Multi Criteria Decision Making Model for evaluation of selected developed counties priority for FDI from United States

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ABSTRACT

The objective of this study is to evaluate the relative priority of nine developed countries (Australia, Canada, Germany, Ireland, Japan, Luxembourg, Netherland, Switzerland, and United Kingdom) as a home country for foreign direct investment (FDI) from the United States' vantage point over the three periods of the economic pre-crisis (2004-2006), crisis (2007-2009), and post-crisis (2010-2012). This study suggests a methodology based on a combination of the analytic hierarchy process (AHP), the technique for order preference by similarity to ideal solution (TOPSIS), and the multi-period multi-attribute decision-making (MP-MADM) technique. Fifteen FDI determinants were selected from the latest studies (the study employed HeckitBMA methodology to induce selection bias and resolve the model's uncertainty surrounding the validity of the FDI theories), namely: bilateral distance, colony, common language, host countries' market size, development, GDP growth, market potential, productivity, tax, corruption risk, internal conflict risk, religious tension risk, trade agreements (LAIA, APEC), and currency union (dollar). The AHP method was applied to prioritize the set of FDI determinants. The TOPSIS method was employed to evaluate the attractiveness of nine alternative countries for FDI during three spans of time. Meanwhile, the MP-MADM method was used to aggregate the related data from each period. The results show that during the pre-crisis period, Japan has won the best destination for the U.S. to increase direct investment. Canada, Germany, Luxembourg, Australia, the United Kingdom, Ireland, Switzerland, and the Netherlands follow Japan sequentially during this period. However, during the crisis, the priority set changes to Australia, Japan, Germany, Canada, the United Kingdom, Luxembourg. Turning to the post-crisis period, Japan

becomes the first priority for the U.S. for FDI, and Germany, Canada, the United Kingdom, Australia, Luxembourg, Switzerland, Ireland, and the Netherlands rank sequentially after Japan.

Keywords: Foreign direct investment, Analytic hierarchy process, Technique for order preference by similarity to ideal solution, Multi-period multi-attribute decision making

ÖZ

Bu çalışmanın amacı, 2007 Finansal Krizi öncesi (2004-2006), Kriz (2007-2009) ve Kriz sonrası dönemleri için Amerika Birleşik Devletleri kaynaklı doğrudan yabancı yatırımların (DYY) dokuz gelişmiş ülkeye (Almanya, Avustralya, Hollanda, İngiltere, İrlanda, İsviçre, Japonya, Kanada, Lüksemburg) dağılımındaki göreli öncelikleri değerlendirmektir. Bu amaçla analitik hiyerarşi süreci (AHP), çok dönemli–çok kriterli karar verme (MP-MADM) ve TOPSIS yöntemleri kullanılmıştır. Literatürdeki son dönem çalışmaların incelenmesi sonucunda 15 değişken; ülkeler arası mesafe, ülkeler arası kolonyal ilişki, ortak dil kullanımı, ev sahibi ülkenin pazar büyüklüğü, gelişmişlik düzeyi, GSMH büyümesi, pazar potansiyeli, verimlilik, vergi düzeni, yolsuzluk düzeyi, ülke içi çatışma riski, dinsel gerginlik riski, ticari anlaşmalar (LAIA, APEC) ve ülkeler arası para birliği; doğrudan yabancı yatırımın açıklayıcıları olarak belirlenmiştir. DYS belirleyicileri arasında öncelik sırasına karar verebilmek için AHP, belirlenen üç zaman dilimi için veri setini oluşturan dokuz gelişmiş ülkenin doğrudan yabancı sermaye çekme konusundaki göreli avantajını değerlendirebilmek amacıyla TOPSIS, her dönem için ilgili verilerin toplulaştırılmasında ise MP-MADM yöntemi kullanılmıştır.

Çalışma sonuçları Kriz öncesi dönemde Japonya'nın ABD kaynaklı DYY için, veri setindeki dokuz ülke arasında göreli olarak, en avantajlı ülke olduğunu göstermektedir. Bu dönemde Japonya'yı sırasıyla Kanada, Almanya ve Lüksemburg takip etmektedir. Fakat Kriz dönemi olarak belirlenen 2007-2009 yılları arasında DYY belirleyicileri ile ilgili önceliklerin değişikliğe uğraması nedeniyle ülke sıralaması değişmiş olup, birinci sıraya yükselen Avustralya; Japonya ve Kanada

tarafından takip edilmektedir. Kriz sonrası dönem sıralaması ise Japonya, Almanya, Kanda, İngiltere, Avusturya, Lüksemburg, İsviçre, İrlanda ve Hollanda şeklindedir.

Anahtar Kelimeler: Doğrudan yabancı yatırım, analitik hiyerarşi süreci, çok dönemli–çok kriterli karar verme, TOPSIS

DEDICATION

I wish to dedicate my dissertation to my family. I have a special feeling of gratitude for my loving parents and sister, whose support and encouragement has been endless; they have never left my side and are very special. All I have and will accomplish are only possible due to their love and sacrifices. I would like to especially thank my sister, Shadi, for going way above and beyond the call of sisterhood to not only support, but truly work with me to make this a better piece.

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Chapter 1

INTRODUCTION

Foreign direct investment (FDI) decisively contributes to the economic growth and development of countries. The attractiveness of a location for FDI from United States (U.S.) investors' point of view is considered to be a description of the degree of the economic and financial development of the host countries. In 2010, more than 50% of the U.S. FDI outflow was assigned to developed countries, such as the Netherlands, the United Kingdom, Canada, Luxembourg, and Ireland. The FDI outflow direction and the priority of the volume of investment flow to the developed countries is a controversial issue for the United States. The output of the decision about FDI priority will be used as an input in many other decision-making processes, such as policy making, the establishment of foreign relations with other countries, and the arrangement of different trade agreements. In addition, the FDI trend changes when a financial crisis occurs in many countries. About 40% of the multinational companies face serious problems in their investment process such as risk of not ending projects or eviction. Both the volume and direction of the FDI flow was significantly affected following the 2007 global financial crisis. Different industries were affected by the crisis differently regarding each sector. For instance, biotechnology or food and beverages are less affected by the crisis, while automotive and steel industries are impacted fiercely. However, the developed countries were affected the most (according to UNIDO 2009, the FDI inflow to developed countries declined by 39%). Therefore, the consideration of the priority of FDI with respects to

different spans of time could obtain comprehensive results regarding FDI outflow to the host countries. This study was designed to develop a model to evaluate FDI destinations based on FDI determinants. Using a methodology that generates optimum output in the prioritizing of countries to invest in will create greater added value for multinational enterprise companies and assist policy makers and investors in their strategic decision making.

As a decision-making problem becomes complicated, obtaining the best solution will become more complex. Different studies have been carried out to find an optimum solution in accordance with problem specifications such as linear programming, non-linear programming, convex minimization, decision-making models (MADM, MCDM), neural networks, and genetic algorithms.

Finding an optimum location to invest in is suited to multi-attribute decision-making methods (MADM). In this regard, Levary and Wan (1999) developed an analytic hierarchy process (AHP) to rank the entry mode alternatives encountered by individual firms considering FDI. This model can accompany and cover the uncertainty feature of the FDI environment, and also the decision maker's expert judgments. An expert-driven system based on AHP was constructed by Meziani (2003) and applied to portfolio selection to find the optimum international portfolio. In addition, Grčić and Babić (2003) constructed an AHP evaluation to rank particular countries for FDI. They suggested seven FDI determinants: change of ownership, the establishment and development of financial infrastructure and capital markets, the establishment and development of the market, the establishment of the legal infrastructure, a host country's market size, labor costs, and the vicinity of transition countries (distance). Beim and Le´vesque (2006) also applied a class of MADM

models generally known as value measurement models, which are based on the multi-attribute value theory. They employed fifteen FDI criteria in four major categories (i.e., cultural, economic, legal, and political perspectives) to rank fourteen countries for new business venturing. Beim and Le´vesque (2006) reconstructed Ehrman, and Hamburg's (1986) normative model with the MADM method to aid firms in finding a more attractive subset of countries for investment. They commented that model could be considered as superior to previous methods with regard to some of the MADM features, such as: sensitivity analysis, the ability to express decision-making preferences, and easily replicable by entrepreneurs. Karimi et al. (2010) examined the location decision for FDI in ASEAN countries employing the TOPSIS approach by using ten indicators as determinants of FDI inflows. The empirical results indicated that Singapore was the most attractive for investment among the ASEAN countries, while the rankings of some countries have changed during these past few years. Meanwhile, Abid and Bahloul (2011) suggested an approach with a combination of a gravity model, the analytic hierarchy process, and the goal programming model to evaluate the relative attractiveness of seven MENA countries as locations for foreign portfolio investment. They employed six FDI determinants: information cost, bilateral trade, GDP, investment freedom, institutional quality, and geographic distance.

This study constructed a model by combining AHP and TOPSIS. The FDI determinants were selected from Eicher et al.'s (2012) study. They constructed Heckit Bayesian model averaging (HBMA) which is concerned with model uncertainties regarding the validity of the competing FDI theories and selection bias. This methodology results in robust FDI determinants, accordingly, they highlighted that more than 50% of the suggested FDIs were not robust. Consequently, we

constructed our model based on fifteen robust FDI determinants: distance, market size, colony, common language, development, GDP growth, market potential, productivity, tax, LAIA, APEC, dollar, corruption risk, intern conflict risk, and religious tension risk.

This study was built based on three different periods, the economic pre-crisis (from 2004 to 2006), crisis (from 2007 to 2009), and post-crisis (from 2010 to 2012). We selected nine developed countries which have large share in US FDI outflow as target countries (or host countries): the United Kingdom, the Netherlands, Canada, Luxembourg, Ireland, Switzerland, Germany, Australia, and Japan, with the United States as the foreign direct investor (the home country).

AHP was implemented to obtain FDI determinant weights in the decision process, and the TOPSIS method was employed to carry out the prioritizing alternatives. Multi-period MADM techniques were employed to aggregate the relevant data in each of the three periods.

This study aims to fill the gap by considering the latest robust FDI determinants as decision-making criteria and investigating the investment destination priorities in the three different time periods of pre-crisis, crisis, and post-crisis by developing a model based on a combination of subjective (AHP) and objective (TOPSIS) methods. Investigating the FDI home countries' rankings in different time spans not only reinforces the validity of the designed model, but also results in a more comprehensive model. Using subjective methods will help to receive more realistic results and increase the flexibility of the model.

The present study is designed as follows:

Chapter 2 presents a literature review, including some brief definitions about related topics, theoretical and empirical literature; chapter 3 describes the data, methodology, and the model. The empirical results and analysis are discussed in chapter 4, and chapter 5 contains a conclusion and policy suggestions.

Chapter 2

LITERATURE REVIEW

2.1 FDI Definition

Capital flows across countries in variety of ways. Channels of international capital flows could be distinguished as foreign direct investment (FDI), foreign portfolio investment (FPI) and loan. OECD (2008) defines FDI as "*a category of investment that reflects the objective of establishing a lasting interest*[1] *by a resident enterprise in one economy (direct investor) in an enterprise (direct investment enterprise) that is resident in an economy other than that of the direct investor"*. Broadly, during FDI process the investors in one country (the home country) obtain ownership of assets in other country (the host country) to control the main activities of a firm such as management, production and distribution (Moosa, 2002). According to the definitions, investors in FDI process obtain some significant control over the firm they invest in. Applying micro-management[2] standards and using different management skills, they could be more flexible and response in a short period of time to changing economic environments (Razin, et al., 2003).

2.2 Importance of FDI

The financial capital, technology and other skills could be transferred to one country in different manners, in this regards, FDI has important role to play. The home and

[1] The pivotal characteristics of FDI are high degree of control and influence on the management of enterprises and a long-term relationship between the direct investment enterprise and investor.
[2] Micro-management ascribe to a manager who's slightly involved in the daily activities (happening on a daily basis) and decisions of their team. On the other hand, hands-on management could be a synonym for micro management.

host countries involve cost and benefits during this process. However, there is fundamental disagreement on what constitutes costs and benefits. Meanwhile, benefits to the host country would not be realized automatically; however, theoretically, high positive effects on the host country have been proved. Accordingly, the certain conditions have to be satisfied to materialize the positive effect. In this regards, Crespo and Fontoura (2006) evaluate the domestic productivity which affected by foreign presence. The most widely investigated FDI spillovers determinants are domestic firm characteristics, regional effect, absorptive capacity, additionally, the FDI characteristics which determine the magnitude of the spillover effect is related to the national origin from which the FDI emanates and other factors such as market-orientation[3] of the foreign MNEs. Meanwhile, they mentioned that the absorptive capacity of domestic firms is the most robust empirical result. They also noted that in order to capture the benefits (indirect) from FDI the absorptive capacity is considered as a fundamental precondition in this regards. In general, FDI effects and determinants could be distinguished in terms of FDI types.

There are alternatives to service a foreign market such as exporting or licensing agreements rather than FDI. The reasons that firm choose to establish the affiliate production in foreign market instead of other options are quite inquisitional issue. The presence of specific intangible assets of the firm, such as managerial skills, technologies would be the main reason. Developing of appropriate agreements in terms of rents with an external party is very difficult (Blonigen, 2005). Oliver Williamson[4] is the former scientists that worked on transactions costs, and the development of the

[3] Accordingly Li, et al. (2001) carried out the study to find out the benefits of FDI to domestic firms by distinguishing between domestic market-motivated and export-oriented FDI. They concluded that in the case of export-oriented FDI the benefits for domestic firms are only by increasing efficiency.

[4] See Oliver E. Williamson ,"Transaction-cost economics: The governance of contractual relations", The Journal of Law and Economics, Vol. 22, No. 2, 1979, pp 233-261

ownership-location-internalization (OLI) paradigm that elaborates and conceptualizes this notion in-depth (Dunning, 2001, Rugman, 1980).

2.3 Types of FDI

FDI motivations can be classified from the perspective of the investor or source country. Caves (1971) distinguished between horizontal and vertical FDI. Ekholm, et al. (2007) introduced new phenomena in FDI type called as an export platform FDI. Moreover, Baltagi, et al. (2007) revealed more complicated vertical FDI.

In similar cases such as where a multinational enterprise (MNE)'s competitive advantages come from internal, indivisible assets associated with knowledge and technology, it might be cheaper to expand directly in a foreign country, rather than through trade for MNEs. This is referred to as horizontal FDI, while an early model of horizontal multinationals is mentioned in Markusen (1984). On the other hand, the trade of intermediate inputs between MNEs or in other words divisions of the same firm is considered as a significant fraction of world trade flows, an important portion of these flows which is referred to vertical FDI (Razin, et al., 2003). An early example of a model with vertical multinationals is in Helpman (1984), thereafter, Markusen, et al. (1996) and Carr, et al. (2001) developed a unified model called, knowledge-capital model. Meanwhile, Aizenman & Marion (2004) examined the effect of uncertainty on vertical and horizontal FDI. They showed that regarding Vertical FDI, as the level of uncertainty of supply increases the expected income amount from Vertical FDI will decline, however, this will be inverse direction regarding horizontal FDI (the expected income increases). On the other hand, expected income in both vertical and horizontal FDI modes are affected adversely by higher level of demand. Meanwhile, regarding vertical FDI, MNEs are incurred

higher financial lose as a result of host country's uncertainty about predatory actions than under the horizontal mode. In addition, they reveal same manner of impact for volatility and sovereign (greater effect on vertical FDI than on horizontal FDI). In addition, there is a new phenomenon which creates novel motivation in FDI flows, export-platform affiliate production (EP), Ekholm, et al. (2007) introduce that in EP mode the home country's firm targets to sale in third countries rather than in the parent or host countries. Baltagi, et al. (2007) also considered the other important FDI type which intermediate goods produce and ship among variety of host countries for required processing before producing of final product and thereafter ship to the home country.

2.4 Theories and Determinants of FDI

Aliber (1993) mentioned that most efforts at positing a theory of FDI can be placed in two groups on the basis of advantage attributed to the source country firms. One group of theories identifies those factors that explain which firms are most likely to invest abroad. He noted that firms that invest abroad must have some type of monopolistic advantage. These groups of theories emphasize firm's specific advantages that enable individual firms to compensate for additional cost they encounter in organizing and managing subsidiaries in foreign countries. The second group theories identify those countries that are most likely to be source and host countries in terms of micro financial capital market.

The above-mentioned FDI types motivate different regressors that identify FDI determinants. In addition, it could be beneficial for an empirical specification and decision making approach that can surround factors (short-run long-run) that influence the FDI. Accordingly, the general equilibrium theory of Heckscher-Ohlin

could be considered as parallel issue with FDI, Heckscher-Ohlin (1980s) considered differences in relative production's endowments factors or in other words predictors of trade flow between countries. Thereafter, the gravity model of trade had been added to the literature. This model determines trade flow between two countries as a function of the GDP and bilateral distance of each country. Many trade literatures try to support and reinforce the theory and help to turn it back in fashion after a decade of critics such as Anderson and van Wincoop (2003)[5].

The gravity approach provides quite well approximation of the FDI determination and suggest model for FDI flow (Navaretti, et al., 2004, Mutti, et al., 2004, Bergstrand, et al., 2007).

$$Y_{ijt} = \alpha_0 + \alpha_t + \beta_1 \log GDP_{it} + \beta_3 \log D_{ij} + \beta_4 X_{ijt} + \varepsilon_{ijt} \quad (1)$$

Where i and j represent source and host county respectively, Y_{ijt} is the logarithm of bilateral FDI at time t. GDP_{jt}, and GDP_{it} consider as a host and source market size. Countries their bilateral distance is presented by D_{ij} in the equation. Here alternative FDI theories are included by a matrix of covariates, X_{ijt}. In order to exclude bias (come from aggregate global shocks), α_t, or time fixed effect had been added. As a result, adding α_t (Time fixed effects) any spurious correlation could be assuaged (Navaretti, et al. 2004).

In order to capture the country pair specific impacts, independent variables such as language, border and colonial history usually add to equation. For instance, Oh, et al.

[5] See Anderson, James E.; van Wincoop, Eric. "Gravity with Gravitas: A Solution to the Border Puzzle" American Economic Review, 93, 1, 2003, pp. 170-92.

(2011) find that in trade and FDI process, there is hierarchy in transaction costs of major languages.

The **exchange rate** effect could be categorized into “effects of level” and “effect of volatility” of exchange rate. Imperfect capital market concept reveals the exchange rate effect on the FDI decisions. This concept mentions borrowing from external sources is more expensive than internal one, therefore, lower cost of funds and growth in investor firms’ wealth will be considered as a result of currency appreciation in foreign investor’s country (Froot, et al., 1991). On the other hand, exchange rate volatility in some case influence the FDI, if investors are risk averse and the degree of variable in production is quite low then there should be no change in FDI location choice. Meanwhile if the real exports demand shocks and real exchange rate shocks has inverse relationship then the share of production capacity will increase as exchange rate volatility rises. In addition, there are many evidences in studies that increasing in exchange rate volatility will result in expansion of the share of total investment located abroad (Goldberg, et al., 1995).

