Why Do Foreign Firms Invest in South West England?

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Abstract

Regional Development Agencies compete to attract foreign direct investments (FDI) that generate economic benefits. This paper seeks to identify factors that attract FDI to the South West region of the UK. The results suggest that the South West's average wage levels, population density, unemployment rate, physical infrastructure expenditure, growth and the relative dominance of the manufacturing sector all contribute to the multinational enterprise's decision to locate to the South West. The amount of defence spending is also found to be a determinant, suggesting that the defence sector might be an attractor of FDI. These results are endorsed by a separate survey analysis.

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1. Introduction

The amount of foreign direct investment (FDI) coming into the UK has quadrupled over the last twenty years (Invest UK, 2001) with a record level of FDI announced in 2000 of over 800 new, recorded projects. Regional Development Agencies (RDAs) across the UK compete to attract FDI from multinational enterprises (MNEs) to gain direct economic benefits for their region in the forms of greater employment, knowledge, training, wealth and managerial expertise. Indirect effects from FDI of regional development and regeneration can also occur through the multiplier and the creation and/or attraction of firms to the local economy along supply chains.

Various authors have examined the determinants of FDI into individual UK regions (such as Hill and Munday, 1991, for Wales) but the authors are unaware of any empirical examination that has focused on South West England. This is surprising given that the South West is the largest English region when measured by area. This paper fills a gap in the literature by conducting in *ex post* examination of the motivation for foreign firms to invest in the South West England.

This paper has the following structure. Section 2 reviews the literature. The data and econometric techniques are presented in Section 3 and the empirical results in Section 4. Section 5 reports primary research undertaken to complement the econometric investigation while the results of this primary research are offered in Section 6. Policy implications follow in Section 7. A conclusion ends the paper in Section 8.

2. Literature Review

Theories of FDI, the ownership and control of domestic physical productive assets by foreign firms, have been developed in response to the failure of classical and neo-classical models of international trade to explain the existence of FDI by MNEs. Trade barriers, taxes, asymmetric information and differences in cultures and tastes all lead to market imperfections that encourage FDI. For instance, after controlling for market size and relative labour costs, Barrell and Pain (1999) find that Japanese FDIs were significantly influenced by trade protection measures, and in particular by the level of anti-dumping actions.

Vernon (1966) and Knickerbocker (1973) developed the theoretical origins of FDI prior to the identification that asymmetries in markets create incentives to undertake FDI. Vernon applied the product life cycle hypothesis to both FDI and international trade and identified that the lifecycle of a product has three distinct stages, with the final stage of the product life cycle being where manufacturing takes place in the lowest cost location. Typically, the UK is not the cheapest place in the EU to produce goods and the effect of relatively high production costs was one reason why Clarks, a major manufacturer of apparel, moved its manufacturing base from the South West of the UK to Portugal. Other British-owned firms that have relocated abroad include those that operate in the textile, steel and manufacturing industries, and this is often because of lower costs and higher rates of productivity elsewhere. Indeed Dyson, the pioneer in cyclone vacuum cleaners and one of the South West's indigenous success stories, closed its Malmesbury (Wiltshire, UK) manufacturing plant and, quite openly, relocated to Malaysia to a benefit from comparatively low-cost production.

A second factor that influences the choice of location is the ability to compete with indigenous firms. Hymer (1976) addresses the question of how MNEs can compete with indigenous firms and suggests that they achieve this by maximising its advantage in the

production process of intermediate goods and that access to new, large and affluent markets can be the most significant factor to a company when deciding to invest abroad. Support of Hymer's theory is provided by Lunn (1980).

Dunning (1979, 1993) synthesised a number of different elements of the theory of the firm, international trade and international production and argues that there is no general theory of FDI. His developments, which have become known as the 'Eclectic Paradigm', pull together the main approaches of international market failure, industrial organisation theory and location theory by combining functional ownership, location and internalisation advantages as explanations to suggest why companies may export, license or service international markets through FDI.

Although various papers present investigations into the determinants of FDI at a national level (examples include Knickerbocker, 1973; Kravis and Lipsey, 1982; Wheeler and Moody, 1992), relatively little research has been undertaken looking at FDI at the regional level. There are, of course, some exceptions.

Collis and Noon (1994) examined FDI at the sub-national level in the UK and conclude that financial assistance and regional industrial mix are major determinants to the levels of FDI. They also suggest that securing initial investments lead to greater FDI, as second wave investments are common among investing companies. Cheng and Kwan (2000) support this when they find a strong self-reinforcing effect of FDI.

Regional supply chains and industrial structures can influence the probability that a firm locates to a region once it has also decided to locate to a country. Collis and Roberts (1992) show that communication infrastructure were the main attraction of the West Midlands. Stone and Peck (1995) compare the performances of the UK regions in the foreign owned manufacturing sector. Particular attention was placed on employment changes attributable to new plants relative to plant closures, acquisitions and *in situ* expansions and contractions. They identified a clear gap between the contraction in employment in Northern Ireland and Scotland on one hand and the gains in the Northern region of Wales on the other.

Three of the most important papers in the FDI literature on UK regional differentials are Hill and Munday (1991, 1992) and Billington (1999). A summary of their findings is presented in Table 1. Hill and Munday (1991) present econometric research into the determinants of regional FDI in the UK with particular focus on the Welsh economy. They estimate three equations each with different dependent variables: new FDI projects (*FDIP*), FDI jobs (*FDIJ*) and FDI capital expenditure (*FDIC*). The one significant variable in all models was the Wales/UK earnings ratio, while regional preferential assistance was significant in the *FDIC* model, the share of infrastructure was significant in the *FDIJ* model and the Welsh/UK output growth differential was significant in the *FDIP* model.

{Table 1 about here}

Hill and Munday (1992) develop their original model to examine levels of FDI using a pooled sample of nine regions from 1979-1989. Their results show that all variables were significant when regressed against jobs and projects. Cheng and Kwan (2000) present a regional analysis of FDI in China and found similar results: a large regional market, good infrastructure and preferential policy all had a positive effect, while wages had the predictable negative effect.

