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**DETERMINANTS OF FDI IN AUSTRALIA:  
WHICH THEORY CAN EXPLAIN IT BEST?**

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# **Determinants of FDI in Australia: Which Theory can explain it best?\***

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Any remaining errors or omissions are the responsibility of the author.

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## **Determinants of FDI in Australia: Which Theory can explain it best?**

**Abstract:** In this paper the determinants of FDI inflows in Australia, the second largest net importer of FDI in the developed world, are analysed using quarterly aggregate data for Q3/1985 to Q2/2002. FDI inflows are explained using market size, factor costs, transport costs and protection, risk factors, policy variables and other factors, i.e. variables based on a number of different theoretical models. It was found that Australian FDI is driven by longer term considerations and its determinants could not be fully explained by any single theoretical model. Exchange rate appreciation discouraged FDI in the medium-term, but had a positive longer term effect, indicating that FDI is encouraged by a sound economic environment. There was, however, no evidence that lower corporate tax rates increased FDI inflows.

**Key Words:** FDI; Time Series Analysis

**JEL Classification:** F21, C22

## I Introduction

Increased globalisation over the last two decades has led to strong growth of international business activity and foreign direct investment (FDI), which in turn has led to extensive research on the determinants and consequences of FDI. Despite the considerable amount of research that has been undertaken, Australia – the second largest net importer of FDI in the developed world<sup>1</sup> – represents a country with a substantial share of foreign ownership whose FDI experience has been largely overlooked in terms of a comprehensive economic analysis. Empirical work on FDI and its determinants and consequences is still limited. This situation exists despite the fact that Australia's FDI<sup>2</sup> stock was worth US\$ 111.1 billion in 2001, the twelfth largest in the world<sup>3</sup>, and that Australia ranked tenth in the world in terms of most attractive investment destination.<sup>4</sup> Between 1990 and 2001, Australia received an average of US\$ 6.5 billion in FDI inflows a year. Australia's inward FDI stock was as much as 29.2% of its GDP – larger than the average for developed economies at 17.1%.<sup>5</sup>

The purpose of this analysis is to determine what has caused Australia's volatile FDI experience and what factors have determined FDI inflows into Australia.<sup>6</sup> In order to analyse this question, new and previously unused quarterly data for FDI in Australia have been explored with some interesting results. Contrary to popular opinion, lower corporate tax rates were not found to encourage FDI inflows. It was other factors that mattered: market growth, real wage growth, labour supply, openness and interest rates emerged as key factors in explaining

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<sup>1</sup> Australia's net imports of FDI between 1995 and 2004 were US\$ 44.4 billion. OECD (2005), p.8.

<sup>2</sup> Australian FDI is defined as investment in overseas enterprises in which the Australian organisation has a significant influence and owns not less than 10% of the ordinary shares or equivalent. The Australian Bureau of Statistics (ABS) changed the minimum ownership level from 25% to 10% in June 1985. Source: [www.abs.gov.au](http://www.abs.gov.au).

<sup>3</sup> UNCTAD (2002), p. 310, Annex table B.3.

<sup>4</sup> A.T. Kearney and Global Business Policy Council (2002), p.2, Figure 1.

<sup>5</sup> UNCTAD (2002), p. 320, Annex table B.6.

<sup>6</sup> Determinants of FDI are obviously not the only important issue. Welfare implications of FDI in Australia are also of great importance and have been analysed in related research by the author.

Australian FDI. Exchange rate appreciation discouraged FDI in the medium-term, but had a positive longer term effect, indicating that a sound economic environment encourages FDI.

The paper is organised as follows. In section 2, theoretical and empirical issues related to determinants of FDI are reviewed. In section 3, previous empirical results related to the determinants of quarterly FDI in Australia are discussed. Section 4 makes some concluding remarks and outlines possible directions for further research.

## **II Theoretical Issues and Related Empirical Findings**

### **II.I General Theoretical Models and Empirical Studies of Determinants of FDI**

There is a variety of theoretical models explaining FDI and a wide range of factors that can be experimented with in empirical studies in order to find the determinants of FDI. In general, at least eight different approaches to explaining FDI as the location decision of multinational enterprises (MNEs) can be distinguished. These are: (1) determinants according to the Neoclassical Trade Theory and the Heckscher-Ohlin model in which capital moves across countries owing to differences in capital returns<sup>7</sup>; (2) ownership advantages as determinants of FDI (including monopolistic advantage and internalisation theory) based on imperfect competition models and the view that MNEs are firms with market power<sup>8</sup>; (3) determinants of FDI in Dunning's (1977 and 1979) OLI framework which brought together traditional trade economics, ownership advantages and internalisation theory; (4) determinants of FDI according to the horizontal FDI model or Proximity-Concentration Hypothesis<sup>9</sup>; (5) determinants of FDI according to the vertical FD model, Factor-Proportions Hypothesis or the theory of international

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<sup>7</sup> See, for instance, Markusen et al. (1995), pp.98-128 and Aliber (1970) for the model with currency risks.

<sup>8</sup> See Hymer (1960), Kindleberger (1969) and Caves (1971) for ownership advantages and Buckley and Casson (1979) for internalisation theory.

<sup>9</sup> See Krugman (1983), Markusen (1984), Ethier (1986), Horstmann and Markusen (1992), Brainard (1993).

fragmentation<sup>10</sup>; (6) determinants of FDI according to the Knowledge Capital Model<sup>11</sup>; (7) determinants of FDI according to the diversified FDI and risk diversification model<sup>12</sup>; and (8) policy variables as determinants of FDI when FDI is seen as the result of a bargaining process between MNE and governments<sup>13</sup>. There are also some additional individual models that are difficult to characterise in any of these approaches.

Hence, there is not one single theory of FDI but a variety of theoretical models attempting to explain FDI and the location of MNEs. The different approaches do not necessarily replace each other but explain different aspects of the same phenomenon. From each of the theories discussed, a number of determinants can be extracted. These generally include ownership advantages, market size and characteristics, factor costs, transport costs and protection, risk factors and policy variables.

Ownership advantages such as R&D and advertising expenditure, skill and technology intensity, the existence of multiplant enterprises and firm size have been shown to be important in a number of studies<sup>14</sup>, while in another area of research, aggregate variables such as market size, growth and trade barriers have also appeared to have an effect on the location of FDI.<sup>15</sup> A combination of both ownership advantages and location advantages (including market size and characteristics, factor costs, transport costs and protection) and other factors (such as political regime and infrastructure quality) has been shown to have explanatory power when analysed under the OLI framework.<sup>16</sup>

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<sup>10</sup> See Helpman (1984). For models on international fragmentation of production see Dixit and Grossman (1982), Dearnorff (2001) and Jones and Kierzkowski (2004)

<sup>11</sup> See Markusen (1997).

<sup>12</sup> See Hansen et al. (2001), Grossman and Helpman (2002), Ekholm et al. (2003) for studies on new forms of FDI, and Rugman (1975) for risk diversification.

<sup>13</sup> Game-theoretic frameworks in which this bargaining process is analysed include Bond and Samuelson (1986), Black and Hoyt (1989), Barros and Cabral (2001), Haaland and Wooton (2001).

<sup>14</sup> See Caves (1974), Swedenborg (1979), Saunders (1982).

<sup>15</sup> See Scaperlanda and Mauer (1969), Goldberg (1972), Lall (1980).

<sup>16</sup> See Dunning (1980), Santiago (1987), Pain (1993), Barrel and Pain (1996).