The important fact that consider as a boosting economic factor regarding developing countries is inward investment. Accordingly, these improvements in economy will be carried out by technology transfer, capital accumulation, acquisition, innovative capacity and economic growth (Moosa, 2002). However this effect could become pallid with regards to mode of entry to the host country (Temiz, et al., 2013). According to the basic FDI models, FDI (commonly GDP per capita is considered as proxy for FDI) flows from countries with high capital capability to high labor capability countries (Eicher, et al., 2012). With regards to Knowledge-capital model, lager vertical FDI outflow will result from greater skill difference or education

disparities. In 2001, the knowledge-capital model has been considered in Carr, et al. empirical examination. The obtained results reveals that trade costs of the two countries, GDP of the two countries, FDI costs, and differences in **factor endowments** between the home and the host are consider as a regressors for MNE sales in a host country. Numbers of author criticize Carr, et al., for instance, Blonigen, et al. (2003) and (2005) which pointed out to the variable specification error and they mentioned that the original results will not be achieved as the errors are fixed.

FDI with high returns will be attracted to the countries with high **growth rate in GDP**. Generally, the productions of goods and services in countries with high rate of GDP will be high also; therefore, its export volume increases as well. In this regards Zhao & Du (2007) prepared a study to investigate the causality between FDI and economic growth in China and they found more significant evidences regarding impact of China's economic growth on FDI inflow (which supports the market-size hypothesis) rather than, effect of FDI inflow to the economic growth of china. In addition Lee & Chang (2009) applied panel co-integration and panel error correction models for a set of 37 countries using annual data for the period 1970-2002. They explore First, when a country has a solid financial system as its foundation, it follows that it is in a better position to more effectively reap the benefits from FDI inflows. Next, the healthy development of the financial system is a drawing force for FDI. Moreover, it could be easier in the long run to attract even more FDI if a well-developed financial system is supplemented with an active economic policy. Furthermore, the financial development indicators have a larger effect on economic growth than does FDI. FDI outflows in form of export platform are highly affected by the size of proximate third country market. Hence, higher **market potential** will

be considered as sign of greater export platform FDI receiving to the host country, this will depend on the market size of host country relative to other country (Ekholm, et al., 2007, Baltagi, et al., 2007, Blonigen, et al., 2007, Eicher, et al., 2012).

Country **productivity** is another economic factor that has vital effect on FDI returns. Increase in productivity which will result in higher return in FDI, typically, the volume of FDI inflow to the host country increases. However, this may decrease the extensive FDI outflow from the source country at the same time. This will be as result of increase in setup cost (Razin, et al., 2008).

FDI flows have been affected by host and source **corporate tax rates**. Razin & Sadka (2007) found that the host country tax rate has a negative effect primarily on the volume of investment flows, whereas the source tax rate has a positive effect mostly on the decisions to invest. The return to FDI may be subject to international double taxation. There are many highlighted literature review, noted that considering different type of tax treaties, the FDI could change. For instance, applying tax exemption system, the foreign income is exempted from tax payment in home country if it is taxed in the host country. However, using credit system (or worldwide taxation), home country of the subsidiary accept tax liabilities in the host country as credit (Mooij, et al., 2003). However, there are different tax treaties such as bilateral international treaties that the effects of them on the FDI have not been uncovered yet.

Financial risk also plays a crucial role as determinants of FDI. These risks actually reflect in return on investment. Different indicator can explain the degree of financial

risk in a country such as ICRG[6] and other ratings that is provided by OEDC, IMF. Razin, et al. (2008) found that one of the factors that plays important role in their all constructed models is host-country financial risk; however, there is no prove regarding bilateral FDI flows of source. Meanwhile, economic and political risks such as expropriation are also considered as the important regressors of FDI. In addition, it is well worth to mention that the expropriation of a firm's assets and increase in business costs will be inevitable by poor legal protection and poor quality of institution. However, lack of accurate measurements of institutions result in difficulty in estimating magnitude of the effect of institution on FDI (Blonigen, 2005).

One of the incentives of FDI flows that effect on the FDI costs is reducing of tariffs among collaborating counties. As a result, the delivery cost of goods will be cheaper for MNEs and consumers. Some of the large regional trade agreements **(RTAs)** among countries could be named as, EU[7], EFTA[8], and NAFTA[9]**.** Baltagi, et al. (2008) by concentrating on Europe Agreements, concluded that existence of regional trade agreements affect the FDI positively, particularly, this impact will be more tangible in export-platform FDI mode.

In accordance with above-mentioned items, different FDI theories and types result in variety of the FDI determinants. There are also some comprehensive studies such as Blonigen (2005) that describe this issue as well. Recently, the study has been carried out by Eicher, et al. (2012) to construct robust FDI determinants. They reinforced previous studies by utilizing combination of Heckit and Bayesian Model Averaging

[6] International Country Risk Guide (http://www.prsgroup.com/ICRG_methodology.aspx)
[7] European Union
[8] European Free Trade Area
[9] North American Free Trade Area

(BMA). The weaknesses of the earlier studies were selection bias in data set and diversity in FDI theories. It is well worth to mentioning that, missing data also jeopardizes the FDI theories' validity as well. Consequently, they constructed data set based on different sources and used data from 1988 to 2000. The data set belongs to forty six countries which twenty five consider as member of OECD. They introduce twenty three and thirteen FDI determinants regarding FDI flow and FDI selection respectively in their global set (46 countries). They also constructed the Heckit model to make a comparison and test the effectiveness of their model. Their model results in fewer and different FDI determinants. Meanwhile, using specific test to check the effectiveness of their Heckit BMA and Heckit model, strengthen the study results.

Table (15) illustrates the employed FDI determinants and relevant degree of significance using HeckitBMA model. They set the posterior inclusion probability to 50% as a minimum to get effective variables.

2.5 Decision Making

The practice of decision making is as old as man. Decision making is a process of selecting the best among different alternatives. Wanger (1975) mentioned that "*Unquestionably most, if not all, decision making is part of an unending history of action. Earlier choices have affected the present, current decisions will influence the future, and so on*". The final choice will be generated from every decision making process. The final choice could be an action or opinion. There are certain important decisions that people have to make which can change the course of their lives. However, in the distinctive vantage point, the consequences of one county's government policymaking or decision making will affect societal, economic situation of same and other countries.

The process of decision making could be described in Figure 1 as follows:

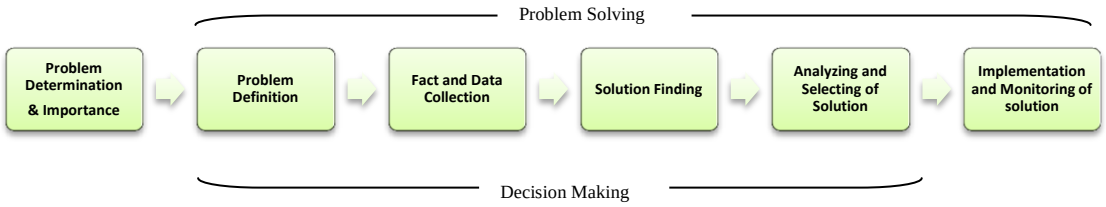

Figure 1. Decision Making Process

In practice, decision making is consisting of step 2 till 5 and the implementation and monitoring of solution step will be consider as feedback to the decision making process .

2.5.1 Multi Criteria Decision Making

Multiple criteria or often conflicting, results in employing multiple criteria decision making (MCDM) process (Hwang, et al., 1981). Generally, the structure of decision making problems coordinates MCDM method into two types (Figure 2):

Consist of MADM with Limited number of alternatives (such as selection or assessment problems) and MODM with unlimited number of alternative solution and boundless range of value.

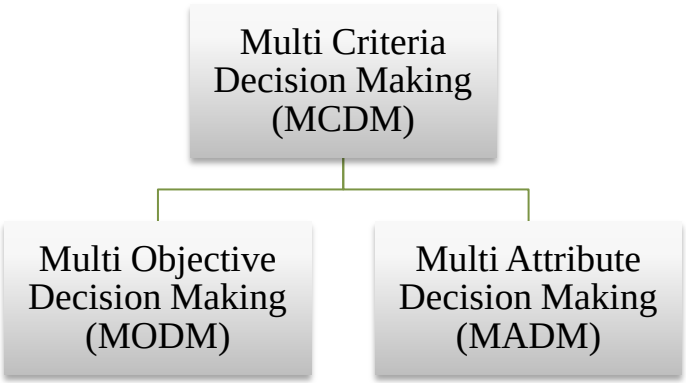

Figure 2. Multi criteria Decision Making Models

2.5.1.1 Multi Objective Decision Making (MODM)

In the process of multi objective decision making, the decision maker's attributes or objectives could disclose in the alternatives or choices of problem. Two kinds of issue, the decision maker's priority regarding objectives, attributes and objectives relationship are considered as a main steps in designing of this problems. The decision making environment most of the time is infinite and continue and different mathematical algorithms such as simplex could be employed to solve the problem (Yang, et al., 2007). With regards to the problem structures, two or more decision objectives will be entered in the problem space in the same time and the optimization process surrounding the whole problem. Following equations and structure are considered as standard form in MODM problem solving:

Minimize $\mathrm{F}(\boldsymbol{x}) = [\mathrm{F}_1(\boldsymbol{x}), \mathrm{F}_2(\boldsymbol{x}), \ldots \mathrm{F}_\mathrm{k}(\boldsymbol{x})]^T$

$$\boldsymbol{x} = (x_1, x_2, \ldots, x_3) \tag{2}$$

Subject to $g_j\,(\boldsymbol{x}) \leq 0,\ j = 1, 2, \ldots, m$,

$$h_i\,(\boldsymbol{x}) = 0,\ l = 1, 2, \ldots, e\ ,$$

Accordingly m, k and e represent the number of objective functions, constraints (unequal) and constraints (equal) respectively. $\boldsymbol{x}$ is considered as decision variable while it is a member of the $\mathrm{F_i}(\boldsymbol{x})$ is the objective functions or criteria.

However, unlike single objective problems, the multi objective optimization solution is not single global solution and commonly called none dominated, Pareto optimal, Pareto efficient or non-inferior (Marler, et al., 2004).

There are different strategies in solving multi objective problems, such as weighting methods consist of weighted global criterion[10], weighted sum[11], lexicographic method[12], weighted min-max method[13], exponential weighted criterion[14], weighted product method[15] and bounded objective function method[16]. In addition, the goal programming (GP) method[17], in which the total deviation from the objective function's goals will be minimized. GP have been constructed based on study by

[10] This solving strategy is considered as utility function and could be expressed as the weighted exponential sum : $\mathrm{U} = \sum_{i=1}^{k} w_i [F_i(\boldsymbol{x})]^p$, $F_i(\boldsymbol{x}) > 0\ \forall_i$ or $\mathrm{U} = \sum_{i=1}^{k} [w_i F_i(\boldsymbol{x})]^p$, $F_i(\boldsymbol{x}) > 0\ \forall_i$

[11] $\mathrm{U} = \sum_{i=1}^{k} w_i F_i(\boldsymbol{x})$

[12] The objective function ordered based on their importance.

[13] or weighted Tchebycheff method, $\mathrm{U} = \max\{w_i [F_i(\boldsymbol{x}) - F_i^o]\}$

[14] $U = \sum_{i=1}^{k} (e^{pw_i} - 1)\, e^{pwF_i(\boldsymbol{x})}$

[15] $U = \prod_{i=1}^{k} [F_i(\boldsymbol{x})]^{w_i}$

[16] The most important objective will be minimized and other objective functions are added to the problem constraints (additional constraints)

[17] The optimization problem is formulated as follows:
$Minimize_{x \in X, d^-, d^+}\ \sum_{i=1}^{k} ({d_i}^+ + {d_i}^-)$
Subject to $F_j(\boldsymbol{x}) + {d_i}^+ + {d_i}^- = b_j\ , j = 1,2, \ldots, k,$
${d_j}^+, {d_j}^- \geq 0, \quad j = 1,2, \ldots, k,$
${d_j}^+ {d_j}^- = 0, \quad j = 1,2, \ldots, k,$
d_j is the deviation from the goal b_j for the jth objective.

Charnes, et al. (1955), they deal with executive compensation methods. They extended their study in 1961 by working on management models and industrial application (Charnes, et al., 1957).

2.5.1.2 Multi Attribute Decision Making (MADM)

Multi Attribute Decision Making (MADM) refers to making priority decision in the finite alternative environments that are described by multiple, usually conflicting, attributes (Hwang, et al., 1981).

Multi Attribute Decision Making (MADM) could be in somehow a qualitative or a quantitative method. In some circumstances decision makers express decision criteria however; the criteria are routed in empirical and objective studies most of the times. The data set according to each decision criteria and attribute is required. This methodology will select optimum alternative by considering of high degree of satisfaction among all decision attributes (Yang, et al., 2007).

2.5.1.2.1 Characteristic of MADM Problems

Alternatives: All the alternatives (option, action, and candidate) will be ranked or prioritized. The numbers of alternatives are finite and could be few or abundant.

Attributes: In this sort of problems, considering the problem characteristic there are numerous attributes or criteria or goal. These criteria will be expressed by decision makers or will be extracted from the relevant literatures.

Incommensurable Unites: Different attributes have different dimension. For instance, GDP is expressed in dollar and distance could be calculated in kilometer.

Attribute Weights: weighting process which is considered as relative importance of criteria is one of the vital steps in MADM method. Weight allocation to the attributes could be implemented by using mathematical procedures such as Entropy, or employing expert judgments.

Decision Matrix: Decision matrix collects most of the required data for solving MADM problems. Figure (3) shows attributes or criteria in the columns, C_j, and alternatives, A_i, in the rows. Therefore, the matrix elements or arrays,x_{ij}, indicates the related performance weight of the *i*th alternative,A_i, with respect to the j^{th} attribute, C_j (Yoon, et al., 1995).

Criteria / Alternative	C_1	$C_2 \cdots$	$C_i \cdots$	C_n
A_1	x_{11}	$x_{12} \cdots$	$x_{1j} \cdots$	x_{1n}
A_2 ⋮	x_{22} ⋮	$x_{22} \cdots$ ⋮	$x_{2j} \cdots$ ⋮	x_{2n} ⋮
A_i ⋮	x_{i1} ⋮	x_{i2} ⋮	$x_{ij} \cdots$ ⋮	x_{in} ⋮
A_m	x_{m1}	$x_{m2} \cdots$	$x_{mj} \cdots$	x_{mn}

Figure 3. Decision Making

2.5.1.2.2 Normalization

As we mentioned, in the process of solving decision making problems , encountering different criteria will be inevitable, each criteria could bear positive or negative characteristic (i.e. most of the time quality/cost will be considered as a positive/negative attribute in decision making process). On the other hand, each criterion in decision matrix may have different scale or dimension, for instance, distance between two countries could be exerted in kilometer or a county's GDP might be added in dollar. In order to carry out the comparison among alternative, the

decision matrix shall be obtain comparable scale, which will be satisfy by normalization technique. There are different approaches in normalization of decision making matrix which could be summarized as follows:

2.5.1.2.2.1 Vector Normalization Method

According to the vector normalize method each decision matrix members are divided to the square root of summation of all squared elements in each column. Mathematically, all values will be ranging from 0 to 1. Thus the matrix become scale less and could be compared. Following equation shows the formulation as well:

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}}, \; i = 1, \dots, m; \; j = 1, \dots, n \tag{3}$$

r_{ij}, is the normalized value of alternative i, with regards to j^{th} criteria.

2.5.1.2.2.2 Linear Normalization Method

If all criteria in decision matrix bear positive characteristic:

$$r_{ij} = \frac{x_{ij}}{\mathrm{Max}\, x_{ij}} \tag{4}$$

Otherwise, if all criteria have negative distinctive,

$$r_{ij} = 1 - \frac{x_{ij}}{\mathrm{Max}\, x_{ij}} \tag{5}$$

As we mentioned above, in real world decision matrix is consist of positive and negative criteria, to normalize composite criteria , linear normalization method will convert the negative criteria to positive by using equation (6),

$$r_{ij} = \frac{\frac{1}{x_{ij}}}{\mathrm{Max}_i \left(\frac{1}{x_{ij}}\right)} = \frac{\mathrm{Max}_i\, x_{ij}}{x_{ij}}. \tag{6}$$

2.5.1.2.2.3 Fuzzy Normalization Method

This method use following equations to normalize performance rating in decision matrix (x_{ij}) for positive or the larger-the-better type, and negative or the smaller-the-better type criteria respectively:

$$r_{ij} = \frac{x_{ij} - \min\{x_{ij}\}}{\max\{x_{ij}\} - \min\{x_{ij}\}}, \quad (7)$$

$$r_{ij} = \frac{\max\{x_{ij}\} - x_{ij}}{\max\{x_{ij}\} - \min\{x_{ij}\}}, \quad (8)$$

This method usually use, when there are not significant differences in the performance measures.

2.5.1.2.3 Evaluation of Attributes Weights

As we mentioned in pervious sections, one of the crucial problem in MADM process is the obtaining the weights of decision criteria or on the other words relative importance of attributes. There are number of methods to reach criteria weights. Considering the information sources most of the approaches could be suited into the **subjective approaches** and **objective approaches**.

During **the subjective approaches** the weights will be allocated to the criteria based on the decision maker's favor or preference. This approach reflects the decision maker's judgments thus the alternative ranking analysis result will be a function of DMs' knowledge of experience.

The subjective methods include combinational data gathering approaches and mathematical science, eigenvector method which is lay down on pairwise

comparison among criteria (also known as AHP[18]) developed by Saaty (1977) and weighted least square method , Delphi method that constructed by Chu, et al. (1979) and Hwang, et al. (1978) respectively.

On the other hand, **objective approaches** basically use the objective information such as employing decision matrix data as input to the approach. Most of them required mathematical calculations only and they do not consider any expert judgments as well. The objective approaches include LINMAP (Srinivasan, et al., 1973), entropy method (Hwang, et al., 1981), and multiple objective programming model (Choo, et al., 1985), etc.

However, Ma, et al. (1999) proposed an integrated method to determine criteria weights. They combined subjective and objective information.