Billington (1999) examines both national and regional determinants of FDI. He uses a general to specific approach to obtain results that suggest population density, wage rates,

unemployment and regional dummies are statistically significant determinants of FDI. Unlike Hill and Munday (1991, 1992), Billington (1999) found real GDP, regional preferential assistance and real annual public spending on roads all to be statistically *in*significant determinants to the level of FDI.[1]

3. Modelling FDI in the South West

The South West economy has grown steadily over the last two decades, although some areas within the South West – such as Cornwall and the Forrest of Dean – remain amongst the poorest parts of the EU. The South West's economy currently constitutes a mere 8% towards national GDP (South West RDA, 2001) even though it is the largest English geographical region.

Given that MNEs have chosen to invest in the UK, what factors influence the decision by MNEs to invest in the South West? We adopt the models of Hill and Munday (1991, 1992) and Billington (1999) to obtain empirical results for the South West regions of the UK. Hill and Munday (1992) estimate equation (1) while Billington (1999) estimates equation (2):

$$FDI(X)_t = f(LC_{(t-x)}, GRO_{(t-x)}, RPA_{(t-x)}, INF_{(t-x)}) \quad (1)$$

$$FDI(X)_t = f(GRO_{(t-x)}, SIZE_{(t-x)}, INF_{(t-x)}, UNP_{(t-x)}, LC_{(t-x)}, RPA_{(t-x)}, IND_{(t-x)}, SW_{(t-x)} \quad (2)$$

Dependent Variables[2]

Following Hill and Munday (1991), the model presented below is constructed using three separate measures for the dependent variable: the region's share of new FDI projects (*FDIP*), the region's share of jobs created/safeguarded through FDI (*FDIJ*) and the region's share of FDI capital expenditure (*FDIC*).

- *FDIP:* This variable represents a standardised share of new FDI projects and is derived by creating an index of the number of new projects in the South West compared to the number of new projects in the UK (South West projects / UK projects). An average performance by the South West against all other regions will result in an index value equal to 1. All the data are lagged for one and two years in accordance with Billington (1999).
- *FDIJ:* This variable represents a standardised share of regional jobs created/safeguarded and is derived by creating an index of the number of jobs created/safeguarded in the South West compared to the number of jobs created/safeguarded in the UK (South West jobs / UK jobs).
- *FDIC:* This variable represents the standardised share of capital expenditure for the South West relative to the whole of the UK, after controlling for inflation.

[1] The contrasting results might be due to regions attracting different levels of FDI because different factors attract different MNEs and these factors might by region specific. In other words, the fixed effects employed in Billington (1999) might capture regional heterogeneity that is correlated with other regional specific variables.

[2] Full details of all variables are included in the Appendix. Our ability to replicate the variables of Hill and Munday (1991, 1992) and Billington (1999) are restricted by data availability.

Independent Variables:[3]

In accordance with the literature reviewed above and the empirical studies of Hill and Munday (1991, 1992) and Billington (1999), several explanatory variables are employed in the empirical estimations.

- *Regional Economic Growth*: In accordance with Hill and Munday (1991), two measures have been used to measure growth: *GRO* and *SWGRO*. *GRO* is the South West's growth rate compared to the UK as a whole, while *SWGRO* is the annual rate of output growth for the South West. We expect a positive sign here.
- *Population Density:* This is the South West population density compared to the UK (in persons per km^2) and is adopted from Billington (1999). This variable captures the size of the market and the availability of labour.
- *Infrastructure:* The infrastructure measure used by Hill and Munday (1991) is adopted and is the South West's share of spending on motorway and trunk roads compared to the whole of the UK. It is a proxy for the relative rate of improvement in infrastructure and an indication of the level of infrastructure. A factor that determines the location of a foreign investment is location advantage (Dunning, 1979) and locational advantages can fall into two main categories: infrastructure and labour. If a region has a well-built and maintained infrastructure this is deemed to be of great benefit to investing companies.[4]
- *Regional Incentives:* Regional and national assistance is available through a number of incentives. However, the main source of such data is Regional Preferential Assistance (RPA) that records the actual payments made. The variable is included to capture the amount of financial assistance compared to other regions and includes grants given to either regional authorities or directly to the company to attract them to the region. RPA reduces the total cost of the investment to the foreign firm by financing start-up costs and by improving infrastructure, thereby reducing company operating costs. Two measures are employed here to capture the RPA effect: *RPA* and *EMRPA*. Hill and Munday (1991) use *RPA*, which is the regional share of UK RPA in real terms. *EMRPA*, used by Hill and Munday (1992), is similar to *RPA* but linked to the number of workers and not the whole population. The latter should limit the effects of a region having a non-standard demographic profile, such as an above average proportion of inhabitants who are retired.
- *Earnings (ERN):* Relative earnings are an indication of wage levels that impact on companies' costs and profitability. Although earnings is a poor measure of relative unit labour cost, as it takes no account of other costs associated with labour and is an indirect measure of labour productivity, the earnings ratio is employed as a proxy for relative labour costs. However, a highly educated and skilled workforce will command higher wages and this may attract investing firms in the high technology industries.
- *Unemployment (UN):* This is the South West's unemployment rate relative to the UK as a whole and is included because as unemployment increases then labour availability increases and labour costs should either fall (or rise at a slower rate in the future), which

[3] There are a number of variables that have been omitted from the model that are sometimes suggested in the literature as being important, such as barriers to trade, inflation and political stability. However their omission is chosen because they are probably more important at the national level, as suggested by Billington (1999), and less important at the regional level.

[4] Collis and Roberts (1992) found that infrastructure ranked as the most significant variable for companies when deciding to locate to the West Midlands.

should attract more FDI. Other than Billington (1999), Friedman *et al*. (1992) also found this to be a statistically significant determinant of FDI.

- *Manufacturing Ratio:* Billington (1999) includes the proportion of GDP from manufacturing as a proxy for the degree of industrialisation of regions and Wheeler and Moody (1992) provide evidence that the degree of industrialisation has a significant impact on the amount of FDI.
- *Defence Expenditure:* Historically the South West is a region that has been grounded in the defence industry; examples include Rolls Royce, BAE Systems and Augusta Westlands. This defence link with the South West is reinforced by the location of the MOD procurement centre in Bristol. When defence spending increases as a percentage of GDP, this has a positive knock on effect within the local market with higher growth and greater levels of FDI.

