

# MODELING COUNTRY-SPECIFIC RISKS IN FOREIGN INVESTMENT USING AN EXPERT-DRIVEN SYSTEM

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## ABSTRACT

*Assuming that regulatory obstacles such as capital controls, breach of contract, and other market imperfections are still predominant even in today's increasingly integrated financial markets, this study demonstrates application of the analytic hierarchy process (AHP) to effectively assess country-specific risks to cross-border investments. The AHP is an expert-driven system that has been applied to numerous fields but has yet to be applied to the assessment and management of country-risk exposure. This study shows that it is also capable of selecting an optimal host country (OHC) for a foreign investment, herein a national market where country-specific risks are least likely to adversely affect its return.*

*Keywords: analytical hierarchy process, country-specific risks, optimal host country*

## INTRODUCTION

The underlying theoretical basis of diversification formalized in Markowitz Portfolio Theory and the Capital Asset Pricing Model has been well documented in the finance literature. International diversification enables investors to reduce the unsystematic risk of investing in one economy. Business cycles do not happen uniformly across countries; when one country is experiencing rapid growth, another may be in a recession. By investing across countries, investors should logically eliminate from their investment portfolios part of the cyclical fluctuations that would arise from the domestic business cycle. Such investors will be exposed to systematic risk related to the global economy.

But in spite of the theoretical and matter-of-fact groundings of international diversification, many studies have demonstrated that investors nevertheless hold portfolios that consist nearly exclusively of domestic assets. This violation of standard theories of portfolio choice is known as the "international diversification puzzle." So

why do investors seem to have this bias in favor of investments in their home country? Standard models of optimal portfolio choice cannot rationalize this pattern of asset holdings, even in the presence of unhedged foreign exchange risk.

Obviously many factors can constrain the flow of capital movements across national boundaries. Various methodologies referencing different barriers to capital movements have been employed to explain investors' bias in favor of domestic markets, but the results remain clearly inconclusive.

This study is not another explanation for this international diversification puzzle. Rather, it advocates to those who want to try a different approach to this problem a completely different strategic formulation. This study shows that the main benefit of the analytic hierarchy process (AHP) is that it provides decision makers with a method to structure complex problems into the simpler form of a hierarchy of factors and of alternatives that can be more easily identified and evaluated. This tool can be used either as a stand-alone decision making model for the decision makers who do not want to ignore expertise within the ranks of their corporations or/and as an effective supplemental tool to traditional models. Experience gained in the field can certainly not be ignored especially considering that the more traditional models have yet to effectively address this problem.

First, the finance literature is searched to identify the most significant country-specific barriers to international capital flows. These barriers are then submitted for review by a sample of international experts operating in the New York metropolitan area. Using their experience in foreign markets, they identify the most formidable of these macro barriers by comparing them to each other. Then they compare them in terms of their impact on returns in a given sample of countries.

Although a careful attempt has been made in choosing these countries, it is important to note that what is central to this study is not the sample of countries included for the purpose of illustrating this procedure. As each portfolio manager has a different set of countries in mind, what is really important are the methodology underlying the AHP and its ability to incorporate the knowledge of various experts during the identification and selection process that ultimately leads to the optimal host country. This process takes full advantage of practitioners' knowledge of these markets in terms of their specific risks by providing them with a comprehensive framework that integrates the effect of all the interactive parameters.

To demonstrate application of the AHP in measuring country-specific risk exposure, five developing countries (Brazil, China, Mexico, Russia, and Taiwan) are randomly selected and compared to each other by a group of experts in terms of ten specific risks. Undoubtedly, the ideal optimal country (OHC) has a frictionless market where the impact of these risks is minimal.

## LITERATURE REVIEW

Although the benefits of international diversification have been recognized since Markowitz's seminal work in 1952, it is widely agreed that global investors including multinational corporations hold too little of their financial wealth outside the country where they are domiciled. Seemingly, the growth and integration of capital markets over the past two decades or so has not led to similarly dramatic capital outflows. For example, in 1991 French and Porteba find an explanation in the apparent tendency of U.S. pension funds to overweight their domestic equity markets in explicit limits on cross-border investment known as the 'prudent man' rule. This rule is interpreted as limiting their degree of international exposure.