2.5.1.2.3.1 Entropy

As we mentioned before Entropy is categorized in the objective criteria weighting approaches. This method is basically routed in thermodynamics, thereafter, the concept of entropy used firstly in information and communication theory by Shannon. This method have been used in different filed of science such as engineering, management, sociological economic, etc. The main idea in Shannon approach is measuring of uncertainty related to probability distribution in terms of entropy (Wang, et al., 2012, Gill, 2005, Luca, et al., 1972). Shannon has determined the measurement of uncertainty (E_i) as below:

$$E_i = -k \sum_{i=1}^{m} f_{ij} \ln f_{ij} \ , i = 1,2, \dots, m \ \ j = 1,2, \dots, n \qquad (9)$$

[18] Analytical Hierarchy Process

Where the $f_{ij} = \frac{x_{ij}}{\sum_{j=1}^{n} x_{ij}}$, $k = \frac{1}{\ln m}$

And *j*th attribute's entropy weight is defined as follows:

$$w_j = \frac{1-E_i}{n-\sum_{j=1}^{n} E_i} \quad (10)$$

With regards to above equation, when *j*th entropy amount is low means that the *j*th attribute has very different performance rating, thus the related weight $w_j$will high. And the entropy weight satisfies:

$$0 \leq w_j \leq 1 \, , \sum_{j=1}^{m} w_j = 1$$

2.5.1.2.3.2 Analytic Hierarchy Process

The analytic hierarchy process (AHP) is suggested in the subjective information environment. In 1977, Saaty developed this approach based on pairwise comparison. In this regards, the importance of each attribute will be compared relative to others one by one. This process will be carried out by expert individual judgments and they will score using specific ratio scale.

Meanwhile, AHP also allows evaluating the consistency of individual judgments.

$$\text{Numbers of Pairwise comparison} = \binom{n}{2} , n \ \textit{is number of criteria} \quad (11)$$

This process could be done in group situation, means that two or more decision makers will participate in decision making process in this regards the geometrical average[19] will be used to aggregate the individual judgments.

[19] $x_{ij}^{\cdot} = (\prod_{l=1}^{k} x_{ijl})^{1/k}$ where $i, j = 1,2, \dots, n$ and $i \neq j$
k is number of individuals and $l = 1,2,3, \dots, k$

2.5.1.2.4 Multi Attributes Decision Making Methods

There are varieties of MADM methods; figure (4) depicts some of the popular MADM methods based on characteristic of value, crisp and fuzzy:

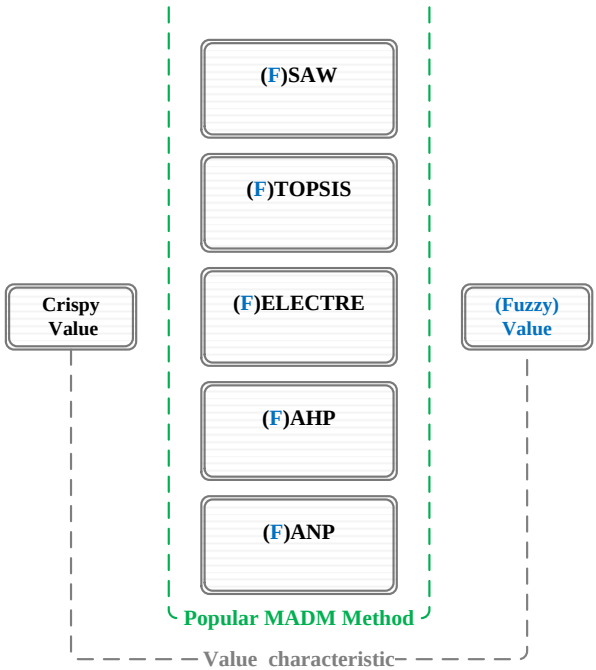

Figure 4. MADM Methods

In 1965, the Fuzzy theory has been introduced to perform in uncertain circumstances by Zadeh. This theory is capable to convert most of the vague and inaccurate concepts or variable or systems to mathematical form. Therefore, this will pave the way for analyzing, controlling and decision making in the uncertain environment.

Fuzzy multiple attribute decision making (FMADM) methods have been developed to improve the MADM process and approximate it to the real problem circumstances. Chen, et al. (1992) mentioned that unquantifiable information, nonobtainable information, incomplete information and partial ignorance could be the main reasons for imprecision outcomes from the conventional method. All of the

decision making method could be extended to fuzzy environment (Chen, 2000, Chang, 1996, Hatami-Marbini, et al. , 2011, Mikhailov, et al., 2003).

Simple additive weighted (**SAW**) is one of the uncomplicated methods of MADM. One of the formers in MADM problems was Churchman, et al. (1957). They used SAW method for the first time in their study. By calculating of the overall assessment value[20] of each decision alternative, the priorities of alternatives could be easily computed (Hwang, et al., 1981, Wang, et al., 2010).

Hwang & Yoon (1981) constructed an approach, call technique for order preference by similarity to ideal solution (**TOPSIS**). The solving approach in this methodology is quite special and also the easily understandable. The best alternative in this method will be selected based on the basic assumption; the best alternative among others should have the shortest Euclidean distance[21] from the ideal solution and the farthest distance[22] from the negative-ideal solution. The alternative with the highest relative closeness measure[23] is chosen as best.

In addition to TOPSIS, elimination et choice in translating to reality **(ELECTRE)** have been introduced in 1980s, this model was considered as one of the best methods in MADM. The basic idea in this approach is "outranking", that means the final

[20] Following measures require to SAW:
Step 1: Quantification of the decision matrix.
Step 2: Normalization of decision matrix. SAW method will use linear approach in normalization.
Step 3: Choosing the best alternative A^* with regards to:
$\boldsymbol{A^* = \{A_i | Max \sum_{j=1}^{n} r_{ij} w_j\}}$
As the overall assessment value get the higher value that decision alternative will be consider as a better one.

[21] $d_i^+ = \sqrt{\left[\sum(v_{ij} - v_j^+)\right]^2}$, $v_j^+ =$ (the best value for jth criteria)

[22] $d_i^- = \sqrt{\left[\sum(v_{ij} - v_j^-)\right]^2}$, $v_j^- =$ (the worst value for jth criteria)

[23] relative closeness measure: $\frac{d_i^-}{(d_i^+ + d_i^-)}$

results will not be alternative rankings. However during this method the alternative may be eliminated. The concordance and discordance matrix will be generated based on comparison among alternatives regarding positive and negative characteristics of each alternative. Thereafter, the overall concordance matrix will be obtained to find the required ranking among alternatives.

As we mentioned before, AHP method has been proposed in 1970s by Saaty. This methodology solves and analyzes the problems similar to what human brains do. AHP enables decision maker to determine the contrary and simultaneous impacts of numerous complicated circumstances. This process assist DMs to determine the priorities based on their goal, knowledge and experience, as they could include their emotions and judgments. In this regards AHP stays on three facts, drawing hierarchy tree, determining of priority, consistency of judgments (Saaty, 1977, Saaty, 1987). Zahedi (1986) also reviewed the AHP and applications mentioned four steps in analytical hierarchy process as first step: dividing decision problem to the relevant groups in hierarchy manner, second step: pairwise comparison between alternatives considering each decision criteria third step: employing engine value method to evaluate the consistency degree, forth step: aggregation of all weighted decision matrixes to obtain the overall ranking of the alternatives.

Belton & Gear (1983) came across to the problem during AHP; they found that if there are two identical alternatives the AHP may prioritize the alternative in a contrary manner. To solve this problem, they proposed that each column of AHP shall be divided to the maximum entry each column called (reserved-AHP). Thereafter, Saaty (1994) accepted the variant and established Ideal Mode AHP.

On the other hand, in some cases there are interacts between criteria and alternatives. There are dependence and feedback among criteria or alternatives. Saaty (1996) and Saaty & Vargas (1998) developed analytic network process (ANP) to solve the issue. Simply, the AHP considered as special case for ANP. The ANP overcomes the constraint of the AHP regarding existing of mutual effect between hierarchy elements. Therefore, the problem environment converts to the network from hierarchy. In this regards to start the ANP, the supermatrix should be generated by comparing all the attributes. After that, the next step will be the transforming all columns sum to unity which will produce weighted supermatrix. Next, the weighted supermatrix is raised to limiting powers to get the global priorities or called weights.

2.5.1.2.5 Multi Period MADM

Most of the times decision makers gather information in different periods, for instance, current study also has been constructed in three different periods (pre-crisis, crisis, and post crisis) which each period includes three successive years. MADM methodologies could be revised in this regards and called multi-period multi-attribute decision making (MP-MADM). The most important step in aggregation of information of MADM is preparing dynamic weighted averaging operator (DWA), this approach have been introduced by Xu, et al. (2008) for a first time. Accordingly, different DWA operator such as the arithmetic, geometric series and normal distribution has been suggested in their study. Based on this operator he developed MP-MADM approach as follows:

Considering $A(t_k) = (x_{ij}(t_k))_{m\times n}$ as a decision matrix, where $x_{ij}(t_k)$ is an attribute value at the period t_k. As we mentioned before, we need to measure all attributes in

dimensionless units and to facilitate inter-attribute comparisons. Therefore, the normalized matrix will be as follows:

$$R(\mathrm{t_k}) = (\mathrm{r_{ij}}(\mathrm{t_k}))_{\mathrm{m\times n}} \tag{12}$$

Thereafter, in order to accumulate the attribute values $\mathrm{r_{ij}}(\mathrm{t_k})$ $(\mathrm{j} = 1,2,\ldots,\mathrm{n})$ in the *i*th row of the normalized decision matrix $R(\mathrm{t_k})$ into an overall attribute value $\mathrm{r_i}(\mathrm{t_k})$ of the alternative A_i at the period $\mathrm{t_k}$ the weighted averaging operator utilized:

$$\mathrm{r_i}(\mathrm{t_k}) = \sum_{j=1}^{n} w_j(t_k) r_{ij}(t_k)\ ,\ i = 1,2,\ldots,m \tag{13}$$

Suppose that there are p periods $\mathrm{t_k}$ (k = 1,2,. . . ,p), whose weight vector is

$\lambda(\mathrm{t}) = \{\lambda(\mathrm{t_1}), \lambda(\mathrm{t_2}), \ldots, \lambda(\mathrm{t_p})\}^{\mathrm{T}}$, where $\lambda(\mathrm{t_p}) \geq 0$, $\mathrm{k} = 1,2,\ldots,\mathrm{p}$, $\sum_{\mathrm{k=1}}^{\mathrm{P}} \lambda(\mathrm{t_p}) = 1$,

$\mathrm{w}(\mathrm{t}) = \{\mathrm{w_1}\lambda(\mathrm{t_k}), \mathrm{w_2}\lambda(\mathrm{t_k}), \ldots, \mathrm{w_n}\lambda(\mathrm{t_k})\}^{\mathrm{T}}$ is the weight vector of the attributes

$\mathrm{c_i}(\mathrm{i} = 1,2,\ldots,\mathrm{m})$ at the period $\mathrm{t_k}$, where $\mathrm{w_j}\lambda(\mathrm{t_k}) \geq 0, \mathrm{j} = 1,2,\ldots,\mathrm{n}$, $\sum_{\mathrm{j=1}}^{\mathrm{n}} \mathrm{w_j}\lambda(\mathrm{t_k}) = 1$.

To aggregate the overall attribute values $\mathrm{r_i}(\mathrm{t_k})$, $(\mathrm{k} = 1,2,\ldots,p)$ of the p different periods $\mathrm{t_k}, (\mathrm{k} = 1,2,\ldots,\mathrm{p})$ into a complex overall attribute value $\mathrm{r_j}$ of the alternative $\mathrm{A_i}$, dynamic weighted averaging (DWA) operator have been employed as follows:

$$r_i = \sum_{k=1}^{p} \lambda(t_k) r_i(t_k),\ \ i = 1,2,\ldots,m \tag{14}$$

Note that $\lambda(t)$ can be given by decision maker or could be drawn from different method such as arithmetic series, geometric series, normal distribution based methods.

Meanwhile, Xu, et al. (2008), Jahan & Edwards (2013), Xu & Yager (2008) and Tsaur (2011) also constructed the model for multi periods environments when the periods are expressed in interval numbers.

2.6 Theoretical Evidence of MADM in FDI Decisions

Kobrin (1976) in order to evaluate the relationship of environmental aspects (economic, social and political) and US FDI flow in manufacturing developed a descriptive model. In this regards he employed regression analysis to considering the relation between FDI and alternatives such as government instability and subversion, economic growth, socioeconomic development and market size and potential. However the regression analysis does not provide the ranking of countries it spread knowledge concerning the relevancy of criteria for FDI in a specific context.

Ehrman & Hamburg (1986) provided method that incorporates a measure of risk which include highest mean and highest variance scores for each exclusive index (they classified FDI criteria in three major categories: political, commercial and monetary) called normative model, to aid firms to find more attractive subset of countries for investment. Meanwhile, Beim & Le´vesque (2006) commented that MADM method could be considered as superior to this method with regards to some of the MADM features such as: sensitivity analysis, ability to express DM preference, easily replicable by entrepreneurs.

Levary & Wan (1999) developed analytic hierarchy process (AHP) to rank foreign direct investment entry mode possibilities of individual firms. In this approach the AHP considered to overcome the uncertainty of FDI including foreign direct investment future expectations and pairwise comparisons of decision maker's judgment which are entailed in the AHP. So that in their study, the entry mood alternatives ranking has been depended on above-mentioned uncertainties. In their explanatory instance which is considered United State multinational firm foreign direct investment in China, they defined four alternatives including: whole ownership, majority and minority owned joint venture and no entry as an entry mode and rank them according to their decision criteria (uncertainties) and five different scenarios.

Saraoglu & Detzler (2002) developed a rigorous framework based on AHP methodology to set the allocation of asset and mutual funds. This structure considered individual preferences and find a solution for the complex problem of selecting mutual funds by generating model which provide reasonable recommendations regarding asset-allocation and assist investors to fine the most appropriate funds alternative within different class of assets. They mentioned that the model is pliable and user friendly while it could be used for portfolio decision process.

Meziani (2003) offered expert-driven system again based on AHP that was considered in different studies but this time carried on portfolio selection. This study showed how the AHP can be modeled to effectively assess barriers to cross-border investments. It demonstrated that it is capable of effectively contributing to the selection of an optimal investment portfolio (OIP). They argued that in order to

construct OIP, investors could choose international markets which are including the least significant obstacles.

Grčić & Babić (2003) constructed AHP evaluation to rank particular transition country (fifteen countries of Europe and the Baltic states) for FDI. The selected FDI determinants are divided in two main groups: Determinants of the general progress in the transition process and Specific determinants of FDI in transitional countries. Empirical data for the selected determinants are taken from the Transition Report of the European Bank for Reconstruction and Development for 2001. In this study Change of ownership, Establishment and development of financial infrastructure and capital markets, establishment and development of the market, establishment of the legal infrastructure, market size of a host country, labor costs, vicinity of transition countries (distance) have been employed as determents of FDI. The results reveal that on the top of the scale are the central eastern European and Baltic States (except Lithuania), and at the bottom of the scale are the Southeastern European countries.

Beim & Le´vesque (2006) illustrate that by using MADM methodology decision maker can facilitate the process of deciding on different countries in order to venture into. They applied a class of MADM which is "value measurement models", that is based on Multi attribute Value Theory (MAVT). They employed fifteen FDI criteria in four major categories (i.e. cultural, economic, legal, political perspectives) to rank countries (fourteen) for new business venturing. The preferences to weight each determinant varied regarding to five different entrepreneurs as decision maker.

Lin & Tsai (2009) provided model in order to choosing location for FDI in Chinese recently developed hospitals based on MCDM. They developed a multidirectional

relationship decision model and combined that with ANP and TOPSIS techniques. In order to rank 15 considered regions, TOPSIS approach has been employed additionally, to illustrate the performance of the approach and test the efficiency of that, the case study has been applied.

Chou (2009) proposed approach which is designed to consider objective and subjective rating simultaneously unlike most other approaches which apply quantitative and qualitative models to deal with objective and subjective data rating respectively. In this regard, to deal with objective crisp data and subjective fuzzy ratings, they established fuzzy multiple criteria decision-making model. They utilized the offered model to parse choosing the location for international center distributions (three different ports in Taiwan).

Karimi, et al. (2010) examined the location decision for FDI by Applying TOPSIS methodology in ASEAN countries and established an approach to solve the problem of strategic decision making. They have been used TOPSIS to evaluated ASEAN countries attractions and capacities and provide final ranking from 2000 to 2005. In order to provide the ranking, they defined ten indicators as foreign direct investment determinants inflows and base on them they conclude that among considered countries Singapore resulted as most attractive country for investment.

Abid & Bahloul (2011) suggested an approach which combined gravity model AHP and goal programming model to evaluate the priority of selected MENA countries as a destination for FPI from viewpoints of G7 countries investors in 2001 to 2005. They used gravity model to determine the foreign portfolio investment criteria called attractiveness factors with respect to thirty investing and forty three receiving

country. Moreover, they applied AHP method to prioritize FPI location alternatives base on gravity model's significant variables. According to AHP results, while most appropriate destination from Japanese and US investor's point of view is Saudi Arabia, investor from France, Germany and Italy prefer Turkey for their investments and Canadian investors select Algeria for their FPI. In addition, they developed AHP–GP combined model in order to evaluate PI of G7 investors in MENA countries. MENA countries attractiveness alters during years, for instance in 2001 to 2005 Canadian, French and Italian investors more attracted to Iran for their overseas investments. In the same period Turkey was the most desirable destination for Germany and UK while Japan and U.S. prefer to invest more in Saudi Arabia. They concluded that amending bilateral trade and also institutional quality for a MENA country in addition with soften foreign investment limitation and decreasing information costs are pivotal solutions in order to attract more foreign portfolio investment.

Xiajing & Junjie (2011) evaluated the economic development differences in province of Zhejiang. They employed the data from 2007 to 2009 of eleven cities in the mentioned province and assist TOPSIS method to analyze ten extracted indicators to fine out existence of economic disparity and reasons of that among the 11 cities in the region.

Radfar & Ebrahimi (2012) identified and prioritized various foreign investment methods for technology transferring in ship making industry based on a Fuzzy Multi Criteria Decision making approach. They were considered the viewpoints of managers and experts familiar with foreign investment issues in Iran's ship making industry through studying different foreign investment methods and the effective

factors on prioritizing of the methods and using the sample judging. They have employed the Fuzzy TOPSIS method to analyze the collected data. In conclusion, they showed that among various foreign investment methods, the joint venture and the subsidiary company are of highest and lowest priorities, respectively.

Chapter 3

DATA AND METHODOLOGY

3.1 Type and Source of Data

Data used in this study are annual figures for the period of 2004-2012. We have divided this period in to three economic situations and defined them as pre-crisis, crisis, post-crisis span of time. This model has been constructed to evaluate U.S. FDI outflow priority in nine top FDI partnerships including, Australia, Canada, Germany, Ireland, Japan, Luxembourg, Netherland, Switzerland, and United Kingdom. The FDI determinants have been extracted from Eicher, et al., (2012) study; we have employed fifteen FDI criteria. Table (1) reference the data source for each determinant.

