

ERASMUS UNIVERSITY ROTTERDAM

MSc in Maritime Economics and Logistics

2008/2009

Foreign Direct Investment in Greenfield Port Projects
in Developing Countries

*A Determination of Leading Indicators for Successful
Investment*

By
Christopher C. Fisher

Acknowledgements

There are a number of individuals, without whom this thesis would have been extraordinarily difficult or near impossible to undertake effectively. Therefore, it is with the deepest appreciation that I would like to mention the contributions of those who made this work possible.

First and foremost, I would like to thank my thesis advisor, Dr. Koen Berden who not only contributed throughout the thesis writing, but also played a substantial hand in reigniting my dormant interest in economics. Throughout my many years in pursuit of my various degrees there have only been a handful of people who were able to present the "Dismal Science" in a truly engaging manner, demonstrating its value as a tool for meaningful real world analysis and seemingly devoid of the pain that generally accompanies study of the topic. Dr. Berden tops the list in this regard. For this reason and for his keen insights into how to deal with the problems which seemed endemic to the thesis topic, I would like to express my sincerest gratitude and consider it an honor to have had the opportunity to work with him.

Next, I would like to thank Mr. Richard Liebrechts who generously agreed to provide his own insights on the topic, enviable gained from firsthand, real world experience in the particular area of study. His review of the initial efforts provided a wonderful barometer against which my theoretical analysis could be measured for not only the veracity of some of the assumptions, but as a general reality check. I consider it unfortunate that time did not allow me to incorporate all his observations, but present one of my own... *"We meet the most interesting people on trains to Brussels."*

Finally, I would like to thank Mr. Adam Beauchamp and Mr. Soren Hansen from APM Terminals in Den Haag, The Netherlands for their willingness to share their own knowledge of the topic and the experience of APM Terminals with me in furtherance of the topic. They both sacrificed their valuable time to facilitate my investigation and Mr. Beauchamp, in particular, patiently reviewed my qualitative analysis, providing some interesting insights of his own. The experience APM Terminals has in this area is second to none and the opportunity to sit down with company representatives was incredibly valuable.

Abstract

This study addresses the question, are there leading indicators in the determination of successful Greenfield Seaport investment in Developing Nations? The findings show that there are several factors which would appear indicative of successful investment or at a minimum the creation of a climate which makes it attractive for investment in the Greenfield port sector. Among the most significant findings of this study include the determination that the most significant impact on the viability of Greenfield seaport investment is the particular host nations' ability to facilitate business as gauged by the Ease of Doing Business rank and the Access to natural resources the country has at its disposal. Beyond that, the general ability of a nation to effectively tender Greenfield port projects dramatically increases the likelihood of success Greenfield investment.

Table of Contents

Acknowledgements.....	2
Abstract.....	3
Chapter 1 Introduction.....	7
1.1 Background	7
1.2 Research Question.....	8
1.3 Research Objectives and Hypothesis	8
1.4 Structure of Thesis	8
Chapter 2 Scope of Problem.....	9
2.1 Developing Nation	9
2.2 Greenfield Investment.....	10
2.3 Major Issues with Developing Nation Investment	11
Chapter 3 Literature Review.....	13
3.1 Gravity Analysis	13
3.2 Foreign Direct Investment.....	15
3.3 Concessions and Private Investment.....	17
3.4 Port Selection Criteria/Supply Chains	19
3.5 The Impact of Risk	19
Chapter 4 Methodology.....	22
4.1 Multiple Regression Analysis.....	22
4.2 Gravity Analysis	22
4.3 Qualitative Analysis	23
4.3.1 SWOT/TOWS Matrix	23
Chapter 5 Factor Description/Justification	25
5.1 Economic Freedom (EFI)	25
5.2 Economic Stability/Growth (GDP Deflator).....	25
5.3 Ease of Doing Business	26
5.4 Security Competence.....	26
5.5 Access to Natural Resources/Commodity Based Economies	27
5.6 Political Stability	27
5.7 Existing Hinterland Infrastructure.....	28
5.8 Balance of Payments (imports/exports)	29

5.9 Potential Supply Chain Integration: The Logistics Performance Index (LPI)	30
5.10 Port Model.....	31
5.11 Investment Schemes (Privatization, Concessions and Traditional Investment).....	32
5.12 Statutory Incentives	33
5.13 Preferential Trade Agreements	34
5.14 Foreign Aid/Official Development Assistance	34
5.15 General Foreign Direct Investment.....	35
5.16 Country Specific Dummy Variables	36
Chapter 6 Factor Ranking/Analysis.....	37
6.1 Factor Analysis	37
6.2 Multiple Regression / Gravity Analysis.....	38
6.2.1 Further Refinement of Regression Factors:.....	38
6.2.2 Gravity Model Modification:	39
6.2.3 Final Factor Confirmation:	40
6.2.4 Final Regression	41
6.2.5 Distance to the World:	42
6.2.6 Ease of Doing Business:.....	42
6.2.7 Access to Natural Resources/Commodities Based Economies:	43
6.2.8 Dummy Variables.....	43
6.2.9 Statistically Insignificant Variables:	44
6.3 SWOT/TOWS Matrix.....	44
Chapter 7 Case Studies	47
7.1 Exemplar Projects	47
7.1.1 Shenzhen Dachen Bay Terminal - China	47
7.1.2 Gangavaram Port Ltd. – India	47
7.1.3 Yangshan Port – China	47
7.1.4 Shanghai East Container Terminal (SECT) – China.....	47
7.1.5 Cai Mep International Terminal – Vietnam.....	48
7.1.6 Gateway Terminals International, (GTI) – India	48
7.1.7 Suez Canal Container Terminal – Egypt.....	48
7.1.8 General Factors in Greenfield Port Development.....	48

7.1.9 Preferential Trade Agreements.....	50
7.1.10 Statutory Incentives	50
7.1.11 Port Model.....	51
7.1.12 Investment Schemes.....	51
Chapter 8 Conclusions	53
References	54

Chapter 1 Introduction

Developing nations have experienced growth difficulties, it would seem, in perpetuity. Due to numerous factors both within and out of their control, many nations have stagnated. This is often in spite of access to tremendous amounts of natural resources and favorable, yet unmarshalled comparative advantages held by many of the nations. The key to unlocking these and raising the nation out of 'Developing' status appears to be access to foreign direct investment, given that it has been shown in prior studies that not only does FDI have a lasting impact on GDP, but actually causes growth. (Hanson 2006). This growth may not only lift the developing nation, but also the investors whom have taken the relatively higher risk to insert FDI into a developing economy.

All that said, however, Foreign Direct Investment appears to be both a driver and a passenger in the globalization witnessed in recent decades. It spawns new growth and is spawned by new growth. It creates new markets and is created by new markets. It provides access to new technologies for developing countries and access to cheaper labor for developed, capital rich countries. It yields employment and economic growth to the economically depressed and yields high returns to the economically gifted and adventurous. Or, it doesn't. Whether due to or in spite of all these observations and apparent contradictions, it has demonstrated itself to be a fickle tool which doesn't easily yield the exact order of operation for its successes or its losses. Thus the question still remains, what are the drivers of successful foreign direct investment?

1.1 Background

The question posed above is an exceptionally broad one. With far too many exogenous contributors to possibly answer satisfactorily, this question must be distilled down to a manageable degree and analyzed within a specific sector where the results can be teased out and extraneous factors can be marginalized. With this in mind, the question posed above has been distilled down to include not only a specific sector, but a specific type of investment.

Foreign Direct Investment takes place in two general ways; mergers and acquisitions or Greenfield investment. This study will focus on Greenfield investment, with particular attention paid to ports and terminal investment within developing economies. Greenfield port investment in developing nations offers opportunities for high returns on investment, but carries with it a relatively larger degree of risk than traditional methods of foreign direct investment like mergers and acquisitions. The genesis of this risk is largely a function of the fact that the investment has no track record from which to evaluate future performance, thus, when considering an investment within this particular sector, it is imperative to determine a set of factors or leading indicators which can be used to establish the likely success of a given Greenfield investment. This necessarily entails determining not only which factors appear to impact FDI to the greatest extent, but which factors also create an environment where that FDI, when inserted into the economy directly into the maritime port sector, will yield the most stable and possibly the most profitable results for the investor.

1.2 Research Question

The aim of this thesis is to discover if there are definitive factors or leading indicators which predict successful Greenfield port investment in developing economies. As such, the thesis must look at two subtly different questions. First, what determinants may actually bring in FDI into a developing nation? These determinants are of course the prerequisite factor for any determination of successful investment. Next, the determination of what is 'Successful' investment must be made and applied to preselected examples of FDI, specifically in the maritime port/terminal sector. While this is an oft studied phenomenon on the general macro scale of foreign direct investment, it is not a problem that has easy or definitive answers. Indeed, Kok and Ersoy (2009) note that "A large number of studies have been conducted to identify the determinants of FDI but no consensus has emerged, in the sense that there is no widely accepted set of explanatory variables that can be regarded as the "true" determinants of FDI."

1.3 Research Objectives and Hypothesis

Given the propensity for patterns to develop in investments over time via market forces signaling sound and unsound investments, this thesis hypothesizes that there are indeed general leading indicators which will materialize prior to and/or throughout every planned Greenfield port investment which will, to a significant degree, indicate if it will be successful or if it will fail. While these indicators are likely to exist largely on the macroeconomic scale, there are factors which are expected to be, at a minimum, regionally specific and exist as a function of a particular interplay between nations given factors surrounding their particular bilateral trade. Thus the objective of this thesis is to identify major factors, both macro and incident specific, and to quantify them in a meaningful manner wherein they can be utilized by both governments and potential investors in developing economies, specifically in the maritime sector, to gauge the expected success of a particular investment.

1.4 Structure of Thesis

The basis for the thesis will be a combination of quantitative and qualitative analysis, where in secondary macroeconomic data will be used quantitatively to stratify factors in terms of impact to the success of the model. Once the initial stratification is complete, the data will be used in several qualitative analyses to attempt to determine "best case scenarios". Subsequently, these will be compared to case studies to determine veracity and applicability. The independent variable will be National Greenfield Port Investment from 2000-2007. There is no doubt that when viewed through the prism of generalized FDI, there are certain individual factors which do in fact lead investment or hinder it. Indeed, Chakrabarti (2001) found "the relation between FDI and many of the controversial variables (namely, tax, wages, openness, exchange rate, tariffs, growth and trade balance) are highly sensitive to small alterations in the conditioning information set". This paper will aim to further refine these linkages in the maritime port sector.

Chapter 2 Scope of Problem

In order to understand the problem facing firms interested in investing in Greenfield maritime port projects abroad in developing nations, it is important to refine the terms this paper uses so as to confine the parameters to address the particular research question without going too far afield. In that vein, 'Developing Nation' and 'Greenfield Investment' are defined below, followed by a more detailed explanation of the problems this paper intends to address and subsequently solve.

2.1 Developing Nation

A 'Developing Nation' for the purpose of this study will fall below a particular ranking on the United Nation's Human Development Index. According to the United Nations' Human Development Report, "The HDI – human development index – is a summary composite index that measures a country's average achievements in three basic aspects of human development: health, knowledge, and a decent standard of living. Health is measured by life expectancy at birth; knowledge is measured by a combination of the adult literacy rate and the combined primary, secondary, and tertiary gross enrolment ratio; and standard of living by GDP per capita (PPP US\$). [2]. While the United Nations notes that "There is no established convention for the designation of "developed" and "developing" countries or areas in the United Nations system." [3], the United Nations' Statistics Division nevertheless uses these same standards to rank countries into developed or developing/least developed and finds that regionally, most developing nations are to be found in Africa, Americas (excluding North America), Caribbean, Central America, South America, Asia (excluding Japan) and Oceania (excluding Australia and New Zealand). [4] This methodology provides a functional ranking which this paper will use as a guide wherein if a nation falls below an HDI ranking of 0.80, it may be considered to be a 'Developing Nation'. Within those parameters there is additional stratification which will be used to delineate the nations even further if necessary. The specific data set used was the HPI for 2008. [5].

This particular methodology, once land-locked nations, nations with no immediate sea route and nations with a dearth of information (e.g. Somalia and Iraq) were eliminated, yielded 70 nations for initial review. As this number is too large to sufficiently analyze reasonably, it was culled down further via World Bank data on Public Private Investment. [15] This data provides the total amount of investment in U.S. Dollars, in Greenfield sea ports by nation and reduces the number of nations under review to a manageable 14 nations.



Figure 1: All Developing Nations

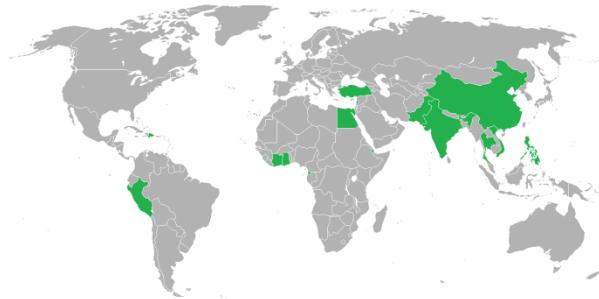


Figure 2: Selected 14 Nations

2.2 Greenfield Investment

A 'Greenfield' Investment is "a form of foreign direct investment where a parent company starts a new venture in a foreign country by constructing new operational facilities from the ground up. In addition to building new facilities, most parent companies also create new long-term jobs in the foreign country by hiring new employees." [6] This is particularly attractive for developing nations, as there is little the country need offer save for concessions to the engaging company for a particular length of time and in return, the nation acquires a potentially viable source of tax revenue, employment and an ostensible draw for other businesses to engage similarly within the nation.

With particular attention paid to port projects within this study, according to the World Bank Private Participation in Infrastructure Database, between 2000 and 2007, out of a total 164 private seaport investment projects, there were approximately 64 Greenfield seaport projects around the world. This represents 39% of all private seaport investments during that period; an investment distribution which has remained consistent for nearly twenty years and which doesn't appear to be changing.

Financial Closure Year	Concession	Divestiture	Greenfield project	Management and lease contract	Total
2000	9	1	11	0	21
2001	5	0	4	1	10
2002	3	1	4	1	9
2003	11	0	3	0	14
2004	9	0	7	4	20
2005	26	0	12	1	39
2006	15	4	14	2	35
2007	7	0	9	0	16
Grand Total	85	6	64	9	164
	51.8%	3.7%	39.0%	5.5%	

Source: http://ppi.worldbank.org/explore/ppi_exploreSector.aspx?sectorID=3

Table 1-Aggregate Greenfield Port Investment

In order to determine with more specificity where these projects have been located, the investments over that 8 year period beginning 2000 were broken down further by country and region to show where the prevalence of the projects is the greatest. With this step complete, the countries to be evaluated were culled from the original 70 nations to a manageable 14. These nations present the highest documented investment in Greenfield seaports and provide requisite data for analysis of the impact of the various dependant variables on the aforementioned independent variable – Total Greenfield Port Investment Commitments.