4. Econometric Methodology and Regression Results

Based on the literature detailed in the previous section, model augmentations of Hill and Munday (1991, 1992) and Billington (1999) are produced for the South West region. The time period covered is from 1986-1999**.** Models are estimated using three separate dependent variables: the number of new FDI projects (*FDIP*), number of jobs created/safeguarded through FDI (*FDIJ*) and the level of FDI capital expenditure (*FDIC*). These are reported in turn.

Model One: FDIP

The results from the *LFDIP* regression are presented in the Table 2. Columns (a) – (c) present augmentations of Hill and Munday's (1991, 1992) models while columns (d) – (f) present augmentations of Billington's (1999) model. Most models pass all diagnostic tests at the 5% significance, but there is concern over normality for model (f) which is a replication of Billington's model. If we compare the *F*-statistics we find that Billington's model outperforms Hill and Munday's while the null hypothesis of no causal relationship between the regressand and regressors can be rejected in each case.

{Table 2 about here}

Models (a) – (c)

Preliminary observation of models (a) - (c) go some way to support the hypothesis that earnings are an important determinant of the number of *FDIP* in the South West as $LERN_{(t-2)}$ is significant at the 10% level in model (a) and (b). The coefficient for $LERN_{(t-2)}$ has a positive sign, suggesting that higher labour costs will increase the level of FDI. High labour costs could be strongly associated with and an indication of a relatively highly skilled and educated work force. The interpretation is that MNEs operating in high skilled and high value-added industries look to invest in a region with relatively high labour costs, as it is more likely to be able to provide the educated workforce that the MNE needs.

GRO and *RPA* are both insignificantly different from zero, suggesting that the regions growth rate and the region's preferential assistance do not significantly attract FDI projects.[5] When the defence proxy is included all variables become insignificant determinants of the number of new FDI projects. This leads to the conclusion that industrial structure is influencing *FDIP* and should be incorporated into the model; when we include the importance of the defence sector in our model then the statistical significance of the other variables falls.

The infrastructure variable, $LINF_{(t-1)}$, is negative and highly significant in two of the three models. The negative coefficient suggests that lower rates of increase in infrastructure expenditure lead to higher FDI. This might be capturing the fact that the FDI responds to an already developed transportation infrastructure; if a region has to increase its investments in its transportation infrastructure every year then it is probably because the current infrastructure is inadequate or inefficient.[6]

Models (d – f)

The first thing to notice from our replications of Billington's models is that the results support those presented above: earnings appear to have a significant and positive effect on the number of FDI projects, and infrastructure expenditure has a negative effect. Also, the growth rate of the region appears to be an insignificant determinant, as does the regions' preferential assistance. Immediately noticeable is the identification that the density of the population and unemployment rates are highly significant determinants of the level of FDI in terms of projects.

Once $LDEF_{(t-1)}$ is included $LERN_{(t-2)}$ increases in significance to the 1% level, reinforcing the belief that $LERN_2$ is critical in explaining regional FDI, but this might be due to a problem with the normality of the residuals biasing the results. Further weight could be added to this proposition because $LGR_{(t-2)}$ becomes significant at the 1% level, having not been significant in the two previous models. Although there is a question over the normality of the residuals in model (f), the defence variable is significant at the 5% level and has a positive coefficient, suggesting that there may be some multiplier and attraction effects from the defence sector in the South West on FDI.

[5] The insignificance of *RPA* is in contrast to the results of Hill and Munday (1991) but can be easily explained by differences between the South West and Welsh economies. A large part of North and West Wales plus the Valley areas qualify for grant aid under Objective One status whereas the South West only has Objective One status in Cornwall. If the South West increases its share of grants compared to the rest of the UK, it is likely to be caused by less grants being paid nationally. The South West's prosperity as a whole is not governed by grants. Weight is added to the argument when looking at Honda's investment into Swindon. When the original investment took place, Honda stated that Swindon had won the investment because it was the only place that had ***not*** offered financial incentives to locate there. Honda believed that financial incentives were only offered when significant structural difficulties in the local economy were apparent.

[6] This measure is biased towards the expenditure on trunk roads and motorways, ignoring the requirements of the service and weightless industries.

Model 2: LFDIJ Regression Results

The results from the *FDIJ* regressions are presented in Table 3:

{Table 3 about here}

These results are comparatively poor. According to the *F*-statistic, the null hypothesis of no causal relationship between the regressand and regressors can only be rejected at the 10% level in most cases. Also the diagnostic tests are rejected in two cases: once for serial correlation in Hill and Munday's model and once for normality for Billington's model.

Models (a - c)

When the defence valuable is excluded from the model, the South West's growth rate and the region's preferential assistance both appear to be significant determinants of number of jobs created/safeguarded through FDI. However, the region's growth rate appears to have a negative sign, suggesting that an increase in economic activity decreases the number of jobs created/safeguarded through FDI. This could be because higher growth makes the region less attractive, probably because it increases the demand for local labour and this would result in higher costs of labour. Including the defence variable makes everything insignificant.

Models (d-f)

In model (e), after the variable deletion test, the *t*-tests for $LERN_1$, along with all the remaining five variables, $LGR_{(t-1)}$, $LDEN_{(t-1)}$, $LINF_{(t-2)}$ $LUNP_{(t-1)}$ and $LMANR_{(t-1)}$ become statistically significant at the 5% level. All the variables, except $LMANR_{(t-1)}$ have the expected signs.

$LERN_{(t-1)}$ for the first time has a negative coefficient; high numbers of jobs created are likely to be in manufacturing and low skilled industries. These industries are in the mature phase of the product life cycle and the investing firm may be searching out a low cost base. Hence as earnings decrease job creation through FDI increases.

$LMANR_{(t-1)}$ has a positive coefficient which is in accordance with economic theory but in contrast to the *LFDIP* model. This can be explained: when an MNE invests in a region it creates large amounts of jobs and therefore labour availability may be their prime concern. Since *FDIJ* measures job creation the results in *FDIP* and *FDIJ*, although different, are not unexpected, as investments that are labour intensive could be in the manufacturing sector.