Table 1. Data Source

Criteria	Date Source
(1) DISTANCE	CEPII
(2) MRKT_SIZE	The World Bank
(3) COLONY	CEPII
(4) COM_LANG	CEPII
(5) DEVELOPMENT	OEDC
(6) GDP_GROWTH	OEDC
(7) MRKT_POTENTIAL	CEPII
(8) PRODUCTIVITY	The World Bank
(9) TAX	http://taxfoundation.org/article/oecd-corporate-income-tax-rates-1981-2012
(10) LAIA	http://www.aladi.org/
(11) APEC	http://www.apec.org/
(12) DOLLAR	http://wn.com/currency_union
(13) CORRUPT	International Country Risk Guid
(14) INTERN_CONFLICT	International Country Risk Guid
(15) RELIGIOUS_TENSION	International Country Risk Guid

3.2 Methodology

In this study, four types of analyses were employed. First of all, AHP method were undertaken to evaluate the FDI determinants weights in three pre crisis, crisis, post crisis period. Second, vector normalization approach was employed to normalize all data related to each set of FDI determinant for each country. Third, dynamic weighted averaging operator were employed to aggregate multi period data in three different span of time (pre-crisis, crisis, post-crisis). Lastly, TOPSIS method was applied in order to prioritize the alternative countries based on defined FDI determinants.

3.3 Empirical Model

There are some concentrated theoretical and empirical studies on prioritization of FDI determinants and destinations considering different countries. The presented model in this study will use the robust FDI determinants (see Eicher, et al., 2012) as a decision making criteria and FDI destination countries (host countries) as alternatives for United States. The contraction of FDI determinants and alternatives will produce the decision matrix. As we mention there are variety of multi attribute decision making methods, in this model we have employed AHP and TOPSIS methodologies to carry out the alternative rankings. Figure 5 illustrate the constructed model.

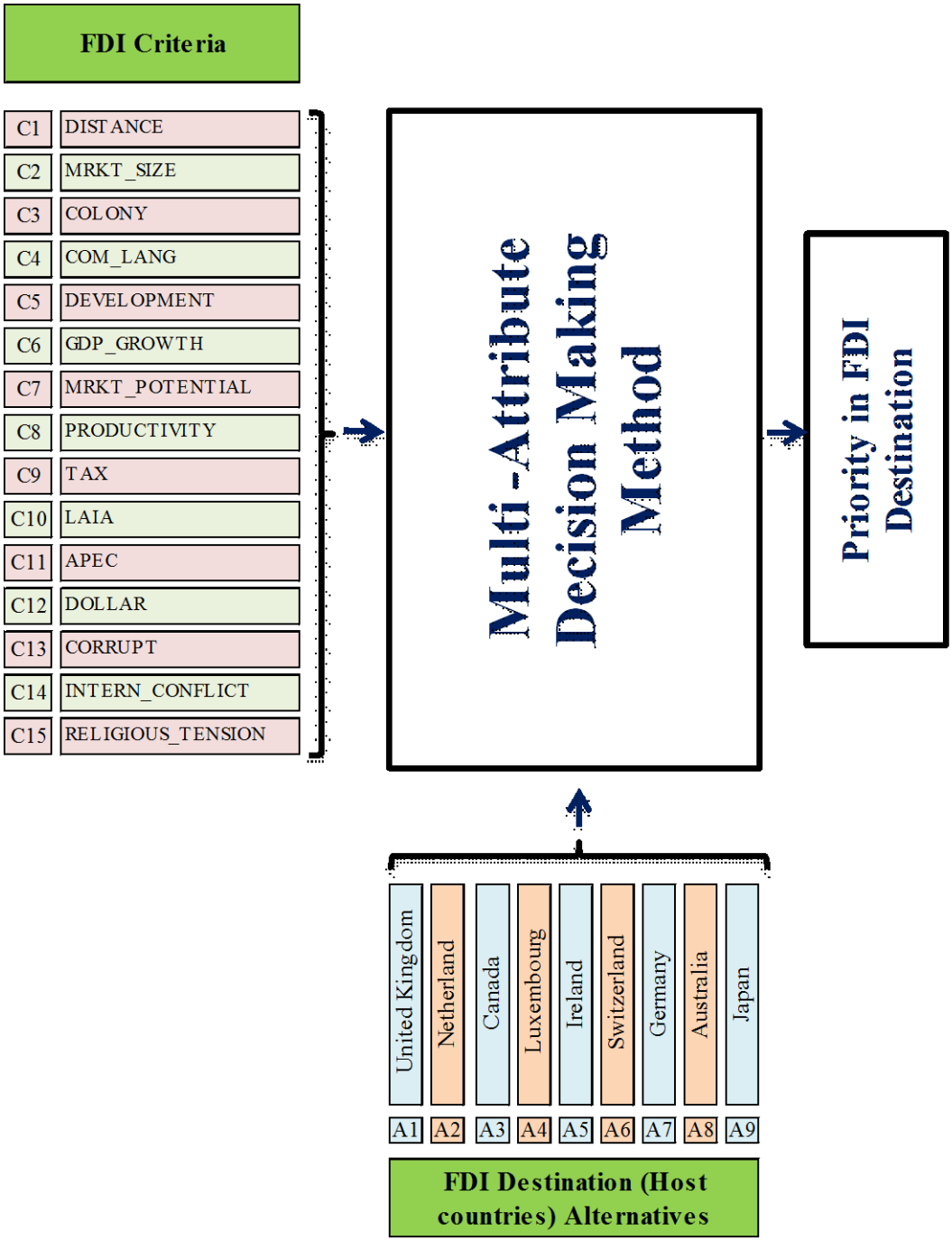

Figure 5. FDI Multi-Attribute Decision Making Model

3.4 FDI Criteria

According to the different studies regarding defining and developing of FDI determinants, this study will employ FDI determinant based on Eicher et al. (2012) study , they construct FDI determinant by considering two important constraints in

FDI data base, uncertainty and selection bias. Table (2) illustrates the bilateral and host country's FDI determinants that have been employed in this study.

Table 2. FDI Criteria

Category	Criteria	Description	
Gravity	(1) DISTANCE	Natural log of bilateral distance	-
	(2) MRKT_SIZE	Host country natural log of real GDP	+
Geography/history	(3) COLONY	Share colonial relationship (If yes, =2 , then , =1)	+
	(4) COM_LANG	Share common language (If yes, =2 , then , =1)	+
Factor endowment	(5) DEVELOPMENT	Host country natural log of real GDP per capita	+
Growth and productivity	(6) GDP_GROWTH	Host country GDP growth rate	+
	(7) MRKT_POTENTIAL	Sum of host country's distance-weighted GDP to all other countries	-
	(8) PRODUCTIVITY	Host country productivity (real GDP per worker)	+
Fiscal/monetary policy	(9) TAX	Host country corporate effective tax rate	-
RTAs/CUs/investment	(10) LAIA	Latin American Integration Agreement (If yes, =2 , then , =1)	-
	(11) APEC	The Asia-Pacific Economic Community (If yes, =2 , then , =1)	+
	(12) DOLLAR	Dollar Currency Unions (If yes, =2 , then , =1)	+
Economic risk	(13) CORRUPT	Host country corruption	+
Political risk	(14) INTERN_CONFLICT	Host country internal conflict	+
	(15) RELIGIOUS_TENSION	Host country religion in politics	+

In keeping with the robust FDI determinants illustrated in the above-table, following table (3) will reveal the characteristic and effect of each determinant on FDI flows.

Table 3.FDI Criteria Characteristic

Criteria	Effect on FDI Flow
(1) DISTANCE	-
(2) MRKT_SIZE	+
(3) COLONY	+
(4) COM_LANG	+
(5) DEVELOPMENT	+
(6) GDP_GROWTH	+
(7) MRKT_POTENTIAL	-
(8) PRODUCTIVITY	+
(9) TAX	-
(10) LAIA	-
(11) APEC	+
(12) DOLLAR	+
(13) CORRUPT*	+
(14) INTERN_CONFLICT*	+
(15) RELIGIOUS_TENSION*	+

* In every case the lower the risk point (value), the higher the risk, and the higher the risk point total the lower the risk.

3.5 Weighting FDI Criteria

AHP method has been employed to determine the FDI criteria weight. The weights have been calculated for each period separately based on expert judgments.

Based on Analytic Hierarchy Process, the first step will be constructing of pairwise comparison matrix for criteria (as we mentioned, this will be in three deferent periods and the expert judgments will be in group). Following steps need to be considered:

Step 1: Construction of pairwise comparison matrix among criteria and each of these judgments is assigned a number on a scale based on Saaty's rating scale table. The relevant table is arranged in Appendix section.

The general pairwise comparison matrix could be constructed as follows (all arrays of matrix will be arranged by considering $a_{ij} = \frac{1}{a_{ji}}$)

Criteria / Criteria	C_1	$C_2 \cdots$	$C_j \cdots$	C_n
C_1	1	$a_{12} \cdots$	$a_{1j} \cdots$	a_{1n}
C_2 ⋮	$1/a_{12}$ ⋮	$1 \cdots$ ⋮	$a_{2j} \cdots$ ⋮	a_{2n} ⋮
C_i ⋮	$1/a_{1j}$ ⋮	$1/a_{2j}$ ⋮	$1 \cdots$ ⋮	a_{in} ⋮
C_n	$1/a_{1n}$	$1/a_{2n} \cdots$	$1/a_{in} \cdots$	1

Figure 6. General Pairwise Comparison Matrix

Step 2: Normalization of pairwise comparison matrix:

$$n_{ij} = \frac{a_{ij}}{\sum_{i=1}^{m} a_{ij}}, \text{ where } n = 1,2,\dots,m \quad (15)$$

Step 3: Calculation of arithmetic average of each row of normalized pairwise comparison matrix:

$$\mathrm{Wj} = \frac{\sum_{j=1}^{n} \mathrm{n}_{ij}}{\mathrm{n\ or\ m}}\ ,\ where\ m = 1,2,\dots,n \tag{16}$$

At the end of this step criteria weights will be calculated and following step will be continued to test the consistency of judgments.

Step 4: Calculation of weighted sum vector:

$$WSV = pairwise\ comparison\ matrix\ \times\ matrix\ of\ w_j\ \ (step\ 3) \tag{17}$$

Step 5: Calculation of consistency vector:

$$CV = WSV \div Wj\ (each\ array\ one\ by\ one) \tag{18}$$

Step 6: Calculation of maximum eigen value of pairwise comparison matrix (λ_{max})

$$\lambda_{max} = \frac{\sum CV}{n} \tag{19}$$

Step 7: Calculation of inconsistency index (II) and Consistency Ratio CR

$$II = \frac{\lambda_{max} - n}{n-1} \tag{20}$$

$$CR = \frac{II}{IRI} \tag{21}$$

In order to calculate CR for provided judgments the table (17) which derived from Saaty has been used. The upper row of the table provides the order of the random matrix, and the lower row introduces the random judgments of corresponded index of consistency.

According to Saaty argues, consistency ratio bigger than 0.1 implies that sometimes judgments could be accepted when the limit of consistency is through CRs higher than 0.1 (but not too much more).

According to Chapter 2, Analytic Hierarchy Process could be carried out in group rather than individual judgments, therefore, to aggregate geometric average will be employed.

3.6 Normalization

After preparation of each determinant's weight, the next steps will be normalization of decision matrix, this will allow attribute comparison. Vector normalization method has been employed in this study to attain the harmonize decision matrix.

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}}, \; i = 1, \dots, m; \; j = 1, \dots, n \qquad (22)$$

r_{ij}, is the normalized value of alternative i, with regards to j^{th} criteria.

3.7 Aggregation of Multi Period Decision Making

This study has been carried out in the multi period environment. The study consists of three different economical periods, pre-crisis, crisis, post-crisis. Each period is composed of numbers of years. To aggregate the relevant data in three mentioned periods, the following steps need to be considered.

Step 1: Normalization of decision matrix for each year.

$$R(t_k) = (r_{ij}(t_k))_{m \times n} \qquad k = 1, 2, \dots, 9$$

Step 2: Calculation of $V_i = \sum_{k=1}^{p} \lambda(t_k) v_i(t_k), \;\; i = 1,2, \dots, m$ (23)

to aggregate the respective year data in each three period.

Where the weighted averaging operator (v_i) has been utilized through:

$$v_i(t_k) = \sum_{j=1}^{n} w_j(t_k) r_{ij}(t_k) \ , \ i = 1,2, \dots, m \quad (24)$$

And, weight vector is $\lambda(t) = \{\lambda(t_1), \lambda(t_2), \dots, \lambda(t_p)\}^T$, where $\lambda(t_p) \geq 0, k = 1,2, \dots, p, \sum_{k=1}^{P} \lambda(t_p) = 1$.

Note that λ(t) can be given by decision maker or could be drawn from different method such as arithmetic series, geometric series, normal distribution based methods.

3.8 TOPSIS

Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) is the method that has been constructed based on the concept that the alternative which has the shortest distance and farther distance from the positive and negative ideal solution relatively is considered as best chosen alternative. This method examines the distance relationship between the ideal positive solution and negative ideal solution, which regards as the maximal benefits and minimal benefits solution. Additionally in order to ranking alternatives in multi-attribute decision making in accord with the distance relationship between the alternative and the ideal alternative, TOPSIS could be beneficial. In this study, among MADM methodologies, TOPSIS has been considered due to its simple and programmable computation procedure and its user friendly application advantage which assist users by processing data directly without any previous mathematical calculation. Besides, it also has the capability of combining with other decision making method such as AHP (Xiajing, et al., 2011).

Six major steps shall be taken to achieve the optimum ranking of alternatives:

Step 1: Quantification and Normalization of the decision matrix.

Step 2: Calculation of weighed normalized decision matrix: Multiplication of normalized decision matrix (R) to diagonal matrix of criteria weights ($W_{n\times n}$)

$$V = R \times W_{n\times n} \tag{25}$$

Step 3: To define the ideal positive (V_j^+) and negative (V_j^-) solution (alternative):

(V_j^+): [Vector of the best value of each criterion in V]

The best value for positive and negative criteria will be the maximum and minimum amount respectively.

(V_j^-): [Vector of the worst value of each criterion in V]

The worst value for positive and negative criteria will be the minimum and maximum amount respectively.

Step 4: To find out each alternative distances from the positive (V_j^+) and negative (V_j^-) ideal alternative:

$$d_i^+ = \sqrt{\left[\sum(v_{ij} - v_j^+)\right]^2}, \qquad i = 1,2 \ldots, \mathrm{m} \tag{26}$$

v_j^+, is the best value for each attribute irrespective of alternative.

$$d_i^- = \sqrt{\left[\sum(v_{ij} - v_j^-)\right]^2}, \qquad i = 1,2 \ldots, \mathrm{m} \tag{27}$$

v_j^-, is the worst value for each attribute.

Step 5: To calculate the integrated evaluation index CL (relative closeness measure)

$$CL_i^* = \frac{d_i^-}{(d_i^+ + d_i^-)} \tag{28}$$

Step 6: to rank alternatives, the highest value of CL, the better alternative.

Note that TOPSIS will be carried out for each three aggregated period separately.

Chapter 4

EMPIRICAL RESULTS

4.1 Criteria Weighting

In this study in order to calculate the weights of each criterion, the AHP method has been employed. Weighting process has been carried for each period individually as indicated in chapter (3). To complete pairwise comparison matrix expert judgment has been carried out by four different foreign investment experts. Three matrixes have been handed out regarding pre-crisis, crisis and post-crisis periods. Following table illustrate the aggregated FDI criteria weights with respect to AHP method.

Table 4. Criteria Weights

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPTION	INTERN CONFLICT	RELIGIOUS TENSION
Pre Crisis:	**5.21%**	**12.42%**	**1.62%**	**1.62%**	**9.22%**	**11.42%**	**14.00%**	**14.17%**	**6.65%**	**2.70%**	**2.70%**	**2.72%**	**4.67%**	**5.17%**	**5.72%**
Crisis:	**5.33%**	**12.69%**	**1.39%**	**1.39%**	**8.24%**	**15.12%**	**12.64%**	**11.75%**	**6.41%**	**2.08%**	**2.08%**	**2.08%**	**6.88%**	**5.93%**	**6.00%**
Post Crisis:	**7.57%**	**13.27%**	**1.31%**	**1.31%**	**12.54%**	**11.79%**	**10.97%**	**10.24%**	**6.50%**	**2.42%**	**2.42%**	**2.46%**	**5.76%**	**5.88%**	**5.54%**

In order to reach desirable degree of consistency in expert judgments, the consistency ratio have been calculated for each three matrixes based on steps 4 to 7 illustrated in chapter 3. Following table reveals the consistency ratio:

Table 5. Consistency Ratio

	Pre Crisis	Crisis	Post Crisis
λ max	16.973	17.158	16.712
CR	0.089	0.097	0.077

Note: Saaty's CI table: n = 15 and the relevant CI =1.59

The CR calculations for matrixes demonstrate the required degree of consistency has been satisfied.

AHP results reveal that during pre-crisis period, the productivity in host countries gains the highest weights 14.17% among other factors, meanwhile Razin et al. (2008) also noted that increase in productivity level will affect the FDI set up cost and increase the FDI outflows to existing MNEs. In Crisis period productivity weight reach to11.75% (fourth level) and 10.24% (fifth level) during post crisis period.

In addition, GDP growth, signals higher returns, has been received the greatest priority in comparison to other FDI determinants by 15.12% in the span of crisis period. This result varies in pre crisis to 11.42% (fourth level) and 11.79% (third level) in post crisis.

Based on previous studies, larger market size in host countries affect positively FDI outflow to the host countries. In this regards, in the post crisis period 12.69% weight has been allocated to the market size criteria, however, this amount varies in pre-crisis to 12.42% (third level) and 13.27% (third level).

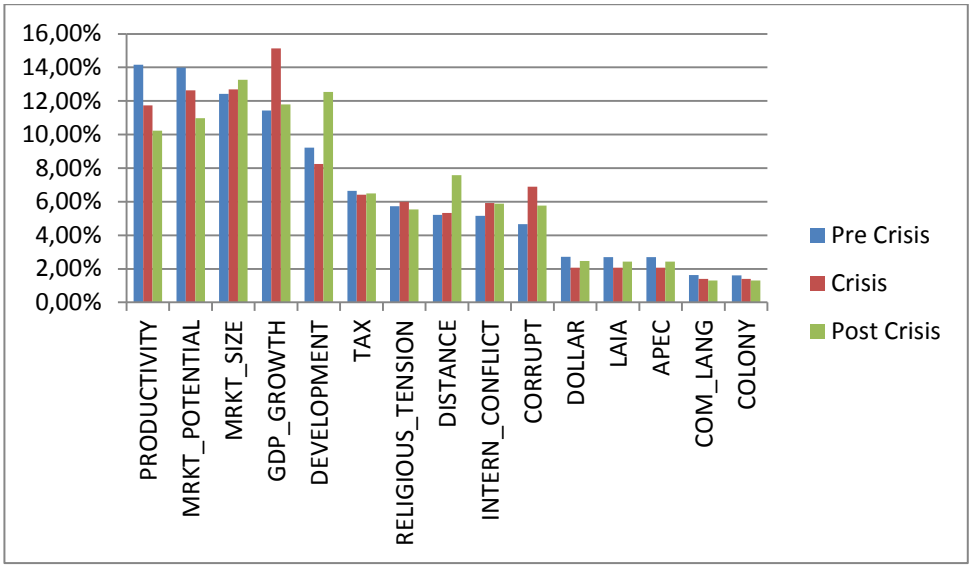

Figure 7. FDI Criteria Weight ranking

4.2 Normalization

The next step after gathering data for all FDI determinants will be the normalization of decision matrixes (each 9 matrix separately) based on equation (22) that mentioned in chapter 3. Therefore, all arrays of decision matrix will be in same dimension and the comparison among them will be applicable. The relevant results have been arranged in Appendix section.