Country	PPI Type	PPI Subtype	Total Investment Commitments (Millions USD)
China	Greenfield project	Build, operate, and transfer	7344.17
Côte d'Ivoire	Greenfield project	Build, operate, and transfer	140
Djibouti	Greenfield project	Build, operate, and transfer	430
Dominican Republic	Greenfield project	Merchant	200
Egypt, Arab Rep.	Greenfield project	Build, operate, and transfer	1190.9
Ghana	Greenfield project	Merchant	10
India	Greenfield project	Build, operate, and transfer	2534.65
Lebanon	Greenfield project	Build, operate, and transfer	150
Pakistan	Greenfield project	Build, operate, and transfer	211
Peru	Greenfield project	Build, operate, and transfer	400
Philippines	Greenfield project	Build, operate, and transfer	40.7
Thailand	Greenfield project	Build, operate, and transfer	15
Turkey	Greenfield project	Merchant	114.8
Vietnam	Greenfield project	Build, operate, and transfer	267

Table 2 - Greenfield Port Investment By Country

2.3 Major Issues with Developing Nation Investment

When determining the reasons why a company might engage in foreign direct investment in general, or in a specific type of investment including port investment, the first step is to determine what general conditions exist which have traditionally hampered investment into the market. Using Africa as a proxy for regions with a historical dearth of foreign direct investment, the reasons generally surface with not much more required than basic empirical observation. They can be generally enumerated as:

- Political Instability
- Lack of Political Transparency
- Inhospitable Regulatory Environment
- GDP Growth and Market Size
- Poor Infrastructure
- High Protectionism
- High Dependence on Commodities
- Increased Competition
- Corruption and Weak Governance
- Poor and Ineffective Marketing Strategies.

(Dupasquier 2005)

Most or all of these factors are shared by nearly all developing markets, which lead to a distinct lack of investment. As such, these are also the primary issues which investors face in a bid to develop Greenfield projects within these nations. The goal of this paper is to determine which of a series of leading indicators may possess predictive capacity to aid in determining when a developing nation is ripe for an infusion of foreign direct investment specifically in the port sector. These challenges have been used to determine a viable set of indicators, the movement of which in a positive or negative direction will possess some measure of predictive capacity for determining if successful investment may be made within a developing economy.

Chapter 3 Literature Review

While there is substantial research which has been conducted to discover both the determinants of foreign direct investment and the outcomes of the same, the application of the study on the topic in regard to the impact demonstrated within the transport sector has been minimal at best. An aspect even less well treated is this particular study as it pertains to Greenfield investment in developing nations.

This chapter provides a cursory look at a portion of the information which pertains even tangentially to the topic being treated in this paper. Among the sources consulted, special attention was paid to those addressing foreign direct investment in developing nations and to those papers which utilized similar techniques as will be applied within this study in an effort to verify the applicability of the techniques and to discover comparable results against which the result in this study might be compared in order to assess their veracity. A broad list of research which was examined as part of this study is included below and separated by the specific topic each addressed.

3.1 Gravity Analysis

In an effort to better understand the impact gravity has on the viability of investment in Greenfield ports, the first step required was the analysis of current literature on the topic at hand. The literature addresses various aspects of gravity analysis and represents various uses to which it was placed. As this paper intends to utilize gravity analysis to determine to some extent what the determinants for FDI infusion into a developing economy, Walkenhorst's (2004) study, which investigates the factors that influence the distribution of foreign direct investment FDI across countries of investor-origin and manufacturing industries in Poland was used. The results confirmed the general appropriateness of the basic gravity model formulation for FDI analysis in transition countries, as well as important links between FDI, trade, and labor costs. His final conclusion noted that due to the diversity across manufacturing industries found with respect to the extent to which factors such as capital costs and industry competitiveness influence foreign investment activities, generalizing claims regarding the determinants of FDI flows should be treated with care.

Next reviewed was another paper addressing FDI and Gravity Analysis. In it, Liu (2008) also utilized the gravity model, however modified to assess the impact of regional trade agreements (RTAs) on changes in China's foreign direct investment inflow. A modified gravity model was adopted in the empirical analysis, using FDI inflow as a dependent variable, and home-country factors, host-country factors, and bilateral linkage factors as determinants. The results indicated that the formation and implementation of RTAs is an important determinant of FDI inflow in some cases. Baier, et al (2008) agree and note that 'competitive liberalisation' of national governments of the past several decades has created a 'market' for regional economic integration agreements (EIAs), similar to the RTA's mentioned previously. They note that countries which have selected to be part of these agreements have, evidently selected well in the sense that these agreements can explain some bilateral trade flows.

Carrying on with a review of studies which utilize gravity analysis for trade prediction purposes, the work of Helpman, Melitz and Rubinstein (2008) was evaluated. They

used an international trade model which predicts positive as well as zero trade flows across pairs of countries and which allows the number of exporting firms to vary across destination countries. This showed that the impact of trade frictions on trade flows can be decomposed into the intensive and extensive margins and yields a generalized gravity equation that accounts for the self-selection of firms into export markets and their impact on trade volumes. Perhaps most importantly, their model shows that traditional estimates are biased and that most of the bias is due not to selection but rather due to the omission of the extensive margin and the effect of the number of exporting firms varies across country pairs according to their characteristics. This variation is large and particularly so for trade between developed and less developed countries and between pairs of less developed countries. In support of the argument toward bias in gravity models, Silva and Tenreyro (2006) develop an argument that the parameters of log-linearized models estimated by OLS lead to biased estimates of the true elasticities. They use, as an illustration, the gravity equation for trade and find significant differences between estimates obtained with the proposed estimator and those obtained with the traditional method.

To further understand the uses and impact of FDI and Gravity Models, the next study evaluated was Africano and Magalhaes (2005), in which they investigate the relation between the stock of foreign direct investment and the geographical pattern of trade flows in the Portuguese economy. In this study, the gravity model was applied to bilateral trade between Portugal and OECD countries plus Brazil from 1998 to 2000. The study showed that the stock of inward FDI is positively related to trade, suggesting the existence is complementary between the two. This effect is stronger on exports than on imports resulting in a positive impact on trade balance. It is also found that the stock of outward FDI has no significant relation either with Portuguese exports or imports. Finally, FDI helps to explain the above “normal” exports to the EU and the below “normal” imports from Candidate Countries.

Once again addressing the gravity model, the following paper was examined. Marimoutou, Pegin and Pegin-Feissolle (2009) in this paper, addresses the problem of the role of the distance between trading partners by assuming the variability of coefficients in a standard gravity model. The distance can be interpreted as an indicator of the cost of entry in a market (a fixed cost): the greater the distance, the higher the entry cost, and the more we need to have a large market to be able to cover a high cost of entry. To explore this idea, the paper uses a method called Flexible Least Squares. The primary result of the research is that the more the partner's GDP is large, the less the distance is an obstacle to trade. This is particularly interesting because it further reinforces the idea that, as the study of gravity in physics observes, mass is an essential element of gravity and the larger the mass, the greater the gravitational pull of the object.

To understand the interaction between the FDI and foreign aid as studied by gravity models, Kimura and Todo (2007) was reviewed. In this paper, they investigate whether and how foreign aid facilitates foreign direct investment flows into less developed countries. They employ a large data set of source-recipient country pairs and conduct gravity equation-type estimation. Their empirical methodology enables them to distinguish among three effects of aid on FDI: a positive “infrastructure effect,” a

negative “rent-seeking effect,” and a positive “vanguard effect,” which is specific to the same source-recipient country pair of aid and FDI. According to their empirical analysis, foreign aid in general does not necessarily have an infrastructure, rent-seeking, or vanguard effect. However, they find robust evidence that foreign aid from Japan has a vanguard effect, while aid from other donor countries reveals no such effect. This vanguard effect seems to be peculiar to the Japanese foreign aid. The fact that the impact of foreign aid in a positive direction exists at all, means that it is a significant variable which to study. However, it is important to determine why it operates as it does when the aid is from Japan vice other nations. Nevertheless, it confirms that FDI is in fact, impacted to varying degrees by foreign aid.

When utilizing certain models, it is necessary to insert dummy variables to account for factors the model itself won't account for otherwise or to offset statistical discrepancies which arise as a result of the data used. Darku (2009) demonstrated that the appropriate econometric technique of testing for the effect of regional integration on bilateral trade is to augment the standard gravity model with country specific dummies instead of regional integration dummies. This is particularly important to this study in that the breadth of the study will be sweeping enough as to require dummies which likely account for nations rather than regions. In this same vein, another method for accounting for variables unaccounted for otherwise is through the use of proxy variables. This alternative method for estimating gravity models by multiple linear regression based on proxy variables circumvents the endogeneity problems arising when least-squares estimators are used, according to de Grange, Troncoso, Ibeas and González (2009). The proxy variable approach generated consistent estimators for a gravity model without endogeneity bias. They concluded that proxy variables eliminate the endogeneity and produce consistent estimators in gravity models estimated using least squares. They also find that, despite its elimination, endogeneity bias has no significant impact either on gravity model prediction or on urban transportation system planning processes based on such models.

The takeaways in this section of the literature review are, first that the use of gravity analysis is effective in explaining a large degree of not only international trade, but FDI as well. Second, it does carry with it biases which are real but not insurmountable and finally, the formation of trade agreements appears to be able to increase the gravity of some nations with regard to the attraction of FDI.

3.2 Foreign Direct Investment

As the investment in a Greenfield port is at its core a foreign direct investment, it is necessary to determine broadly what it is which generates the impetus for FDI. By way of discovering this, Kok and Ersoy (2009) investigated whether foreign direct investment determinants affect foreign direct investment based on both a panel of data (FMOLS-fully modified OLS) and cross-section SUR (seemingly unrelated regression) for 24 developing countries, over the period 1983-2005 for FMOLS and 1976-2005 for cross-section SUR. The main objective of their study was to define the main FDI determinants that show the capital flows to developing countries in a globalization framework. The secondary objective of the study was to assign countries' convergence by using the same FDI determinants. FDI flow was viewed as one of the main dynamics of globalization phenomenon thus FDI flow determinants were said to contribute to

countries' process of political development. They discovered that the interaction of foreign direct investment with some FDI determinants have a strong positive effect on economic progress in developing countries, while the interaction of foreign direct investment with the total debt service/GDP and inflation have a negative impact. The most important determinant of FDI is the communication variable.

Moving on from this to the question of long term sustainability of the FDI once it is invested, it is important to look at the impact FDI has on Economic Growth. Nair-Reichert and Weinhold (2001) studied the increase in FDI flows to developing countries over the prior decade to determine if this type of financing enhances economic growth. They used a "mixed fixed and random (MFR) panel data estimation method to allow for cross country heterogeneity in the causal relationship between FDI and growth and contrast [their] findings with those from traditional approaches." They discovered that the relationship between both foreign and domestic investment and economic growth in developing countries is highly heterogeneous and that estimation methods which assume homogeneity across countries can yield misleading results. The conclusion of the study found that *there is some evidence that the efficacy of FDI in raising future growth rates, although heterogeneous across countries, is higher in more open economies.*

Building on this finding, that FDI can in fact improve growth rates, the literature review moved on to a review of foreign direct investment within Africa, a continent full of developing economies. Dupasquier and Osakwe (2005) examined the performance, promotion, and prospects for foreign direct investment in Africa. Factors such as political and macroeconomic instability, low growth, weak infrastructure, poor governance, inhospitable regulatory environments, and ill-conceived investment promotion strategies, were identified as responsible for the poor FDI record of the region. The paper stresses the need for more trade and investment relations between Africa and Asia. It also argues that countries in the region should pay more attention to the improvement of relations with existing investors and offer them incentives to assist in marketing domestic investment opportunities to potential foreign investors. Finally, the paper argues that the current wave of globalization sweeping through the world has intensified the competition for FDI among developing countries. Consequently, concerted efforts are needed at the national, regional, and international levels in order to attract significant investment flows to Africa and improve the prospects for sustained growth and development.

This growth potential via FDI is important and must be tracked. By way of tracking the success or failure of foreign direct investments, it is necessary to establish consistent criteria by which to judge that success. In a review of literature to aid in addressing this point, (Christiansen 2004) came to light. In it, Christiansen addresses the need for development agencies to remedy their lack information about the quality of the investment climate in developing countries and the likely repercussions for direct investment. The paper goes a long way toward demonstrating what is currently used and how well it achieves its goal. It provides an overview of a variety of scoreboards for the investment climate that have been established by a number of actors, including the World Bank, UNCTAD and several private "think tanks". Additionally, it documents their similarities and discrepancies in assessing the investment climates of developing,

emerging and transition economies. Finally, it tests their predictive power regarding countries' ability to attract foreign direct investment.

Not all foreign direct investment is Greenfield investment, however, and an understanding of the various types of investment which FDI includes as well as the driving factors behind the alternatives is vital to understand. To this end, Dikova & Witteloostuijn (2007) was reviewed. In the paper, they bridge two streams of foreign direct investment literature, specifically studies on establishment mode choice (i.e., the choice between an acquisition and a Greenfield establishment) and studies on entry mode choice (i.e., the choice between a wholly owned outlet and a subsidiary with shared ownership). They develop a framework for the evaluation of the choice of mode of entry in the context of a single foreign investment. They find that a parent firm's technological intensity, international strategy and experience determine both establishment and entry mode choices. In the context of transition economies, they empirically examine the possibility of moderation via recipient country's institutional environment and conclude that the degree of the host country's institutional advancement moderates the effect of both technological intensity and international strategy on the establishment and entry mode choice. Thus, the development of a nation's institutional environment may well determine the mode choice and make one environment more or less attractive to Greenfield FDI than another.

Of final note in this section is the impact foreign aid has on FDI. This study aims to determine if foreign aid is a reasonable leading indicator of successful FDI in Greenfield ports. So, the impact on FDI by foreign aid, must then be studied. Selaya and Sunesen (2008) argue that the notion that foreign aid and foreign direct investment are complementary sources of capital, conventionally held among governments and international cooperation agencies to be accurate, is at best incomplete. In particular, they point out that while aid may raise the marginal productivity of capital by financing complementary inputs, such as public infrastructure projects and human capital investment, it may also crowd out productive private investments if it comes in the shape of physical capital transfers. Their results suggest that aid invested in complementary inputs draws in foreign capital while aid invested in physical capital crowds out FDI.

The conclusions one can draw from this section of the literature review are numerous, but overall seem to suggest that FDI not only has positive impacts on developing economies when invested, but also positively impacts growth rates in those same economies, carrying forward the initial benefit of the investment. This growth will not, however, materialize unless there is a concerted effort on the part of governments within those nations to both facilitate the FDI required and to create a climate in which the FDI can flourish and ideally attract additional investment.

3.3 Concessions and Private Investment

The manner in which a port is developed is integral to an understanding of the factors involved in the success of development in general and Greenfield development in particular. In light of that, numerous papers were examined to gain a better understanding of the research that had already been accomplished in this vein and the

conclusions which had been reached. This review was aimed at defining the methods by which ports are developed in a way in which will produce both a framework for qualitative analysis and generate ideas for quantitative analysis.

As a portion of this paper is designed to assess both concession agreements and the degree of economic/business freedom a nation has and the impact that freedom may have on a new Greenfield project, it was important to review literature which dealt with both concessions and ease of doing business/economic freedom. Pallis, Notteboom and De Langen (2008) study the capabilities and strategies required for obtaining a concession to operate a terminal in a seaport and the barriers to entry they create via the procedures required for their implementation. It found that tenders may act to lower barriers to entry by increasing the degree of transparency within the process and closing the door to much of the corruption which might otherwise flourish.

Continuing on the same lines in the review of concessions and privatization, Niekerk (2005) notes that recently many ports have introduced private participation in port operations through different forms of concession or lease agreements. One of the most common reasons for private participation was believed to be efficiency gains through the introduction of competition. Noting that developing nation ports don't necessarily escape the monopoly aspect possible with the running of private ports, the author notes that contestability within these ports is diminished by the fact that developing countries have low cargo volumes; are often remote countries that only serve natural hinterlands; and may encompass end ports on the north-south routes that are not located on existing major shipping networks. Most of these ports pursue private participation in order to generate funds for investment; increase efficiencies; and ensure cost-effective services. To avoid monopolistic behavior, the author suggests a sound regulatory framework is necessary.