Model 3: LFDIC Regression Results

The results of these regressions are included in Table 4:

{Table 4 about here}

Model (a - c)

The three models pass all diagnostic tests at the 5% significance level while the *F*-statistic is significant at the 1% and 10% levels indicating that the null hypothesis of no causal relationship between the regressand and regressors can be rejected.

The results of the individual variables again indicated that the $LERN_2$ variable had a positive coefficient but was not significant at the 10% level. The alternative hypothesis of high labour costs reflecting a highly qualified and skilled labour force could be appropriate here. $LGR_{(t-1)}$ variable is insignificant and has a negative coefficient, as with the *FDIJ* model. It is possible that the market growth variable picks up effects of shrinking factor endowments, including labour and an increase in costs. $LINF_{(t-1)}$ and $LEMRPA_{(t-1)}$ are significant at the 1% and 5% levels and both have negative coefficients, due to $LINF_{(t-1)}$ picking up effects of a poor infrastructure and $LEMRPA_{(t-1)}$ picking up effects of lower levels of capital expenditure on national FDI. The variable deletion test, omitting $LERN_{(t-2)}$ and $LGR_{(t-1)}$, has a positive effect on the two remaining variables. Both $LINF_{(t-1)}$ and $LEMRPA_{(t-2)}$ become significant at the 1% level and the model becomes significant at the 1% level. The *F*-test between models indicates the omitted variables are statistically insignificant. With the inclusion of the omitted variables and the $LDEF_{(t-1)}$ variable, the number of observations is reduced to 13. $LINF_{(t-1)}$ and $LDEF_{(t-1)}$ are now significant at the 10% level and $LEMRPA_{(t-2)}$ is significant at the 5% level. The model passes all diagnostic tests and is significant at the 10% level.

Models (d) – (f)

The three models pass all diagnostic tests at the 5% significance level while the *F*-statistic is consistently significant at the 1% level indicating that the null hypothesis of no causal relationship between the regressand and regressors can be rejected.

$LERN_{(t-2)}$ is statistically significant throughout the results at the 10% or 5% levels and has positive coefficients. The model improved with the omission of $LUNP_{(t-1)}$ and inclusion of $LDEF_{(t-2)}$. $LDEN_{(t-1)}$ remained significant at the 1% level.

A word of caution: the robustness of the model is questioned due to a number of conflicting indicators: $LINF_{(t-x)}$, $LEMRPA_{(t-x)}$ and $LDEF_{(t-x)}$ change coefficient signs between models (a) to (c) and models (d) to (f). Both signs can be explained with economic theory. These concerns are reinforced with the changing lag structures between models. In models (a) – (c) and (d) – (f) all three variables, $LINF_{(t-x)}$, $LEMRPA_{(t-x)}$ and $LDEF_{(t-x)}$, change their lag structure from one to two years or visa-versa. A possible explanation is that the extra variables in models (d) – (f) may be influenced by multicollinearity. However, correlation matrices do not support this assumption, as all correlations are relatively low, the highest being 0.57. However the high R^2 and low *t*-ratios are an indication that multicollinearity may be present. An alternative explanation is that the variables may pick up different effects in the different models.

Discussion

The dependent variables, *FDIJ* and *FDIC* are forecast data and not actual observed data. They should therefore be viewed more sceptically than the *FDIP* results. The results of the models are good with all three models passing the *F*-tests on overall fit. Regression results that replicate Billington (1999) have higher R^2s than those of Hill and Munday (1991, 1992). The results on the variables were also pleasing with all 11 different variables proving to be statistically significant in different models.

The variables represented proxies for labour, market growth and size, incentives, infrastructure, industrialisation and the South West's economy. *LERN* was found to be significant in all three models. However in *FDIP* and *FDIC*, a two-year lag was most appropriate and the coefficient sign was positive. In the *FDIJ* model, a one-year lag with a negative sign was preferred.

Hill and Munday (1991, 1992) found earnings to be negative in all three models. Billington only tested one model, *FDIP*, and found unit wage costs to be negative. In the three regressions, earnings are negative in the *FDIJ* model but positive in *FDIP* and *FDIC*. The difference in results could be explained by a higher skilled service economy in the South West. It is these high skilled employees that are highly paid, which are attractive to some types of MNEs. However when jobs created is the dependent variable the coefficient sign changes to negative. Investments focussed on large-scale employment will frequently search for the lowest cost base, ceteris paribus. This is because the investments are likely to be in manufacturing or similar industries in the final stage of the product life cycle, hence the negative coefficient.

Market growth was significant in all three models. In models *FDIP* it had a positive coefficient, in model *FDIJ* it had a negative coefficient and in model *FDIC* it had either a negative or a positive coefficient. Billington (1999) did not find this variable significant but Hill and Munday (1991) did, and they found it to possess a positive coefficient. The contrasting results are believed to occur due to market growth picking up effects of limited labour availability. This is a particular problem for the South West as the government has strict building restrictions on Greenfield sites. The South West has an extremely high proportion of areas of outstanding natural beauty and has suffered from a lack of housing stock: as the market grows, the saturation point comes closer and demand for labour starts to exceed supply, leading to a reduction in levels of FDI.

The variable for density was found to be positive in *FDIJ* models and is in line with Billington's (1999) results. However the *FDIP* and *FDIC* models produced a negative coefficient. This can be explained by the geography of the South West. As the South West suffers from land shortages, high areas of density may indicate saturation point and shortages of factor endowments.

The infrastructure proxy of spending on motorways and trunk roads were found to be significant and have a positive coefficient in Hill and Munday's (1991a, 1992) model but not significant in Billington's (1999). The proxy for infrastructure seems to capture not only increased spending on infrastructure, but also the effect of having a poor infrastructure in the first place. It was this effect which was probably reflected in our results: infrastructure was significant and negative in all three models.

Unemployment in *FDIP* and *FDIJ*, as with Billington (1999), was found to be significant and positively signed. This suggests that labour availability and skilled labour in the market place are crucial when attracting FDI.