4.3 TOPSIS Results and Analysis

As we mentioned before, in this study data are categorized in three different periods. After calculation of normalized decision matrixes, the next step will be construction of weighted normalized decision matrix based on equation (25); this will be carried out for each year by employing of criteria weight matrix.

In the next step, in order to aggregate yearly decision matrixes in our defined economical periods, the first thing will be selecting of weighted vector. In this study uniform distribution has been employed, thus in each period all years have same

effect in the defined periods. Therefore, with regards to the equation (24), for each period (pre crisis, crisis, and post crisis) the following assumption has been considered: $\lambda(t_1) = \lambda(t_2) = \lambda(t_3) = 1/3$

Further to TOPSIS methodology, the next step will be determining of the positive and negative ideal solution. In this regards, for criteria with positive feature the positive ideal solution will be maximum and minimum for negative. On the other hand, for negative feature criteria the ideal solution for positive and negative will be minimum and maximum respectively. For instance in our case, DISTANCE is characterized in negative criteria, as the bilateral distance increases the FDI flow will become lower. Therefore, the positive and negative ideal solution based on table (24) will be

$i^+ =$

$min(0.0121, 0.0128, 0.0012, 0.0132, 0.0111, 0.0136, 0.0131, 0.0347, 0.0236) = 0.0012.$

$i^- =$

$max(0.0121, 0.0128, 0.0012, 0.0132, 0.0111, 0.0136, 0.0131, 0.0347, 0.0236) = 0.0347.$

In the next step, the distance of each alternative form positive and negative ideal solutions have been calculated based on equation (26) and (27), then the relative closeness indexes have been computed as per equation (28).

The last step is raking the CL indexes, the higher value in CL index, and the better alternative to invest. In the pre crisis period, Japan with CL = 0.5767 has been placed

in the first rank then Canada, CL = 0.4602 in second, Germany CL = 0.4339 in the third rank, Luxemburg CL = 0.4089, Australia CL = 0.4055, United Kingdom CL = 0.4053, Ireland CL = 0.3668, Switzerland CL = 0.2497, Netherland CL = 0.1908 are respectively ranked in the fourth, fifth, sixth, seventh, eighth, ninth.

Table 6. Weighted Vector (Pre Crisis)

Year	Time Preference
2004	0.333
2005	0.333
2006	0.333

Table 7. Positive and Negative Ideal Solutions (Pre Crisis)

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
i+	0.0012	0.0914	0.0093	0.0071	0.0531	0.0583	0.0074	0.0932	0.0089	0.0078	0.0127	0.0099	0.0139	0.0206	0.0224
i-	0.0347	0.0007	0.0047	0.0035	0.0237	0.0201	0.0741	0.0357	0.0230	0.0078	0.0064	0.0049	0.0096	0.0126	0.0119

Table 8. Distance and Relative Closeness to Ideal Solution (Pre Crisis)

Distance from Positive Ideal		Distance from Negative Ideal		Alternatives	CL Index
d1+	0.0902	d1-	0.0615	United Kingdom	0.4053
d2+	0.1234	d2-	0.0291	Netherland	0.1908
d3+	0.0928	d3-	0.0791	Canada	0.4602
d4+	0.1137	d4-	0.0787	Luxembourg	0.4089
d5+	0.1066	d5-	0.0618	Ireland	0.3668
d6+	0.1156	d6-	0.0385	Switzerland	0.2497
d7+	0.0912	d7-	0.0699	Germany	0.4339
d8+	0.1062	d8-	0.0724	Australia	0.4055
d9+	0.0805	d9-	0.1096	Japan	0.5767

Table 9. Weighted Vector (Crisis)

Year	Time Preference
2007	0.333
2008	0.333
2009	0.333

Table 10. Positive and Negative Ideal Solutions (Crisis)

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
i+	0.0012	0.0918	0.0080	0.0061	0.0477	0.0566	0.0071	0.0772	0.0086	0.0060	0.0098	0.0072	0.0208	0.0238	0.0242
i-	0.0355	0.0008	0.0040	0.0030	0.0206	-0.0235	0.0665	0.0292	0.0233	0.0060	0.0049	0.0036	0.0125	0.0134	0.0113

Table 11. Distance and Relative Closeness to Ideal Solution (Crisis)

Distance from Positive Ideal		Distance from Negative Ideal		Alternatives	CL Index
d1+	0.1025	d1-	0.0624	United Kingdom	0.3782
d2+	0.1176	d2-	0.0510	Netherland	0.3026
d3+	0.0986	d3-	0.0788	Canada	0.4442
d4+	0.1219	d4-	0.0691	Luxembourg	0.3618
d5+	0.1278	d5-	0.0463	Ireland	0.2659
d6+	0.1103	d6-	0.0622	Switzerland	0.3609
d7+	0.0908	d7-	0.0761	Germany	0.4562
d8+	0.0982	d8-	0.1025	Australia	0.5107
d9+	0.1020	d9-	0.1060	Japan	0.5098

Table 12. Weighted Vector (Post Crisis)

Year	Time Preference
2010	0.333
2011	0.333
2012	0.333

Table 13. Positive and Negative Ideal Solutions (Post Crisis)

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
i+	0.0017	0.0953	0.0076	0.0057	0.0705	0.0549	0.0066	0.0646	0.0088	0.0070	0.0114	0.0086	0.0169	0.0233	0.0222
i-	0.0504	0.0008	0.0038	0.0029	0.0323	0.0060	0.0575	0.0264	0.0215	0.0070	0.0057	0.0043	0.0122	0.0169	0.0148

Table 14. Distance and Relative Closeness to Ideal Solution (Post Crisis)

Distance from Positive Ideal		Distance from Negative Ideal		Alternatives	CL Index
d1+	0.0860	d1-	0.0645	United Kingdom	0.4285
d2+	0.1187	d2-	0.0367	Netherland	0.2362
d3+	0.0828	d3-	0.0862	Canada	0.5102
d4+	0.1125	d4-	0.0678	Luxembourg	0.3760
d5+	0.1130	d5-	0.0479	Ireland	0.2978
d6+	0.1080	d6-	0.0485	Switzerland	0.3099
d7+	0.0696	d7-	0.0860	Germany	0.5529
d8+	0.1039	d8-	0.0738	Australia	0.4155
d9+	0.0689	d9-	0.1088	Japan	0.6121

4.4 Ranking and Comparison

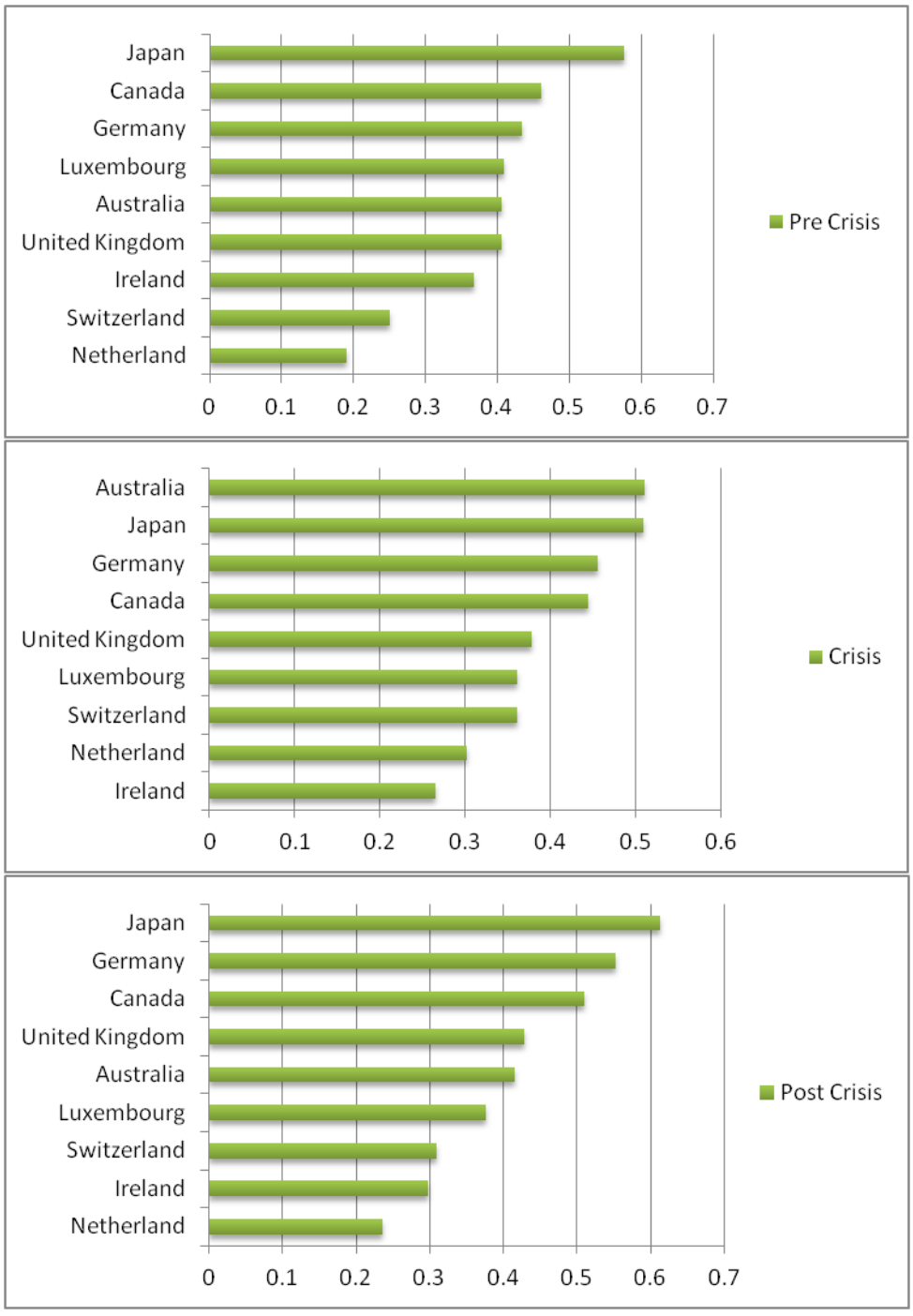

Figure 8. Alternative Ranking

According to our designed model output, the first priority for US to increase FDI outflow in pre-crisis period is Japan with closeness index 0.5767. Meanwhile, during the Crisis, Japan falls to the second level while Australia places in the first grade

with closeness index 0.5107. In the third period (post crisis) the attractiveness of Australia declines and Japan reaches the first level by CL 0.6121. Narrowing down to the table (23) the aggregated weighted decision matrix, during pre-crisis, reveals that closeness of some of the important (high weighted) Japan's FDI determinants to ideal points, market size of 0.09145, market potential of 0.01456 makes Japan more attractive for U.S. to invest. Meanwhile, Australia by obtaining 0.05664 weight regarding GDP growth and 0.00710 in market potential (the most important FDI criteria among others according to table (25) criteria weights) forced Japan to one level down during the crisis period. During post crisis period Germany with 0.06745 and 0.04516 weights in market size and GDP growth respectively reaches to the second level after Japan. Declining in Australia GDP growth during post crisis is one of the most important reasons downgrade Australia in fifth level in this period.

Considering obtained results, closeness index, most of the alternatives place in different ranking position throughout the pre-crisis, crisis, and post crisis periods. For instance, Canada places in second position in pre-crisis, fourth position in crisis and third position in post crisis period. In addition, while United Kingdom was in sixth level in pre crisis, upgraded during next periods by one level. Luxembourg regarding productivity (0.07725) and risk factors of FDI determinants, corruption, religious tension and intern conflict risks (0.020803, 0.022247, 0.024221) placed as an ideal alternative among other countries, however, its market size, market potential, GDP growth (0.00081, 0.06649, 0.00337) have remote distance from ideal solutions in comparison with other alternatives in the crisis period. Meanwhile these conditions remain steady in post crisis. It is well worth mentioning that this model accumulates all FDI determinants data base on relevant criteria weights.

Regarding Ireland, Switzerland, Netherland, these countries among other counties in our set placed in last three, seventh, eighth, ninth, priority respectively, in pre-crisis period, ninth, seventh, eighth priority in crisis period, in crisis period and eighth, seventh, ninth, priority, in post crisis period.

Regarding Ireland, negative GDP growth (-0.01954) during crisis period forced it to fall to the last level from seventh in our country set while after crisis period moved one level up by improving GDP growth (0.01441).

Switzerland's GDP growth weight (0.02737) ranked as closest country to ideal solution (Australia, 0.05663), however, considering, other determinants such as market size, market potential, this country got lower level (seventh level in market size and market potential) during crisis.

In the crisis period Netherlands was considered as ideal solution in regards to corruption risk and intern conflict risk, however, Netherlands other FDI determinants weighs were not as much as other countries satisfactory in our county set.

Chapter 5

CONCLUSION

5.1 Conclusion

Investing overseas can generate many benefits to MNEs, such as reducing transport costs and exploiting the economy of scope. In general, from the investing countries' viewpoints, investing in other countries will increase overseas income, and FDI outflows result in more efficient and competitive management of firms by virtue of gaining entrance to the markets outside the country and higher integrating into the global supply and value chains. Additionally, home countries receive benefits such as repatriated profits, intellectual property royalties, and similar payments.

According to the U.S. Bureau of Economic Analysis[24] statistics, U.S. FDI outflow amounts varied from 2004 to 2012. Accordingly, the allocation of U.S. FDI outflows to the home countries also varied during this period.

This study attempted to design a model to evaluate the host countries' attractiveness for FDI. This model considered the nine years from 2004 to 2012, and categorized each three years as pre-crisis, crisis, and post-crisis (crisis refers to the 2007 Financial Crisis). The Financial Crisis, which began in summer 2007, resulted from bubbles in real estate and credit sector which at the end led to excessive leverage. The financial crisis led to a progressive deterioration of the investment situation in

[24] See: http://www.bea.gov/

the world economies. It is well worth mentioning that the FDI outflow of most of the developed countries, such as the U.S., was affected during the crisis. UNCTAD's survey conducted in 2008 also mentioned that 40% of the companies that responded indicated that the financial instability had a "negative" or "very negative" impact on their investments. The reasons behind this could be attributed to the liquidity constraint, worldwide economy growth slowdown, and increases in risk averseness attitudes among managers that resulted in moving from high risk projects to safe ones.

In this regard, fifteen robust FDI criteria were selected from the existing literature and AHP has been employed to allocate weights by using expert judgments. Nine developed countries as a FDI destination were selected, including the United Kingdom, the Netherlands, Canada, Luxembourg, Ireland, Switzerland, Germany, Australia, and Japan. Accordingly, about 50% of United State FDI outflows allocate to this developed country set. In addition, the multi period MADM technique was used to aggregate the data in each period. Finally, the TOPSIS methodology was used to find out the optimum results based on ideal solutions considering the criteria characteristics.

According to our model in the pre-crisis period, Japan has the highest priority among other alternatives. With regards to statistics, the economic growth in Japan in 2004 was the highest recorded since 1996. Additionally, Japan's forceful relationship with the developing countries in Asia makes this country a good business opportunity for foreign investors. Japan is considered as a center of innovation in the world and connects Asia and the world. Since 2001, Japan has featured one of the world's leaders in bio-industries among other countries such as the United State and Europe

in different area such as protein engineering, glycol engineering, bio-informatics, and so forth. Meanwhile Japan is considered to be one of the largest world markets, and it has a stable and high level business environment. Therefore, the favorable conditions of Japan's market size, market potential, and productivity, has resulted in surpass of Japan in comparison with the eight other alternatives. Canada placed second after Japan; its bilaterally close distance to the U.S. and its high market potential are the pivotal reasons that make Canada the second most attractive country for U.S. investors. Canada is also considered as one of the richest natural resource base countries in the world, which makes it more attractive for foreign investors. Meanwhile, Canada's high quality human resources and flexible labor market play a pivotal role in drawing foreign investors' attention to this country. These factors might also motivate Canada's export platform role. The third place in the pre-crisis time period belongs to Germany, narrowing down to the weighted matrix; market size and market potential have significant effects on ranking Germany's attractiveness. Germany is located in the heart of Europe and has a sophisticated energy and communications infrastructure, which increases accessibility to other growing markets in Europe, therefore positively affecting the level of the market potential of this country. Meanwhile, Germany's large domestic market and cost-effective production are the reasons for Germany's position in the U.S. priority. Luxembourg purchases U.S. services and intellectual property, such as medical research and entertainment. U.S. firms are among the most prominent foreign investors in Luxembourg. Luxembourg's productivity level, high GDP growth, and development level place it fourth in the ranking. Comparing Australia's market potential and other alternatives during this period, Australia would be the ideal country for U.S. investments. U.S. direct investment in Australia is led by the

nonbank holding, mining, finance and /insurance companies, and manufacturing sectors. However, by contributing other highly weighed factors, Australia's attractiveness among the other alternatives dove and placed it as fifth. Considering the favorable bilateral colonial and common language features between the United Kingdom and the U.S., the U.K.'s other highly weighted FDI determinants did not demonstrate desirable conditions during this period in comparison to the other alternatives. Ireland was considered as an ideal alternative among others in our set in terms of GDP growth. However, other factors, such as small market size, pulled it down into seventh. Regarding Switzerland and the Netherlands, these countries placed eighth and ninth, respectively.