The Proximity-Concentration Hypothesis and horizontal FDI model have also been found to be robust, as FDI could be explained by market size, transport costs and protection and agglomeration economics such as R&D and advertising intensity or scale economies.<sup>17</sup> Studies in which horizontal, vertical FDI, the Knowledge Capital Models and their determinants have been assessed have also found market size and characteristics, in particular a country's skilled labour endowment, and transport costs and protection to be important factors explaining FDI.<sup>18</sup> However, it seems that both the horizontal FDI model and Knowledge Capital Model explained overall FDI better than the vertical FDI model.

Moreover, risk factors, such as market risk, the exchange rate and the interest rate, have been found to further determine the location of MNEs<sup>19</sup> and so have policy variables (such as corporate tax rates, tax concessions and other fiscal and financial investment incentives).<sup>20</sup> Hence the empirical evidence strengthens the idea that the different approaches do not necessarily replace each other, as each theoretical model can generally be supported by some regression analysis. Results, however, may differ substantially from country to country, a result that cross-country studies may hide, as they force results into one single structure. Hence, there is a need for detailed country case studies, as a lot can be learned from it. Therefore, FDI should be explained – more broadly – by a combination of ownership advantages, market size and characteristics, cost factors, transport costs and protection, risk factors, policy variables and other factors, which can be experimented with. This approach also explains why many empirical studies take that approach, even when focusing on specific aspects or theories of FDI.

## **II.II Australian Empirical Studies of Determinants of FDI**

One of the earliest studies on FDI in general and the basis of research on Australian FDI is a field study by Brash (1966). When surveying American manufacturing companies in Australia,

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<sup>17</sup> See Eaton and Tamura (1994), Brainard (1997), Ekholm (1998).

<sup>18</sup> See Hansen et al. (2001), Blonigen et al. (2002), Braconier et al. (2002), Markusen and Maskus (2002).

<sup>19</sup> See Thompson (1985), Cushman (1988), Klein and Rosengren (1994).

<sup>20</sup> See Root and Ahmed (1978), Rolfe et al. (1993), Bénassy-Quéré et al. (2001).

he found the growth of the domestic market to be the most important factor for FDI, followed by barriers to trade and cost factors. These factors were more important than the use of Australia as an export base or the preferences of local customers for local products. Other studies worth noting are Buckley and Mathew's (1979) study of UK first-time investors in Australia and Hutchinson and Nicholas' (1994) and Nicholas et al.'s (1996) surveys of Japanese companies in Australia.

There are also a small number of empirical studies on the determinants of FDI in Australia, though they are mixed in their success to support theoretically predicated effects. The empirical studies focusing on ownership advantages (Parry, 1978; Ratnayake, 1993) are in line with theoretical predictions, but the testing of variables in studies focusing on location factors, such as market size, factor costs, transport costs and protection, or risk factors (Karunaratne and Tisdell, 1998; Tcha, 1999; Yang et al., 2000) does not always bring the expected result. In the more recent studies variables such as trade barriers (Ratnayake, 1993), openness (Karunaratne and Tisdell, 1998), interest rate and inflation (Yang et al., 2000) were found to be significant and of the predicted (positive) sign. Other variables such as Host GDP, exchange rate and transport costs were not found to be significant at all, while the coefficients on wage rate changes, openness and industrial disputes even had an unexpected sign.

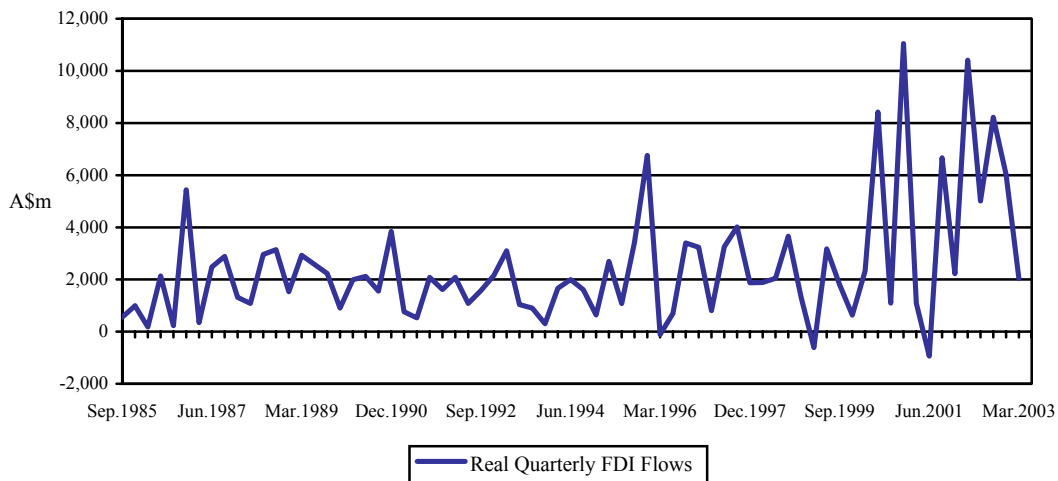
Even the most recent study, Yang et al.'s (2000) analysis of quarterly FDI data, had a number of shortcomings. The model was based on a short time period (35 observations between Q3/1985 and Q1/1994) and did not take into account the variety of theoretical models discussed above, in particular none of the new FDI models, such as the horizontal, vertical or diversified FDI model or knowledge capital model. Nominal FDI was used as the dependent variable, and the model failed to explain large fluctuations of FDI at the end of the sample period. Given these mixed results, more evidence is needed, particularly on analysing more recent data, as the economic and political structure in Australia and internationally has been changing very rapidly.



### III Methodology, Data and Estimation

For the econometric analysis, quarterly aggregate FDI flow data published by the Australian Bureau of Statistics (ABS) are used. The dataset has not been used in its full length in any previous study and thus it provides an opportunity for new research into the determinants of Australia's inward FDI. An extensive dataset with 71 observations for the period Q3/1985 to Q1/2003 was used, covering the last two decades in which increased globalisation and FDI growth has occurred.<sup>21</sup> The dataset includes three negative values, depicting disinvestments. The series also exhibits large fluctuations in the last quarter of the sample (see Figure 1), which are aimed to be explained by this model.

**Figure 1:** Real Quarterly FDI Inflows into Australia, Q3/1985 to Q1/2003



The different variables were chosen to reflect a broad range of factors likely to affect FDI, considering the theoretical models as well as empirical studies previously discussed. The explanatory variables include factors describing market size and characteristics, factor and transport costs, market risk, policy variables and OECD GDP.<sup>22</sup> Quarterly aggregate FDI was specified as a function of the following form:

<sup>21</sup> The ABS changed the definition of FDI on 30 June 1985 (reducing the minimum ownership level from 25% to 10% of equity interest), so data from previous years cannot be used owing to limited comparability. Furthermore, quarterly FDI data are only available aggregated by industry.