Other manners incorporating concessions and aimed at increasing the level of competition within the port sector include public private partnerships. Wiegmans, Ubbels and Rietveld (2002) examine the desire to create a more competitive, market based transport system which led to involvement of the private sector in infrastructure investments. The paper also addresses impacts which make it unattractive to invest in transport infrastructure for private parties. The ultimate aim of the paper is to enumerate the characteristics of investments in infrastructure in general, with the aim to clarify the hesitation under which private investors suffer. In addition, one specific category of infrastructure investments, (container terminals) is discussed here as an exception as container terminals are mostly financed with involvement of private parties. From a comparative study between 'normal' investments in infrastructure and investments in container terminal infrastructure, the authors argue that terminals have several features, which lead to a lower risk for private parties, in particular restricted competition in the terminal market and protected monopoly profits, labor productivity gains and fall in unit costs, and a light regulatory framework. Because of these characteristics public private partnerships occur rather often and seem to be attractive. However, the study went on to find that without government support it is still not realistic to attract private investment in the terminal market.

This movement toward greater private activity in ports seems to be directly impacted by the perceived risk of the venture. Hoffman (2001) finds that the supply of private sector participation by port operating companies appears to depend on the port's hinterland and the perceived country risk. Perceived corruption, illiteracy, and a pending broader structural reform seem to have a negative impact on both demand and on supply. He goes on to note that privatized port operations may help the urgently needed general structural reform of the particular developing economies, including better education and more stable public institutions, which in turn will reduce the remaining obstacles for port privatization.

Overall, it is clear that port privatization to any appreciable degree does, in fact, improve effectiveness and competitiveness. Tongzon and Heng (2005) investigated the relationship between port ownership structure and port efficiency. They applied a stochastic frontier model which incorporated the inefficiency effect, to show whether port privatization is a necessary strategy for ports to gain a competitive advantage. This study also investigated the determinants of port competitiveness. The results of the study showed that private sector participation in the port industry to some extent can improve port operation efficiency, which will in turn increase port competitiveness. And this doesn't stop merely at ports. Starting from the premise that a wave of innovations has increased the level of competition in maritime transport, in particular in port activities, Pando, Araujo and Maqueda (2005) find that shippers have many more alternatives available, something that tends to increase the hinterland of each port, precisely by reducing captive hinterlands. This has prompted ports to move towards formulas in which private initiative has a bigger role to play.

3.4 Port Selection Criteria/Supply Chains

With port choice selection a difficult thing to determine in a Greenfield port context, it was necessary to turn to existing ports and related research on port selection criteria to aid in determination of what might be used in selection of the sites, at a minimum. Magala and Sammons (2008) analyzed currently operating ports to determine the degree to which progressive integration of ports into supply chains has aided in port selection. They discovered that "shipper's influence on port choice decisions is diminishing, particularly now that a single shipping line, a third-party service provider or a supply chain integrator may control the freight from the origin to the final destination using various transport arrangements and multiple alternative pathways designed to minimize the total logistics cost and maximize value for both the customer and the supplier.

3.5 The Impact of Risk

The impact of risk on any FDI decision cannot be overstated. As with any investment decision, the degree of risk associated with the project is inevitably one of the most impactful factors used to determine the attractiveness of the proposition. In that vein, this section of the literature review was aimed at a review of papers which addressed the risks associated with FDI in general and, if possible, Greenfield investment in particular.

Harkening back to the an above section on foreign aid and whether or not it translates into a more attractive climate for FDI, the first paper reviewed treated this subject specifically, but with an eye toward the risk which always seems to accompany nations with environments which need foreign aid in the first place. According to Bruner and Oxoby (2009), evidence suggests that foreign aid in the developing world does not translate into investment. They go on to point out that poor institutions in these developing economies (particularly with respect to property rights) results in an inability to fully appropriate the return to one's investment, thereby serving as a prominent disincentive to investment. Their results suggest that stronger property rights reduce conflict and increase investment.

Continuing on with the evaluation of risk in the investment decision but with particular emphasis on ports, Ho and Ho, (2006) investigate the merits of viable seaport infrastructure investment and note that it is typically 'lumpy' and requiring large capital expenditure and long payback period. A key feature of such an infrastructure investment is to structure a defensible risk management strategy to deal with uncertainties. They went on to demonstrate that risk management strategies can provide responsive alternatives to new opportunities. Through a case study of Singapore's Jurong Port they analyze the impact of the original risk management strategy employed and the impact it had on the success of the port. Of particular interest to this literature review was the article's treating of typical methods of investment in large port infrastructure projects.

Risk at higher than acceptable levels appears to be endemic to developing nations. In an attempt to view this from the optic of a real life case study, this literature review examined the situation of Tanzania. Of particular interest for its treatment of specific reasons why one developing nation in particular (Tanzania) is experiencing difficulties with maritime transport operations, Wood (2004), explores the current state of coastal and inland shipping, provides an overview of the state of ports and shipping and the reasons underlying the crisis of competitiveness in terms of both global pressures and national and regional dynamics. Problems of competitiveness he noted included under-investment, management failures, skills shortfalls and difficulties in interfacing with the railway network. He also noted greater issues such as a substantial trade imbalance and sever political instability.

Among the more specific causes for the risk noted in the situation above are corruption within the nation and other various barriers to entry, many of which are related to or bi-products of that corruption. Djankov, La Porta, Shleifer and Lopez (2000) present new data on the regulation of the entry of start-up firms in 85 countries. The data cover the number of procedures, official time, and official costs that a start-up firm must bear before it can operate legally. The official costs of entry are extremely high in most countries. Countries that regulate entry more heavily have greater corruption and larger unofficial economics, but not better quality goods (public or private). Countries with more democratic and limited governments regulate entry more lightly. The evidence suggests that regulating entry benefits politicians and bureaucrats.

Continuing on with the review of trade barriers and restrictions and their relation to risk, Hoekman and Nicita (2008) review new indices of trade restrictiveness and trade

facilitation that have been developed at the World Bank and compares the trade impact of different types of trade restrictions applied at the border with the effects of domestic policies that affect trade costs. Based on a gravity regression framework, the analysis suggests that tariffs and nontariff measures continue to be a significant source of trade restrictiveness for low-income countries despite preferential access programs. This is because the value of trade preferences is quite limited: a new measure of the relative preference margin developed in the paper reveals that this is very low for most country-pairs. Most countries with very good (duty-free) access to a market generally have competitors that have the same degree of access. The empirical analysis suggests that measures to improve logistics performance and facilitate trade are likely to have the greatest positive effects in expanding developing country trade, increasing the trade impacts of lowering remaining border barriers by a factor of two or more.

While it becomes clear that political risk is associated with or is a predictor of FDI, Nabamita and Sanjukta (2008) found that financial development is definitely a determinant of the extent of foreign direct investment inflow into an economy and showed that the contribution of financial development can be dependent on the political situation of the recipient nation. Higher political stability aids financial institutions to reap the benefits of FDI efficiently. This paper empirically investigated the role of political risk in the association of FDI and financial development. Using a panel of 97 countries, they were able to demonstrate a non-linear relationship between financial development and FDI, but also showed that the impact of development on FDI becomes negative beyond a certain threshold level of development – a relationship which is affected by political risk due to the fact that it actually alters the threshold.

The result of this review is a confirmation that political risk does seem to impact the degree of FDI which will enter a nation and that political risk is most often a function of the degree of corruption associated with doing business within that nation. This study will take this result and utilize a number of various measures to attempt to account for the political risk associated with investment in the nations reviewed.

Chapter 4 Methodology

The methodologies which were set out to be used within this study encompassed both quantitative and qualitative approaches moving from a macro level approach to a micro level. In an effort to determine the applicability of the particular factors selected for the analysis, the first step will be the inclusion of multiple regression analysis. The factors were to be quantified and regressed to determine which are most explanatory against a given dependant variable. Subsequently, Gravity Analysis was to be employed on specific ports selected for case study analysis. Finally, a qualitative analysis was to be undertaken to gauge from purely empirical observation if the results produced by the quantitative analysis hold consistent with expected results from a business perspective.

4.1 Multiple Regression Analysis

Regression analysis refers to procedure generally implemented for producing a model used to analyze a number of variables between or among which it is conjectured that a relationship exists. This supposed relationship is analyzed by holding the independent variable or variables – those which are believed to directly impact the variable being studied – constant against the variable being studied which is known as the dependant variable. The aim of the model is to create a regression equation wherein variations to the independent variables produce a reliable and predictive result which holds true against a particular historical data set. Regression analysis is used primarily for its predictive capability, derived by utilization of time series data to forecast particular future states and, within a predetermined standard deviation, may be used to conclude causal relationships between or among one or more dependant variable and the independent variable.

In this study, regression analysis will be used in precisely the above described manner utilizing data sets provided by various international bodies to determine the degree of predictive ability each of the factors has on the independent variable, National Greenfield Port Investment. As much of the data would be required to represent a particular aspect of each economy which may or not be easily quantified or even quantifiable, several of the data sets used will be in the form of indexes. These indexes will serve as proxies for various other factors which are not possible to discretely quantify. Other data sets will be quantified or indexed on an ad hoc basis to attempt to tease out certain factors for which there currently exists neither the actual required specific data nor a viable index from which to pull.

4.2 Gravity Analysis

The Gravity Model, inspired by Newton's law of Gravity, is a regularly utilized model by which to analyze bilateral trade flows given distance and size of the economies involved. Widely attributed to ground-breaking work by Jan Tinbergen (1962), the gravity model has become a staple in economic research related to international trade. He found that with regard to volume, bilateral trade flows appeared to be proportional to economic size of the nations and the degree of trade resistance between them. According to Helpman (2008), Tinbergen's measures of trade resistance "included geographic distance, a dummy for common borders, and dummies for Commonwealth and Benelux memberships" and have been used in some form or fashion since as they produce a good fit for most data sets being used to estimate international trade flows.

Because of empirical faults, models such as the Heckscher-Ohlin model, which use relative factor abundance of individual countries to attempt to predict trade, or with the even less complex Ricardian Comparative Advantage model, other attempts were made at finding a model which corrected for outcomes which deviated from expectations. One of these deviations came in the form of empirical evidence that countries with similar incomes were observed to trade more. Here, the Gravity model seemed to provide a feasible framework from which to analyze these occurrences and maintain accurate predictive capabilities.

In the trade context, the typical form of the gravity model is given by, $T_{ij} = kY_i^\alpha Y_j^\beta D_{ij}^\epsilon$, where T_{ij} is the bilateral trade, nominal exports, imports or total trade from country i to country j , Y_i (resp. Y_j) is the nominal GDP in country i (resp. j) and D_{ij} is the geographical distance between countries i and j . (Marimoutou, 2009) Silva (2006) notes that “In its simplest form, the gravity equation for trade states that the trade flow from country i to country j , denoted by T_{ij} , is proportional to the product of the two countries’ GDPs, denoted by Y_i and Y_j , and inversely proportional to their distance, D_{ij} , broadly construed to include all factors that might create trade resistance.” In this study, this model will be used to aid in predicting which economies will likely have success in an exchange of foreign direct investment in ports given their propensity to trade with one another and other nations with sufficient mass (GDP) to warrant additional investment in maritime trading capabilities.

4.3 Qualitative Analysis

Given the explicit business nature of any investment decision, it is important to evaluate case studies provided within the context of this analysis within an accepted business framework. While the gravity and regression analyses provide the desired leading indicators from a macro level, the added analysis on a business decision level which a SWOT analysis provides will go a significant way toward confirming via basic empirical evidence that the macroeconomic indicators conform to real world experience and expectations for investments.

4.3.1 SWOT/TOWS Matrix

In the case of analysis of particular port investment, the use of tried and tested methods of evaluating business decisions will go a long way toward determining the real world factors which contribute to the success or failure of the specific investment. In that vein, in addition to macroeconomic indicators decided upon in initial phases of the analysis, this study will incorporate the use of SWOT analysis with regard to specific case studies designed to represent Greenfield port investment with either positive or negative outcomes.

A SWOT analysis is designed to analyze the various Strengths, Weaknesses, Opportunities and Threats associated with a particular investment. From a colloquial point of view, the four letters associated with the analytical tool can be summarized thusly; inside, outside, good news, bad news. Strength and Weaknesses therefore are indications of the situation prevalent within the organization or the investment. These are internal indications of the value the investment itself brings to the table. As Strength,

therefore would be a positive factor associated with the investment which would exist with or without the presence of competition of any kind and equally, the Weakness would be a negative factor which exists with or without outside influence. Conversely, the existence of Opportunities or Threats relies on the existence of outside stimuli to materialize. A Threat or Opportunity would not exist without competition against which the investment is either superior or inferior.

With more specificity, Strengths may be defined as attributes of the investment which are helpful to achieving the objective. Weaknesses may be defined as attributes of the investment which are harmful to achieving the objective. Opportunities may be defined as external conditions impacting the investment which are helpful to achieving the objective. And finally, Threats may be described as external conditions which could damage the performance of the investment.

The effective use of SWOT requires an establishment of objectives which must be met in order to have an investment deemed to be successful, thus this particular analysis will view the case studies through a prism of what is and is not successful, a determination which will dovetail with the macroeconomic analysis and this come full circle to aid in closing the loop on the robust economic and business analysis required to make a successful business decision in these fluid investment climates.

Chapter 5 Factor Description/Justification

Regarding the quantitative analysis to be performed as a part of this study, the parameters for the analysis were determined both via historical economic precedents for various factors which were deemed via prior research to contribute to application of foreign direct investment in developing nations and the later success thereof. There are however, factors which, due to a lack of sufficient time series data or viable proxies, cannot be included into a quantitative analysis and thus must be reserved for subsequent qualitative study. The factors initially used in this study are described below.

5.1 Economic Freedom (EFI)

Economic Freedom, as an abstract concept, has no direct measure which one can use to encapsulate all the various factors which make the nation either stable or unstable. In fact, economic freedom must be looked at from various perspectives for a viable rational analysis of nations to be achieved. The one nexus around which most of these factors appear to coalesce is in economic outcomes. Those outcomes can be measured and certain contributing factors can be used to determine the reason for those outcomes.

Conceptually, Economic Freedom is clearly a key determinant of the viability of a climate for fruitful investment in the trade sector, insofar as it represents factors within given economies which either facilitate or hinder free trade. Taken on a country by country basis, this concept often times is sufficient to explain why a particular nation is economically better off than other nations of similar size and with similar natural resources. The difficulty in using economic freedom is in finding a measure which captures the major factors which determine how economically free a nation is. Fortunately, there is a current measure of economic freedom in the form of an index created by the Heritage Foundation called simply 'The Economic Freedom Index'. This index evaluates most nations on factors such as Fiscal Freedom, Trade Freedom, Business Freedom, Government Size, Monetary Freedom, Investment Freedom, Financial Freedom, Property Rights, Freedom from Corruption and Labor Freedom. Each factor is scored and an aggregate number is generated for the total score for the nation in a given year. [7] For the purposes of this study, the Economic Freedom Index will be used as the measure of how economically free a nation is.

5.2 Economic Stability/Growth (GDP Deflator)

By way of determining a level of economic stability, this study will utilize GDP deflator as its measure. [9] The measure of the GDP deflator is equal to Nominal GDP/Real GDP multiplied by 100. This allows for the measurement, against a base year, of the rise in prices which can't be directly attributable to the rise in real GDP. Since this measurement of inflation doesn't depend on a particular basket of goods, but rather evaluates the GDP of a nation as an aggregate figure exclusive of the biases the basket selection would bring or the variations which would necessarily occur when disparate nations with disparate baskets are compared, this measurement is likely to be the most accurate measure for this analysis. As such the GDP deflator will be calculated for each nation evaluated and regressed against the dependant variable to determine the impact inflation had on the success or failure of the investment.