Two measures were used to represent grants but only *RPA* produced a statistically significant result. It was negative in the *FDIJ* model and positive and negative in *FDIC* model. The contrasting results raise concerns about the *FDIC* model. The unexpected negative result can be explained by a rising share of *RPA* in the South West which may be as a result of falling levels of national FDI and hence regional FDI.

The manufacturing ratio was statistically significant and gave a negative result for *LFDIJ* and a positive result for *LFDIC*. Although Billington (1999) tested this variable, he never found the manufacturing ratio to be statistically significant. However it is feasible that unskilled and semi-skilled labour intensive FDI will locate to a low manufacturing area to ensure it can recruit the required labour force. By locating in a low manufacturing area the MNE reduces the number of competitors for the potential employees.

The final variable, *LDEF* was a proxy for the South West region as a defence dominated economy. *LDEF* was significant with a positive coefficient in *FDIP* and *FDIC* model (c). However in *FDIC* model (f) the variable was significant with a negative coefficient. The mixed results are a concern and further research is necessary here. The main difference in findings between this paper and Hill and Munday's (1991a) and Billington's (1999) analyses can be explained by the differing structures of the economies evaluated.

In addition the low sample size may be one of the reasons why the results vary. Nevertheless, the sample size is not too different from the sample sizes employed by Hill and Munday (1991, 1992).

5. Primary Research

Some primary research was undertaken to compliment the econometric empirical analysis presented above. The rationale for the design and implementation of the small questionnaire was to gain additional evidence to support the results from the econometric model. The questionnaire was sent to foreign owned companies that located in to the South West region between 1995 and 2001. The results will inherently be biased towards those companies that located to the South West and we do not identify those factors that encouraged MNEs to locate to other regions.

The questionnaire was designed with an answer scoring system to assist with statistical interpretation. Scoring systems reduce the amount of time needed to fill in the form and increase the response rate. The method for estimating the sample was to use a stratified sampling technique to increase the likelihood that the selection process was random. Companies were contacted via an introductory letter, sent on South West Regional Development Agency headed paper and they were assured that companies would be anonymous in any analysis. The letter included a pre-paid addressed envelope to return the completed questionnaire. 18 out of 50 questionnaires were returned giving a response rate of 36%. The sample was stratified by:

- **Year of investment**. The South West RDA hold data from 1995-2001. For the sample to remain unbiased it was important to have companies who located to the South West in every one of the six years represented in the sample.[7]
- **Sector**. The sample was stratified by sector to ensure the three sectors of the economy (were represented: 18 manufacturing, 16 ICT and 16 Services sector firms were sent questionnaires. Of those 8, 7 and 3 companies respectively returned completed questionnaires.

[7] The sample period in the questionnaire does not correspond directly to the period of the econometric model (1986-1999). The full six years data is used, 1995-2001, to ensure that the sample would be at its most representative.

- **County**. Each county has different factor endowments that may lead to specific results.

Twenty-nine individual questions were included in the questionnaire. The respondents were asked to grade a number of factors according to the perceived importance for the company when it was deciding to invest/re-invest in the South West region. The questionnaire has been designed using a scoring system from 1-5, where 1 implied high importance and 5 implies no importance. The questionnaire had six separate sections: 'Infrastructure', 'Cost of Production', 'Labour', 'Environment', 'Government' and Clustering'.

{Table 5 about here}

6. Results of Primary Research

Unsurprisingly, labour is the most important determinant of FDI in the South West, which is in accordance with both the theoretical understanding (Root and Ahmed 1979; Scheider and Fry 1985) and the econometric results presented above. However the results are interesting in that infrastructure and cost of production are ranked 6th and 5th respectively and are below mean importance. However this may not be a true picture as infrastructure, cost of production and labour are all intrinsically linked. Infrastructure improvements have a positive knock-on effect on the cost of labour by increasing labour availability through widening the catchment area and providing the telecommunication infrastructure to support home working. It also decreases the cost of production by influencing productivity through home working and reducing transportation costs of goods and services.

The infrastructure result in the primary research may be biased. The questions relating to proximity to airport, London, rail network and sea port occupy four of the five bottom ranking positions in the index and skew the results of the other three infrastructure questions. If the infrastructure measure were only availability of land/premises, standard of communication and proximity to motorway, the mean average index would have been 0.44 points above the mean importance index.

FDIP and *FDIC* wage rates were positively correlated with FDI projects and jobs suggesting that the quality of labour is more important than the cost of labour. These results are reinforced by this primary research into grants, which have little impact in attracting FDI. Costs overall are not rated as being above average importance in attracting FDI. This highlights how important the labour market is to foreign investors and suggests that resources should be injected into the economy to attracting additional personnel to the region and to train the personnel already in the region if FDI is to increase.

{Table 6 about here}

Government is above mean importance suggesting that it is a fairly important determinant of FDI. Regional government may become an increasingly important issue in the future with PM Tony Blair's vision of decentralisation. These policies have already led to the formation of the Regional Assembly in the South West, which may prove to be the forerunner to a regional parliament, as with the new parliaments created in Wales and Scotland.

Infrastructure and the environment were all below mean importance. A direct interpretation of these results would suggest that these variables are relatively less important.

However, infrastructure is linked with the cost of production and the availability of labour. It is also influenced by the four groups which had comparatively little importance (proximity to railway, airport, London and sea port).

Economic theory suggests that infrastructure is an important determinant of FDI (Hill and Munday 1991, 1992; Billington 1999). It was the most important factor in the survey work of Collis and Roberts (1992) when evaluating the determinants of investment into the West Midlands. Only companies that located into the South West were questioned in our survey and those MNEs that did evaluate the South West but decided to locate elsewhere were obviously excluded from our sample. This includes those companies who rejected the South West Region due to its poor infrastructure. This suggests the South West is securing FDI in spite of having a poor infrastructure and would increase its share of FDI if the infrastructure were improved.