<sup>22</sup> It should be noted that the choice of variables was somewhat restricted by the availability of quarterly Australian data.

$$rfdi = f(\text{market}, rwages, lab, trade, cdut, inr, exr, inf, indus, tax, oecdgdp)$$

where the variables are as listed and defined below:

- rfdi* quarterly FDI in Australia, deflated by the price index for private gross fixed capital expenditure, plant & equipment (*invdef*),
- market* Australian market size represented by real Australian GDP (*ausgdp*),
- rwages* real wages in Australia, measured by *rwages1*, which is defined as average weekly earnings (*awe*) deflated by consumer price index (*cpi*), *rwages2*, which is defined as wages, salaries and supplements (*wss*) per employee (*emp*) per week deflated by the implicit price deflator for GDP (*ipd*), or both variables adjusted for changes in labour productivity (*prod*), *rwages11* and *rwages22*,
- lab* labour supply in Australia, measured by the number of job vacancies (*ausjobvac*) or, alternatively, by the unemployment rate (*ausuer*),
- trade* amount of trade in Australia, either measured by real imports (*impo*) and real exports (*expo*) or, alternatively, by the openness of the economy (*open*, which is defined as the sum of *expo* and *impo* divided by *ausgdp*),
- cdut* Australian customs duties,
- inr* Australian interest rate, measured by either the nominal interest rate, i.e. the 30-day bank accepted bill rate (*bb30*), or, alternatively, by the real interest rate (*rir*, which is calculated as *bb30* minus *inf*),
- exr* Australian exchange rate, measured by the US dollar-Australian dollar exchange rate (*usexr*) or, alternatively using the trade-weighted index (*twi*),
- inf* Australian inflation rate,
- indus* amount of industrial disputes in Australia,
- tax* Australian corporate tax rate,
- oecdgdp* OECD GDP trends measured by total real GDP of all OECD countries (*oecdr GDP*), or, alternatively, by the quarterly or annual growth difference between OECD GDP and Australian GDP (*oecdgrdifq* and *oecdgrdifa*).

In summary, market size is represented by *market*, factor costs by *lab* and *rwages*, transport costs and protection by *trade* and *cdut*, risk factors by *inr*, *exr*, *inf* and *indus*, policy variables by *tax* and other factors by *oecdgdp*. For an overview of how the different effects that those variables have on FDI are seen in different theoretical models, see Table 1.

GDP is expected to have a positive effect on FDI (or at least on horizontal FDI) as serving a market directly becomes more efficient relative to exporting, the larger the market is. Furthermore, it can be assumed that the growth of an economy encourages FDI. In contrast, if most FDI is vertical FDI, market size should not be an important determinant.

Higher labour costs are expected to have a negative effect on FDI as it makes producing in the country more expensive relative to trading. However, it could also be argued that higher wages reflect a higher skill level or cause firms to substitute capital for labour in their production process, both of which should encourage FDI. Similarly, a higher unemployment rate (or a lower number of job vacancies) should have a positive effect on FDI since labour and search process for labour is cheaper for MNEs, the more people are looking for work.

There are various ways in which trade and trade costs may affect FDI. MNEs often choose to invest in countries that they already trade with and might make their investment decision as a decision to switch from exports to FDI. Therefore, Australian imports should have a positive effect on FDI, while the effect of exports is unclear. However, trade can also play a role in various stages of the production process: firms might use intermediate inputs (in the case of vertical FDI) or set up subsidiaries to export to foreign markets (in the case of export-platform FDI). In this case an economy would appear more attractive for FDI the more open it is. Trade costs, on the other hand, could have a positive effect on FDI. MNEs might prefer to invest and supply the foreign market directly rather than to export their goods if trade costs are higher. In this case higher customs duties are expected to encourage FDI. However, this is only true for the case of horizontal FDI. In the case of vertical FDI, higher customs duties might actually discourage FDI, as importing intermediate goods becomes more expensive.

**Table 1:** FDI Determinants according to different Theories of FDI

	1. Heckscher-Ohlin Model	2. Ownership Advantages <sup>23</sup>	3. OLI Framework	4. Horizontal FDI (Proximity Concentration Hypothesis)	5. Vertical FDI (Factor Proportions Hypothesis)	6. Knowledge Capital Model	7. Diversified FDI/Risk Diversification	8. Policy Variables	Other Factors
Market size	---	---	Positive	Positive	Nil	Positive	---	---	---
Wages	Negative	---	Negative	Positive (indicating per capita income or skilled labour)	Negative (indicating unskilled labour/factor abundance)	---	---	---	---
Labour Supply	---	---	---	Skilled labour: Positive	Unskilled labour/ factor abundance: Positive	---	---	---	Negative correlation with Wages: Positive
Trade/Openness	---	---	Positive (depends on FDI form)	---	---	---	---	---	---
Trade Barriers	---	---	Positive (depends on FDI form)	Positive	Positive	Positive	---	---	---
Interest Rate	Positive	---	Political/ Market Risk: Negative	---	---	---	Positive	---	---
Exchange Rate Appreciation	---	---		---	---	---	Negative	---	---
Inflation Rate	---	---		---	---	---	Political/ Market Risk: Negative	---	---
Industrial Disputes	---	---		---	---	---		---	---
Tax Rates	---	---	Negative	---	---	---	---	Negative	---
OECD GDP	---	---	---	---	---	---	---	---	Positive

<sup>23</sup> Ownership advantages include factors such as R&D, skill and technology intensity, which could not be analysed using quarterly aggregate FDI data.

Higher market risk (represented by interest rate, exchange rate, inflation rate and industrial disputes) should discourage FDI. A higher interest rate, reflecting higher returns to capital, is expected to increase FDI. The appreciation of the Australian dollar (or depreciation of US dollar) should have a negative effect on FDI, as it increases the cost of investing in Australia. The inflation rate is another means to capture market stability and is expected to negatively affect FDI, as lower inflation is associated with a more stable macroeconomic environment. More industrial disputes might scare foreign companies off and thus discourage FDI.

A higher corporate tax rate also makes it less attractive for MNEs to invest, while a reduction in the Host country's tax rate should have an encouraging effect on FDI. OECD GDP is included to represent world GDP trends<sup>24</sup>. MNEs may grow and increase their total FDI as the world economy grows. OECD GDP should thus have a positive effect on FDI in Australia. Furthermore, if Australia grows by more than the OECD average, Australia should attract more FDI, while a lower growth rate than the OECD average should discourage investment.

For the estimation of the model, the time series were either used in constant price form or were deflated, so that only real data was used. Data exhibiting a seasonal pattern (*ausgdp*, *expo*, *impo*, *ipd*, *awe*, *wss*, *emp* (used for *rwages*), *jobvac*, *uer*, *oecdgdp*, *oecdgdprq*, *oecdgdppgra* and *indus*) were used in seasonally adjusted form<sup>25</sup>. Other time series (*rfdi*, *cdut*, *bb30*, *inf*, *tax*) did not exhibit any significant seasonal pattern and were thus used in unadjusted form. If alternative variables could be used, the ones with the best fit were chosen. Insignificant variables were not included in the final model.

Current and lagged values were included if significant. Including lagged values seemed reasonable given that the investment decision is often a time-consuming process and is made several periods before the actual investment takes place. Therefore, current values of the

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<sup>24</sup> Due to the fact that Australian GDP accounts for an average of only 0.43% of OECD GDP and is thus considered as too small to affect world GDP trends, it remains included in the OECD GDP series used.

