
2001	49.99	17.34	9.15	2.07	0.74	0.22	20.48	100.00
2002	43.34	24.29	10.88	0.17	0.87	0.18	20.27	100.00
2003	46.05	20.23	12.88	2.04	0.74	0.15	17.92	100.00

Sources: OECD International Direct Investment Statistics Handbook, 1992-2003 (2004), ABS Cat No. 5352.0, INTERNATIONAL INVESTMENT POSITION, AUSTRALIA: SUPPLEMENTARY COUNTRY STATISTICS, 2004 (2005), and NTERNATIONAL INVESTMENT POSITION, AUSTRALIA: SUPPLEMENTARY COUNTRY STATISTICS, 2000-2001 (2003) and Industry Commission, Implications for Australia of Firms Locating Offshore, 1996, AGPS

Note: Date before and after 1986 are not strictly comparable due to a change in definition of ADIA. According to the ABS, ADIA is defined as net capital investment by Australians in foreign enterprises in which they have at least a 10 percent equity interest. Prior to 1985-86, Australian equity shares had to be at least 25 percent in order to be qualify as direct investment (IC, 1996, pp. 7-8).

Appendix III: Definition of Variables and their Data Sources

FDI = Outward Australian FDI in real US$. Data sources: OECD (2004b) *International Direct Investment Yearbook 1992-93,* (ABS) (2003), *International Investment Position, Australia: Supplementary Country Statistics, 2000-2001*. Cat. No.5352.0. Canberra and ABS (2005), International Investment Position, Australia: Supplementary Country Statistics, 2004, Cat No. 5352.0.

MS = Market size, estimated by the level of real GDP in US$.

Data Sources:

(i) For OECD countries (US, UK, New Zealand, Canada, Netherlands, Japan, Belgium): OECD Statistical Database; National Accounts; www.oecd.org/document; Retrieved 11.5.2006
(ii) 'Real Historical Gross Domestic Product (GDP) and Growth Rates of GDP' for Baseline Countries/Regions (in billions of 2000 dollars) 1971-2006, Contact: Mathew Shane (202-694-5282, mshane@ers.usda.gov)
http://www.ers.usda.gov/data/macroeconomics/Data/HistoricalRealGDPValues.xls

MG = Growth in market is measured by the growth in real GDP. Data sources are the same as above given under MS.

KC = Knowledge capital is measured by the R&D expenditure as percentage of GDP.

Data Sources:

(i) Organisation for Economic Co-operation and Development, Main Science and Technology Indicators (2004). Linkages, Cited in R&D share of gross domestic product, by selected countries: 1981–2003 In: National Science Foundation: Chapter 4: Research and Development: Funds and Technology.
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(vii) Organisation for Economic Co-operation and Development, Main Science and Technology Indicators (2004). Cited in R&D share of gross domestic product, by selected countries: 1981–2003, in: National Science

Foundation: Chapter 4: Research and Development: Funds and Technology Linkages.
(viii) R&D Expenditure by APEC economies: Table: R&D Expenditure (Revised Oct 2005)
http://www.apec-isti.org/IST/anex/welcome/rdshom.htm

OP = Openness is measured by tariff rates for each country.

Data Sources:

(i) Gwartney, Lawson & Gartzke 2005 Economic Freedom of the World: 2005 Annual Report (Belgium) - Mean Tariff Rate p55 (73) - (Lux) p112(130),
http://www.fraserinstitute.ca/admin/books/chapterfiles/EFW2005complete.pdf#
(ii) World Bank: Data on Trade and Import Barriers. Table 1: Trends in Average Tariff Rates for Developing and Industrial Countries, 1981-2003 (Unweighted in %),
http://siteresources.worldbank.org/INTRANETTRADE/Resources/tar2002.xls

ES = Economic stability measured by budget deficit/surplus percentage of GDP.

Data source:

(i) TABLE B–79.—Federal receipts, outlays, surplus or deficit, and debt, as percent of gross domestic product, fiscal years 1934–2006,
http://a257.g.akamaitech.net/7/257/2422/17feb20051700/www.gpoaccess.gov/eop/2005/B79.xls
(ii) Balance of Payments and International Investment Position 2006 (ABS Cat NO. 5363.0, p13-15) F1. INTERNATIONAL COMPARISON OF CURRENT ACCOUNT BALANCES (a)(b) 1985-1998,
http://144.53.252.30/AUSSTATS/abs@.nsf/featurearticlesbyCatalogue/9CBED9BB3A176A21CA2569DE002A3034?OpenDocument
(iii) Khusaini, Moh 2002 Role of Economic Fundamentals in Explaining Indonesian Currency Crisis Table 4.5 (Selected Countries 1992 -1996) p30,
http://isp-aysps.gsu.edu/papers/ispwp0219.pdf

RI = Regional integration dummy whose value is 1 for NAFTA and EEC countries, 0 otherwise.

CL = Cultural and language similarity dummy, 1 for English speaking countries, 0 otherwise.