During the crisis period, the importance of GDP growth and corruption risk increased considerably in comparison with other FDI criteria. Many developed countries such as Japan and the United Kingdom suffered from downward GDP growth during the financial crisis. In addition, according to some monitoring and risk assessment organizations, such as the PRS Group and Transparency International, during the global financial crisis the corruption risk increased in some richer countries. Consequently, Australia exceeded Japan and placed first, forcing Japan to second. Meanwhile, the U.S. was the largest investor in Australia, with approximately 43%. Australia fared very well during the crisis. In comparison with other countries Australia absorbed crisis impacts less. While other developed countries experienced recessions and unemployment, Australia could have better growth outcomes in this period. There are different arguments regarding the reasons behind this issue; some authors[25] have noted that strong trade links between China and Australia and regulatory structure will be the pieces of the puzzle that complete the answer. The

[25] Jennifer G. Hill

most important factors that made other countries, such as the European countries, more vulnerable to the crisis were high budget deficits and high government debts. Australia faced the financial crisis with a robust foundation; they were debt-free, running surplus budgets, and had strong growth with significant assets. Meanwhile, the actual numbers also demonstrate about a 7% increase in the level of the inward FDI to Australia. However, Japan's economy was hit by the crisis, and the sharp decline in the level of exports due to the demand contraction of Japan's trade counterpart resulted in negative economic growth (it is well worth mentioning that the main reasons behind the Japanese economic collapse during the crisis were Japan's trade and industrial structure). On the other hand, favorable conditions in the German economy during the crisis ranked Germany in the same position as the third most attractive country for U.S. FDI outflow. The extraordinary trade surplus in the German's current account (high amount of total export comparing total import) helped this country to recover the crisis effect, where the majority of European countries experienced debt crisis significantly. However, Germany's GDP growth was hit deeply by the financial crisis, it could transmit crisis on the account of country-specific characters. Such as the stable consumption level and positive trade balance (despite the decline in the export of goods), steadily diversified Germany's regional foreign trade. Among the other alternatives, Ireland lost its place during the crisis and ranked as the lowest most attractive country during the crisis period. Since the mid-1990s, this country along with other European countries had been improving their economic conditions, and one of the most pivotal factors in this regard was the U.S. FDI. However, after 2002, the economic conditions got worse and there was high inflation and lower productivity. GDP growth increasingly became related to the housing market (the property bubble). Therefore, during the crisis, the collapse in

property-related tax revenue rose. The banks increased their lending; most of them relied on short-term borrowing from abroad instead of on their deposits. This proved to be highly damaging when the bubble burst.

The importance of development, GDP growth, market size, and market potential during the post-crisis period significantly affected the priority of the target countries' FDI. The aggregated data in this period reveals that Japan, Germany, and Canada each play a vital role as a host country for the U.S. to increase investment. When it comes to measuring the market size, Japan still accounts for more than 55% of the whole Asian retail market, and is the second-largest market in the world after the U.S. Germany was able to recover quickly after the crisis in comparison to the other countries. The crisis affected Germany's GDP growth, which became negative, but after passing through the crisis the numbers became positive with a greater value compared with the pre-crisis period. The other reason behind this quick recovery was some tax reform that was exerted after the crisis period. On the other hand, the largest consumer market in the European Union is Germany. However, the Germany's marketplace borders are not bounded to its borders. Furthermore, many U.S. firms select Germany as their FDI expansion destination since the volume of trade, number of consumers, and Germany's geographic location at the heart of the 28-member European Union. Canada and the U.S. have one of the world's largest investment relationships. Many reasons such as strong GDP growth, low tax rates, and a common language make The U.S. as the largest foreign investor in Canada.

This model could be used for various set of countries in different span of time as well. In addition, it will be considered as an important tool for decision makings, in order to reach optimum results in the decision making process. Policy maker and

decision makers could obtain the best priority in increasing of FDI outflows to the destination countries regarding different economic situation. Meanwhile, using this model could assist policy maker in dealing with different aspects of FDI simultaneously. This model also could help in improvement of the investment climate and the relations between countries. Investment barriers also could be determined and analyzed during the process of using this method.

Further researches might use different decision making approaches such as SAW, ELECTRE or employ aggregated methods such as Borda and Copeland methods in prioritizing of the alternatives. Also window data envelopment analysis (DEA) could be implemented to analysis of alternative's priority, the decision making unit's efficiency in the different periods. The designed framework could be used in different area of study as well, such as project management, portfolio management, tourism management, and so on.

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APPENDIX

Table 15. Robust FDI determinants

Variables	FDI flow Golobal Heckit BMA			FDI selection Golobal Heckit BMA			Description
	inclprob	postmean	poststedv	inclprob	postmean	poststedv	
Gravity							
DISTANCEij	**1**	**-0.682**	**0,043**	0,12	0,015	0,044	Natural log of bilateral distance
MRKT_SIZEi	**1**	**0,543**	**0,124**	0,01	0	0,004	Natural log of real GDP (Source country)
MRKT_SIZEj	**1**	**-1.036**	**0,124**	0,02	0,001	0,005	Natural log of real GDP (Host country)
Geography and history							
BORDERij	0,02	0,003	0,032	0,01	-0.002	0,024	If pair share a common border
COLONYij	**1**	**1,074**	**0,178**	0,06	0,016	0,073	If pair share colonial relationship
COM_LANGij	**1**	**0,642**	**0,113**	**1**	**-0.505**	**0,106**	If pair share common language
Factor endowment							
DEVELOPMENTi	**1**	**1,016**	**0,042**	0,01	0	0,005	Natural log of real GDP per capita (Source country)
DEVELOPMENTj	**1**	**0,824**	**0,044**	**1**	**0,505**	**0,099**	Natural log of real GDP per capita (Host country)
EDU_DIFFij	0,02	0	0,003	0,02	0,001	0,006	Source minus host education level
Growth and productivity							
GDP_GROWTHi	0,01	0,004	0,145	0	0	0	GDP growth rate (Source country)
GDP_GROWTHj	**1**	**3,073**	**1,071**	0	-0.001	0,03	GDP growth rate (Host country)
MRKT_POTENTIALj	**0,93**	**-0.433**	**0,235**	0	0	0,004	The summation of distance-weighted GDP to all other countries
PRODUCTIVITYj	**1**	**0,04**	**0,006**	0,01	0	0,004	Real GDP per worker (Host country)
PRODUCTIVITYi	0,08	0,001	0,003	0,01	0,003	0,051	Real GDP per worker (Source country)
Fiscal/monetary policy							
TAXi	**1**	**-4.462**	**0,446**	**1**	**0,244**	**0,026**	Corporate effective tax rate (Source country)
TAXj	**1**	**-4.636**	**0,435**	**1**	**-0.201**	**0,025**	Corporate effective tax rate (Host country)
RERij	0,19	0	0,001	0,08	0,001	0,003	Real exchange rate (host/source currency)
RTAs/CUs/investment							
INVEST_TREATYij	0,03	0,004	0,033	0	0	0,001	=1 if both countries are in a treaty
RTAij							
Bi_RTAij	0,06	0,023	0,115	0	0	0,001	
NAFTAij	0,01	0,003	0,05	0	0,001	0,025	
EUij	0,01	0	0,01	0,01	0	0,002	
EFTAij	0,01	-0.001	0,028	**1**	**0,836**	**0,078**	
EEAij	0,01	0	0,014	0,29	-0.001	0,002	
LAIAij	**0,98**	**-1.113**	**0,49**	0,01	0	0,008	
APECij	**1**	**0,761**	**0,133**	**0,72**	**0,159**	**0,115**	
EUROij	0,01	0,001	0,026	0	0	0,001	
DOLLARij	**1**	**4,434**	**1,194**	0,05	0,003	0,012	
Economic risk							
BUREAUj	0,03	0,003	0,023	0,01	0	0,003	Bureaucratic quality (Host country)
BUREAUi	**0,79**	**0,188**	**0,14**	0,01	0	0,001	Bureaucratic quality (Source country)
CORRUPTj	**0,97**	**0,121**	**0,053**	0,02	0,001	0,004	Corruption (Host country)
CORRUPTi	**1**	**0,221**	**0,051**	0	0	0,002	Corruption (Source country)
FIN_RISKj	0,01	0	0,001	**0,83**	**0,058**	**0,032**	Financial risk (Host country)
FIN_RISKi	0,01	0	0,001	**1**	**0,409**	**0,054**	Financial risk (Source country)
Political risk							
DEMOCRATICj	0,02	0,001	0,009	0,01	0	0,002	Democratic accountability (Host Country)
DEMOCRATICi	0,03	0,002	0,016	0,01	0	0,002	Democratic accountability (Source Country)
ETHNIC_TENSIONj	0,01	0	0,004	**0,68**	**0,03**	**0,023**	Ethnic tentions (Host Country)
ETHNIC_TENSIONi	**0,92**	**0,09**	**0,051**	0	0	0,011	Ethnic tentions (Source Country)
EXTERN_CONFLICTj	0,02	0	0,006	0	0	0,002	External conflict (Host Country)
EXTERN_CONFLICTi	0,01	0	0,003	0,09	-0.040	0,14	External conflict (Source Country)
GOV_STABILITYj	0,05	0,002	0,011	0	0	0,001	Government stability (Host Country)
GOV_STABILITYi	0,02	0	0,006	0,01	0	0,009	Government stability (Source Country)
INTERN_CONFLICTj	**0,98**	**0,089**	**0,037**	0,02	0,005	0,046	Internal conflict (Host Country)
INTERN_CONFLICTi	0,16	-0.010	0,029	0,01	0	0,001	Internal conflict (Source Country)
INV_PROFILEj	0,02	-0.001	0,007	0,01	0	0,003	Investment profile (Host Country)
INV_PROFILEi	**0,96**	**0,076**	**0,035**	0,1	0,004	0,014	Investment profile (Source Country)
LAW_ORDERj	0,46	0,052	0,071	0,01	0	0,003	Law and order (Host Country)
LAW_ORDERi	0,01	0	0,008	0,13	-0.009	0,025	Law and order (Source Country)
MILITARYj	0,01	0	0,005	**0,65**	**-0.401**	**0,331**	Military in politics (Host Country)
MILITARYi	0,02	-0.001	0,013	0,28	0,043	0,073	Military in politics (Source Country)
RELIGIOUS_TENSIONj	**1**	**0,284**	**0,054**	**1**	**0,249**	**0,019**	Religion in politics (Host Country)
RELIGIOUS_TENSIONi	0,01	0	0,006	**0,99**	**-0.011**	**0,003**	Religion in politics (Source Country)
SOCIO_ECONj	0,14	0,006	0,02	0	0,001	0,044	Socioeconomic conditions (Host Country)
SOCIO_ECONi	0,06	0,004	0,017	0,01	0	0,001	Socioeconomic conditions (Source Country)
PAST-FDI-DUM				**1**	**2,241**	**0,038**	**Suggested by Razin et al. (2008)**
NEGATIVE FDI LAG	**0,99**	**-0.296**	**0,119**	**0**	**0**	**0,001**	**Relevant to negative FDI flows (while the zero flow is repored)**

Table 16. Saaty Rating Scale

Intensity of importance	Definition	Explanation
1	Equal importance of both elements	Two factors contribute equally to the objective
3	Weak importance of one element over another	Experience and judgement slightly favour one over the other
5	Essential or strong importance of one element over another	Experience and judgement strongly favour one over the other
7	Demonstrated importance of one element over another	Experience and judgement very strongly favour one over the other. Its importance is demonstrated in practice
9	Absolute importance of one element over another	The evidence favouring one over the other is of the highest possible validity
2,4,6,8	Intermediate values between two adjacent judgments	When compromise is needed
Reciprocals of the above non-zero numbers	If activity i has one of the above non-zero numbers assigned to it when compared with activity j, then j has the reciprocal value when compared to i	

Table 17. Saaty Consistency Index Table

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
IRI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56	1.57	1.59

Table 18. Pairwise Comparison Matrix (Pre Crisis, Crisis, Post Crisis)

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION	Weights
DISTANCE	1.00	0.50	7.00	6.00	0.33	0.17	0.17	0.20	1.00	4.00	4.00	3.00	0.50	0.50	0.50	0.0521
MRKT SIZE	2.00	1.00	6.00	6.00	1.00	1.00	1.00	1.00	2.00	7.00	7.00	7.00	3.00	4.00	3.00	0.1242
COLONY	0.14	0.17	1.00	1.00	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.0162
COM LANG	0.17	0.17	1.00	1.00	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.0162
DEVELOPMENT	3.00	1.00	4.00	4.00	1.00	0.50	0.50	0.25	2.00	4.00	4.00	4.00	3.00	4.00	3.00	0.0922
GDP GROWTH	6.00	1.00	4.00	4.00	2.00	1.00	0.50	0.50	2.00	5.00	5.00	5.00	3.00	4.00	3.00	0.1142
MRKT POTENTIAL	6.00	1.00	4.00	4.00	2.00	2.00	1.00	2.00	3.00	4.00	4.00	4.00	3.00	4.00	3.00	0.1400
PRODUCTIVITY	5.00	1.00	4.00	4.00	4.00	2.00	0.50	1.00	4.00	5.00	5.00	5.00	3.00	4.00	3.00	0.1417
TAX	1.00	0.50	4.00	4.00	0.50	0.50	0.33	0.25	1.00	2.00	2.00	2.00	3.00	4.00	3.00	0.0665
LAIA	0.25	0.14	4.00	4.00	0.25	0.20	0.25	0.20	0.50	1.00	1.00	1.00	0.33	0.25	0.33	0.0270
APEC	0.25	0.14	4.00	4.00	0.25	0.20	0.25	0.20	0.50	1.00	1.00	1.00	0.33	0.25	0.33	0.0270
DOLLAR	0.33	0.14	4.00	4.00	0.25	0.20	0.25	0.20	0.50	1.00	1.00	1.00	0.33	0.25	0.33	0.0272
CORRUPT	2.00	0.33	4.00	4.00	0.33	0.33	0.33	0.33	0.33	3.00	3.00	3.00	1.00	0.50	0.33	0.0467
INTERN CONFLICT	2.00	0.25	4.00	4.00	0.25	0.25	0.25	0.25	0.25	4.00	4.00	4.00	2.00	1.00	0.50	0.0517
RELIGIOUS TENSION	2.00	0.33	4.00	4.00	0.33	0.33	0.33	0.33	0.33	3.00	3.00	3.00	3.00	2.00	1.00	0.0572

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION	Weights
DISTANCE	1.00	0.33	8.00	8.00	0.25	0.20	0.17	0.20	1.00	5.00	5.00	5.00	0.50	0.25	0.33	0.0589
MRKT SIZE	3.00	1.00	7.00	7.00	2.00	0.50	1.00	1.00	2.00	8.00	8.00	8.00	2.00	5.00	4.00	0.1374
COLONY	0.13	0.14	1.00	1.00	0.20	0.20	0.20	0.20	0.33	0.33	0.33	0.33	0.17	0.20	0.20	0.0145
COM LANG	0.13	0.14	1.00	1.00	0.20	0.20	0.20	0.20	0.33	0.33	0.33	0.33	0.17	0.20	0.20	0.0145
DEVELOPMENT	4.00	0.50	5.00	5.00	1.00	0.50	0.25	0.25	2.00	4.00	4.00	4.00	2.00	3.00	3.00	0.0848
GDP GROWTH	5.00	2.00	5.00	5.00	2.00	1.00	3.00	3.00	2.00	5.00	5.00	5.00	2.00	3.00	3.00	0.1683
MRKT POTENTIAL	6.00	1.00	5.00	5.00	4.00	0.33	1.00	2.00	3.00	5.00	5.00	5.00	2.00	3.00	3.00	0.1401
PRODUCTIVITY	5.00	1.00	5.00	5.00	4.00	0.33	0.50	1.00	3.00	6.00	6.00	6.00	2.00	3.00	3.00	0.1278
TAX	1.00	0.50	3.00	3.00	0.50	0.50	0.33	0.33	1.00	3.00	3.00	3.00	2.00	3.00	3.00	0.0646
LAIA	0.20	0.13	3.00	3.00	0.25	0.20	0.20	0.17	0.33	1.00	1.00	1.00	0.20	0.20	0.25	0.0223
APEC	0.20	0.13	3.00	3.00	0.25	0.20	0.20	0.17	0.33	1.00	1.00	1.00	0.20	0.20	0.25	0.0223
DOLLAR	0.20	0.13	3.00	3.00	0.25	0.20	0.20	0.17	0.33	1.00	1.00	1.00	0.20	0.20	0.25	0.0223
CORRUPT	2.00	0.50	6.00	6.00	0.50	0.50	0.50	0.50	0.50	5.00	5.00	5.00	1.00	3.00	0.33	0.0734
INTERN CONFLICT	4.00	0.20	5.00	5.00	0.33	0.33	0.33	0.33	0.33	5.00	5.00	5.00	0.33	1.00	2.00	0.0656
RELIGIOUS TENSION	3.00	0.25	5.00	5.00	0.33	0.33	0.33	0.33	0.33	4.00	4.00	4.00	3.00	0.50	1.00	0.0620

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION	Weights
DISTANCE	1.00	0.50	9.00	9.00	0.33	0.20	0.17	0.25	2.00	5.00	5.00	3.00	2.00	2.00	2.00	0.0771
MRKT SIZE	2.00	1.00	7.00	7.00	1.00	1.00	1.00	1.00	2.00	8.00	8.00	8.00	2.00	5.00	4.00	0.1338
COLONY	0.11	0.14	1.00	1.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.0135
COM LANG	0.11	0.14	1.00	1.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.0135
DEVELOPMENT	3.00	1.00	5.00	5.00	1.00	2.00	2.00	2.00	2.00	5.00	5.00	5.00	2.00	2.00	2.00	0.1321
GDP GROWTH	5.00	1.00	5.00	5.00	0.50	1.00	2.00	2.00	2.00	5.00	5.00	5.00	2.00	2.00	2.00	0.1266
MRKT POTENTIAL	6.00	1.00	5.00	5.00	0.50	0.50	1.00	2.00	2.00	5.00	5.00	5.00	2.00	2.00	2.00	0.1143
PRODUCTIVITY	4.00	1.00	5.00	5.00	0.50	0.50	0.50	1.00	3.00	6.00	6.00	6.00	2.00	2.00	2.00	0.1036
TAX	0.50	0.50	5.00	5.00	0.50	0.50	0.50	0.33	1.00	3.00	3.00	3.00	2.00	2.00	2.00	0.0646
LAIA	0.20	0.13	5.00	5.00	0.20	0.20	0.20	0.17	0.33	1.00	1.00	1.00	0.25	0.20	0.25	0.0267
APEC	0.20	0.13	5.00	5.00	0.20	0.20	0.20	0.17	0.33	1.00	1.00	1.00	0.25	0.20	0.25	0.0267
DOLLAR	0.33	0.13	5.00	5.00	0.20	0.20	0.20	0.17	0.33	1.00	1.00	1.00	0.25	0.20	0.25	0.0270
CORRUPT	0.50	0.50	5.00	5.00	0.50	0.50	0.50	0.50	0.50	4.00	4.00	4.00	1.00	1.00	1.00	0.0609
INTERN CONFLICT	0.50	0.20	5.00	5.00	0.50	0.50	0.50	0.50	0.50	5.00	5.00	5.00	1.00	1.00	1.00	0.0628
RELIGIOUS TENSION	0.50	0.25	5.00	5.00	0.50	0.50	0.50	0.50	0.50	4.00	4.00	4.00	1.00	1.00	1.00	0.0587

Table 19. Normalized data (Pre Crisis)