<sup>25</sup> In the case of *indus*, the variable was seasonally adjusted using Eviews' Census X11 (multiplicative) function. The Census X11 method is a standard method used by the US Bureau of Census to seasonally adjust publicly available data and is provided as a function in Eviews. See Eviews 4 User's Guide, p.184.

explanatory variables might not have much of an effect on the investment decision. Then again, if a sudden change in conditions makes a country appear less attractive than at the time the initial decision was made, the planned investment might not be realised. Therefore a dynamic equation as a combination of shorter and longer lag lengths, depending on each individual variable, was chosen as a model to explain FDI. The appropriate lag lengths were chosen using the Schwarz Criterion (SC)<sup>26</sup>, though serial correlation was also taken into account when searching for the optimal number of lag lengths. Here, SC was minimized for the inclusion of one lag of *inf*, two lags of *rwages22*, three lags of *ausgdp*, *open*, *usexr*, four lags of *bb30*, *jobvac* and five lags of *tax*. Including *rwages22* reduced the sample size to 68 observations (Q3/1985 to Q2/2002). The variables *indus*, *cdut* and *oecdgdp* were not included, as they were not found to be significant and their inclusion worsened the model's fit. No lags of the dependent variable were included in the model.<sup>27</sup> The model was then estimated in the following form:

$$\begin{aligned}
rfdi_t = & \alpha + \beta_{11} ausgdp_t + \beta_{12} ausgdp_{t-1} + \beta_{13} ausgdp_{t-2} + \beta_{14} ausgdp_{t-3} + \beta_{21} jobvac_t + \beta_{22} \\
& jobvac_{t-1} + \beta_{23} jobvac_{t-2} + \beta_{24} jobvac_{t-3} + \beta_{25} jobvac_{t-4} + \beta_{31} rwages22_t + \beta_{32} \\
& rwages22_{t-1} + \beta_{33} rwages22_{t-2} + \beta_{41} open_t + \beta_{42} open_{t-1} + \beta_{43} open_{t-2} + \beta_{44} open_{t-3} \\
& + \beta_{51} bb30_t + \beta_{52} bb30_{t-1} + \beta_{53} bb30_{t-2} + \beta_{54} bb30_{t-3} + \beta_{55} bb30_{t-4} + \beta_{61} usexr_t + \beta_{62} \\
& usexr_{t-1} + \beta_{63} usexr_{t-2} + \beta_{64} usexr_{t-3} + \beta_{71} inf_t + \beta_{72} inf_{t-1} + \beta_{81} tax_t + \beta_{82} tax_{t-1} + \beta_{83} \\
& tax_{t-2} + \beta_{84} tax_{t-3} + \beta_{85} tax_{t-4} + \beta_{86} tax_{t-5} + \varepsilon_t
\end{aligned}$$

In order to test whether the explanatory variables should enter in differences<sup>28</sup>, the model can be written more compactly as:  $FDI_t = \mu + \sum_{i=1}^8 \beta_i(L)x_{it} + \varepsilon_t$ . The polynomial in the lag operator is defined as<sup>29</sup>:  $\beta_i(L) = \beta_0 + \beta_1L + \beta_2L^2 + \dots + \beta_r L^r$ . If  $\beta_i(L) = \beta_0 + \beta_1L + \beta_2L^2 + \dots + \beta_rL^r$ , then  $x_{it}$  enters in differences if  $\beta_0 + \beta_1 + \dots + \beta_r = 0$ . Hence, a Wald test can be conducted for:  $H_0: \beta_i(L) = 0$  and  $H_1: \beta_i(L) \neq 0$ . The results of the tests are presented in Table 2.

<sup>26</sup> The Schwarz Criterion is computed as  $SC = -2(\log L/T) + k \log(T)/T$ . It is preferred to other methods, such as the Akaike Information Criterion, as it imposes a larger penalty for additional coefficients.

<sup>27</sup> A model with a lagged dependent variable was experimented with, but it had little success, leading to an explosive unit root and instability.

<sup>28</sup> For more details on the test see Davidson et al. (1978).

<sup>29</sup> See Greene (2000), p.724.

**Table 2:** Test for Differencing, Quarterly FDI Model

Variable	$\chi^2$	Prob.	Variable	$\chi^2$	Prob.
<i>ausgdp</i>	0.017	0.896	$\Delta$ <i>ausgdp</i>	7.784*	0.009
<i>rwages22</i>	0.0144	0.905	$\Delta$ <i>rwages22</i>	16.851*	0.000
<i>jobvac</i>	7.189*	0.007	<i>jobvac</i>	9.712*	0.004
<i>open</i>	4.120*	0.042	<i>open</i>	12.215*	0.001
<i>bb30</i>	3.898	0.048	<i>bb30</i>	8.573*	0.006
<i>usexr</i>	0.144	0.704	$\Delta$ <i>usexr</i>	4.327*	0.045
<i>inf</i>	11.486*	0.001	<i>inf</i>	16.888*	0.000
<i>tax</i>	0.788	0.375	<i>tax</i>	0.782	0.383

\* significant at 10% critical value

The hypothesis that the variables should be used in first differences could not be rejected at the 10% critical value in the cases of *ausgdp*, *usexr*, *rwages22* and *tax*. Differencing those variables – except *tax* – once and repeating estimation and test, however, shows that the hypothesis that the variables should be used in second differences was rejected at a 10% critical value for all variables. The variable *tax* has a step structure (it is constant for some periods and has some zero variances) and thus does not satisfy the usual conditions underlying tests for differencing. Since it is being used purely as an explanatory variable, it was included in the most natural form. Hence, the model including  $\Delta$ *ausgdp*,  $\Delta$ *usexr*,  $\Delta$ *rwages22* and *tax* was used for further estimation.

The parameters in the model were estimated using OLS and are shown in Table 3. The fit of the model was found to be reasonably good ( $R^2$  of 76.1% and a much lower adjusted  $R^2$  of 53.6% owing to the large number of regressors). Most of the lags for the variables included were significant at a 10% critical value and the F-statistic showed that the null hypothesis that all the slope coefficients in a regression are zero was rejected.

Further evaluation of the model was successful. The hypotheses of non-autocorrelation, non-heteroscedasticity and parameter stability could not be rejected at a 5% critical value.<sup>30</sup> Even though the hypothesis of correct functional form was rejected at a 5% critical value<sup>31</sup>, the

<sup>30</sup> Heteroscedasticity (White, ARCH(1)):  $F(60,3) = 1.339$ , Prob = 0.522 (5% critical value: 8.580) and  $F(1,62) = 0.779$ , Prob = 0.381 (5% critical value: 4.000), Autocorrelation (AR(1)):  $F(1,32) = 1.376$ , Prob = 0.250 (5% critical value: 4.150), Parameter Stability (Chow test): Q3/2001 to Q2/2002,  $F(4,29) = 0.998$ , Prob = 0.425 (5% critical value: 2.700), Q3/2000 to Q2/2002,  $F(8, 25) = 1.521$ , Prob = 0.202 (5% critical value: 2.340).

<sup>31</sup> RESET(1):  $F(1,32) = 9.686$ , Prob = 0.004 (5% critical value: 4.150)

model was regarded as the best possible result, as no equation for which the RESET test did not fail could be found, despite experimenting with alternative variables and lags and transforming the variables into log form.