The reasoning behind the use of the GDP deflator (inflation) as a measure of economic stability is the substantial impact out of control inflation can have on the economic futures of a nation. Historically, shown to be a predecessor to wars (see post WWI hyperinflation in Germany), the stability and robustness of an economy is demonstrated in large part by the rate of inflation that economy experiences. Some nations with economies largely based on a single commodity (Iran and Venezuela for example) are likely to have higher levels of inflation. This may be either attributed to the degree of political stability nations in this category face or to the fact that the economic fortunes are so closely tied to the fluctuations of a single commodity; nevertheless, the measure holds some explanatory power.

5.3 Ease of Doing Business

On a more functional level, there are distinct advantages in some countries over others in regard to actually conducting business on a day to day basis. This, of course, plays into the attractiveness of a nation for foreign direct investment. If the nation is generally free but is difficult to operate within, the prospect of investing in the nation diminishes. This is especially true as relates to foreign direct investment in Greenfield projects, where the risk is relatively greater than simply acquiring an existing business with the concomitant infrastructure in place to deal with the environment.

In an effort to gauge this particular risk or difficulty of conducting day to day business activity, this paper will utilize a current index – The Ease of Doing Business Index. Within this index, according to www.doingbusiness.org, [8] “Economies are ranked on their ease of doing business, from 1 – 181, with first place being the best. A high ranking on the ease of doing business index means the regulatory environment is conducive to the operation of business. This index averages the country's percentile rankings on 10 topics, made up of a variety of indicators, giving equal weight to each topic. The rankings are from the *Doing Business 2009* report, covering the period April 2007 to June 2008.” These rankings include starting a business, employing workers, registering property, obtaining permits, protecting investors, paying taxes, cross border trade, enforcing contracts, obtaining credit and closing a business.

For this analysis, the data required was sparse at best, as this index did not exist until 2004. Therefore, for the purposes of this study and because sufficient time series data does not exist due to the relative newness of the index, the numbers utilized will be held constant at the most current year for the 10 years evaluated.

5.4 Security Competence

Security is the factor of national stability which represents where the state is either able or unable to control the level or degree of conflict within its borders. This is particularly important as regards foreign direct investment as an unstable nation will inevitably provide an unstable climate for investment due to the inability to protect both the capital allocated for the investment and the labor required to operate the venture. Among the various inputs for this index are factors such as territory affected by conflict, incidence of coups, gross human rights abuses and conflict intensity. It is expected that nations exhibiting a high degree of security competence would be in a better position to and better able to identify and evaluate important assets with regard to infrastructure and vessels which would be susceptible to attack or use in a criminal enterprise. They would

be better able to assess the threat levels to each of these assets and the likelihood the threats will take place and would possess a demonstrable ability to establish and enforce viable and useful security measures which could serve to protect the investments in question. These capabilities would both reduce the threats to the port infrastructure itself, to the cargo while at port and to the supply chain, which is vital for the proper functioning of the port as an input in the global economic system.

For the purposes of this study and because sufficient time series data does not exist due to the relative newness of the index, the numbers utilized will be held constant at the most current year for the 10 years evaluated. Due to the fact that nations rarely move substantially and negatively away from their current security status in the short term, this particular data set will be inferred to be applicable for use on a short term (5-10 year) basis. This data is not available in a time series and therefore won't be applied to the regression portion of this analysis, instead being used for the qualitative analysis to investigate the comparative impact it has on investments which were made in the short term. It will be considered a relative strength or weakness of a nation in the context of a SWOT analysis. [12]

5.5 Access to Natural Resources/Commodity Based Economies

According to Christiansen (2004) "...experience shows that countries possessing non-trivial amounts of natural resources are likely to attract resource seeking investors, regardless of their level of economic development and performance more generally." This would necessarily entail that the access to or possession by a developing nation of a substantial amount of a natural resource which is sought after would, at a minimum, improve the viability of investing in a Greenfield port in that nation. This is particularly true because the nation would not necessarily need to be in a geographical location such that it could be easily integrated into an existing trade pattern. If the amount of the natural resource is great enough, the value of shipping the resource directly from the nation would generate immediate demand for the port's use, once built and guarantee a somewhat steady stream of commerce for as long as the resource remains viable for export.

For the purposes of this study, the degree of access to a natural resource will be determined via the net export by that nation of the existing commodity. These commodities will include, Agricultural products, Food, Fuels and Mining Products, Fuels, Iron and Steel, Chemicals and Textiles. The data will be gathered from the World Trade Organization Trade Statistics Database [10] and applied to a particular subset of nations meeting the aforementioned criteria for developing nation status.

5.6 Political Stability

Busse and Hefeker (2005) demonstrate that factors related to political stability such as an efficient law and order system, basic democratic rights and the absence of both internal and external conflict have a substantial effect on the degree of foreign direct investment into a nation. When a nation is politically unstable, the drive to invest within the country, at least with any kind of long term commitment, is comparatively negligible versus investment climates where the political situation is substantially more stable. Interestingly, and antithetical to the idea that access to natural resources may increase the degree of trade a nation enjoys and thus make it a more hospitable climate for

investment in ports is the conclusion by Collier and Hoeffer (2002) that countries with a higher percentage of national income from primary commodity exports have been more prone to civil war, a factor which could possibly offset the attractiveness brought by access to those same commodities if not completely negating it.

For the purposes of this study, the measure of political stability will be a measure provided by the World Bank [11] which assess year over year stability and non-violence as an index. According to the World Bank the index measures the government's ability to carry out its declared programs, and its ability to stay in office and depends on issues like the type of governance, the cohesion of the government and governing party or parties, the closeness of the next election, the government command of the legislature, and approval of government policies.

5.7 Existing Hinterland Infrastructure

Empirically, hinterland infrastructure is an integral determinant of the effectiveness of trade within any country. The easier it is to move goods and people throughout the country and to points of import and export, the more likely trade will take place both within and outside the nation. Developing nations generally have a lack of significant investment in infrastructure which contributes to both their developing status and any dearth of foreign direct investment they may experience. This is largely due the increase in transport costs which the lack of a sufficient infrastructure provides and the subsequent lack of productivity a nation experiences via an inability to properly utilize natural resources and comparative advantage. Indeed, Kazutomo & Wilson (2009) via regression analysis, discovered that “the expansion of port infrastructure would *ceteris paribus* reduce the import charges / trade costs, ultimately paid by the importers. In turn, reduction in the transport costs may lead to an expansion of trade through the ports.” While specifically regarding hinterland infrastructure Rietvelf (1994) points out that “Better transport infrastructure means more opportunities to recruit qualified labour which improves labour productivity.”

This does not necessarily mean that the factor will be highly correlated, however; especially, given the nature of many developing nations' exports themselves. First of all, it is extremely common for developing nations to export much more than they import. This is related to the fact that many developing nations export largely commodities related to natural resources for which they possess a comparative advantage and abundance. This need to export would appear to be the fuel for the FDI furnace. It may also minimize the need for hinterland distribution or even consolidation to any appreciable degree. Hinterland infrastructure merely needs to move from locations within the country where the natural resource exists and to the port for transit onto purchasing nations.

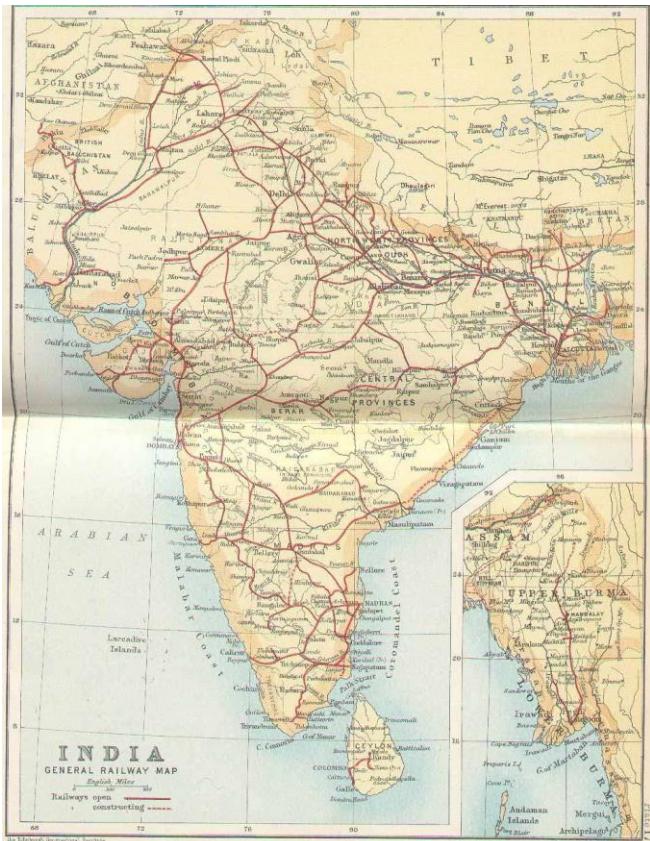


Table 3 - 1893 Indian Railway Map

factor, the analysis will be conducted with the use of hinterland infrastructure data as provided by the CIA world fact book, which accounts for the total number of kilometers of hinterland transport infrastructure to include roadways, railways and inland waterways. The aggregate number of kilometers of all hinterland infrastructure will be totaled and regressed to determine the numerical impact this factor has on the dependant variable. As this factor is highly unlikely to change significantly within a ten year period, the latest year of the study will be held constant over the prior 10 year period.

5.8 Balance of Payments (imports/exports)

As a measure of trade, data on imports and exports to and from the nation are a direct measure of the growth or diminishment of trade experienced by a particular nation. Ostensibly, the degree to which a nation trades and the subsequent growth or reduction in that number, is an intuitive measure of the desirability of the nation for construction of a port.

However, it could also be that this factor is negatively correlated but still significant. For instance in cases, perhaps where a negative balance of payments may actually foster the investment in Greenfield port investment over and above nations with a positive balance of payments or even cases where a positive balance of payments could be a deterrent to Greenfield port investment. This would be most likely to occur when there is

This is little clearer than when looking to East India Trading Company run India during the 19th century. The configuration of the railways were such that they moved from one area of the country with substantial natural resources directly to the ocean for transport. As can be seen from the 1893 map of Indian railways [16], the rail at the time moved almost exclusively in a North-South direction with virtually no direct East-West travel possible throughout large portions of the country, a situation especially true for modern day Pakistan. This propensity to value a hinterland in developing nations chiefly as a means of extraction rather than a means of dissemination makes the impact a hinterland may have on the decision to invest in a Greenfield port in a developing nation minimal at best.

For the purposes of this study and in order to determine the impact of the

a situation in which there is a current account surplus in a nation and the export industry is likely to have reached a level of maturity that obviates the need for investment along the lines of Greenfield investment. As it pertains to developing nations, it would mean that Greenfield investment is more attractive when it is implemented on the cusp of economic success or revival rather than in the midst of it. When there is an established export network and it is integrated well with the major industries within the economy, the room available for profitably investing in developing economies would need to be minimal and the returns not nearly great enough to merit the risk associated with the investment.

This study will analyze the balance of payments for each country within the data set and via multiple regression analysis, determine the statistical impact this has had on the viability of investment in each nation.

5.9 Potential Supply Chain Integration: The Logistics Performance Index (LPI)

When evaluating where to invest, it is first important to place the investment decision inside some existing criteria for selection by customers of currently functioning competitive investments. In the context of ports, it is necessary to evaluate port choice decisions for shippers who currently operate within the environment the investment might be made. It has been noted in prior research that Ports not only must themselves be efficient, they must exist within efficient chains where the total cost of the elements is lower than the cost of competing chains for a comparable level of service. (Magala 2008) It has also been argued in Robinson (2002) that, in a competitive environment, shippers ultimately choose a port on the basis of the comparative advantage they are afforded as a function of that particular port's integration into a particular supply chain.

In the context of Greenfield ports, this could be relatively difficult to measure, as the ports are not in fact operating as part of any supply chain upon the decision to invest. There is a measure, however, which evaluates the logistics climate of an entire nation; the Logistics Performance Index. For the purposes of this study, this index will be used as a proxy for potential supply chain integration.

The Logistics Performance Index is a World Bank administered index based on survey data provided by freight forwarders and express carriers. It purports to provide feedback from these various groups on the ease of logistics operations within various countries in which the respondents conduct business. According to the World Bank, "They combine in-depth knowledge of the countries in which they operate with informed perceptions of other countries with which they trade, and experience of global logistics environment. Feedback from operators is supplemented with objective data on the performance of key components of the logistics chain in the home country, data collected for 100 countries." The index broadly uses seven (7) basic factors to determine the relative ranking amongst other nations. These are *Customs/Border control efficiency and effectiveness as it relates to clearance processes, Quality of transport and It Infrastructure, Ease and affordability of arranging shipments, competence of the local logistics industry (transport operators, customs brokers, etc), Ability to track and trace*

shipments, Timeliness of shipments to destination and Domestic logistics costs (handling, warehousing, etc). [1] (World Bank 2009)

This index provides valuable information which may encapsulate, from a more subjective perspective, underlying structural efficiencies and deficiencies within a set of countries which make those countries attractive locations in which to conduct business or locations which would otherwise not be viable for any type of significant transportation related foreign direct investment. For the purposes of this study and because sufficient time series data does not exist due to the relative newness of the index, the numbers utilized will be held constant at the most current year for the 10 years evaluated.

5.10 Port Model

Port privatization to at least some degree has been shown to improve port operation efficiency. Tongzon and Heng (2005). There are several degrees of port privatization which may be considered. According to Baird (1999) one may institute one of four models for port operation/privatization.

The first is known as a 'Service Port' model or PUBLIC port, in which no privatization is implemented. The Regulator, Land Owner and Operator are all one in the same. This model is employed in numerous countries throughout the developing world and is often noted as one of the contributing causes for the lack of productivity in developing nation ports.

The second option is known as PRIVATE I model or a 'Landlord Port' model. This is a more common type of arrangement where the regulation and ownership of the port land is reserved for the local or national government, but the operation of the terminals and the port itself is the purview of private terminal operators via long term leases. Examples of this type of arrangement include many ports throughout North America and Western Europe, including the port of Rotterdam.

The third option for port privatization is that of a PRIVATE II model. This model entails that both ownership of the land and the operation of the port itself belong to private enterprise. The government merely retains the right and responsibility to regulate port operations. Baird (1995) further notes that "Single-user bulk oil, coal, ore, and aggregate terminals often correspond to this model, but it is generally not considered appropriate in large multi-user ports. However, certain large multi-user ports in the UK appear to conform to this model." He goes on to point to Tilbury, Felixstowe and Harwich as examples of this particular arrangement.

The fourth and final possibility for privatization is what is known as a 'Tool Port' or PRIVATE III model. This is found when all the elements of the port, regulation, ownership and operation are all devolved from government control and into the hands of private enterprise. The port is thus entirely in the hands of the market and subject to market forces for pricing and operational decisions. This is a rare form of port found in few places in the world, primarily within the UK.

A chart of the arrangements described above is found below.

Port Models	Port Regulator	Port Landowner	Port Operator
Public	Public	Public	Public
Private I	Public	Public	Private
Private II	Public	Private	Private
Private III	Private	Private	Private

Table 4: Baird (1995)

These various arrangements bring with them positives and negatives for the success of the port under which the operational regime is in place. This study will evaluate, via case study, the empirical impact the particular arrangement each has had on the various ports which are evaluated.