7. Policy Implications

Policy makers have two choices when it comes to evaluating the earnings variable. If they want to create more jobs through FDI they need to reduce labour costs as the *ERN* variable returned a negative coefficient. This seems a hazardous short-term measure, as competing purely on labour cost is appropriate for industries in the mature stage of the product life cycle leading to problems of having to re-structure and modernise the economy in the future. In the *FDIP* and *FDIC* models, the *ERN* variable was positive. It seems more appropriate for policy makers to try to increase the amount of *FDIP* and *FDIC* rather than go for short-term job creation. This way the policy makers have the freedom to target growing sectors in the earlier stages of the product life cycle creating highly skilled jobs for the local economy. The primary research reinforces this view with skills level and labour productivity above the mean importance index, ranked 2nd and 4th overall. A policy to improve the provision of education and training within the region should be followed. This will have the effect of increasing skill levels and productivity whilst retaining higher labour costs. Initially, this will limit the levels of job creation in the short-term. However, attracting high-tech investment brings high skilled jobs to the region and will bring long-term sustainable job creation. This in turn will have a positive multiplier effect on market growth creating a positive upward economic spiral.

Local governments should undertake actions to facilitate in-migration of highly skilled workers into the region. Availability of labour was 1st in the list of importance in the primary research and *UNP* was positively significant in all three econometric models. Targeted in-migration will ensure that the correct skill bases are available in the South West. Clearly the unemployment variable does not mean that the policy makers should encourage mass scale redundancies.

Infrastructure is negative and significant in all three models. The negative coefficient is probably capturing the effects of having an existing poor infrastructure and not an indication that spending on infrastructure reduces FDI. The authorities have a responsibility to ensure that investment in the infrastructure of the region is maximised. The questionnaire highlights that the availability of land and premises is above the mean importance index and the 3rd most important factor in an average company's decision to locate to the region. Telecommunications and proximity to motorways were above mean importance suggesting further investment in both is required. Consideration should be given to light rail systems and other green transport systems to support these increasing population densities. The improvement of infrastructure, along with labour, is a key variable to attracting FDI and economic regeneration of the region as a whole.

Grants and incentives were not significant in *FDIP*, negatively significant in *FDIJ* and positively and negatively significant in the *FDIC* models. This raises concerns over the validity of the results and hence its implications for policy makers. The primary research shows that grants and incentives are unimportant in a company's decision to invest in the South West. However this does not tell the full story and highlights the difficulty in trying to manage such a diverse region. The South West has a two-speed economy split between the prosperous northern part of the region, centred around the M4/M5, compared to the Objective One and Objective Two areas of Cornwall and Plymouth. Grants and Incentives are important for these areas, which can be used to improve infrastructure as well as directly benefit investing companies. Further research is required at intra-regional level to support this hypothesis.

8. Conclusions

Two important papers were written in the 1990s that investigated the importance of FDI for regional economies. This paper has adopted their models and applied them to empirically investigate the determinants of FDI in the South West. Some results were in line with those two studies, but some differed. Our results illustrate that one simple model is inappropriate for all regional analyses and this highlights the difficulty of identifying appropriate economic policy for RDAs from academic research.

The econometric methodology is complemented by some primary research where the purpose was to identify the factors that influenced the decision of MNEs to locate to the South West. This primary research illustrates that firms in different sectors and in different counties found different factors to be important to them; this may well illustrate that MNEs locate to an area because of specific factors and this part of the research may prove to be useful for policy makers as it highlights the benefits and problems of heterogeneous locations.

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Variable definitions and sources

- **FDIP** is the standardised regional share of new FDI projects. This is defined as the region's per capita share of new FDI projects in the South West, compared to the whole of the UK. Source: Office of National Statistics publications and IUK (2001).
- **FDIJ** is the standardised regional share of new and safeguarded jobs from FDI. This is defined as the region's per capita share of new FDI jobs created and safeguarded in South West, compared to the whole of the UK. Source: Office of National Statistics publications and IUK (2001). This was measured by the number of jobs created/safeguarded. Invest UK figures record both the number of new jobs created and the number of jobs safeguarded by an investment. There is an outlier in the data set for 1997, which corresponds to a high level of jobs created in that year. The increase in the index for 1997 is most probably due to a dramatic increase in jobs safeguarded within the South West, as two large manufacturing operations were acquired safeguarding 5,900 jobs between them; this is compared to only 818 jobs created/safeguarded for the whole of 1987.
- **FDIC** is the standardised regional share of capital expenditure from FDI. This is defined as the region's per capita share of FDI capital expenditure, in £000's, in the South West, compared to the whole of the UK, in base year 1987. Source: IUK (2001), Wolfbane Cybernetic WebPages (2001) and Office of National Statistics publications.
- **GRO** is the South West's growth rate compared to the whole of the UK. Source: Office of National Statistics publications and Wolfbane Cybernetic WebPages (2001).
- **SWGRO** is the South West's Growth Rate South West. Source: Office of National Statistics publications and Wolfbane Cybernetic WebPages (2001).
- **DEN** is the South West's population density ratio, compared to UK. Source: Office of National Statistics publications.
- **INF** is the South West's share of spending on motorway and trunk roads, compared to UK, weighted by population. Source: Transport Statistics publications, Wolfbane Cybernetic WebPages (2001) and Office of National Statistics publications. Data was collected from DTLR Transport Statistics yearly reports and was available for all years apart from 1995/96. To fill this gap, an estimate was made by graphing the remaining observations and reading the missing year's observation from the graph. The observations read from the graph and included in the data set are £180,000 for the South West and £1,453,840 for England. The high observation in 1987 is partially due to the extensive three lane M5 widening program of that year.
- **RPA** is the standardised regional share of regional preferential assistance per capita, compared to the whole of the UK. Source: Office of National Statistics publications and Wolfbane Cybernetic WebPages (2001).
- **EMRPA** is the standardised regional share of regional preferential assistance, weighted by the number of workers in the region. Source: Office of National Statistics publications and Wolfbane Cybernetic WebPages (2001)
- **ERN** is the average gross weekly male full-time earnings ratio, for the South West relative to the whole of the UK. Source: Office of National Statistics publications and Wolfbane Cybernetic WebPages (2001).
- **UNP** is the South West unemployment ratio, relative to the whole of the UK. Source: Office of National Statistics publications.
- **MANR** is the percentage of the region's output that is comprised of manufacturing goods for the South West relative to the whole of the UK. Source: Office of National Statistics publications and Wolfbane Cybernetic WebPages (2001)
- **DEF** is the percentage of the region's output that is comprised of defence expenditure. Source: Defence Statistics publications, Wolfbane Cybernetic WebPages (2001) and Office of National Statistics