**Table 3: Quarterly FDI Equation**

<b>Dependent Variable: <i>rfdi</i></b>							
Sample (adjusted): Q4/1986-Q2/2002. Included observations after adjusting endpoints: 63							
<b>Model A: Model with variables in level form</b>				<b>Model B: Model after differencing</b>			
<b>Variable</b>	<b>Lags</b>	<b>Coeff.</b>	<b>t-stat</b>	<b>Variable</b>	<b>Lags</b>	<b>Coeff.</b>	<b>t-stat</b>
<i>c</i>	---	-53,860.030	-1.245	<i>c</i>	---	-46,506.020*	-2.922
<i>ausgdp</i>	0	0.529	1.508	$\Delta$ <i>ausgdp</i>	0	0.485	1.513
	1	-0.862*	-1.878		1	-0.310	-1.114
	2	1.905*	4.167		2	1.518*	4.702
	3	-1.553*	-4.329		---	---	---
<i>rwages22</i>	0	-69.162*	-2.482	$\Delta$ <i>rwages22</i>	0	-69.985*	-3.037
	1	-15.763	-0.521		1	-88.221*	-3.683
	2	89.631*	3.068		---	---	---
<i>jobvac</i>	0	2.987	0.066	<i>jobvac</i>	0	5.215	0.123
	1	-15.363	-0.288		1	-18.687	-0.378
	2	-124.685*	-2.396		2	-121.501*	-2.467
	3	84.265	1.651		3	81.693	1.691
<i>open</i>	4	-104.661*	-2.042	<i>open</i>	4	-107.007*	-2.300
	0	-358.547	-0.837		0	-320.591	-0.959
	1	1,337.852*	2.764		1	1,344.767*	2.923
	2	-1,613.752*	-3.335		2	-1,600.964*	-3.489
<i>bb30</i>	3	1,750.865*	3.731	<i>bb30</i>	3	1,737.408*	4.066
	0	-442.733	-0.738		0	-319.254	-0.686
	1	1,820.041*	2.703		1	1,809.746*	2.913
	2	-939.555	-1.587		2	-967.302*	-1.718
<i>usexr</i>	3	-850.861	-1.283	<i>usexr</i>	3	-849.119	-1.343
	4	1,050.538*	2.458		4	1,044.182*	2.661
	0	26,817.570*	1.722		0	23,088.430*	1.767
	1	-62,598.160*	-2.706		1	-36,463.220*	-2.608
<i>inf</i>	2	95,948.230*	4.437	$\Delta$ <i>usexr</i>	2	58,680.810*	4.801
	3	-55,771.630*	-3.623		---	---	---
	0	307.680	0.657		0	197.627	0.500
	1	2,350.747*	4.752		1	2,218.790*	5.579
<i>tax</i>	0	39.445	0.185	<i>tax</i>	0	62.962	0.320
	1	665.676*	2.486		1	657.872*	2.575
	2	-1,449.343*	-5.376		2	-1,426.736*	-5.619
	3	645.634*	3.001		3	652.092*	3.238
	4	634.412*	2.507		4	598.847*	2.591
	5	-390.064*	-2.069	5	-407.642*	-2.308	

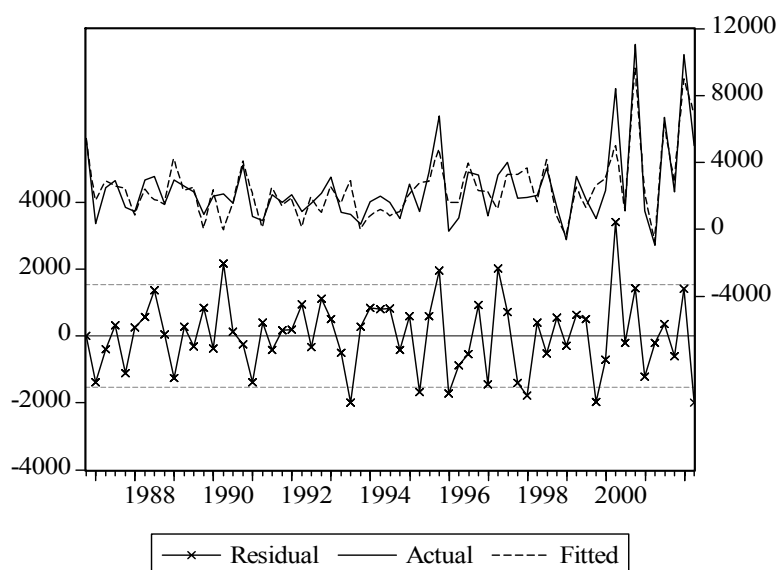
\* significant at 10% critical value

<b>R-squared</b>	0.763	<b>R-squared</b>	0.761
<b>Adjusted R-squared</b>	0.493	<b>Adjusted R-squared</b>	0.536
<b>S.E. of regression</b>	1,610.258	<b>S.E. of regression</b>	1,539.541
<b>Sum squared resid</b>	75,194,997.000	<b>Sum squared resid</b>	75,845,993.000
<b>Log likelihood</b>	-530.156	<b>Log likelihood</b>	-530.427
<b>Durbin-Watson stat</b>	2.338	<b>Durbin-Watson stat</b>	2.308
<b>Schwarz criterion</b>	19.066	<b>Schwarz criterion</b>	18.878
<b>F-statistic</b>	2.826	<b>F-statistic</b>	3.391
<b>Prob (F-statistic)</b>	0.003	<b>Prob (F-statistic)</b>	0.000



The hypothesis of endogeneity was tested but rejected for  $\Delta ausgdp$ .<sup>32</sup> Comparing the time series plots for the actual FDI series and the fitted series derived from the model (Figure 2) also shows that the model performs quite well and even manages to explain the sharp fluctuations from the mid 1990s onwards. So the equation can be considered as an adequate representation of the data generating process.

**Figure 2:** Actual and Fitted Quarterly FDI Series, Q3/1985 to Q2/2002



After having concluded that the regression equation is an adequate representation of the data generating process, the estimation results of the Quarterly FDI Model could be analysed. In order to analyse the effect that each explanatory variable in the dynamic model has over time, the longer run effects were calculated as the sum of the coefficients for the lags of each explanatory variable and are stated in Table 4.<sup>33</sup> The signs of the current effect, the effect after

<sup>32</sup> Endogeneity was tested for using the Hausman test and consumption ( $\Delta cons$ ) as an instrument for  $\Delta ausgdp$ , i.e. a variable that is correlated with  $\Delta ausgdp$  but not with  $rfdi$  (see Eviews Help Topic: The Hausman test). No appropriate instrument could be found for  $\Delta usexr$ , the other potentially endogenous variable, while the remaining variables were assumed not to be contemporaneously endogenous.

<sup>33</sup> For example, the current effect of  $bb30$  is simply the coefficient on current  $bb30$ . The effect after one lag is the sum of the coefficients on current  $bb30$  and  $bb30(-1)$ , while the longer run effect of  $bb30$  is equal to the sum of the coefficients on all lags of  $bb30$  included in the model.

one lag and the longer run effect of each variable on FDI are compared with the expected signs and Yang et al.'s results.

**Table 4:** Quarterly FDI Equation, Observed and Predicted Effects

	Current effect	Effect after one lag	Longer run effect	Expected Sign (from Table 1)	Yang et al's result*
$\Delta ausgdp$	0.485 (n.s.)	0.175 (n.s.)	1.693 (+)	+ or nil	$ausgdp$ : n.s.
$\Delta rwages22$	-69.985 (-)	-158.205 (-)	-158.205 (-)	- or +	$\Delta rwages1$ : +
$jobvac$	5.215 (n.s.)	-13.472 (n.s.)	-160.287 (-)	-	---
$open$	-320.591 (n.s.)	1,024.176 (+)	1,160.620 (+)	+	$open$ : -
$bb30$	-319.254 (n.s.)	1,490.492 (+)	718.254 (+)	+	$\Delta bb30$ : +
$\Delta usexr$	23,088.430 (+)	-13,374.790 (-)	45,306.020 (+)	-	$twi$ : n.s.
$inf$	197.627 (n.s.)	2,416.417 (+)	2,416.417 (+)	-	$inf$ : -
$tax$	62.962 (n.s.)	720.834 (+)	137.396 (+)	-	---
$indus$	n.s.	n.s.	n.s.	-	$indus$ : +
$cdut$	n.s.	n.s.	n.s.	+	---
$oecdgdp$	n.s.	n.s.	n.s.	+	---

n.s.: not significant, \* Effect after one lag, ---: Not included

Looking at the effects over time, the change in  $ausgdp$  ( $\Delta ausgdp$ ) was found to have the expected positive effect on FDI (in line with the OLI framework, horizontal FDI model and knowledge capital model, but in contrast to the vertical FDI model), illustrating that a growth in market size makes Australia a more attractive place to invest. However, the variable was only found to be significant after two lags and not in the short run (including the current time period and one lag). Hence, Australian market growth, which indicates a sound economic environment and growth opportunities for MNEs, appeared to affect the investment decision early on. Sudden changes in Australia's growth performance did not affect the decision to invest.