Year: 2004

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.2316	0.3717	0.5774	0.4364	0.2793	0.3043	0.3249	0.2790	0.2283	0.2887	0.2357	0.1986	0.2723	0.2612	0.3828
Netherland	0.2439	0.1080	0.2887	0.2182	0.2985	0.2340	0.5266	0.2876	0.3138	0.2887	0.2357	0.1986	0.3026	0.3938	0.2951
Canada	0.0228	0.2115	0.2887	0.4364	0.2973	0.3265	0.0753	0.2731	0.3125	0.2887	0.4714	0.3971	0.2522	0.3610	0.3828
Luxembourg	0.2521	0.0058	0.2887	0.2182	0.5704	0.4574	0.5307	0.6548	0.1342	0.2887	0.2357	0.1986	0.3026	0.3774	0.3828
Ireland	0.2128	0.0293	0.2887	0.4364	0.3242	0.4566	0.2659	0.3425	0.1664	0.2887	0.2357	0.1986	0.1715	0.3610	0.3190
Switzerland	0.2608	0.0515	0.2887	0.2182	0.3136	0.2534	0.3566	0.2823	0.1894	0.2887	0.2357	0.1986	0.2723	0.3774	0.3190
Germany	0.2509	0.4905	0.2887	0.2182	0.2674	0.1215	0.3455	0.2733	0.3138	0.2887	0.2357	0.1986	0.2723	0.3268	0.3828
Australia	0.6655	0.1237	0.2887	0.4364	0.2765	0.4340	0.0513	0.2746	0.3427	0.2887	0.4714	0.1986	0.2774	0.3446	0.3828
Japan	0.4513	0.7389	0.2887	0.2182	0.2602	0.2470	0.1000	0.2522	0.3453	0.2887	0.4714	0.1986	0.2118	0.3118	0.3509

Year: 2005

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.2316	0.3764	0.5774	0.4364	0.2782	0.2737	0.3252	0.2798	0.2283	0.2887	0.2357	0.1730	0.2676	0.2329	0.3952
Netherland	0.2439	0.1086	0.2887	0.2182	0.2963	0.2019	0.5246	0.2878	0.3138	0.2887	0.2357	0.1730	0.2973	0.3993	0.1647
Canada	0.0228	0.2147	0.2887	0.4364	0.2957	0.2979	0.0766	0.2751	0.3125	0.2887	0.4714	0.3460	0.2998	0.3660	0.3952
Luxembourg	0.2521	0.0060	0.2887	0.2182	0.5765	0.5183	0.5291	0.6592	0.1342	0.2887	0.2357	0.1730	0.2973	0.3827	0.3952
Ireland	0.2128	0.0306	0.2887	0.4364	0.3275	0.5798	0.2671	0.3393	0.1664	0.2887	0.2357	0.1730	0.2180	0.3660	0.3293
Switzerland	0.2608	0.0521	0.2887	0.2182	0.3120	0.2659	0.3572	0.2842	0.1894	0.2887	0.2357	0.1730	0.2676	0.3757	0.3293
Germany	0.2509	0.4866	0.2887	0.2182	0.2627	0.0676	0.3474	0.2677	0.3138	0.2887	0.2357	0.1730	0.2701	0.3355	0.3952
Australia	0.6655	0.1258	0.2887	0.4364	0.2746	0.3145	0.0526	0.2710	0.3427	0.2887	0.4714	0.1730	0.2973	0.3452	0.3952
Japan	0.4513	0.7376	0.2887	0.2182	0.2570	0.1285	0.1041	0.2517	0.3453	0.2887	0.4714	0.1730	0.2081	0.3050	0.3623

Year: 2006

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.2316	0.3771	0.5774	0.4364	0.2759	0.2377	0.3255	0.2776	0.2301	0.2887	0.2357	0.1741	0.2550	0.2349	0.3952
Netherland	0.2439	0.1097	0.2887	0.2182	0.2975	0.3102	0.5239	0.2891	0.2966	0.2887	0.2357	0.1741	0.2970	0.4027	0.1647
Canada	0.0228	0.2156	0.2887	0.4364	0.2934	0.2580	0.0777	0.2747	0.2992	0.2887	0.4714	0.3482	0.2970	0.3692	0.3952
Luxembourg	0.2521	0.0062	0.2887	0.2182	0.5791	0.4511	0.5282	0.6602	0.1356	0.2887	0.2357	0.1741	0.2970	0.3859	0.3952
Ireland	0.2128	0.0315	0.2887	0.4364	0.3278	0.4939	0.2674	0.3389	0.1682	0.2887	0.2357	0.1741	0.2302	0.3692	0.3293
Switzerland	0.2608	0.0528	0.2887	0.2182	0.3129	0.3429	0.3574	0.2847	0.1835	0.2887	0.2357	0.1741	0.2673	0.3692	0.3293
Germany	0.2509	0.4928	0.2887	0.2182	0.2652	0.3382	0.3475	0.2701	0.3152	0.2887	0.2357	0.1741	0.2970	0.3524	0.3952
Australia	0.6655	0.1266	0.2887	0.4364	0.2712	0.2781	0.0537	0.2675	0.3398	0.2887	0.4714	0.1741	0.2748	0.3230	0.3952
Japan	0.4513	0.7325	0.2887	0.2182	0.2542	0.1547	0.1080	0.2512	0.3491	0.2887	0.4714	0.1741	0.2079	0.3034	0.3623

Table 20. Normalized data (Crisis)

Year: 2007

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.2316	0.3805	0.5774	0.4364	0.2746	0.2955	0.3254	0.2763	0.2304	0.2887	0.2357	0.1741	0.2418	0.2334	0.3976
Netherland	0.2439	0.1110	0.2887	0.2182	0.2982	0.3190	0.5231	0.2850	0.2791	0.2887	0.2357	0.1741	0.3022	0.4002	0.1657
Canada	0.0228	0.2145	0.2887	0.4364	0.2867	0.1790	0.0783	0.2650	0.2958	0.2887	0.4714	0.3482	0.3022	0.3668	0.3976
Luxembourg	0.2521	0.0064	0.2887	0.2182	0.5873	0.5360	0.5271	0.6716	0.1336	0.2887	0.2357	0.1741	0.3022	0.3835	0.3976
Ireland	0.2128	0.0323	0.2887	0.4364	0.3267	0.4430	0.2679	0.3350	0.1690	0.2887	0.2357	0.1741	0.2115	0.3793	0.3314
Switzerland	0.2608	0.0534	0.2887	0.2182	0.3112	0.3129	0.3574	0.2806	0.1863	0.2887	0.2357	0.1741	0.2720	0.3668	0.3120
Germany	0.2509	0.4954	0.2887	0.2182	0.2650	0.2660	0.3482	0.2670	0.3272	0.2887	0.2357	0.1741	0.3022	0.3501	0.3976
Australia	0.6655	0.1279	0.2887	0.4364	0.2678	0.3082	0.0546	0.2615	0.3346	0.2887	0.4714	0.1741	0.2720	0.3168	0.3976
Japan	0.4513	0.7288	0.2887	0.2182	0.2510	0.1783	0.1126	0.2465	0.3506	0.2887	0.4714	0.1741	0.1813	0.3112	0.3645

Year: 2008

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.2316	0.3780	0.5774	0.4364	0.2729	-0.1744	0.3261	0.2753	0.2285	0.2887	0.2357	0.1741	0.2418	0.2274	0.4094
Netherland	0.2439	0.1133	0.2887	0.2182	0.3055	0.3251	0.5220	0.2905	0.2552	0.2887	0.2357	0.1741	0.3022	0.3993	0.1706
Canada	0.0228	0.2166	0.2887	0.4364	0.2882	0.1241	0.0795	0.2665	0.2946	0.2887	0.4714	0.3482	0.3022	0.3661	0.4094
Luxembourg	0.2521	0.0064	0.2887	0.2182	0.5786	-0.1324	0.5264	0.6628	0.1336	0.2887	0.2357	0.1741	0.3022	0.3827	0.4094
Ireland	0.2128	0.0318	0.2887	0.4364	0.3180	-0.3799	0.2679	0.3317	0.1697	0.2887	0.2357	0.1741	0.2115	0.3827	0.3412
Switzerland	0.2608	0.0547	0.2887	0.2182	0.3172	0.3900	0.3575	0.2848	0.1857	0.2887	0.2357	0.1741	0.2720	0.3661	0.3071
Germany	0.2509	0.5023	0.2887	0.2182	0.2712	0.1952	0.3484	0.2739	0.3301	0.2887	0.2357	0.1741	0.3022	0.3494	0.3412
Australia	0.6655	0.1331	0.2887	0.4364	0.2760	0.6791	0.0558	0.2694	0.3334	0.2887	0.4714	0.1741	0.2720	0.3161	0.4094
Japan	0.4513	0.7234	0.2887	0.2182	0.2511	-0.1877	0.1171	0.2487	0.3675	0.2887	0.4714	0.1741	0.1813	0.3161	0.3753

Year: 2000

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.2316	0.3817	0.5774	0.4364	0.2730	-0.3282	0.3267	0.2812	0.2362	0.2887	0.2357	0.1741	0.2418	0.2192	0.4046
Netherland	0.2439	0.1148	0.2887	0.2182	0.3070	-0.3029	0.5194	0.2957	0.2606	0.2887	0.2357	0.1741	0.3022	0.4047	0.2276
Canada	0.0228	0.2215	0.2887	0.4364	0.2903	-0.2287	0.0812	0.2748	0.2863	0.2887	0.4714	0.3482	0.3022	0.3710	0.4046
Luxembourg	0.2521	0.0064	0.2887	0.2182	0.5714	-0.3368	0.5247	0.6384	0.1354	0.2887	0.2357	0.1741	0.3022	0.3598	0.4046
Ireland	0.2128	0.0316	0.2887	0.4364	0.3130	-0.4506	0.2689	0.3426	0.1726	0.2887	0.2357	0.1741	0.2115	0.3879	0.3372
Switzerland	0.2608	0.0564	0.2887	0.2182	0.3222	-0.1600	0.3575	0.2934	0.1943	0.2887	0.2357	0.1741	0.2720	0.3569	0.3035
Germany	0.2509	0.5012	0.2887	0.2182	0.2705	-0.4234	0.3499	0.2768	0.2972	0.2887	0.2357	0.1741	0.3022	0.3541	0.3372
Australia	0.6655	0.1423	0.2887	0.4364	0.2889	0.1361	0.0581	0.2871	0.3222	0.2887	0.4714	0.1741	0.2720	0.3345	0.4046
Japan	0.4513	0.7187	0.2887	0.2182	0.2491	-0.4564	0.1249	0.2518	0.3743	0.2887	0.4714	0.1741	0.1813	0.3204	0.3709

Table 21. Normalized data (Post Crisis)

Year: 2011

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.2316	0.3738	0.5774	0.4364	0.2718	0.2040	0.3262	0.2797	0.2465	0.2887	0.2357	0.1741	0.2364	0.2622	0.4004
Netherland	0.2439	0.1122	0.2887	0.2182	0.3059	0.1847	0.5207	0.3004	0.2690	0.2887	0.2357	0.1741	0.2955	0.4017	0.2670
Canada	0.0228	0.2199	0.2887	0.4364	0.2918	0.3645	0.0818	0.2754	0.1891	0.2887	0.4714	0.3482	0.2955	0.3683	0.4004
Luxembourg	0.2521	0.0064	0.2887	0.2182	0.5690	0.3305	0.5248	0.6353	0.1365	0.2887	0.2357	0.1741	0.2955	0.3515	0.4004
Ireland	0.2128	0.0301	0.2887	0.4364	0.3050	-0.0869	0.2684	0.3377	0.1727	0.2887	0.2357	0.1741	0.2068	0.3850	0.3337
Switzerland	0.2608	0.0559	0.2887	0.2182	0.3237	0.3439	0.3564	0.2951	0.1966	0.2887	0.2357	0.1741	0.2659	0.3515	0.3003
Germany	0.2509	0.5022	0.2887	0.2182	0.2781	0.4714	0.3478	0.2829	0.3209	0.2887	0.2357	0.1741	0.2955	0.3515	0.3337
Australia	0.6655	0.1398	0.2887	0.4364	0.2868	0.2367	0.0593	0.2836	0.3243	0.2887	0.4714	0.1741	0.2881	0.3348	0.4004
Japan	0.4513	0.7235	0.2887	0.2182	0.2571	0.5274	0.1293	0.2577	0.3250	0.2887	0.4714	0.1741	0.2512	0.3139	0.3671

Year: 2010

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.2316	0.3745	0.5774	0.4364	0.2716	0.1746	0.3265	0.2801	0.2468	0.2887	0.2357	0.1741	0.2350	0.2919	0.4004
Netherland	0.2439	0.1125	0.2887	0.2182	0.3066	0.1747	0.5208	0.3018	0.2707	0.2887	0.2357	0.1741	0.2937	0.3965	0.2670
Canada	0.0228	0.2237	0.2887	0.4364	0.2952	0.4449	0.0827	0.2791	0.1784	0.2887	0.4714	0.3482	0.2937	0.3635	0.4004
Luxembourg	0.2521	0.0064	0.2887	0.2182	0.5641	0.2915	0.5243	0.6305	0.1353	0.2887	0.2357	0.1741	0.2937	0.3470	0.4004
Ireland	0.2128	0.0303	0.2887	0.4364	0.3016	0.2518	0.2682	0.3341	0.1736	0.2887	0.2357	0.1741	0.2056	0.3800	0.3337
Switzerland	0.2608	0.0566	0.2887	0.2182	0.3254	0.3391	0.3561	0.2977	0.1975	0.2887	0.2357	0.1741	0.2644	0.3470	0.3003
Germany	0.2509	0.5133	0.2887	0.2182	0.2856	0.5331	0.3467	0.2908	0.3117	0.2887	0.2357	0.1741	0.2937	0.3470	0.3337
Australia	0.6655	0.1420	0.2887	0.4364	0.2896	0.4282	0.0603	0.2870	0.3233	0.2887	0.4714	0.1741	0.2937	0.3525	0.4004
Japan	0.4513	0.7137	0.2887	0.2182	0.2541	-0.1004	0.1337	0.2564	0.3308	0.2887	0.4714	0.1741	0.2644	0.2974	0.3671

Year: 2012

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.2316	0.3705	0.5774	0.4364	0.2714	0.0587	0.3265	0.2789	0.2391	0.2887	0.2357	0.1741	0.2524	0.3106	0.4004
Netherland	0.2439	0.1099	0.2887	0.2182	0.3036	-0.2058	0.5205	0.2968	0.2678	0.2887	0.2357	0.1741	0.2912	0.3924	0.2670
Canada	0.0228	0.2245	0.2887	0.4364	0.2981	0.3677	0.0841	0.2818	0.1680	0.2887	0.4714	0.3482	0.2912	0.3597	0.4004
Luxembourg	0.2521	0.0064	0.2887	0.2182	0.5542	0.0674	0.5233	0.6279	0.1366	0.2887	0.2357	0.1741	0.2912	0.3433	0.4004
Ireland	0.2128	0.0302	0.2887	0.4364	0.3049	0.2018	0.2686	0.3348	0.1742	0.2887	0.2357	0.1741	0.2232	0.3760	0.3337
Switzerland	0.2608	0.0563	0.2887	0.2182	0.3264	0.2081	0.3557	0.2984	0.1988	0.2887	0.2357	0.1741	0.2815	0.3433	0.3003
Germany	0.2509	0.5098	0.2887	0.2182	0.2884	0.1445	0.3461	0.2907	0.3135	0.2887	0.2357	0.1741	0.2912	0.3433	0.3337
Australia	0.6655	0.1449	0.2887	0.4364	0.2959	0.7310	0.0619	0.2946	0.3224	0.2887	0.4714	0.1741	0.2718	0.3597	0.4004
Japan	0.4513	0.7178	0.2887	0.2182	0.2607	0.4185	0.1387	0.2595	0.3374	0.2887	0.4714	0.1741	0.2621	0.2943	0.3671

Table 22. Weighted Decision Matrix Table (Pre Crisis)

Year: 2004

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.0121	0.0462	0.0093	0.0071	0.0258	0.0348	0.0455	0.0395	0.0152	0.0078	0.0064	0.0054	0.0127	0.0135	0.0219
Netherland	0.0127	0.0134	0.0047	0.0035	0.0275	0.0267	0.0737	0.0407	0.0209	0.0078	0.0064	0.0054	0.0141	0.0203	0.0169
Canada	0.0012	0.0263	0.0047	0.0071	0.0274	0.0373	0.0105	0.0387	0.0208	0.0078	0.0127	0.0108	0.0118	0.0186	0.0219
Luxembourg	0.0131	0.0007	0.0047	0.0035	0.0526	0.0523	0.0743	0.0928	0.0089	0.0078	0.0064	0.0054	0.0141	0.0195	0.0219
Ireland	0.0111	0.0036	0.0047	0.0071	0.0299	0.0522	0.0372	0.0485	0.0111	0.0078	0.0064	0.0054	0.0080	0.0186	0.0183
Switzerland	0.0136	0.0064	0.0047	0.0035	0.0289	0.0289	0.0499	0.0400	0.0126	0.0078	0.0064	0.0054	0.0127	0.0195	0.0183
Germany	0.0131	0.0609	0.0047	0.0035	0.0247	0.0139	0.0483	0.0387	0.0209	0.0078	0.0064	0.0054	0.0127	0.0169	0.0219
Australia	0.0347	0.0154	0.0047	0.0071	0.0255	0.0496	0.0072	0.0389	0.0228	0.0078	0.0127	0.0054	0.0129	0.0178	0.0219
Japan	0.0235	0.0918	0.0047	0.0035	0.0240	0.0282	0.0140	0.0357	0.0229	0.0078	0.0127	0.0054	0.0099	0.0161	0.0201

Year: 2005

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.0121	0.0467	0.0093	0.0071	0.0257	0.0313	0.0455	0.0396	0.0152	0.0078	0.0064	0.0047	0.0125	0.0120	0.0226
Netherland	0.0127	0.0135	0.0047	0.0035	0.0273	0.0231	0.0734	0.0408	0.0209	0.0078	0.0064	0.0047	0.0139	0.0206	0.0094
Canada	0.0012	0.0267	0.0047	0.0071	0.0273	0.0340	0.0107	0.0390	0.0208	0.0078	0.0127	0.0094	0.0140	0.0189	0.0226
Luxembourg	0.0131	0.0007	0.0047	0.0035	0.0532	0.0592	0.0740	0.0934	0.0089	0.0078	0.0064	0.0047	0.0139	0.0198	0.0226
Ireland	0.0111	0.0038	0.0047	0.0071	0.0302	0.0662	0.0374	0.0481	0.0111	0.0078	0.0064	0.0047	0.0102	0.0189	0.0188
Switzerland	0.0136	0.0065	0.0047	0.0035	0.0288	0.0304	0.0500	0.0403	0.0126	0.0078	0.0064	0.0047	0.0125	0.0194	0.0188
Germany	0.0131	0.0604	0.0047	0.0035	0.0242	0.0077	0.0486	0.0379	0.0209	0.0078	0.0064	0.0047	0.0126	0.0173	0.0226
Australia	0.0347	0.0156	0.0047	0.0071	0.0253	0.0359	0.0074	0.0384	0.0228	0.0078	0.0127	0.0047	0.0139	0.0178	0.0226
Japan	0.0235	0.0916	0.0047	0.0035	0.0237	0.0147	0.0146	0.0357	0.0229	0.0078	0.0127	0.0047	0.0097	0.0158	0.0207