There are a number of difficulties with the FDI data produced by Invest UK:

- The 'number of projects' is observed data while the data for the 'number of jobs created/safeguarded' and 'share of capital expenditure' are the investing company's three-year forecasts. There is difficulty with comparing FDI statistics across national borders because of data inconsistency. For example, in the US, FDI figures are recorded if the investor purchases 10% of a company's equity; in the UK the investment figure has to be over 50%. This difference could be a source for asymmetric results.
- The data measure purely in-flows and take no account of the overall stock.
- RDAs and Invest UK only record investments where they have either had involvement or actual knowledge of investments that have taken place; this could lead to an underestimation of the total amount of investment.

Dicken and Tickell (1992) highlight the inefficiencies of the Invest in Britain Bureau (IBB, now INVEST UK) in recording foreign investments stating that IBB in the 1980's missed approximately 2,700 new foreign investments and the estimates for job creation were not reached in 2/5ths of the recorded investments.

- The statistics neglect other forms of international collaboration (such as joint ventures) and do not recognise foreign investment if a controlling share of the company is not purchased.

Different authors have different interpretations on the definition of FDI. For example, Hill and Munday (1991, p. 1761) define FDI as "the ownership and control of physical productive assets by foreign residents or firms", but this definition does not specify the degree of ownership that leads to control. These problems are magnified with the developments of cross border co-operation between firms which can be in the form of licensing agreements, strategic alliances, joint ventures and a host of other contractual and non-contractual arrangements. Therefore the measurement of FDI can be problematic. For clarity and continuity the definition formulated by Invest UK is adapted here: for an FDI project to be registered as a success with Invest UK, the investing company or individual must have over 50% share equity in the company.

Table 1: Determinants of Regional FDI

Author	**Hill and Munday (1991)**	**Hill and Munday (1992)**	**Billington (1999)**
Regions of study	**Wales**	**11 Regions of UK**	**11 Regions of UK**
Labour Costs[8]	*Wales/UK Earnings Ratio*	*Regional/UK Male Weekly Gross Earnings*	*Male Wage Cost per £1000 of Output in Manufacturing*
Labour Availability	-	-	*Population Density* *Regional Unemployment Rate*
Market Growth	*Welsh/UK index of production growth rate*	-	Change in Real GDP
Market Size	-	-	*Population Density*
Regional Incentives	*Regional Preferential Assistance*	*Regional Preferential Assistance*	Regional Preferential Assistance
Infrastructure Spending	*New Trunk Road and Trunk Road Improvement*	*Regional Expenditure on Road Transport System*	Real Annual Public Spending on Roads
Regional Effects	-	*Regional Dummies*	*Regional Dummy*
Time	-	Time Dummies	-
Industrialisation	-	-	% GDP from Manufacturing

Note: *Italics* signify that the variable was found to be significant

[8] However, Lall (1998) argues that low labour costs are only a good measure in low technology activities and labour costs are not a good measure for labour productivity. Indeed, labour costs might be a better measure for labour availability and labour skills.

Table 2. *FDIP* regression results

Model	(a)	(b)	(c)	(d)	(e)	(f)
Observations	**14**	**14**	**13**	**14**	**14**	**13**
$LERN_{(t-2)}$	34.85* (1.98)	35.31* (2.04)	23.31 (0.86)	28.02 (1.44)	31.29* (1.92)	68.32*** (4.70)
$LGR_{(t-1)}$	9.61 (1.19)		14.33 (1.20)			
$LGR_{(t-2)}$				15.26 (1.33)	16.76 (1.73)	28.57*** (4.16)
$LINF_{(t-1)}$	-1.67** (2.64)	-2.07*** (3.43)	-2.03 (1.87)	-3.30*** (4.16)	-3.23*** (4.58)	-5.01*** (7.74)
$LRPA_{(t-2)}$	-1.05 (1.59)		-0.78 (1.02)			
$LEMRPA_{(t-1)}$				0.42 (0.55)		
$LDEN_{(t-1)}$				38.12** (2.49)	33.09** (3.25)	40.57*** (5.02)
$LUNP_{(t-2)}$				2.89 (1.82)	3.42** (2.79)	3.83*** (4.93)
$LMANR_{(t-1)}$				-0.97 (0.43)		
$LDEF_{(t-1)}$			-1.16 (0.68)			1.79** (2.80)
F-Statistic	4.12**	6.16**	3.03*	4.67**	8.01***	19.37***
R^2	0.65	0.53	0.68	0.84	0.84	0.94
Adjusted R^2	0.49	0.44	0.45	0.66	0.73	0.89
DW-Statistic	1.69	1.45	1.86	2.84	2.80	2.56
Serial Correlation	0.16	0.49	0.03	2.69	3.22	0.96
Functional Form	0.97	1.91	0.13	0.00	0.28	2.25
Normality	5.49	0.68	0.79	0.12	0.03	6.66**
Heteroskedasticity	0.00	0.17	0.05	0.03	0.31	0.25
Var. Deletion	**(a) vs (b)**	1.51		**(d) vs (e)**	0.22	

Note: The dependent variable in each case is the log of *FDIP*. The $|t|$ ratios are in parentheses. ***, ** and * imply significance at the 1%, 5% and 10% levels.