In 1998, Tesar and Werner show that domestic assets continue to overwhelmingly dominate portfolios despite the rapidly growing volume of international financial trade. They examined the foreign investment positions of major industrial countries and found that by the end of 1996 international investment as a fraction of the total domestic market of stocks and bonds equaled about 10 percent for the U.S., 11 percent for Canada, 18 percent for Germany, and 22 percent for the U.K. Although these numbers have increased from a decade ago, excluding the U.K., calculations of a diversified portfolio would have much higher fractions devoted to international assets.

More recently, using the implicit shadow cost of foreign investment, a method first proposed by French and Porteba (1991) as "a more comprehensive measure of home bias," Jeske's results (2001) show that with an additional decade of data unavailable to French and Porteba there continues to be perplexing levels of home bias in all industrialized countries in spite of growing globalization and increasingly integrated financial markets.

Several barriers can nurture this tendency to remain close to home. These barriers have been outlined in a rich body of literature. Much of the literature on country-specific risks still concentrates on the extreme cases of expropriation nationalization. In many other types of macro risks exposure, some obvious, some subtle, can threaten the profitability of foreign investments. The risk of overthrow of a government and establishment of one hostile to the foreign interests is the most obvious. The risk is more subtle where a close circle of a ruler is given control over the economy of the country and can determine who will do business with that government. An example is the Philippines under Marcos.

A more recent example is the shelving of a huge rail project that raised a big stir both in and outside Malaysia. This project worth \$3.82 billion was initially awarded by former Malaysia's Premier Mahathir Mohamad to Malaysia Mining Corp., a company run by a close friend of his at the expense of two railroad companies from China and India with considerably more expertise. According to *The Wall Street Journal* (2003), these two companies also submitted very favorable bids.

Of several other possible reasons, Worzala (1994) finds that transaction costs in

less liquid markets and particular taxation regimes are among the most significant irritants of capital movements across national boundaries. Barriers to capital movements can take many other forms such as foreign exchange and capital controls. Both effects are well documented in the literature (Eun and Janakiramanan 1986, Tamirisa 1999). For instance, Tamirisa argues that the impact of exchange and capital controls on trade and project portfolio diversification depends on the level of development in each country. They are “a notable barrier in developing and transition economies but not in industrial economies.”

Information cost is behind most studies that relate asymmetric information to home bias, such as Ahearne, Grier, and Warnock (2000) or Suh (2000). They stress the differences in the kinds of information available to foreign and domestic investors. Banz and Clough (2002) also acknowledge inadequate disclosure of economic and financial data as a major limitation to those considering investing in foreign markets. They specifically highlight a lack of uniform accounting rules, poor corporate governance, and inadequate clearing and settlement infrastructure. For corporate governance, they see a need in both established and (especially) emerging markets for plans to tighten regulations on the disclosure of information to further increase transparency and help create a more appealing environment for foreign capital.

Although the literature describes several country-specific risks, this study will use only a limited sample. The size of the sample is limited to ten country-specific risks to minimize inconsistencies in respondent judgments. We are also limiting the choice of national markets to five host countries for the same reason. A larger sample would generate an excessive number of pairwise judgments, which would heavily tax the capacity of the respondents to be consistent throughout the survey (Miller 1956). Also, as the collaboration of U.S. global investment experts is critical to the completion of this study, a larger sample would mean a longer survey, which could limit the number of responses, thereby weakening the results of the analysis. Choice of the countries used in this analysis assumes that a low correlation coefficient between the U.S. market and other national markets is a key capital flow driver. It is generally accepted that if markets tend to experience somewhat identical cycles, diversification across national markets will be less effective.

### ***The Analytical Hierarchy Process – A Brief Review***

This research illustrates how the optimal host country can be identified based on the AHP, first developed by Saaty (1980). The AHP is a simple decision analysis model appropriate when the decision maker wants to deal with complex, unstructured, and multi-attribute problems in arriving at the overall best decision. Applications of the AHP have been reported in numerous fields such as conflict resolution, project selection, budget allocation, transportation, health care, and manufacturing, but it has yet to be applied to portfolio selection. The strength of the AHP lies in its ability to