5.11 Investment Schemes (Privatization, Concessions and Traditional Investment)

In recent years, developing nations as well as developed have utilized Public Private Partnerships to great effect to encourage private participation in building public infrastructure, from roads and rail to airports and sea ports. This has not only brought substantial funds to the table, but has introduced a new and generally more flexible ethos into the management and operation of that infrastructure. This flexibility in the construction of Greenfield ports has mitigated the risk to a certain degree, for firms interested in investing, as the entity which takes on the risk of the construction of the new facility is finally able to reap an appropriate degree of reward for the degree of risk assumed.

This new infusion of private sector participation and capital is not generally, however, unrestrained. Each of these partnerships is accompanied by conditions laid out by the governmental authority which restricts some aspect of the private participation and ensures that the asset will ultimately devolve in control back to the government itself. In order to achieve this and meet the criteria which the private investors must satisfy regarding reasonable return on investment, each deal is structured specifically to achieve those aims. Those structures carry with them both advantages and disadvantages for both parties and the final product, thus making some deals, specifically for port investment, more effective than others. Accordingly, it is important to evaluate successful and unsuccessful projects of this kind from the perspective of the method of investment used to determine if there is one type which yields better results than others. As private investment is not the only means by which ports are constructed, it is necessary to compare these investments against publically funded investment as well. By way of explanation of the private structures, however, the following describes the most prominent structures used in this process.

According to Betancor and Rendeiro (1999) , a BOT (Build Operate Transfer) scheme occurs when the government grants a concession or franchise to a private firm in order to finance and build or modernize a facility that will also be operated by the firm for a certain period of time (20 to 50 years is a common period for airports). The private

operator will get corresponding revenues and in turn it will assume all commercial risk. When the concession period expires, the facility will return to the government. The concession contract may include some regulatory provisions regarding the prices charged or the quality provided.

Most concession agreements are variations on this BOT theme. The following are versions of the model which can be employed in development of a Greenfield port.

1. **BOOT (*Build Own Operate Transfer*):** This particular scheme is extremely similar to a BOT, but allows the operator to also retain ownership of the asset during the concession period. This is often to enable the operator the assets with which to guarantee loans.
2. **BOMT (*Build-Own-Maintain-Transfer*):** BOMT model is also quite similar to BOT model except that in BOMT model the party who gains the concessions is responsible for the maintenance of the project facilities during the stated concession period.
3. **BOO (*Build-Own-Operate*):** In this model the project facilities are not transferred to the host government after the completion of the project. This is differentiated from a typical private investment in that the government does maintain some degree of influence over the operations of the investment.
4. **BOLT (*Build-Own-Lease-Transfer*):** Within this model, the private entrepreneurs are invited to build the asset and then lease the completed assets to the public sector. The public sector pays the lease charges for the asset and subsequently, on the expiration of the lease term, the asset is transferred back to the public entity. This usually corresponds with the economic life of the facility.

Alternate methods for port investment include both direct public private partnerships like joint ventures, and capitalization, where the port is sold as an investment and shares are sold in an initial public offering with large amounts of the shares retained by the government. The final method is simply public investment in the entirety of the project.

It is the aim of this analysis to review the basic structures under which Greenfield port investments are created and to determine which, if any, are the most viable methods to utilize in the development of a Greenfield port investment. In that vein, this analysis will evaluate each of the following eight (8) general schemes used to affect investment in new port projects. There are additional financing schemes including privatization schemes, but as several are reserved for assets which have already been constructed, the study here will be limited to schemes where the asset is yet to be built.

5.12 Statutory Incentives

Beginning with the wave of privatization and liberalization which hit many economies in the late 70's and early 80's, many developing nations began to attempt to utilize those concepts to improve the degree of private participation experienced within their economies. This move was ostensibly aimed at improving their economic outcomes through utilizing the same methods employed by nations like the United Kingdom and the United States. Chief among the tactics involved in this push toward privatization was the liberalization of tax policies and introduction of incentives for private

investment. Indeed, Chhibber and Dailami (1990) find; “The shift in economic strategy from the past method of direct government intervention to a new strategy [Privatization], dependent on policy-induced incentives, is currently a focus of the ongoing liberalization and privatization measures undertaken in most developing countries. A well-designed corporate tax system is an integral ingredient of such a new strategy.” This tactic has proven to be somewhat successful in attracting various types of business into developing nations (see Liberia and flagging of ships).

Provision of statutory incentives, particularly tax incentives, to spark investment offers a substantial factor for evaluation of the success or failure of foreign direct investment in ports. As such, this paper will evaluate the selected nations which have implemented or enabled the implementation of Greenfield investments in ports in terms of the various tax structures each utilized.

5.13 Preferential Trade Agreements

Preferential trade agreements have had a direct impact on the degree and level of foreign direct investment. According to Medvedev (2006), it is related to both the general idea that a free trade agreement will be signed “threshold effects” and the actual expansion of the market size associated with the implementation of the agreement. Lim (2001) agrees and cites several sources of data which point to the conclusion that market size is the strongest determinant of foreign direct investment. With regard to the port sector, when the developing nation has substantial raw materials or commodities which are attractive or needed by potential developed nation partners within the trade agreement, the likelihood of investment in ports, particularly Greenfield investment, should ostensibly increase. This is demonstrated by the observation that this increase in market size is generally stronger with regard to trade agreements between developing nations and more developed, OECD like nations.

Thus particular attention will be placed on trade agreements which are brokered between developed and developing nations. The aim of this analysis is to determine the degree to which the formalization of trade between developed nations and developing nations impacts the success of Greenfield ports created within the context of those agreements.

5.14 Foreign Aid/Official Development Assistance

Research regarding foreign aid and its impact on foreign direct investment has not been entirely uniform in the conclusions drawn as to the reliability of aid to foster growth in foreign direct investment. From one perspective, foreign aid can free up the finite amount of government capital which is available to developing nations for each to pursue projects which make the nations more viable locations for foreign direct investment. It can free up funds for infrastructure and education which may have formerly been needed for basic necessities such as food. This is one perspective of foreign aid. The other perspective suggests that it can actually be a deterrent to infusions of foreign direct investment. In fact, there are some studies, Bruner and Oxoby (2009) for instance, which conclude that sans the proper protection of private property, foreign aid will have virtually no positive impact on growth or encouragement

of foreign direct investment. Snyder (1996) even found that countries which receive larger aid allocations experience lower subsequent levels of private investment.

It is, of course possible, given the literature review that Bruner and Oxoby (2009), foreign aid will have virtually no positive impact on growth or encouragement of foreign direct investment were perhaps accurate not only as regards generalized foreign direct investment, but also in the realm of Greenfield investment in sea ports. It could be that the degree to which investment is impacted by foreign aid is unappreciable at best and at worst utterly insignificant, particularly given the impact which might appear as part of the crowding out effect. Where foreign aid enters an economy to accomplish one task or another, the impetus for the local economy to accomplish the same object is obviated and any entrepreneurial motivation which may have once existed within the environment to tackle the specific goal is supplanted by the knowledge that a source with generally far superior access to resources and, in the case of developing nations, often a much better relationship with or even the blessing of the national or local government, will do the work as competition is pointless. While this would not necessarily impact the investment in a Greenfield port, especially as it pertains to foreign direct investment from large multinational corporations, it is possible it creates a trend in the local economy which stifles local economic entrepreneurship and creativity to the point that it may actually affect in a negative way, the viability of engaging in other larger investments in that particular economy.

With all this in mind, this study will test, via the utilization of OECD statistics on Official Development Assistance [13], the impact foreign aid has on the potential for foreign direct investment in the form of a Greenfield port investment to be successful.

According to the International Monetary Fund's, External Debt Statistics Guide for Compilers and Users, Official Development Assistance is defined as follows:

"Flows of official financing administered with the promotion of the economic development and welfare of developing countries as the main objective, and which are concessional in character with a grant element of at least 25 percent (using a fixed 10 percent rate of discount). By convention, ODA flows comprise contributions of donor government agencies, at all levels, to developing countries ("bilateral ODA") and to multilateral institutions. ODA receipts comprise disbursements by bilateral donors and multilateral institutions."

5.15 General Foreign Direct Investment

Foreign Direct Investment (FDI), which is the measure of investment from foreign owned companies within a particular nation, is a meaningful measure of both globalization and the extent to which a particular nation is perceived as a viable investment climate. Globalization is made possible largely as a direct function of trade flows, thus the means with which to affect those trades – ports and infrastructure development – will likely directly impact the level of foreign direct investment a nation is likely to receive. In fact, "Developing countries, emerging economies and countries in transition have come increasingly to see FDI as a source of economic development and modernization, income growth and employment." (OECD, 2002, p. 5) and "Most empirical studies conclude that FDI contributes to both factor productivity and income

growth in host countries, beyond what domestic investment normally would trigger.” (OECD, 2002, p. 9) While this may be a lagging indicator of formerly successful investment, or a climate which has reached a certain level of viability, it may also lead, insofar as it may demonstrate an upward trend in the development of the requisite infrastructure and regulatory processes required for international investors to make sound investments within the nation. This would necessarily entail that investment in a Greenfield project could yield substantial returns while assuring the investors that risk will be minimized in comparison to other nations within the region with less foreign direct investment demonstrated. Furthermore, this is supported by the fact that the OECD (2002) considers FDI as an important source of economic development and modernization.

It could also be, however, that despite the fact that ports and generalized foreign direct investment appear indelibly tied together, the impact on Greenfield ports created by generalized FDI doesn’t really exist to any appreciable degree because what inspires a Greenfield project in the seaport sector may have little to do with the specific type of FDI the particular developing nation is acquiring. While correlated to generalized FDI, the Greenfield port itself may, in fact, have drawn investment to serve a sector which has completely escaped the generalized FDI.

There are two measures by which to evaluate foreign direct investment into a nation which will be used in this study. The first is a measure of FDI in absolute terms; simply the aggregate amount of FDI infused into the nation for a given period. [14] The second measure is slightly different and rates the FDI on an index; the FDI performance index. According to UNCTAD, “The *Performance Index* is shown for three-year periods to offset annual fluctuations in the data. The indices cover 141 economies for as much of the period as the data permit, and the indices exclude tax havens, which for tax rather than productive reasons tend to have massive FDI inflows in relation to their economic size.”

5.16 Country Specific Dummy Variables

When evaluating several different nations via regression analysis, there will inevitably be factors which are difficult or even impossible to account for in any meaningful way. These often include cultural aspects of the several nations which are not easily quantifiable or may even include variables which can be quantified, like language, but due to software limitations it makes more sense to attempt to group them in with culture. In an effort to account for these variables, the regression analysis will utilize country specific dummy variables. In this instance, the variables will be strictly binary and exist as a ‘1’ where the specific country is being accounted for and a ‘0’ in columns where another is the primary focus.

Chapter 6 Factor Ranking/Analysis

6.1 Factor Analysis

When analyzing anything within the framework of a regression analysis using multiple factors, it is important to review each of the factors against the others to determine if there is substantial Multicollinearity. In order to accomplish this we use the Pearson Correlation. In this analysis, a positive association is suggested by the discovery of a positive correlation, a negative (or inverse) association is suggested by the discovery of a negative correlation and the degree of association is a function of how close the number is to either a 1 or a negative 1.

	Human Development Index	Economic Freedom (EFI)	Economic Stability/Growth (GDP Deflator)	Ease of Doing Business	Security Competence	Access to Nat. Res./Commod. Based Economies	Political Stability	Existing Hinterland Infrastructure	Balance of Payments (imports,exports)	Potential Supply Chain Integration (LPI)	Foreign Aid/Official Development Assistance	General Foreign Direct Investment	GDP	Greenfield Port Investment
Human Development Index	1.00													
Economic Freedom (EFI)	0.43	1.00												
Economic Stability/Growth (GDP Deflator)	0.23	0.18	1.00											
Ease of Doing Business	-0.50	-0.71	-0.05	1.00										
Security Competence	0.30	-0.15	0.27	-0.09	1.00									
Access to Nat. Res./Commod. Based Economies	0.23	-0.16	-0.15	-0.26	-0.04	1.00								
Political Stability	0.30	-0.07	0.40	-0.13	0.34	0.29	1.00							
Existing Hinterland Infrastructure	-0.03	-0.25	-0.14	0.01	-0.18	0.70	0.07	1.00						
Balance of Payments (imports,exports)	0.16	-0.26	-0.07	-0.09	0.08	0.89	0.37	0.42	1.00					
Potential Supply Chain Integration: The Logistics Performance Index (LPI)	0.32	0.40	-0.07	-0.69	-0.33	0.57	0.26	0.46	0.30	1.00				
Foreign Aid/Official Development Assistance	-0.06	-0.45	-0.25	0.01	0.12	0.45	0.51	0.46	0.42	0.30	1.00			
General Foreign Direct Investment	0.24	-0.19	-0.10	-0.19	0.05	0.95	0.34	0.50	0.97	0.43	0.43	1.00		
GDP	0.20	-0.18	-0.12	-0.18	-0.04	0.98	0.27	0.71	0.90	0.51	0.46	0.96	1.00	
Greenfield Port Investment Commitments (2000-2008) in Millions	0.13	-0.28	-0.11	-0.06	0.03	0.95	0.33	0.70	0.92	0.41	0.52	0.94	0.97	1.00

Table 5 - Initial Pearson Correlation

As can be seen from the chart above, which utilizes this methodology to test the various factors, there are approximately four factors which show high degrees of correlation with other factors in the analysis. While some of these appear highly correlated, it is not necessarily the case that they should be eliminated, as they may be necessary to explain the small degree of the later regression which is not complete otherwise. However, by way of review, each of these variables demonstrating a high degree of correlation with another variable within the analysis will be covered below.

In the above analysis, it becomes clear that there are several variables which appear to be highly correlated with one another; Access to Natural Resources, Balance of payments (BOP), General FDI into the nation, Gross Domestic Product (GDP) and specific private Greenfield port investment. There are numerous reasons why these may be correlated to one another which will be addressed below.

Access to natural resources appears correlated highly to BOP, FDI, GDP and Greenfield port investment. With regard to BOP, it is likely correlated based in the fact that for many nations much of their trade, when developing, is basically trade in their own natural resources. So, any trade conducted by these nations would be heavily influenced by the resources each has to trade and thus this factor would be highly correlated. This may explain a significant amount of the correlation with the gross domestic product of the nation as well, provided the nation doesn't have a robust manufacturing sector, which many developing nations do not have. With regard to FDI and Greenfield port investment, these are both likely correlated to this variable as a result of the fact that most FDI, be it Greenfield ports or otherwise, is focused on extraction of natural resources in the developing stage of economic growth. The port investment may be acting as a facilitator of the generalized foreign direct investment into the nation.

Next it can be seen that the BOP is correlated rather closely with GDP, generalized FDI and Greenfield port investment. These factors are often found to affect one another directly, as trade is a facilitator of economic growth and FDI has been shown to join accomplish the same, likely to its propensity to increase trade. These factors are in fact correlated to one another to a large extent and this is to be expected, as each tends to form a virtuous circle around GDP, the aggregate measure of economic success relative to the world, and influence it directly as an increasing GDP reciprocates and spawns additional investment.

As these factors show substantial correlation, it is important that the highest among them be removed from the data being evaluated. Thus the threshold for removal based on the Pearson Correlation is .90 and *GDP, BOP and FDI were removed from the Analysis.*

6.2 Multiple Regression / Gravity Analysis

6.2.1 Further Refinement of Regression Factors: Regression analysis in this instance yielded what could be construed as 'expected' results. Prior studies which were cited in the descriptive section of this thesis held several findings which were effectively corroborated by the initial regression analysis conducted on the various

factors suitable for the use of this methodology. However, many of the original variables which were believed to be significant did not, in fact, yield sufficient P-Values to remain part of the final analysis. *This required the further elimination of Security Competence, Hinterland Infrastructure, Logistics Performance Index (LPI) and Foreign Aid.* This left only Economic Freedom, Economic Stability, Ease of Doing Business, Political Stability, Access to Natural Resources and the various dummy variables in the regression equation.