Table 3. *LFDIJ* regression results

Model	(a)	(b)	(c)	(d)	(e)	(f)
Observations	**14**	**14**	**12**	**14**	**14**	**12**
$LERN_{(t-1)}$	5.45 (0.35)			-42.96* (1.98)	-53.62** (2.45)	-48.07* (2.52)
$LSWGR_{(t-2)}$	-9.43* (2.09)	-9.32* (2.17)	-8.01 (1.74)			
$LGR_{(t-1)}$				-19.33* (2.18)	-24.26** (2.76)	-26.37* (2.71)
$LINF_{(t-1)}$	-0.79 (1.28)	-0.76 (1.30)				
$LINF_{(t-2)}$				-1.76* (2.36)	-1.89** (2.38)	-0.68 (0.64)
$LEMRPA_{(t-1)}$	-1.07* (1.88)	-1.08* (2.02)	-0.75 (1.00)	-1.05 (1.44)		
$LDEN_{(t-1)}$				42.70* (2.11)	59.14** (3.32)	44.36* (2.28)
$LUNP_{(t-1)}$				6.47** (2.93)	6.47** (2.73)	4.25 (1.93)
$LMANR_{(t-1)}$				11.08** (2.82)	11.55** (2.76)	6.22 (1.19)
$LDEF_{(t-2)}$			-1.47 (1.41)			-1.31 (0.94)
F-Statistic	3.55*	5.14**	3.62*	3.70*	3.45*	4.32*
R^2	0.61	0.60	0.67	0.81	0.74	0.88
Adjusted R^2	0.43	0.48	0.48	0.59	0.53	0.68
DW-Statistic	2.56	2.57	2.95	1.93	1.43	2.22
Serial Correlation	1.26	1.28	4.68*	0.00	0.39	0.28
Functional Form	1.91	2.46	1.17	1.58	4.82	0.05
Normality	1.69	1.43	0.15	7.13**	0.84	0.98
Heteroskedasticity	0.04	0.05	0.70	0.53	2.85	0.00
Var. Deletion	**(a) vs (b)**	0.13		**(d) vs (e)**	2.07	

Note: The dependent variable in each case is *LFDIJ*. The $|t|$ ratios are in parentheses. ***, ** and * imply significance at the 1%, 5% and 10% levels.

Table 4. *LFDIC* regression results

Model	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**
Observations	**14**	**14**	**13**	**14**	**14**	**12**
$LERN_{(t-2)}$	0.40		40.16	30.19*	38.41**	27.49*
	(0.36)		(1.09)	(2.23)	(3.02)	(2.58)
$LGR_{(t-1)}$	-0.62		-21.27	15.50**	15.59**	10.83
	(0.05)		(1.34)	(2.79)	(2.66)	(1.85)
$LINF_{(t-1)}$	-2.40**	-2.56***	-3.16*			
	(2.33)	(3.17)	(2.21)			
$LINF_{(t-2)}$				1.61**	1.52**	1.71*
				(3.47)	(3.15)	(2.70)
$LEMRPA_{(t-2)}$	2.83**	2.92***	2.65**			
	(2.88)	(3.69)	(2.79)			
$LEMRPA_{(t-1)}$				-1.33**	-1.33**	-1.07*
				(2.91)	(2.76)	(2.40)
$LUNP_{(t-1)}$				1.84		
				(1.33)		
$LDEN_{(t-1)}$				-104.69***	-110.69***	-119.69***
				(8.31)	(8.91)	(9.73)
$LMANR_{(t-1)}$				-6.77**	-8.79***	-6.70*
				(2.77)	(4.35)	(2.40)
$LDEF_{(t-1)}$			4.42*			
			(1.92)			
$LDEF_{(t-2)}$						-1.75*
						(2.31)
F-Statistic	3.57*	8.54***	3.25*	23.00***	23.87***	24.87***
R^2	0.61	0.61	0.70	0.96	0.95	0.98
Adjusted R^2	0.44	0.54	0.48	0.92	0.91	0.94
DW-Statistic	1.36	1.33	1.97	2.58	2.69	2.02
Serial Correlation	1.12	1.41	0.00	1.19	2.53	0.07
Functional Form	0.63	0.48	0.34	0.02	0.04	4.21
Normality	0.96	1.20	0.66	2.01	4.03	0.96
Heteroskedasticity	0.02	0.00	0.47	0.05	0.07	0.09
Var. Deletion	**(a) vs (b)**	0.06		**(d) vs (e)**	1.78	

Note: The dependent variable in each case is *LFDIC*. The $|t|$ ratios are in parentheses. ***, ** and * imply significance at the 1%, 5% and 10% levels.

Table 5. Stratified sample

Year	Number of FDI Successes	Number of Companies Contacted	Manufacturing	ICT	Services
1995/6	10	**3**	1	1	1
1996/7	24	**7**	3	2	2
1997/8	39	**12**	4	4	4
1998/9	33	**10**	4	3	3
1999/00	31	**9**	3	3	3
2000/1	29	**9**	3	3	3
Total	**166**	**50**	**18**	**16**	**16**

(Source: South West Regional Development Agency, 1995-2001)

Table 6. Level of Importance of Different Factors

Grouped Variable	Mean Importance	Ranking
Labour	2.24	1
Clustering	2.81	2
Government	2.92	3
Environment	3.02	4
Cost of Production	3.12	5
Infrastructure	3.28	6

Note: 1=high importance, … 5=no importance.

Table 2: Ranking Table for Each Sector

Manufacturing	Significance Level	Ranking
Labour	2.25	1
Environment	2.69	2
Government	2.78	3
Clustering	2.84	4
Cost of Production	3.16	5
Infrastructure	3.19	6

ICT	Significance Level	Ranking
Labour	2.04	1
Government	2.91	2
Clustering	3.00	3
Cost of Production	3.14	4
Environment	3.39	5
Infrastructure	3.55	6

Services	Significance Level	Ranking
Labour	2.13	1
Clustering	2.25	2
Cost of Production	2.38	3
Government	2.7	4
Infrastructure	2.75	=5
Environment	2.75	=5

Table 3: Ranking Table for County Results

Wiltshire	Significance Level	Ranking
Labour	2.20	1
Government	2.92	2
Cost of Production	3	3
Environment	3.05	4
Infrastructure	3.13	5
Clustering	3.35	6

Avon	Significance Level	Ranking
Clustering	2.06	1
Labour	2.38	2
Government	2.75	3
Environment	3.19	4
Infrastructure	3.22	5
Cost of Production	3.31	6

Devon	Significance Level	Ranking
Labour	2.13	1
Government	2.60	2
Cost of Production	2.88	3
Environment	2.94	4
Clustering	3.13	5
Infrastructure	3.63	6