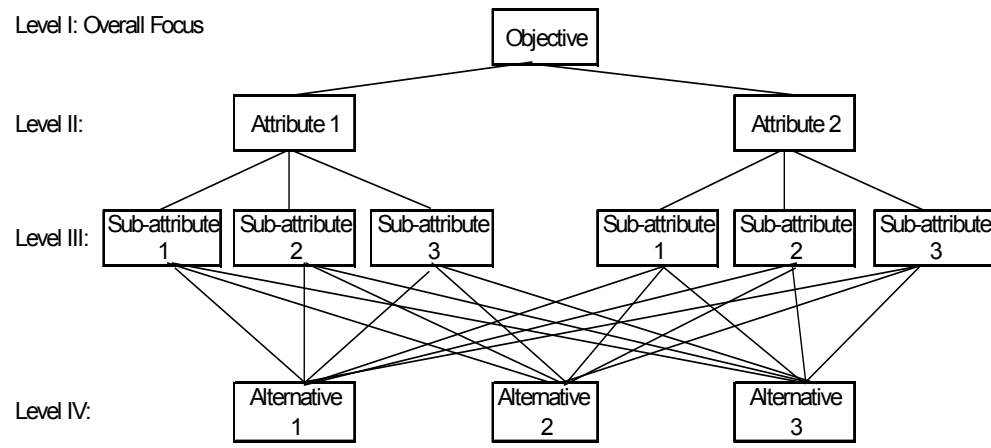
effectively incorporate practitioners' judgment about the importance that would be attached to different influential factors and to structure a complex and multi-attribute system matrix. The AHP assumes the three basic principles of logical analysis: constructing hierarchies, establishing priorities, and maintaining logical consistency.

**Structuring the Hierarchy**

The AHP initially breaks down a complex multi-criteria decision-making problem into a hierarchical structure. The hierarchy pyramid is structured by enumerating the relevant elements that should enter into the decision outcome. The elements are then grouped in levels.

The top level of the hierarchy, referred to as the focus, consists of a single element or goal, which is the overall objective. The elements that affect the decision are called attributes or criteria. They are included in the subsequent levels, each of which may have several elements. Attributes are mutually exclusive and their priorities are independent of the elements positioned below them in the hierarchy. The lowest level of the hierarchy is referred to as alternatives, which are decision options (Figure 1, Saaty 1980).

**Figure 1. A Graphical Representation of the Mechanics of the AHP**



**Setting Priorities**

Once the problem has been decomposed and the hierarchy constructed, the prioritization procedure starts in order to determine the relative importance of the elements on the next higher level. The pairwise judgment starts from the second level (first level of attributes) and finishes in the lowest level alternatives. The AHP uses

pairwise comparisons to establish priority weights for all elements in the hierarchy. Pairwise comparisons are repeated until all combinations of elements have been exhausted. The level comparisons result in a “priority vector,” which indicates the relative importance of the elements with respect to each criterion.

The decision maker must express preference between each pair of elements according to the pairwise comparison scale shown in Table 1 (Saaty 1980, 1982). This method of ranking enables the decision maker to incorporate his/her experience and knowledge in an intuitive and natural manner.

What is obtained after performing the comparisons is the vector priority or the relative importance. This is accomplished using the values set up in Table 1 and arranging them into a matrix. This process is the heart of AHP. In this step logical thinking and feelings are used to make value judgments.

### ***Maintaining Logical Consistency***

The AHP process then determines the consistent nature of the pairwise comparisons. The consistency indices of the pairwise comparison matrix are measured in the following way. The consistency index (CI) is computed using

$$CI = (\lambda_{\max} - s) / (s - 1),$$

where CI is the consistency index of the pairwise comparison matrix,  $s$  is the size of the comparison matrix, and  $\lambda_{\max}$  is a dominant real positive eigen value.

Then, the consistency ratio (CR) is obtained from the consistency index using

$$CR = CI / RCI,$$

where RCI is a random consistency index provided in Table 2. The RCI is derived from a sample (of size 500) of randomly generated pairwise comparison matrices with entries from Saaty’s nine-point scale provided in Table 1. If the CR value is larger than 0.10, which is the acceptable upper limit for CR (Saaty 1982), it implies that there is a 10 percent chance that the elements are not compared well. In this case the decision maker must review the comparisons again. Although the mathematical process of the AHP is tedious, the use of expert system software makes it simple and accurate to apply (Turban 1993).

## **APPLICATION OF THE AHP MODEL**

In this study we narrow down the application of Markowitz’s mean-variance model to multinational capital budgeting for two reasons. The decision to undertake an investment in a particular foreign country is routinely made by U.S.-based corporations. Also, if shareholders are well diversified in their own portfolios, we would expect them to be concerned about a company’s asset contribution to diversifiable risk.