6.2.2 Gravity Model Modification: Of note here with regard to gravity analysis, it was discovered well into the thesis, following several attempts at discovering a manner in which to employ the methodology that only a hybrid version of the analysis could be effectively employed because only destination country data for Greenfield port investments were available and not - as is required in gravity work – source destination information. As the gravity model of trade is a bilateral model, it was important to discover some manner in which it is possible to account for trade with the world if the use of this type of analysis is to be anything like meaningful in a review of factors leading to successful Greenfield port investment in such a broad range of nations. This was initially attempted on a strictly bilateral basis as a means to test the validity of the approach to determination of which factors might be leading indicators of successful Greenfield port investment

In an attempt to garner some of the benefits of the gravity analysis, the distance variable was – weighted for GDP – integrated into the original regression analysis and served as one of the independent variables used in the regression itself. In this instance, the goal was to find a measure by which gravity could be accounted for on a worldwide basis and so the factor “**Distance from the world**” weighted on GDP shares was utilized.

Distance from the world was calculated using the following variables. First, the analysis took into account the bilateral distance between each country and its top trading partners as identified by the World Fact Book. This was designed to account for upwards of 80% of all trade flows each particular country was engaged in on an annual basis for the time series involved. From this point on the GDP of each of the trading partners was accounted for and the percentage of total World GDP was determined for each of the partners. The next step was to multiply the bilateral distances between each of the major trading partners of each country being evaluated with their percentage of world GDP. This in turn was added together to yield, for each of the countries being evaluated, their ‘Distance from the World’. That distance, seen below, became, as a time series, the manner by which distance was incorporated into the regression.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
China	4567.826	4619.886	4640.877	4747.86	4748.101	4559.414	4404.503	4310.414	4234.57	4052.866	3807.8
Cote D'Ivoire	3429.816	3461.962	3479.47	3632.366	3670.439	3554.468	3453.543	3432.025	3433.371	3362.155	3250.075
Djibouti	3660.437	3746.95	3869.024	4040.039	4040.09	3799.163	3635.296	3624.915	3612.69	3459.034	3261.553
Dom. Republic	1400.663	1428.606	1474.396	1571.664	1611.876	1580.838	1576.698	1616.174	1668.726	1701.41	1719.739
Egypt	3717.511	3787.248	3833.763	3944.973	3947.176	3791.2	3659.864	3609.898	3566.921	3431.333	3275.288
Ghana	3394.905	3447.251	3504.816	3660.065	3702.075	3562.09	3471.811	3455.705	3462.433	3387.577	3247.545
India	4163.817	4227.2	4272.157	4422.586	4431.781	4226.361	4055.945	4004.272	3952.653	3779.349	3551.414
Lebanon	3423.11	3463.705	3500.572	3641.455	3662.315	3509.17	3382.171	3349.089	3325.777	3204.75	3046.99
Pakistan	3577.526	3655.59	3755.541	3904.944	3905.203	3673.113	3514.279	3479.434	3445.929	3272.284	3045.208
Peru	4562.356	4770.939	4950.944	4818.192	4663.165	4474.203	4358.445	4274.801	4167.124	4004.604	3962.82
Philippines	4575.433	4715.734	4865.373	4986.985	4943.554	4634.435	4410.105	4348.661	4269.332	4006.897	3734.448
Thailand	4927.155	5084.992	5236.087	5333.833	5277.756	4969.32	4743.506	4668.167	4568.187	4298.252	4028.921
Turkey	2990.91	3031.335	3082.796	3216.179	3233.896	3090.089	2984.525	2966.579	2960.457	2865.09	2732.864
Viet Nam	5177.667	5289.682	5341.039	5439.5	5411.573	5165.542	4951.163	4846.222	4736.667	4491.876	4216.995

Table 6 - Distance From the World (KM)

6.2.3 Final Factor Confirmation: From here, an additional iteration of the Pearson Correlation was utilized using the log of the values remaining and employing more advanced software to yield the following result.

Correlations						
	LN_Dist_world	LN_EFI	LN_EcStab	LN_PolStab	LN_Ease	LN_NatRes
LN_Dist_world	Pearson Correlation	1	-,039	-,652**	-,061	-,197*
	Sig. (2-tailed)		,635	,000	,453	,014
	N	154	154	154	154	154
LN_EFI	Pearson Correlation	-,039	1	,133	-,078	-,476**
	Sig. (2-tailed)	,635		,099	,336	,000
	N	154	154	154	154	154
LN_EcStab	Pearson Correlation	-,652**	,133	1	,241**	,016
	Sig. (2-tailed)	,000	,099		,003	,840
	N	154	154	154	154	154
LN_PolStab	Pearson Correlation	-,061	-,078	,241**	1	-,202*
	Sig. (2-tailed)	,453	,336	,003		,012
	N	154	154	154	154	154
LN_Ease	Pearson Correlation	-,197*	-,476**	,016	-,202*	1
	Sig. (2-tailed)	,014	,000	,840	,012	,000
	N	154	154	154	154	154
LN_NatRes	Pearson Correlation	,290**	-,119	-,153	,114	-,386**
	Sig. (2-tailed)	,000	,141	,058	,158	,000
	N	154	154	154	154	154

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 7 - Pearson Correlation (Second Iteration)

As can be seen in Table 7, the new Pearson Correlation shows no high correlations between the explanatory variables. This demonstrates that the variables themselves do not measure the same underlying information, which implies that they exhibit no high levels of multicollinearity, which in turn implies the regression equation is properly specified. With the final set of variables complete, the next step was to run the final regression, utilizing the remaining significant variables and the dummy variables. Following is a review of the factors which appeared to make the largest impact on the success or failure of individual nations as viable sites for Greenfield seaport investment.

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
1 (Constant)	-37,268	18,709		-1,992	,050
LN_Dist_world	-1,051	,858	-,187	-1,225	,224
LN_EFI	,083	2,626	,006	,032	,975
LN_EcStab	-,316	,522	-,252	-,605	,547
LN_PolStab	-,427	,229	-,255	-1,866	,066
LN_Ease	5,346	2,165	2,845	2,469	,016
LN_NatRes	1,149	,346	1,597	3,324	,001
D_China	2,225	,824	,523	2,699	,009
D_Ivory	-1,286	,598	-,286	-2,148	,035
D_Djibouti	4,166	1,923	,813	2,167	,033
D_DomRep	3,940	3,584	,635	1,099	,275
D_Egypt	2,203	,850	,430	2,592	,011
D_Ghana	3,695	1,995	,595	1,852	,068
D_Lebanon	5,625	2,697	,906	2,086	,040
D_Pakistan	1,608	1,529	,337	1,052	,296
D_Peru	5,039	2,197	1,056	2,293	,025
D_Phili	,215	1,192	,042	,180	,858
D_Thai	10,861	5,106	2,552	2,127	,037
D_Turkey	3,558	2,198	,793	1,618	,110
D_VietNam	2,002	,970	,420	2,064	,043

a. Dependent Variable: VAR00002

Table 8 - Final Regression

6.2.4 Final Regression: The final regression analysis utilized the following equation:

$$\ln \text{Greenfield Port Investment} = \beta_1 * \ln \text{EFI} + \beta_2 * \ln \text{Distance to the World} + \beta_3 * \ln \text{Economic Stability} + \beta_4 * \ln \text{Political Stability} + \beta_5 * \ln \text{Ease of Doing Business} + \beta_6 * \ln \text{Access to Natural Resources} + \beta_{...} * \ln D...$$

The final result does exhibit some positive and predictive results, if not quite as far reaching as initially expected due to the limitations of the data set. Overall, however, the final model exhibited an R^2 value of 0.74, which means the explanatory power of the independent variables turns out to be high. The rationale for this level of explanatory power as regards the contributing factors as well as several interesting observations follow.

In this regression, essentially there are three groups of variables. The first one is the 'distance to the world' variable which incorporates a weighted measure for distance, important not only for economic costs, but also for measuring the level of accessibility of information and knowledge of local circumstances and situations. The second set of variables are the friction variables like ease of doing business, EPI, economic & political stability, and natural resources. Finally, the third set of right-hand side variables are the dummy variables included to capture any country fixed-effects, correcting for any other country specific factors outside the already specified friction variables.

6.2.5 Distance to the World: This variable shows a coefficient of -1, much in line with the literature on gravity for trade in goods and services, which is reassuring. The t-statistic shows however, that distance to the world is not significant. From the perspective of the predictive nature of distance with regard to Greenfield Port investment this could be expected. A significant negative sign for capital flows is expected to be less negative than for trade in goods and services and apparently the knowledge advantage – often cited as a reason for significance of this variable in general FDI – is much more with the host country and firm, causing this variable to become insignificant. In spite of the insignificance, the interesting conclusion which can be drawn from this particular finding which bodes well for FDI in Greenfield ports is that distance doesn't seem to impact financial capital flows, meaning that despite the geographic and economic distance of some developing nations, the potential for them to receive FDI by way of investment in Greenfield port investment doesn't seem likely to be hindered by that distance.

6.2.6 Ease of Doing Business: The highest positively correlated factor, not also a Dummy Variable, which impacts the suitability of a nation for Greenfield port investment is its Ease of Doing Business rank. As the ranking factors in details such as starting a business, employing workers, registering property, obtaining permits, protecting investors, paying taxes, cross border trade, enforcing contracts, obtaining credit and closing a business, this functional level analysis of the ease with which business can be conducted within a nation would appear to directly impact the business operational level of a particular investment in a developing nation which would potentially be suitable for Greenfield investment in the port sector.

It turns out that to a higher degree than many other factors evaluated, this is the case. The ease of doing business within a developing economy does in fact directly impact the suitability and attractiveness of doing business within that economy in general but also with respect to Greenfield investments. This also appears to be substantially intuitive. After all, from a functional level analysis, even in developed economies, the prospect of doing business in some locations is comparatively daunting when analyzed

against others. Thus, the standard holds true within (destination) developing economies and particularly within the Greenfield port investment decision climate.

Another aspect to this may also be the ancillary and concomitant business enterprises which are indelibly connected to the development and operation of a port in any nation. It is important or at least helpful, generally for a port to have an economy which to serve. If that economy smoothly facilitates business creation and operation, it is highly likely that the economy itself will both benefit from and foster an economic climate in which a port would otherwise survive or even thrive. Given this, the ease of opening a business would not only directly impact the port in and of itself, as a business, but would indirectly impact it as it is generally interconnected with other businesses throughout the greater economy.

6.2.7 Access to Natural Resources/Commodities Based Economies: The second highest factor with explanatory power is that of Access to natural resources. This is measured as a function of the value of all natural resource based commodities exported by the nation in a given year. The finding in this study was that, as an explanatory variable, it held quite substantial power in the determination of what is or is not a motivation for Greenfield port investment.

This measure appeared to be intuitively positively correlated to successful Greenfield port investment in developing nations; an appearance which was borne out through analysis. The rationale for this particular finding appears to follow the historical basis for which many ports throughout history have been built in developing economies; the extraction of those natural resources. Where an abundance of natural resources exists, an economy without the capital or infrastructure to utilize those resources internally will inevitably make use of them as export commodities. This means that an outlet for these goods must be found and through the push of governments in need of revenue and private investors eager to gain access to materials needed for continued economic development in their own Developed economies, the motivation for Greenfield port investment is fostered and may generally be seen to come to fruition.

6.2.8 Dummy Variables: The dummy variables, included to capture fixed country effects in this analysis yielded some significant results, showing that some countries – for country-specific reasons – did better than the average sample. These countries with significant fixed country effects are: China, Djibouti, Dominican Republic, Egypt, Ghana, Lebanon, Pakistan, Peru, Philippines, Thailand, Turkey and Vietnam. The exception is Ivory Coast that is doing significantly worse. This means that country-specific factors, except for distance and the regressed friction variables (i.e. cultural, regional, historical, country-specific regulatory factors which were not included in the regression) appear to be important nonetheless for Greenfield port investment in developing nations.

Looking at country specific effects for the Dummy variables with regard to each and every one of the countries, it becomes evident that China, Djibouti, Egypt, Lebanon, Peru, Thailand and Viet Nam are doing significantly better due to those same domestic/cultural, etc. factors. Interestingly, Ivory Coast is doing significantly worse. Additionally, when the country specific effects are added to the regression, the results become more accurate. These two findings suggest that there are variables which exist

that may yield even greater explanatory power as regard this particular type of FDI than those selected herein.

From this point forward, the remaining variables were either no longer positively correlated to successful Greenfield port investment in developing nations or were simply not significant.

6.2.9 Statistically Insignificant Variables: Of the variables examined, there were three which were statistically insignificant. First, the Economic Freedom Index, which was positively correlated, was not a significant measure. Second, Economic stability as measured by the GDP Deflator, was shown to be negatively correlated, but the degree to which this factor impacts the choice to invest or to not invest within a nation is minimal at best and statistically insignificant. Finally, political stability was also negatively correlated, but as with the GDP Deflator, showed no statistical significance.

6.3 SWOT/TOWS Matrix

From a strategic perspective, it is important to evaluate the business sense of an investment. In the realm of large scale foreign direct investment, it is incumbent upon the investor to spend considerable time on the theoretical aspects of the investment as well as the numerical analysis in order to make a well informed and reasoned choice, as statistics may tell only half the story. Thus, for the purposes of this thesis, a generalized SWOT analysis will be conducted on the prospect of investing in a theoretical Greenfield port in order to determine if the leading indicators discovered thus far reach a threshold at which they should be used for the purposes of selecting a site and expending the necessary capital. The basis of a SWOT analysis incorporates the positive and negative aspects of a particular investment from both an internal and external perspective. Thus strength is something that is a positive aspect of the investment that is almost exclusively found internal to the investment, while an opportunity is a positive aspect of the investment dependant solely on the external environment in which the investment must operate. Following is a chart outlining the basic assumptions, as verified by an interview with APM Terminals.

<u>Strengths</u>	<u>Weaknesses</u>
<i>Government Financing</i> <i>Fee/Tax Exemptions</i> <i>Private Fund Placement</i> <i>Flexibility</i> <i>Possibility for high ROI</i> <i>Pricing Autonomy</i> <i>Lack of Hinterland Connection</i>	<i>Partial Government Participation</i> <i>Lack of Hinterland Connection</i> <i>ROI Requirement</i> <i>Alternate Investment Options</i> <i>High Risk</i> <i>Lack of Government Safety Net</i>
<u>Opportunities</u>	<u>Threats</u>
<i>Lack of Current Capacity</i> <i>New Industries</i> <i>Increased Demand due to Improved Economy</i> <i>Expansion Opportunities</i> <i>High Risk</i>	<i>Established Ports</i> <i>Excess Capacity</i> <i>Recession and Subsequent Demand Decrease</i> <i>Government Takeover</i> <i>Labor Unions</i> <i>Shifting Trade Patterns</i>

Table 9 - SWOT/TOWS Matrix

Regarding the Strengths of the theoretical concept of a Greenfield port investment, they exist primarily around the idea that the investment contains an incredible amount of flexibility relative to other typical port investments, allowing the investors the entrepreneurial creativity to possibly turn the enterprise into a greater success than other governmentally encumbered ports in the same environment. Additionally, the Greenfield option for port investment usually is accompanied with certain tax advantages and pricing which make the port much more generally flexible and potentially better able to weather bad economic times. This view was largely borne out through consultations with APM Terminals (APMT).