In terms of factor costs, both the number of job vacancies ( $jobvac$ ) and the change in the real wage rate ( $\Delta rwages22$ ) had the expected negative sign in the longer run (in line with the Heckscher-Ohlin model, OLI framework and vertical FDI model, but in contrast to the horizontal FDI model). FDI was decreasing in the number of job vacancies in the longer run (including up to four lags), though no significant effect could be found in the current time period or even after one lag. The negative sign indicates that a higher demand for labour makes labour and thus production more expensive. This makes Australia a less attractive place to invest – a factor that seems to affect the investment decision early on.

This theory is supported when looking at the change in the real wage rate. Wage increases appeared to have a negative effect on FDI (in the current time period and after one lag). This seems a reasonable result, as higher wages make it more expensive to produce in Australia, which might discourage FDI. In contrast, Yang et al.'s results of a positive effect of wage rate changes and the assumption made in the horizontal FDI model that FDI is attracted by higher wages (representing a higher skill level) were not supported. One interesting outcome is that contemporaneous wage rate changes seem to affect FDI. In fact, the wage rate is one of the only variables to have an effect in the current time period.

Transport costs and protection were measured by openness (*open*) and customs duties (*cdut*). Customs duties, against theoretical predication (based on the OLI framework, horizontal FDI, vertical FDI and Knowledge Capital Model), were not found to be significant and therefore were not included in this model. Openness had the expected positive effect on the inflow of FDI – in the longer run (despite a significantly negative second lag) and after one lag, though no significant contemporaneous effect could be observed. Hence, openness seems to be another factor that has an influence early on in the investment decision and that encourages FDI.

The estimation results for the four risk factors, interest rate (*bb30*), exchange rate appreciation (*Ausexr*), inflation rate (*inf*) and the number of working days lost due to industrial disputes (*indus*), were mixed. While industrial disputes were not found to be significant at all – in contrast to Yang et al.'s unexpected finding of a positive effect, the Australian exchange rate appreciation and inflation rate had signs contrary to the predictions. The Australian interest rate had the expected positive sign in the longer run (including up to four lags) and after one lag but was not significant in the current time period. This illustrates that higher returns to capital in Australia make it more attractive for firms to invest. This result is consistent with the Heckscher-Ohlin model and the risk diversification hypothesis and supports Yang et al.'s result. Furthermore, interest rates seem to positively affect the investment decision early on or one lag before the investment occurs, while contemporaneous changes do not affect FDI.

The unexpected positive signs for exchange rate appreciation and inflation rate are more difficult to explain. If a higher inflation rate signals market instability, it should have a negative

effect on FDI. The unpredicted positive sign is in contrast to theoretical predictions and Yang et al.'s findings. As the effect of inflation on FDI was limited to the short-run and one lag, it only seemed to affect the actual investment but not the decision-making process in the longer run.

An appreciation of the Host exchange rate relative to the US dollar makes it more expensive for MNEs to invest in Australia and should therefore discourage FDI. However, the results are more complex than the prediction, as the analysis of the exchange rate revealed some interesting dynamics. A strong Australian dollar was found to have a positive contemporaneous effect, but a negative effect could be observed after one lag. A strong Australian dollar makes investing more expensive and thus discourages FDI. However, a positive sign was also found after two lags, indicating that a strong Australian dollar encourages FDI and affects the investment decision earlier on.<sup>34</sup> This could be explained by assuming that a strong Australian dollar reflects Australia's sound economic environment, making it a good place to invest. There may also be prospects of growth and higher net returns, as intermediate goods can be bought more cheaply in the international market place. The dynamics of the exchange rate are in contrast to the result in Yang et al., where no significant effect were found, and results by Cushman (1988) or Klein and Rosengren (1994) who found host exchange rate appreciation to have a negative effect on FDI.

Another interesting result is the effect of corporate tax rates on FDI. While there is much discussion that lower corporate tax rates encourage FDI flows, this theory could not be supported by the results here (Table 3). The corporate tax rate (*tax*), the policy variable included, did not have the negative effect predicted by the OLI framework and game theoretic frameworks, but was found to be positive overall. The positive effect in some of the *tax* lags dominated the overall effect on FDI – even though the other *tax* lags and the overall effect up to the third lag had negative signs. Finally, OECD GDP (*oecdgdp*), which was meant to be an

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<sup>34</sup> Interestingly, only *usexr* was found to be significant, while *twi*, which has a strong positive correlation (0.75) with *usexr*, was not significant in this model.

indicator of world GDP or growth trends, was not found to be significant and was therefore not included in the final model.

Overall, the model proved to be an adequate representation of the data generating process and had a higher explanatory power than that of previous models, such as Yang et al.'s model. In addition, the model was able to explain the sharp fluctuations in the FDI series from the mid 1990s onwards. Furthermore, it was found that Australian FDI is driven by long-term considerations and its determinants could not be fully explained by any single theoretical model.

Of eleven potential determinants, five ( $\Delta augsdp$ ,  $jobvac$ ,  $\Delta rwages22$ ,  $open$ ,  $bb30$ ) were found to be significant and of the predicted signs, three ( $\Delta usexr$ ,  $inf$ ,  $tax$ ) had significant effects of unexpected signs, while the remaining three ( $indus$ ,  $cdut$ ,  $oecdgdp$ ) were not found to be significant and were therefore not included in the final model. Factors that appeared to have a strong influence on the investment decision early on were economic growth, openness, interest rates and job vacancies, while contemporaneous wage rate changes and variations in the inflation rate had a short-term impact. Exchange rate appreciation encouraged FDI in the longer run but discouraged it in the medium-run, while the corporate tax rate appeared to have an unexpected positive effect in the longer run.

#### **IV Conclusions and Directions for Further Research**

In the study, for which the most recent data set available was used, some of the limitations of previous studies could be overcome and the variation of FDI over time could be explained successfully. Most of the variables included (GDP growth, wage rate growth, job vacancies, openness, interest rate) had the expected signs, while the signs of other variables (exchange rate appreciation) were plausible – the only exception being the corporate tax rate and inflation rate.

Two points of interest emerged from this estimation. Firstly, the model shows that FDI decisions (unlike portfolio investment decisions) are predominantly driven by longer term considerations. The variables included were not significant in the time period when the investment was made, but were significant for up to five lags. This indicates that the year before

the investment is made is crucial for the investment decision, while the current economic environment does not have much of an effect. Real wage growth and exchange rate appreciation were the only factors that seemed to have an immediate effect on FDI.

Secondly, the estimation results do not show clear support for any of the eight theoretical models discussed. The estimation results seem to be consistent with the predictions of the Heckscher-Ohlin model, though the fact wages and returns to capital were not the only variables found to be significant also indicates that the Heckscher-Ohlin model is not complete. Predictions based on the other models could only be partly supported.