**Table 1. Saaty’s Nine-Point Scale and its Explanation**

| Intensity of importance                   | Definition  | Explanation  |
|---|---|--|
| 1.  | Equal importance of both elements   | Two elements contribute equally to the property  |
| 3   | Weak importance of one element over another   | Experience and judgment slightly favor one element over another                                |
| 5.  | Essential or strong importance of one element over another  | Experience and judgment strongly favor one element over another                                |
| 7   | Demonstrated importance of one element over another   | An element is strongly favored and dominance is demonstrated in practice                       |
| 9   | Absolute importance of one element over another   | The evidence favoring one element over another is of the highest possible order of affirmation |
| 2, 4, 6, 8                                | Intermediate values between two adjacent judgments  | Compromise is needed between two judgments   |
| 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 $i$ |  |

Source: Saaty (1982)

**Table 2. RCI Values of Sets of Different Order S**

| S   | 1 | 2 | 3    | 4    | 5    | 6    | 7    | 8    | 9    |
|-----|---|---|------|------|------|------|------|------|------|
| RCI | 0 | 0 | 0.58 | 0.90 | 1.12 | 1.24 | 1.32 | 1.41 | 1.45 |

Source: Saaty (1982)

Hence, the theoretical framework used to choose among competing foreign projects is the same as the one used by other institutional investors. They must explicitly recognize the risks on the remittance of funds because of legal and political constraints on the movement of funds, differences in the way financial markets and institutions function in other countries, or differences in tax systems. Thus all foreign complexities must be assessed to produce the necessary modifications to either expected cash flow or the rate of discount.

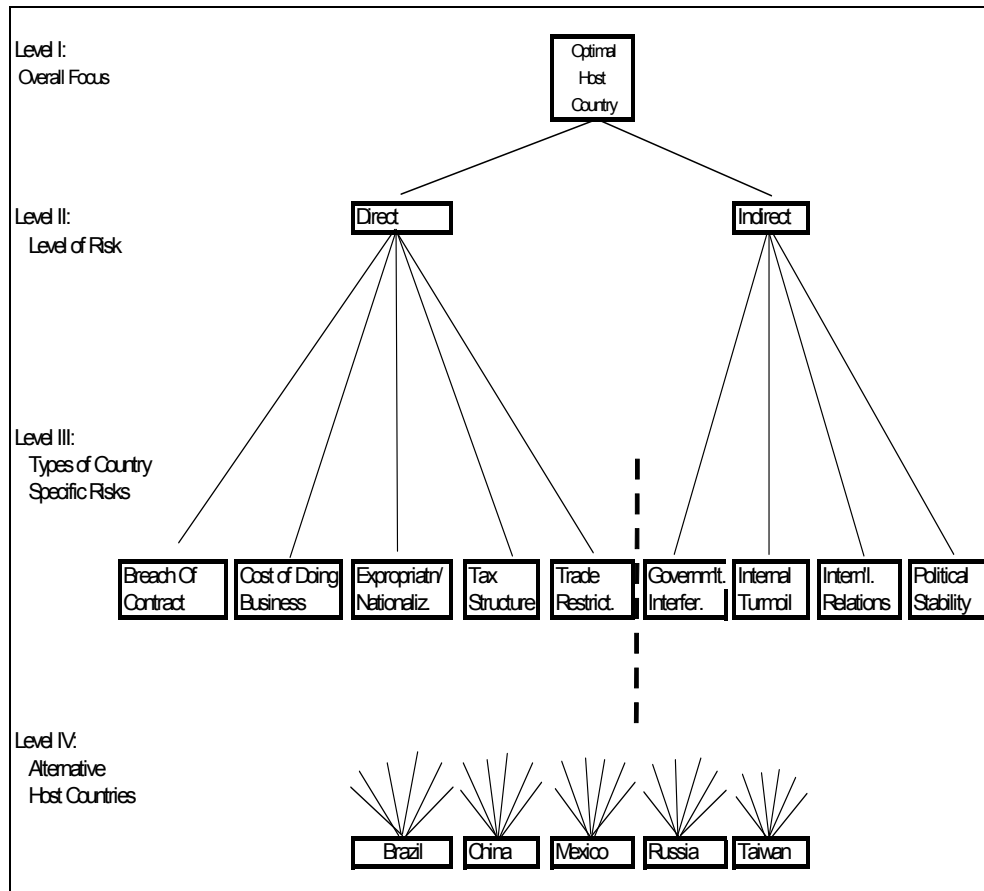
The Analytic Hierarchy Process, according to its author Saaty, provides support for multiple ways of encoding particular structures including the one produced by a multinational capital framework. The decomposition of this paper's hierarchy follows an explicit (direct country-specific risks) to a general (indirect country-specific risks) triangle that helps the respondent narrow his or her choices. Overall, a risk is classified as "direct" or "indirect" depending on the form of intervention of the host country.