While each of the strengths was noted by APMT to, in fact, be a strength, the degree to which they viewed them as strengths did vary. Government financing for instance was not viewed to be a substantial strength, largely because it wasn't always available, so the instances of it happening were rare enough that it had, at least until the recent reduction in the availability of private credit, not registered highly as a net strength to the company. It was, however noted that given the recent difficulties in worldwide banking and thus credit availability, it could increase in importance if governments do become more willing to facilitate investment via provision of subsidized or direct loans to the companies investing in the port.

One strength that turned out to be a tremendous benefit to investors was the inclusion of tax exemptions, often called Tax Holidays. These typically lasted from 5 to 10 years and were a net contributor to the investment achieving a rapid rate of return; often a requirement in a high risk environment like a developing nation.

A final note on strengths, they are not necessarily always obvious or intuitive. One possible strength which might arise, particularly in developing nations, at least as perceived by the terminal operator, is the lack of existing hinterland infrastructure. The perspective of this as a strength can be called the "Island Effect". Where there is

sufficient disposable income to consume imports, largely funded by sufficient exports, in a small geographical area, the lack of existence of hinterland necessarily means that virtually all trade passes through the port. While from a development perspective this might not always be ideal, if the nation has sufficient trade to allow the terminal operator to achieve reasonable or even above average returns, then the lack of an existing robust hinterland would be a net benefit to the terminal rather than a weakness.

In terms of weaknesses, these generally center on the risk of the investment. The Greenfield port generally has a high ROI which is required, largely due to the fact that the risk associated with the port is higher than many other investments. This means that the primary weaknesses exist in the risk of the investment and the possibility that other investments may prove more attractive to potential investors. Additionally, the fact that in Greenfield investments in particular in Developing nations, governments generally demand to stay involved via an ownership stake, means that the flexibility which would otherwise be a strength, may not materialize in the face of an interventionist government.

Moving onto the external aspect of the investment, the opportunities and threats are next to be addressed. The opportunities with an investment of this sort exist primarily around the need for additional capacity, given the discovery of a new market or even the simple increase in demand spurred on by a general economic improvement from a macro perspective. Alternatively, the threats are also heavily influenced by the potential demand modifications the port may experience. These could include recessions or simple excess capacity in a particular market. Additionally, ports are also subject to threats from outside sources such as existing ports and labor unions.

Perhaps the most interesting realization to materialize from the review of this information with APMT was the idea that one particular factor which is alternatively a weakness, and can facilitate funding of an opportunity may prove to be a tremendous threat. With particular interest paid to Chinese ports in this instance, the Chinese government's involvement is the source of substantial capital and motivates much of the new investment in the nation. This is a double edged sword, however, as the Chinese government has a substantial amount of capital to work with and a broad goal of growth, which is not necessarily predicated on the current realities of supply and demand. This suggests that their thirst for expansion in the port sector to accommodate expected manufacturing growth has the distinct possibility of generating massive amounts of excess capacity in the region. While this is initially a strength to a particular investment, the potential long term outcome of the policy of what might be called "expectational investment", rather than investing on fundamentals, on current investments held by terminal operators within the region could be quite negative.

Chapter 7 Case Studies

7.1 Exemplar Projects

Following is a review of available case studies in the area of Greenfield port investment and an analysis of the qualitative factors which impact the viability of Greenfield seaport investment.

7.1.1 Shenzhen Dachen Bay Terminal - China

According to Modernterminals.com, the Shenzhen Dachan Bay Modern Port Development Co. Ltd. Is a Joint Venture Agreement between a private company and the Chinese government. The joint-venture company is responsible for the development and operation of the five-berth Phase I of Shenzhen Dachan Bay Container Terminals. Modern Terminals holds a 65% share interest, while several entities under the Shenzhen Municipal State-owned Investment Management Organization hold the rest of the shares. This particular Greenfield terminal was developed formally as a BOT.

7.1.2 Gangavaram Port Ltd. – India

According to business-standard.com, this is a special-purpose company floated by D. Venkata Satyanarayana Raju, who serves as its managing director. It is a true Greenfield port project and is formally under a 30 year BOT agreement and managed by DP World. The relationship with the government in this instance, while not direct insofar as there is a direct government ownership stake, is substantial. Large portions of the loans used to finance the port were provided by a government bank and the state government is contemplating developing a petrochemical complex in the Visakhapatnam area, which would help the Gangavaram Port to handle more cargo.

7.1.3 Yangshan Port – China

The Yangshan port is a relatively new port built in Hangzhou Bay, just south of Shanghai. This Greenfield port was built largely to circumvent the limitations which the existing port in the region faced. Because of how it was constructed using an offshore island connecting the mainland via a 32.5 km bridge, the port is capable of handling some of the largest container ships in the world. This port was constructed formally under a 30 year BOT agreement with multiple partners including APMT and the Shanghai International Ports Group (SIPG), a parastatal company, and can be viewed also in the context of a joint venture where multiple firms participate in the investment but may have more influence on operations than simply an investment stake. The port is operated under the auspices of a private type I investment, meaning that the regulator and landowner of the port is a public entity, while the operation of the terminal itself is accomplished by a private company; in this case APMT.

7.1.4 Shanghai East Container Terminal (SECT) – China

Shanghai East Container Terminal is Joint venture between APM Terminals and the Shanghai International Ports Group. This port was constructed formally under a 30 year BOT agreement with multiple partners including APMT and the Shanghai International Ports Group (SIPG), a parastatal company and is operated under the auspices of a private type I investment, meaning that the regulator and landowner of the port is a

public entity, while the operation of the terminal itself is accomplished by a private company; in this case APMT.

7.1.5 Cai Mep International Terminal – Vietnam

The Cai Mep International Terminal is a joint venture between APM terminals and two parastatal companies, the Saigon Port Company and the Vietnam National Shipping Lines. In this case the port operates under the Private port type I model and was developed under the auspices of a 30 year BOT agreement.

7.1.6 Gateway Terminals International, (GTI) – India

The GTI terminal is a Joint Venture between APMT and CONCOR. The venture, under the name Gateway Terminals India Pvt Ltd was incorporated to build and operate the container terminal for a period of 30 years under a BOT agreement. The port operates under a port type I model.

7.1.7 Suez Canal Container Terminal – Egypt

The final case study used here will be that of the Suez Canal Container Terminal (SCCT). This terminal is a joint venture company between APM Terminals, COSCO shipping lines, the National Bank of Egypt and Suez Canal and Affiliates as well as a portion held by the Egyptian private sector. Because of the particular breadth of the interests in the terminal, this ostensible joint venture might better be characterized as a Capitalized venture, where various of the share holders are not at all involved in the operation of even construction of the port itself and only hold a financial stake. This port was developed under a 30 year BOT agreement and operates as a private type I port.

7.1.8 General Factors in Greenfield Port Development

According to the Mararashtra Maritime board [19] there are several interesting key factors which Greenfield port investment, Indian Greenfield port investment in particular, tends to share. The ports are typically developed on a modified BOOT basis with concession periods for up to 50 years. They are generally on Government owned land which is transferred to the developer for the duration of the term at the current market value. Most Greenfield projects have some form of government participation. The ports will have certain exemptions from payment of fees and duties and will have full freedom to fix tariffs and rates for services provided at the port.

Based on information procured in regard to several Chinese Greenfield investments in ports, it would appear that these ports share similar factors. Governments would seem to not only endorse the private investment into a port project but would like to have some degree of control within the port once it is completed and thus generally want to hold a certain portion of the ownership shares in the port. Indeed, as can be seen in the exemplars above, the incidence of a parastatal entity controlling large portions of the investment are 100%. This also plays out in the observations of Vietnamese and even Egyptian ports which were reviewed.

According to TM International Logistics Limited [18], while several Greenfield port projects in India have been proposed and taken up by private port developers, the experience of developing these ports has borne out that several contentious issues need to be resolved, before these projects really become viable. The site points out that with the exception of the port of Mundra port, all other Greenfield ports projects have not managed to achieve significant traffic as envisaged. It then provides several key issues which may or may not be responsible for Greenfield port failures.

First and foremost Cargo Traffic Demand is noted to be an extremely important issue to deal with and determine prior to engaging in the particular investment within the Greenfield port environment. It is important that Greenfield port projects clarify the possibilities of generating a stable and growing volume of cargo that has distinct advantage in moving to the proposed Greenfield port location, in terms of landed or loaded freight, compared to their movement through the existing gateway port.

Next, the Logistics Linkages are said to be remarkably significant. The site notes that "Greenfield port projects need to offer a clear logistics advantage in terms proximity to cargo hinterland, rail-road connectivity and other facilities for handling cargo. The success of a Greenfield port project thus hinges on the extent of collaboration between wide range of institutions, including maritime development boards, railways, state governments and other service providers, who between themselves have to share the responsibilities, under a commonly agreed port development plan."

Of note to anyone with experience within the liner shipping industry is the intuitive conclusion that the preference of Shipping Lines and Shippers is a strong determinant of what does or doesn't seem to make a decisive impact on the profitability or viability of a port. It is noted that "Development of a new port implies that shipping lines see a rationale in operating their services to the new port and that economies of scale to operate their services are supported by critical threshold level of cargo volumes and parcel sizes."

Next, and of extremely common interest among many western investors are the environmental issues related to the port investment. The world over, many port projects have been hindered from growth or successful operation because of environmental objections and concerns. TM Logistics notes that "Greenfield port projects need to be backed up a comprehensive national port development plan, based on Intensive environmental impact surveys by Nautical Advisor to the government. Port developers can in turn purely focus on developing the port and other facilities without having to obtain environmental clearance on a case-to-case basis."

The final major issue which appears to raise its head in the real world Greenfield port investment setting is that of the Bankability of Greenfield port project. As with any investment, it is incredibly important that the return on investment be suitable to the investors who are putting money into the project, but even more importantly to the creditors who are expecting a generally smooth and consistent return on their client's funds. Therefore, it is incredibly important to have a viable risk assessment and a risk mitigation strategy. Once the risk tolerances are known, then the appropriate investors

can be located and the appropriate level of guarantees provided to mitigate on an individual basis, the risk aversion of individual clientele or investors.

All of the above observations point to commonalities among Greenfield port investment, not the least of which is, that via a review of the preponderance of the qualitative evidence, it would appear that it is not the final private investor in the port that is the driver in new port development, rather it is the government. The government introduces the tender, though sometimes perhaps spurred on by the private industry. The government maintains significant financial interests in the port despite moving toward an approach of privatization. The government generally has environmental standards which the final product is intended to abide by. Also noted is that traffic is of paramount interest to the investment, which is not always the case to a private investor if the fees per TEU are sufficient, but would be quite important to a government gauging the value or success of the port via measures such as throughput. Thus the commonalities in this process are almost exclusively those commonalities determined by the governments which tender the offers and not by the terminal operators or other private investors – general factors appear to be government imposed.

7.1.9 Preferential Trade Agreements

In the evaluation of the impact which preferential trade agreements have on the development and viability of Greenfield seaport investments, it appears that their impact is very limited. The majority of the Greenfield seaports evaluated in this study don't appear to be investment targets because of their integration into a regime of trade agreements or industries which take advantage of the, rather they seem to be viable largely because they serve either an underserved geographical region or because they were placed in a geographical location which allowed them to serve a specific industry.

7.1.10 Statutory Incentives

Statutory incentives are, of course integral in the attractiveness of Greenfield port investment. In many of the counties in which the ports are developed or proposed, the tax regime may be quite high, as developing economies tend to have a greater reliance on bureaucracy and higher tax regimes to ensure revenue to the degree needed for operation – especially given the low collection rates of many developing economies. In the case of Indian ports, there are specific exemptions by way of fees and dues which the ports do not have to pay and this undoubtedly serves as a draw to investors interested in investing in Greenfield seaport projects. The reason for this is largely to do with the fact that every cost which can be guaranteed over an extended period of time provides security as it relates to the income of the port – at least in how that income is diminished potentially by the expenses the port will experience. In line with the permanent income hypothesis, many people, investors included, tend to make the decision to invest or expend income on the basis of their perceived long term income. The exemptions serve to increase that perceived long-term income and make the Greenfield port investment a more attractive offer.

During an interview with APM Terminals, statutory incentives were noted to be important, but not necessarily a make or break aspect to the potential investment. These incentives in a real world environment generally take the form of two common incentives; Lower Tax Ceilings and Tax Holidays. Both these measures are intuitively

positive to the prospects of investment in a developing nation as they both increase the internal rate of return the company investing in the environment may achieve. The lower tax ceiling has the immediate benefit of reducing the amount of tax paid on revenue generated by the port. This fixed ceiling allows the company to count on a particular level of taxation over the long term which in turn provides an added level of incentive for the firm to invest in the nation. Tax holidays go even further. Usually lasting for between five and ten years, the tax holiday may prove integral and making certain that the costs associated with the actual construction of the project are minimized. For instance, the tax holiday may negate or eliminate the tax on important pieces of equipment which must be brought in to the port as the basis of later operations. Thus, an eight million dollar quay crane which would have been accompanied by an \$800,000 tax penalty due to the typical value added tax in the particular country, would no longer suffer that penalty and the costs of construction are substantially lowered.

7.1.11 Port Model

The typical port model within a Greenfield port in the case studies evaluated tends to be that of the Private I category, this is where the operator is private, but the regulator and the land is public. This is of course modified slightly by the fact that the public entity generally has an ownership stake in the private investment firm, ranging from 11% to 35% of the total value of the firm. So, it is also viable to say that the port model is somewhat of a hybrid Private I and Public port. This is due to the fact that to some degree the public entity will have control over most aspects of the enterprise as a voting member and, particularly in these developing economies, the public sector may have the opportunity to exercise extraordinary rights as a minority member.

7.1.12 Investment Schemes

Of note in this context, is that of the Greenfield ports observed, the general investment scheme is that of the BOT. While other schemes exist, the simplicity of the BOT makes it the ideal choice for simplistic and rapid bidding. Certain modifications can and generally are made to the approach, but overall, the scheme remains that of a BOT. The difference is noted above in that the model and the scheme both share aspects of a public port due to the integration of the public entity into the private ownership structure. While for all intents and purposes, the scheme is that of a BOT, the ownership position of the government in regards to the port make it virtually impossible to completely preclude the hand government will tend to play in the operation of the port.

Of particular interest in most of these investment schemes, certainly in East Asia and to a certain extent elsewhere, is that most of the investment takes place as part of a joint venture with a parastatal company. The governments are generally willing and even eager to invite private enterprise into the arrangement but do generally wish to maintain a certain degree of control over what is likely viewed as a particularly important national resource to the country. This approach seems to be the favored approach by most of the developing nations evaluated within this study and appears to be the most common practice among most developing nations worldwide.

Nation	Port	Approaches to Greenfield Port Investment							
		Private Port	Concession				Partial Privatization		Public Port
			BOO	BOT	BOOT	BOMT	BOLT	Joint Venture	
China	Shenzhen Dachen Bay Terminal		X					X	
India	Gangavaram Port Ltd.		X					X	
China	Yangshan Port		X					X	
China	Shanghai East Container Terminal (SECT)		X					X	
India	Gateway Terminals International		X					X	
Egypt	Suez Canal Container Terminal		X						X
Vietnam	Cai Mep International Terminal		X					X	

Table 10 - Approaches to Greenfield Port Investment

Chapter 8 Conclusions

This study examined the impact certain exogenous factors could potentially have on the attractiveness of Greenfield seaport investment. Of the most interesting conclusions discovered from the qualitative portion of this study, is that far from being a deterrent to Greenfield port investment, the lack of an effective hinterland might actually create an environment where investment in a Greenfield port is actually more attractive. Through the “Island Effect”, where there is sufficient disposable income to consume imports, largely funded by sufficient exports, in a small geographical area, the lack of existence of hinterland necessarily means that virtually all trade passes through the port. While from a development perspective this might not always be ideal, if the nation has sufficient trade to allow the terminal operator to achieve reasonable or even above average returns, then the lack of an existing robust hinterland would be a net benefit to the terminal. Following that, the realization that the manner in which most Greenfield investment in developing nations takes place is remarkably consistent and largely driven by governments instead of private investors was perhaps the conclusion with the greatest impact. It would seem to obviate the purpose behind the original research to some extent in favor of a new question, “what drives governments to issue tenders for Greenfield port investment?”