Year: 2006

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.0121	0.0468	0.0093	0.0071	0.0254	0.0272	0.0456	0.0393	0.0153	0.0078	0.0064	0.0047	0.0119	0.0121	0.0226
Netherland	0.0127	0.0136	0.0047	0.0035	0.0274	0.0354	0.0733	0.0410	0.0197	0.0078	0.0064	0.0047	0.0139	0.0208	0.0094
Canada	0.0012	0.0268	0.0047	0.0071	0.0271	0.0295	0.0109	0.0389	0.0199	0.0078	0.0127	0.0095	0.0139	0.0191	0.0226
Luxembourg	0.0131	0.0008	0.0047	0.0035	0.0534	0.0515	0.0739	0.0935	0.0090	0.0078	0.0064	0.0047	0.0139	0.0199	0.0226
Ireland	0.0111	0.0039	0.0047	0.0071	0.0302	0.0564	0.0374	0.0480	0.0112	0.0078	0.0064	0.0047	0.0107	0.0191	0.0188
Switzerland	0.0136	0.0066	0.0047	0.0035	0.0289	0.0392	0.0500	0.0403	0.0122	0.0078	0.0064	0.0047	0.0125	0.0191	0.0188
Germany	0.0131	0.0612	0.0047	0.0035	0.0245	0.0386	0.0486	0.0383	0.0209	0.0078	0.0064	0.0047	0.0139	0.0182	0.0226
Australia	0.0347	0.0157	0.0047	0.0071	0.0250	0.0318	0.0075	0.0379	0.0226	0.0078	0.0127	0.0047	0.0128	0.0167	0.0226
Japan	0.0235	0.0910	0.0047	0.0035	0.0234	0.0177	0.0151	0.0356	0.0232	0.0078	0.0127	0.0047	0.0097	0.0157	0.0207

Table 23. Aggregated Decision Matrix (Pre Crisis)

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.0121	0.0466	0.0093	0.0071	0.0256	0.0311	0.0455	0.0395	0.0152	0.0078	0.0064	0.0049	0.0124	0.0126	0.0224
Netherland	0.0127	0.0135	0.0047	0.0035	0.0274	0.0284	0.0735	0.0408	0.0205	0.0078	0.0064	0.0049	0.0139	0.0206	0.0119
Canada	0.0012	0.0266	0.0047	0.0071	0.0272	0.0336	0.0107	0.0389	0.0205	0.0078	0.0127	0.0099	0.0132	0.0189	0.0224
Luxembourg	0.0131	0.0007	0.0047	0.0035	0.0531	0.0543	0.0741	0.0932	0.0089	0.0078	0.0064	0.0049	0.0139	0.0197	0.0224
Ireland	0.0111	0.0038	0.0047	0.0071	0.0301	0.0583	0.0373	0.0482	0.0111	0.0078	0.0064	0.0049	0.0096	0.0189	0.0187
Switzerland	0.0136	0.0065	0.0047	0.0035	0.0289	0.0328	0.0500	0.0402	0.0125	0.0078	0.0064	0.0049	0.0126	0.0193	0.0187
Germany	0.0131	0.0608	0.0047	0.0035	0.0244	0.0201	0.0485	0.0383	0.0209	0.0078	0.0064	0.0049	0.0131	0.0175	0.0224
Australia	0.0347	0.0156	0.0047	0.0071	0.0253	0.0391	0.0074	0.0384	0.0227	0.0078	0.0127	0.0049	0.0132	0.0174	0.0224
Japan	0.0235	0.0914	0.0047	0.0035	0.0237	0.0202	0.0146	0.0357	0.0230	0.0078	0.0127	0.0049	0.0098	0.0158	0.0205

Table 24. Weighted Decision Matrix Table (Crisis)

Year: 2007

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.0123	0.0483	0.0080	0.0061	0.0226	0.0447	0.0411	0.0325	0.0148	0.0060	0.0049	0.0036	0.0166	0.0138	0.0238
Netherland	0.0130	0.0141	0.0040	0.0030	0.0246	0.0482	0.0661	0.0335	0.0179	0.0060	0.0049	0.0036	0.0208	0.0237	0.0099
Canada	0.0012	0.0272	0.0040	0.0061	0.0236	0.0271	0.0099	0.0311	0.0190	0.0060	0.0098	0.0072	0.0208	0.0217	0.0238
Luxembourg	0.0134	0.0008	0.0040	0.0030	0.0484	0.0811	0.0666	0.0789	0.0086	0.0060	0.0049	0.0036	0.0208	0.0227	0.0238
Ireland	0.0113	0.0041	0.0040	0.0061	0.0269	0.0670	0.0339	0.0394	0.0108	0.0060	0.0049	0.0036	0.0146	0.0225	0.0199
Switzerland	0.0139	0.0068	0.0040	0.0030	0.0257	0.0473	0.0452	0.0330	0.0119	0.0060	0.0049	0.0036	0.0187	0.0217	0.0187
Germany	0.0134	0.0629	0.0040	0.0030	0.0219	0.0402	0.0440	0.0314	0.0210	0.0060	0.0049	0.0036	0.0208	0.0208	0.0238
Australia	0.0355	0.0162	0.0040	0.0061	0.0221	0.0466	0.0069	0.0307	0.0214	0.0060	0.0098	0.0036	0.0187	0.0188	0.0238
Japan	0.0241	0.0925	0.0040	0.0030	0.0207	0.0270	0.0142	0.0290	0.0225	0.0060	0.0098	0.0036	0.0125	0.0184	0.0219

Year: 2008

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.0123	0.0480	0.0080	0.0061	0.0225	-0.0264	0.0412	0.0323	0.0146	0.0060	0.0049	0.0036	0.0166	0.0135	0.0246
Netherland	0.0130	0.0144	0.0040	0.0030	0.0252	0.0492	0.0660	0.0341	0.0164	0.0060	0.0049	0.0036	0.0208	0.0237	0.0102
Canada	0.0012	0.0275	0.0040	0.0061	0.0238	0.0188	0.0100	0.0313	0.0189	0.0060	0.0098	0.0072	0.0208	0.0217	0.0246
Luxembourg	0.0134	0.0008	0.0040	0.0030	0.0477	-0.0200	0.0665	0.0779	0.0086	0.0060	0.0049	0.0036	0.0208	0.0227	0.0246
Ireland	0.0113	0.0040	0.0040	0.0061	0.0262	-0.0575	0.0339	0.0390	0.0109	0.0060	0.0049	0.0036	0.0146	0.0227	0.0205
Switzerland	0.0139	0.0069	0.0040	0.0030	0.0261	0.0590	0.0452	0.0335	0.0119	0.0060	0.0049	0.0036	0.0187	0.0217	0.0184
Germany	0.0134	0.0637	0.0040	0.0030	0.0224	0.0295	0.0440	0.0322	0.0211	0.0060	0.0049	0.0036	0.0208	0.0207	0.0205
Australia	0.0355	0.0169	0.0040	0.0061	0.0228	0.1027	0.0071	0.0316	0.0214	0.0060	0.0098	0.0036	0.0187	0.0187	0.0246
Japan	0.0241	0.0918	0.0040	0.0030	0.0207	-0.0284	0.0148	0.0292	0.0235	0.0060	0.0098	0.0036	0.0125	0.0187	0.0225

Year: 2009

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.0123	0.0484	0.0080	0.0061	0.0225	-0.0496	0.0413	0.0330	0.0151	0.0060	0.0049	0.0036	0.0166	0.0130	0.0243
Netherland	0.0130	0.0146	0.0040	0.0030	0.0253	-0.0458	0.0656	0.0347	0.0167	0.0060	0.0049	0.0036	0.0208	0.0240	0.0136
Canada	0.0012	0.0281	0.0040	0.0061	0.0239	-0.0346	0.0103	0.0323	0.0183	0.0060	0.0098	0.0072	0.0208	0.0220	0.0243
Luxembourg	0.0134	0.0008	0.0040	0.0030	0.0471	-0.0509	0.0663	0.0750	0.0087	0.0060	0.0049	0.0036	0.0208	0.0213	0.0243
Ireland	0.0113	0.0040	0.0040	0.0061	0.0258	-0.0682	0.0340	0.0402	0.0111	0.0060	0.0049	0.0036	0.0146	0.0230	0.0202
Switzerland	0.0139	0.0072	0.0040	0.0030	0.0266	-0.0242	0.0452	0.0345	0.0124	0.0060	0.0049	0.0036	0.0187	0.0212	0.0182
Germany	0.0134	0.0636	0.0040	0.0030	0.0223	-0.0640	0.0442	0.0325	0.0190	0.0060	0.0049	0.0036	0.0208	0.0210	0.0202
Australia	0.0355	0.0181	0.0040	0.0061	0.0238	0.0206	0.0073	0.0337	0.0206	0.0060	0.0098	0.0036	0.0187	0.0198	0.0243
Japan	0.0241	0.0912	0.0040	0.0030	0.0205	-0.0690	0.0158	0.0296	0.0240	0.0060	0.0098	0.0036	0.0125	0.0190	0.0222

Table 25. Aggregated Decision Matrix (Crisis)

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.0123	0.0482	0.0080	0.0061	0.0225	-0.0104	0.0412	0.0326	0.0148	0.0060	0.0049	0.0036	0.0166	0.0134	0.0242
Netherland	0.0130	0.0143	0.0040	0.0030	0.0250	0.0172	0.0659	0.0341	0.0170	0.0060	0.0049	0.0036	0.0208	0.0238	0.0113
Canada	0.0012	0.0276	0.0040	0.0061	0.0238	0.0037	0.0101	0.0316	0.0187	0.0060	0.0098	0.0072	0.0208	0.0218	0.0242
Luxembourg	0.0134	0.0008	0.0040	0.0030	0.0477	0.0034	0.0665	0.0772	0.0086	0.0060	0.0049	0.0036	0.0208	0.0222	0.0242
Ireland	0.0113	0.0040	0.0040	0.0061	0.0263	-0.0195	0.0339	0.0395	0.0109	0.0060	0.0049	0.0036	0.0146	0.0227	0.0202
Switzerland	0.0139	0.0070	0.0040	0.0030	0.0261	0.0274	0.0452	0.0336	0.0121	0.0060	0.0049	0.0036	0.0187	0.0215	0.0184
Germany	0.0134	0.0634	0.0040	0.0030	0.0222	0.0019	0.0441	0.0320	0.0204	0.0060	0.0049	0.0036	0.0208	0.0208	0.0215
Australia	0.0355	0.0171	0.0040	0.0061	0.0229	0.0566	0.0071	0.0320	0.0211	0.0060	0.0098	0.0036	0.0187	0.0191	0.0242
Japan	0.0241	0.0918	0.0040	0.0030	0.0206	-0.0235	0.0149	0.0292	0.0233	0.0060	0.0098	0.0036	0.0125	0.0187	0.0222

Table 26. Weighted Decision Matrix Table (Post Crisis)

Year: 2010

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.0175	0.0496	0.0076	0.0057	0.0341	0.0241	0.0358	0.0286	0.0160	0.0070	0.0057	0.0043	0.0136	0.0154	0.0222
Netherland	0.0185	0.0149	0.0038	0.0029	0.0384	0.0218	0.0571	0.0308	0.0175	0.0070	0.0057	0.0043	0.0170	0.0236	0.0148
Canada	0.0017	0.0292	0.0038	0.0057	0.0366	0.0430	0.0090	0.0282	0.0123	0.0070	0.0114	0.0086	0.0170	0.0217	0.0222
Luxembourg	0.0191	0.0008	0.0038	0.0029	0.0713	0.0390	0.0576	0.0650	0.0089	0.0070	0.0057	0.0043	0.0170	0.0207	0.0222
Ireland	0.0161	0.0040	0.0038	0.0057	0.0382	-0.0102	0.0294	0.0346	0.0112	0.0070	0.0057	0.0043	0.0119	0.0226	0.0185
Switzerland	0.0197	0.0074	0.0038	0.0029	0.0406	0.0406	0.0391	0.0302	0.0128	0.0070	0.0057	0.0043	0.0153	0.0207	0.0167
Germany	0.0190	0.0666	0.0038	0.0029	0.0349	0.0556	0.0382	0.0290	0.0208	0.0070	0.0057	0.0043	0.0170	0.0207	0.0185
Australia	0.0504	0.0185	0.0038	0.0057	0.0360	0.0279	0.0065	0.0290	0.0211	0.0070	0.0114	0.0043	0.0166	0.0197	0.0222
Japan	0.0342	0.0960	0.0038	0.0029	0.0322	0.0622	0.0142	0.0264	0.0211	0.0070	0.0114	0.0043	0.0145	0.0185	0.0204

Year: 2011

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.0175	0.0497	0.0076	0.0057	0.0341	0.0206	0.0358	0.0287	0.0160	0.0070	0.0057	0.0043	0.0135	0.0172	0.0222
Netherland	0.0185	0.0149	0.0038	0.0029	0.0384	0.0206	0.0571	0.0309	0.0176	0.0070	0.0057	0.0043	0.0169	0.0233	0.0148
Canada	0.0017	0.0297	0.0038	0.0057	0.0370	0.0525	0.0091	0.0286	0.0116	0.0070	0.0114	0.0086	0.0169	0.0214	0.0222
Luxembourg	0.0191	0.0009	0.0038	0.0029	0.0707	0.0344	0.0575	0.0646	0.0088	0.0070	0.0057	0.0043	0.0169	0.0204	0.0222
Ireland	0.0161	0.0040	0.0038	0.0057	0.0378	0.0297	0.0294	0.0342	0.0113	0.0070	0.0057	0.0043	0.0119	0.0223	0.0185
Switzerland	0.0197	0.0075	0.0038	0.0029	0.0408	0.0400	0.0391	0.0305	0.0128	0.0070	0.0057	0.0043	0.0152	0.0204	0.0167
Germany	0.0190	0.0681	0.0038	0.0029	0.0358	0.0629	0.0380	0.0298	0.0202	0.0070	0.0057	0.0043	0.0169	0.0204	0.0185
Australia	0.0504	0.0188	0.0038	0.0057	0.0363	0.0505	0.0066	0.0294	0.0210	0.0070	0.0114	0.0043	0.0169	0.0207	0.0222
Japan	0.0342	0.0947	0.0038	0.0029	0.0319	-0.0118	0.0147	0.0263	0.0215	0.0070	0.0114	0.0043	0.0152	0.0175	0.0204

Year: 2012

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.0175	0.0491	0.0076	0.0057	0.0340	0.0069	0.0358	0.0286	0.0155	0.0070	0.0057	0.0043	0.0145	0.0183	0.0222
Netherland	0.0185	0.0146	0.0038	0.0029	0.0381	-0.0243	0.0571	0.0304	0.0174	0.0070	0.0057	0.0043	0.0168	0.0231	0.0148
Canada	0.0017	0.0298	0.0038	0.0057	0.0374	0.0434	0.0092	0.0289	0.0109	0.0070	0.0114	0.0086	0.0168	0.0211	0.0222
Luxembourg	0.0191	0.0008	0.0038	0.0029	0.0695	0.0080	0.0574	0.0643	0.0089	0.0070	0.0057	0.0043	0.0168	0.0202	0.0222
Ireland	0.0161	0.0040	0.0038	0.0057	0.0382	0.0238	0.0295	0.0343	0.0113	0.0070	0.0057	0.0043	0.0129	0.0221	0.0185
Switzerland	0.0197	0.0075	0.0038	0.0029	0.0409	0.0245	0.0390	0.0306	0.0129	0.0070	0.0057	0.0043	0.0162	0.0202	0.0167
Germany	0.0190	0.0676	0.0038	0.0029	0.0362	0.0170	0.0380	0.0298	0.0204	0.0070	0.0057	0.0043	0.0168	0.0202	0.0185
Australia	0.0504	0.0192	0.0038	0.0057	0.0371	0.0862	0.0068	0.0302	0.0209	0.0070	0.0114	0.0043	0.0157	0.0211	0.0222
Japan	0.0342	0.0952	0.0038	0.0029	0.0327	0.0493	0.0152	0.0266	0.0219	0.0070	0.0114	0.0043	0.0151	0.0173	0.0204

Table 27. Aggregated Decision Matrix (Post Crisis)

	DISTANCE	MRKT SIZE	COLONY	COM LANG	DEVELOPMENT	GDP GROWTH	MRKT POTENTIAL	PRODUCTIVITY	TAX	LAIA	APEC	DOLLAR	CORRUPT	INTERN CONFLICT	RELIGIOUS TENSION
United Kingdom	0.0175	0.0495	0.0076	0.0057	0.0341	0.0172	0.0358	0.0286	0.0159	0.0070	0.0057	0.0043	0.0139	0.0169	0.0222
Netherland	0.0185	0.0148	0.0038	0.0029	0.0383	0.0060	0.0571	0.0307	0.0175	0.0070	0.0057	0.0043	0.0169	0.0233	0.0148
Canada	0.0017	0.0295	0.0038	0.0057	0.0370	0.0463	0.0091	0.0285	0.0116	0.0070	0.0114	0.0086	0.0169	0.0214	0.0222
Luxembourg	0.0191	0.0008	0.0038	0.0029	0.0705	0.0271	0.0575	0.0646	0.0088	0.0070	0.0057	0.0043	0.0169	0.0204	0.0222
Ireland	0.0161	0.0040	0.0038	0.0057	0.0381	0.0144	0.0295	0.0344	0.0113	0.0070	0.0057	0.0043	0.0122	0.0224	0.0185
Switzerland	0.0197	0.0075	0.0038	0.0029	0.0408	0.0350	0.0391	0.0304	0.0128	0.0070	0.0057	0.0043	0.0156	0.0204	0.0167
Germany	0.0190	0.0674	0.0038	0.0029	0.0356	0.0452	0.0381	0.0295	0.0205	0.0070	0.0057	0.0043	0.0169	0.0204	0.0185
Australia	0.0504	0.0189	0.0038	0.0057	0.0365	0.0549	0.0066	0.0295	0.0210	0.0070	0.0114	0.0043	0.0164	0.0205	0.0222
Japan	0.0342	0.0953	0.0038	0.0029	0.0323	0.0332	0.0147	0.0264	0.0215	0.0070	0.0114	0.0043	0.0149	0.0177	0.0204