Market growth is consistent with the OLI framework, the horizontal FDI model and the knowledge capital model. A negative sign on wage growth is consistent with the OLI framework and the vertical FDI model but not with the horizontal FDI model. Furthermore, the positive sign on openness is consistent with the OLI framework and interest rate with the risk diversification model. The fact that trade barriers were not found to be significant does not fit into any of the models discussed. The mixed results in terms of risk factors only give limited support to the OLI framework and the risk diversification model, while the positive sign on tax rates does not support the OLI framework or a model using policy variables.

It is unclear, which model works best in explaining Australian FDI. Comparing these empirical results with the theoretical predictions (see Table 1), it seems as though a combination of the OLI framework and the Heckscher-Ohlin or risk diversification model works best as a theoretical basis, but still remains incomplete. Despite the lack of support for one individual model, the results are consistent with the assumption made previously that there is not one single theory explaining FDI but a combination of theories.

Even with some of the limitations of this model<sup>35</sup>, the study was able to explain the large fluctuations of FDI by using variables based on a combination of different theoretical models. It

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<sup>35</sup> Results are limited by data availability and many research issues are open for further analysis. The determinants of country-specific FDI, industry-specific FDI, different forms of FDI and the consequences of quarterly and industry-specific FDI, for instance, have been analysed in related research by the author.

also highlighted the need for understanding better the nature of Australian FDI and the links between investment decisions and such factors as exchange rate movements.

## DATA APPENDIX

The following table provides details of the units of measurement and the sources of the data used in the empirical work:

<i>Variable</i>	<i>Units of Measurement</i>	<i>Source</i>
<i>ausgdp</i>	A\$ million 2000/01 prices, sa	Australian Bureau of Statistics (ABS), National Accounts
<i>ipd</i>	Index, 2000/01 = 1	
<i>prod</i>	Index, 2000/01 = 1, sa	
<i>cons</i>	A\$ million, 2000/01 prices, sa	
<i>nfdi</i>	A\$ million	ABS, Balance of Payments & International Investment Position
<i>expo</i>	A\$ million, 2000/01 prices, sa	
<i>impo</i>	A\$ million, 2000/01 prices, sa	
<i>twi</i>	Index, May 1970 = 100	
<i>usexr</i>	US\$/A\$	
<i>invdef</i>	Index, 2000/01 = 1	ABS, Treasury Model Database
<i>wss</i>	A\$ million per quarter, sa	
<i>emp</i>	'000 employees, sa	
<i>tax</i>	%	
<i>indus</i>	'000 days per quarter	ABS, Labour Force Statistics
<i>awe</i>	A\$ per week, sa	
<i>jobvac</i>	'000 vacancies, sa	
<i>uer</i>	%, sa	ABS, Modellers' Database
<i>cdut</i>	%	
<i>bb30</i>	% per annum	Reserve Bank of Australia (RBA)
<i>inf</i>	% per annum	
<i>oecdrgdp</i>	US\$ billion, 1995 prices, sa	OECD, Quarterly National Accounts
sa: seasonally adjusted		

## REFERENCES

- A.T. Kearney and Global Business Policy Council (2002), *FDI Confidence Index 5*, A.T. Kearney, Alexandria, VA.
- Aliber, R.Z. (1970), 'A Theory of Direct Foreign Investment', in Kindleberger, C. (ed), *The International Corporation*, MIT Press, Cambridge, MA.
- Barrell, R. and Pain, N. (1996), 'An Econometric Analysis of US Foreign Direct Investment', *Review of Economics and Statistics* **78**, 200-207.
- Barros, P.P. and Cabral, L.M.B. (2001), 'Government Subsidies to Foreign Direct Investment', *CEPR Working Paper*, February.

- Bénassy-Quéré, A., Fontagné, L. and Lahrière-Révil, A. (2001), 'Foreign Direct Investment and Company Taxation in Europe', *Economics Working Papers No. 004*, European Network of Economic Polity Research Institutes, Brussels.
- Black, D.A. and Hoyt, W.H. (1989), 'Bidding for Firms', *American Economic Review* **79**, 1249-1256.
- Blonigen, B.A., Davies, R.B. and Head, K. (2002), 'Estimating the Knowledge-Capital Model of the Multinational Enterprise: Comment', *NBER Working Paper 8929*, National Bureau of Economic Research, Cambridge, MA.
- Bond, E. and L. Samuelson, L. (1986), 'Tax Holidays as Signals', *American Economic Review* **76**, 820-826.
- Braconier, H., Norbaek, P.-J. and Urban, D. (2002), 'Vertical FDI Revisited', *IUI Working Paper 579*, The Research Institute for Industrial Economics, Stockholm.
- Brainard, S.L. (1993), 'A Simple Theory of Multinational Corporations and Trade with a Trade-off between Proximity and Concentration', *NBER Working Paper 4269*, National Bureau of Economic Research, Cambridge, MA.
- Brainard, S.L. (1997), 'An Empirical Assessment of the Proximity-Concentration Trade-off between Multinational Sales and Trade', *American Economic Review* **87**, 520-544.
- Brash, D.T. (1966), *American Investment in Australian Industry*, Australian University Press, Canberra.
- Buckley, P.J. and Mathew, A.M. (1979), 'The Motivation for Recent First Time Direct Investments in Australia by UK Firms', *Management International Review* **19**, 57-70.
- Buckley, P.J. and Casson, M. (1976), *The Future of the Multinational Enterprise*, Macmillan, London.
- Caves, R.E. (1971), 'International Corporations: the Industrial Economics of Foreign Investment', *Economica* **38**, 1-27.
- Caves, R.E. (1974), 'Causes of Direct Investment: Foreign Firms' Shares in Canadian and United Kingdom Manufacturing Industries', *Review of Economics and Statistics* **56**, 279-293.



- Cushman, D.O. (1988), 'Exchange-Rate Uncertainty and Foreign Direct Investment in the United States', *Weltwirtschaftliches Archiv* **124**, 322-336.
- Davidson, J.E.H., Hendry, D.F., Srba, F. and Yeo, S. (1978), Econometric Modelling of the Aggregate Time-Series Relationship between Consumers' Expenditure and Income in the United Kingdom, *Economic Journal* **88**, 661-692.
- Deardorff, A.V. (2001), 'Fragmentation in Simple Trade Models', *North American Journal of Economics and Finance* **12**, 121-137.
- Department of Foreign Affairs and Trade (DFAT) (1999), *Foreign Direct Investment: The Benefits for Australia*, Commonwealth of Australia, Canberra.
- Dixit, A.K. and Grossman, G.M. (1982), 'Trade and Protection with Multistage Production', *Review of Economic Studies* **49**, 583-594.
- Dunning, J.H. (1977), 'Trade, Location of Economic Activity and the MNE: A Search for an Eclectic Approach', in: Ohlin, B. et al. (eds), *The International Allocation of Economic Activity*, Holmes and Meier, London, 395-418.
- Dunning, J.H. (1979), 'Explaining the Changing Pattern of International Production: in Defence of the Eclectic Theory', *Oxford Bulletin of Economics and Statistics* **41**, 269-296.
- Dunning, J.H. (1980), 'Toward an Eclectic Theory of International Production: Some Empirical Tests', *Journal of International Business Studies* **11**, 9-31.
- Eaton, J. and Tamura, A. (1994), 'Bilateralism and Regionalism in Japanese and US Trade and Foreign Direct Investment Relationships'. *Journal of Japanese and International Economics*, vol.8, pp.478-510.
- Ekholm, K. (1998), 'Proximity Advantages, Scale Economies, and the Location of Production', in: Braunerhjelm, P. and Ekholm, K. (eds), *The Geography of Multinationals*, Kluwer Academic Publishers, Dordrecht.
- Ekholm, K., Forslid, R. and Markusen, J.R. (2003), 'Export-Platform Foreign Direct Investment', *NBER Working Paper 9517*, National Bureau of Economic Research, Cambridge, MA.
- Ethier, W. (1986), 'The Multinational Firm', *Quarterly Journal of Economics* **101**, 805-833.
- Eviews (2001), *EViews 4.0 User Guide*, Quantitative Micro Software, LLC, Irvine, CA.