From a quantitative perspective, the results were perhaps a restatement of what is, to most, an obvious conclusion. A developing nation with a need for capital and possessing relatively large amounts of natural resources will be much more likely to draw or demand an outlet for the sale of those natural resources and secondly, the ease with which that nation facilitates business will directly impact the success of the nation in drawing in Greenfield port investment.

Finally, the last variable which yielded something of interest was not a specific variable at all. It was the Dummy variable for the individual nations which acted as a ‘catch-all’ largely for unquantified or unquantifiable domestic/cultural factors. The fact that China, Djibouti, Egypt, Lebanon, Peru, Thailand and Viet Nam are doing significantly better due to those same domestic/cultural factors, the fact that the Ivory Coast is doing significantly worse and the observation that when the country specific effects are added to the regression, the results become more accurate suggest that there are variables which exist that may yield even greater explanatory power as regard this particular type of FDI than those selected herein. This, like the qualitative variables, raises additional questions which present the opportunity for future research on the topic.

In summation, the answer to the question, “are there definitive factors or leading indicators which predict successful Greenfield port investment in developing economies?”, would appear to be a yes. Those found in the regression demonstrate a predictive capacity of 0.74 and it would appear that much of the remaining explanatory power lies in the qualitative factors reviewed above. It must be stated however, that much more predictive capacity exists and may be found via further research.

References

- [1] The World Bank Group, Logistics Performance Index, [Online] Available <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTTRANSPORT/EXTTLF/0,,contentMDK:21514122~menuPK:3875957~pagePK:210058~piPK:210062~theSitePK:515434,00.html> (Accessed 13 July 2009)
- [2] The United Nations Development Programme, Human Development Reports, What is the Human Development Index (HDI)? [Online] Available <http://hdr.undp.org/en/statistics/faq/question,68,en.html> (accessed 23 July 2009)
- [3] United Nations Statistics Division, Composition of macro geographical (continental) regions, geographical sub-regions, and selected economic and other groupings, [Online] Available <http://unstats.un.org/unsd/methods/m49/m49regin.htm#ftnc> (accessed 23 July 2009)
- [4] United Nations Statistics Division, Composition of macro geographical (continental) regions, geographical sub-regions, and selected economic and other groupings, [Online] Available <http://unstats.un.org/unsd/methods/m49/m49regin.htm#developed> (accessed 23 July 2009)
- [5] The United Nations Development Programme, Human Development Index, [Online] Available <http://hdr.undp.org/en/media/HDI2008Tables.xls> (accessed 24 July 2009)
- [6] Investopedia, Terms – Greenfield Investment, [online] Available <http://www.investopedia.com/terms/g/greenfield.asp> (accessed 22 July 2009)
- [7] The Heritage Foundation, Economic Freedom Index, [Online] Available <http://www.heritage.org/index/Ranking.aspx> (accessed 20 July 2009)
- [8] Doing Business, Doing Business 2010, [Online] Available www.doingbusiness.org (accessed 14 July 2009)
- [9] International Monetary Fund, World Economic Outlook Report, [Online] Available <http://www.imf.org/external/pubs/ft/weo/2008/01/weodata/weorept.aspx?pr> (accessed 14 July 2009)
- [10] The World Trade Organization, Statistics Database (Time Series), [Online] Available <http://stat.wto.org/StatisticalProgram/WSDBStatProgramSeries.aspx?Language=E> (accessed 14 July 2009)

[11] The World Bank Group, The World Governance Indicators Project, [Online] Available <http://info.worldbank.org/governance/wgi/index.asp>(accessed 14 July 2009)

[12] The Brookings Institution, Weak States Index, [Online] Available http://www.brookings.edu/reports/2008/02_weak_states_index.aspx(accessed 14 July 2009)

[13] The Organization of Economic Co-Operation and Development (OECD), DAC1 Official and Private Flows, [Online] Available <http://stats.oecd.org/Index.aspx?datasetcode=TABLE1>(accessed 14 July 2009)

[14] The United Nations Council on Trade and Development, FDI Stat, [Online] Available <http://stats.unctad.org/FDI/TableViewer/tableView.aspx>(accessed 14 July 2009)

[15] The World Bank Group, Private Participation in Public Infrastructure Database, [Online] Available <http://ppi.worldbank.org/explore/Report.aspx?mode=1>(accessed 14 July 2009)

[16] Ancestry.com, 1893 Indian Railway Map, [Online] Available <http://homepages.rootsweb.ancestry.com/~poyntz/India/images/Railways1893.jpg>(acce ssed 20 Aug 2009)

[17] Business Standard, CM Inaugurates Gangavaram Port [Online] available <http://www.business-standard.com/india/news/cm-inaugurates-gangavaram-port/363691/>(accessed 29 Aug 2009)

[18] TM International Logistic Limited, Development of Private Ports in India, [Online] available http://www.tmilltd.com/port_management_knowledge.htm(accessed 16 Sept 2009)

[19] Maharashtra Maritime Board, Greenfield, All Weather Ports, Policy Procedures, [Online] Available <http://www.mmbmumbai.com/pGreenfield.htm>(accessed 14 Sept 2009)

[20] International Monetary Fund, World Economic Outlook Database, [Online] Available <http://www.imf.org/external/pubs/ft/weo/2008/01/weodata/download.aspx>(accessed 14 Sept 2009)

Abe, Kazutomo & Wilson, John S., 2009. "Weathering the storm: investing in port infrastructure to lower trade costs in East Asia," Policy Research Working Paper Series 4911, The World Bank.

Alexander B. Darku. "The Gravity Model and the Test for the Regional Integration Effect: The Case of Tanzania." The Journal of Developing Areas 43.1 (2009): 25-44. Project MUSE. 27

Jul. 2009 <<http://muse.jhu.edu/>>.

Ana Paula Africano & Manuela Magalhaes, 2005."FDI and Trade in Portugal: a gravity analysis," FEP Working Papers 174, Universidade do Porto, Faculdade de Economia do Porto.

Athanasiadis A Pallis & Theo E Notteboom & Peter W De Langen, 2008. "Concession Agreements and Market Entry in the Container Terminal Industry," *Maritime Economics and Logistics*, Palgrave Macmillan Journals, vol. 10(3), pages 209-228, September.

Baier, Scott L.& Bergstrand, Jeffrey H. & Egger, Peter & McLaughlin, Patrick A. 2008. "Do Economic Integration Agreements Actually Work? Issues in Understanding the Causes and Consequences of the Growth of Regionalism," *The World Economy*, Blackwell Publishing, vol. 31(4), pages 461-497, 04.

Baird, A. (1999). "Privatization Defined; Is it the Universal Panacea." Mimeo. Napier University

Beauchamp, Adam (2009) Interview by Author. APM Terminals, Den Haag, The Netherlands

Betancor, Ofelia & Rendeiro, Robert, 1999. "Regulating privatized infrastructures and airport services," Policy Research Working Paper Series 2180, The World Bank.

Bruner, David M. & Oxoby, Robert J., 2009."Can Foreign Aid Buy Investment? Appropriation Through Conflict," Working Papers 09-06, Department of Economics, Appalachian State University.

Busse M. and C. Hefeker (2005), "Political Risk, Institutions and Foreign Direct Investment", HWWA Discussion Paper, 315

Chakrabarti, A. (1998), "Determinants of FDI: a comment on globalization-induced changes and the role of FDI policies", available at:
[http://wbln0018.worldbank.org/eurvp/web.nsf/7cbe87578041c85ac12569e4003998b2/c7fad1de6e5d49a9c1256bea0046cce3/\\$FILE/Chakrabarti.pdf](http://wbln0018.worldbank.org/eurvp/web.nsf/7cbe87578041c85ac12569e4003998b2/c7fad1de6e5d49a9c1256bea0046cce3/$FILE/Chakrabarti.pdf)

Chhibber, Ajay & Dailami, Mansoor, 1990. "Fiscal policy and private investment in developing countries : recent evidence on key selected issues," Policy Research Working Paper Series 559, The World Bank.

Christiansen, H. (2004), "ODA and Investment for Development: What Guidance Can Be Drawn from Investment Climate Scoreboards?", *OECD Working Papers on International Investment*, 2004/5, OECD Publishing. doi:10.1787/337561142021

Collier, Paul and Anke Hoeffler. 2002b. "On the Incidence of Civil War in Africa." *Journal of Conflict Resolution* 46(1):13–28.

de Grange, Louis & Troncoso, Rodrigo & Ibeas, Angel & González, Felipe, 2009."Gravity

model estimation with proxy variables and the impact of endogeneity on transportation planning," *Transportation Research Part A: Policy and Practice*, Elsevier, vol. 43(2), pages 105-116, February.

Desislava Dikova & Arjen van Witteloostuijn, 2007. "Foreign direct investment mode choice: entry and establishment modes in transition economies," *Journal of International Business Studies*, Palgrave Macmillan Journals, vol. 38(6), pages 1013-1033, November.

Djankov, S., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2000). The regulation of entry. National Bureau of Economic Research Working Paper No. 7892.

Dupasquier, C., Osakawe, P. (2005). Foreign Direct Investment in Africa: Performance, Challenges and Responsibilities. Economic Commission on Africa; African Trade Policy Center Work in Progress No. 21

Dutta, Nabamita & Roy, Sanjukta, 2008. "Foreign Direct Investment, Financial Development and Political Risks," MPRA Paper 10186, University Library of Munich, Germany, revised 05 Aug 2008.

Elhanan Helpman, Marc Melitz, Yona Rubinstein. (2008) Estimating Trade Flows: Trading Partners and Trading Volumes. *Quarterly Journal of Economics* 123:2, 441-487

Henrik Hansen & John Rand, 2006. "On the Causal Links Between FDI and Growth in Developing Countries," *The World Economy*, Blackwell Publishing, vol. 29(1), pages 21-41, 01.

Hoekman , Bernard & Nicita, Alessandro, 2008. "Trade Policy, Trade Costs, and Developing Country Trade," Policy Research Working Paper Series 4797, The World Bank.

Hoffmann, J. 2001: Latin American ports: results and determinants of private sector participation. *International Journal of Maritime Economics* 3: 221–230.

IMF, 2003, External Debt Statistics: Guide for Compilers and Users – Appendix III, Glossary, IMF, Washington DC.

Kimura Hidemi & Todo Yasuyuki, 2007. "Is Foreign Aid a Vanguard of FDI? A Gravity-Equation Approach," Discussion papers 07007, Research Institute of Economy, Trade and Industry (RIETI).

Liebrechts, Richard (2009) Interview by author. Ecorys, Rotterdam, The Netherlands.

Lim, Ewe-Ghee (2001, November). "Determinants of, and the relation between, foreign direct investment and growth: A summary of the recent literature." Working Paper 01/175, International Monetary Fund (IMF).

Mateus Magala & Adrian Sammons, 2008. "A New Approach to Port Choice Modelling," *Maritime Economics and Logistics*, Palgrave Macmillan Journals, vol. 10(1-2), pages 9-34,

March.

Medvedev, Denis, 2006. "Beyond trade : the impact of preferential trade agreements on foreign direct investment inflows," Policy Research Working Paper Series 4065, The World Bank.

Mun Wai Ho & Kim Hin (David) Ho, 2006. "Risk Management in Large Physical Infrastructure Investments: The Context of Seaport Infrastructure Development and Investment," *Maritime Economics and Logistics*, Palgrave Macmillan Journals, vol. 8(2), pages 140-168, June.

Nair-Reichert, Usha & Weinhold, Diana, 2001." Causality Tests for Cross-Country Panels: A New Look at FDI and Economic Growth in Developing Countries," *Oxford Bulletin of Economics and Statistics*, Department of Economics, University of Oxford, vol. 63(2), pages 153-71, May.

Niekerk, Henriette C. Van , 2005. "Port Reform and Concessioning in Developing Countries," *Maritime Economics and Logistics*, Palgrave Macmillan Journals, vol. 7(2), pages 141-155, June.

OECD. (2002). *Foreign Direct Investment for Development: Maximizing benefits, minimizing costs*. Paris: Organization for Economic Cooperation and Development (OECD).

Pando, Julián, Araujo, Andres and Maqueda, Francisco Javier(2005)'Marketing management at the world's majorports',*Maritime Policy & Management*,32:2,67 — 87

Peter Walkenhorst, 2004. "Economic Transition and the Sectoral Patterns of Foreign Direct Investment," *Emerging Markets Finance and Trade*, M.E. Sharpe, Inc., vol. 40(2), pages 5-26, March.

Recep Kok & Bernur Acikgoz Ersoy, 2009. "Analyses of FDI determinants in developing countries," *International Journal of Social Economics*, Emerald Group Publishing, vol. 36(2), pages 105-123, January.

Rietveld, Piet, 1994."Spatial economic impacts of transport infrastructure supply," *Transportation Research Part A: Policy and Practice*, Elsevier, vol. 28(4), pages 329-341, July.

Robinson, R. 2002: Ports as elements in value-driven chain systems: The new paradigm. *Maritime Policy and Management* 19: 3–8.

Selaya, Pablo & Sunesen,Eva R., 2008."Does Foreign Aid Increase Foreign Direct Investment?", "Discussion Papers 08-04, University of Copenhagen. Department of Economics.

Silva, J. M. C. Santos, and Silvana Tenreyro, "The Log of Gravity," *Review of Economics and Statistics*, 88 (2006), 641–658.

Snyder, Donald W., 1996. "Foreign aid and private investment in developing economies," *Journal of International Development*, John Wiley & Sons, Ltd., vol. 8(6), pages 735-745.

Tianshu Liu, 2008."Impact of Regional Trade Agreements on Chinese Foreign Direct Investment," *Chinese Economy*, M.E. Sharpe, Inc., vol. 41(5), pages 68-102, September.

Tinbergen, J., *The World Economy. Suggestions for an International Economic Policy* (New York: Twentieth Century Fund, 1962).

Tongzon, Jose & Heng, Wu, 2005. "Port privatization, efficiency and competitiveness: Some empirical evidence from container ports (terminals)," *Transportation Research Part A: Policy and Practice*, Elsevier, vol. 39(5), pages 405-424, June.

Vélayoudom Marimoutou and Denis Pegin and Anne Pegin-Feissolle, (2009) "The "distance-varying" gravity model in international economics: is the distance an obstacle to trade?", *Economics Bulletin*, Vol. 29 no.2 pp. 1157-1173.

Verwaal, Margreet (2009) Interview by author. Ecorys, Rotterdam, The Netherlands.

Wiegmans, Bart W. & Ubbels, B. & Rietveld, P., 2002. "Investments in container terminals: public private partnerships," Serie Research Memoranda 0003, VU University Amsterdam, Faculty of Economics, Business Administration and Econometrics.

Wood, Geoffrey(2004)'Tanzanian coastal and inland ports and shipping: crises and policy options',*Maritime Policy & Management*,31:2,157 — 171

World Bank. (2007b). *Port Reform Toolkit Module 4: Legal tools for port reform*. Washington DC: World Bank.