- Goldberg, M.A. (1972), 'The Determinants of US Direct Foreign Investment in the EEC: Comment', *American Economic Review* **62**, 692-699.
- Greene, W.H. (2000), *Econometric Analysis*, Prentice-Hall, New York.
- Grossman, G.M. and Helpman, E. (2002), 'Outsourcing versus FDI in Industry Equilibrium', *NBER Working Paper 9300*, National Bureau of Economic Research, Cambridge, MA.
- Haaland, J.I. and Wooton, I. (2001), 'Multinational Firms: Easy Come, Easy Go?', *CEPR Discussion Paper*, No 2600.
- Hanson, G. H., Mataloni, R. J., Slaughter, M. J. (2001), 'Expansion Strategies of U.S. Multinational Firms', *NBER Working Paper 8433*, National Bureau of Economic Research, Cambridge, MA.
- Helpman, E. (1984), 'A Simple Theory of Trade with Multinational Corporations', *Journal of Political Economy* **92**, 451-471.
- Horstmann, I.J. and Markusen, J.R. (1992), 'Endogenous Market Structures in International Trade (natura facit saltum)', *Journal of International Economics* **32**, 109-129.
- Hutchinson, D. and Nicholas, S. (1994), *Japanese Multinationals in Australian Manufacturing: Facts and Perceptions of Foreign Direct Investment and Technology Transfer*, Department of Economic History, University of Melbourne, Parkville.
- Hymer, S.H. (1976), *The International Operations of National Firms: A Study of Direct Investment*, MIT Press, Cambridge, MA.
- Invest Australia (2003), *Australia: A Wealth of Opportunity*, Commonwealth of Australia, Canberra.
- Jones, R.W. and H. Kierzkowski (2004), 'International Fragmentation and the New Economic Geography', forthcoming in *North American Journal of Economics and Finance*.
- Karunaratne, N.D. and Tisdell, C. (1998), 'Globalisation and Multinational Foreign Direct Investment – Australian Insights', *Economia Internazionale* **51**, 531-553.
- Kindleberger, C.P. (1969), *American Business Abroad: Six Lectures on Foreign Direct Investment*, Yale University Press, New Haven.

- Klein, M.W. and Rosengren, E. (1994), 'The Real Exchange Rate and Foreign Direct Investment in the United States: Relative Wealth vs. Real Wage Effects', *Journal of International Economics* **36**, 373-389.
- Krugman, P.R. (1983), 'The "New Theories" of International Trade and the Multinational Enterprise', in: Kindleberger, C.P. and Audretsch, D.B. (eds), *The multinational corporation in the 1980s*, MIT Press, Cambridge, MA, Ch.3.
- Lall, S. (1980), 'Monopolistic Advantages and Foreign Involvement by U.S. Manufacturing Industry', *Oxford Economic Papers* **32**, 102-122.
- Lucas, R.B. (1993), 'On the Determinants of Foreign Direct Investment: Evidence from East and Southeast Asia', *World Development* **21**, 391-406.
- Markusen, J.R. (1984), 'Multinationals, Multi-Plant Economies, and the Gains from Trade', *Journal of International Economics* **16**, 205-266.
- Markusen, J.R. (1997), 'Trade versus Investment Liberalisation', *NBER Working Paper 6231*. National Bureau of Economic Research, Cambridge, MA.
- Markusen, J.R. and Maskus, K.E. (2002), 'Discriminating among Alternative Theories of the Multinational Enterprise', *Review of International Economics* **10**, 694-707.
- Nicholas, S., Merrett, D., Whitwell, G., Purcell, W. and Kimberley, S. (1996), *Japanese FDI in Australia in 1990s: Manufacturing, Financial services and Tourism*. Australia-Japan Research Centre, The Australian National University, Canberra.
- OECD (2005), *Trends and Recent Developments in Foreign Direct Investments*, OECD, Paris. [www.oecd.org/dataoecd/13/62/35032229.pdf](http://www.oecd.org/dataoecd/13/62/35032229.pdf)
- Pain, N. (1993), 'An Econometric Analysis of Foreign Direct Investment in the United Kingdom', *Scottish Journal of Political Economy* **40**, 1-23.
- Pain, N. and Wakelin, K. (1998), 'Export Performance and the Role of Foreign Direct Investment', *Manchester School of Economic and Social Studies* **66**, 62-88.
- Parry, T.G. (1978), 'Structure and Performance in Australian Manufacturing. With Special Reference to Foreign-Owned Enterprises', in: Kasper, W. and Parry, T.G. (eds), *Growth*,

- Trade and Structural Change in an Open Australian Economy*, Centre for Applied Economic Research, University of New South Wales, Kensington, 173-199.
- Ratnayake, R. (1993), Factors Affecting Inter-Industry Variation of Foreign Ownership of Manufacturing Industry. *Applied Economics* **24**, 653-659.
- Root, F.R. and Ahmed, A.A. (1978), 'The Influence of Policy Instruments on Manufacturing Direct Foreign Investment in Developing Countries', *Journal of International Business Studies* **9**, 81-93.
- Rugman, A.M. (1975), 'Motives for Foreign Investment: The Market Imperfections and Risk Diversification Hypothesis', *Journal of World Trade Law* **9**, 567-573.
- Santiago, C.E. (1987), 'The Impact of Foreign Direct Investment on Export Structure and Employment Generation', *World Development* **15**, 317-328.
- Saunders, R.S. (1982), 'The Determinants of Interindustry Variation of Foreign Ownership in Canadian Manufacturing Industries', *Canadian Journal of Economics* **15**, 77-84.
- Scaperlanda, A.E. and Mauer, L.J. (1969), 'The Determinants of US Direct Investment in the EEC', *American Economic Review* **59**, 558-568.
- Swedenborg, B. (1979), *The Multinational Operations of Swedish Firms: An Analysis of Determinants and Effects*. Industrial Institute for Economic and Social Research, Stockholm.
- Tcha, M. (1999), 'A Note on Australia's Inward and Outward Direct Foreign Investment', *Papers in Regional Science* **78**, 89-100.
- Thompson, R.S. (1985), 'Risk Reduction and International Diversification: An Analysis of Large UK Multinational Companies', *Applied Economics* **16**, 529-541.
- United Nations Conference on Trade and Development (UNCTAD) (2002), '*World Investment Report 2002: Transnational Corporations and Export Competitiveness*', United Nations, New York and Geneva.
- United Nations Conference on Trade and Development (UNCTAD) (2003), *World Investment Directory Country Profile: Australia*. [www.unctad.org](http://www.unctad.org)
- Yang, J.Y.Y., Groenewold, N. and Tcha, M. (2000), 'The Determinants of Foreign Direct Investment in Australia', *Economic Record* **76**, 45-54.