The hierarchy in this application contains four levels (Figure 2). The first level of the hierarchy identifies the objective: selection of the optimal host country. The second level defines the type of risk facing a global investor. It classifies this risk on two levels, namely direct versus indirect meddling of the host country in the investment. The third level specifically describes the types of risk facing investors. Both levels two and three constitute the criteria used to achieve the overall objective. Together, they determine the choice of the optimal host country. The fourth and final level of the hierarchy lists the suggested national markets, one of which will potentially host the investment. The direct and indirect risks are defined in Table 3.

Pairwise comparisons are used to establish priority weights for all the elements of the hierarchy. First, the decision maker provides judgments about the relative importance of each direct and indirect risk of levels two and three in terms of its impact on the decision to choose the optimal host country.



Figure 2. Hierarchy of the Optimal Host Country (OHC)



Next, a preference is specified for each country (level four) relative to each risk. Given the information on the relative importance of these risks and host country preferences with regard to the latter, a mathematical process is used to synthesize the information and provide priority measures indicating the ranking of the four markets.

The basis of this procedure is the completion of an “n x n” matrix where the entries (aij) set forth the answers to the series of questions included in the survey. For example, “Which country (ai or aj) is more advantageous for the U.S. global investor with respect to political stability?” Using the comparison scale, the answer to this pairwise comparison is entered into the “n x n matrix.” If the entry “9” is shown at the a12 position, this means that country a1 is “far more favored” than country a2 with respect to “political stability.”

**Table 3. Definition of Country-Specific Risk Factors (Level 3 of the Hierarchy)**

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**Direct Risk Factors**

**Breach of Contract:** The host government may habitually back out of written agreements with foreign companies or insist on renegotiations.

**Extraordinary Cost of Doing Business:** This can result from the perception that a foreign company is fair game for any costs and will nevertheless earn a profit and remain in the host country.

**Expropriation or Nationalization:** This indicates the likelihood that the host government will confiscate foreign assets.

**Inability of Investors to Repatriate Profit:** Foreign investors may have trouble converting earnings into foreign exchange for the repatriation of profit because of the host country's rigid exchange rules.

**Tax Structure and Administration:** Foreign companies may face a complex web of tax legislation, regulations, and rulings that appear to be inconsistently interpreted and implemented.

**Trade Restrictions:** The host government uses trade laws and regulations to impede foreign investors' ability to import and export.

**Indirect Risk Factors**

**Continual Host Government Interference:** Host government agencies may indirectly and retroactively apply rules, conditions, or fees that are initiated after contracts are signed.

**Internal Social Turmoil:** This refers to the level of dissatisfaction of the population, which may lead to strikes, terrorism directed toward foreign interests in the host country, boycotts, or civil war.

**International Relations:** There may be diplomatic stress between host and home country and/or between host country and its neighbors.

**Political Stability:** The host government may be unable to maintain tranquility, apply laws fully and fairly, implement policies, dominate its political opponents, or some combination of the above.

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**DATA COLLECTION**

The AHP does not need a formal data set. It requires that experts use experience gained in the field to state judgments on criteria and alternatives. In this case,

qualitative judgments on the country-specific risk factors as defined in Table 3 are obtained from an 11-page questionnaire mailed during the first quarter to fourth quarter of 2002 to 70 randomly selected firms operating international investment divisions in the New York metropolitan area. Bearing in mind that this study is based on the interview survey method conducted in an international context, the response rate could be considered fairly high with 15 respondents completing the survey. The respondents are high enough in their institutions' management hierarchy to have decision responsibility. Their experience making international investment decisions ranges from five to 14 years with an average of seven years and three months.

The survey outlines a scenario in which a large U.S. multinational corporation (MNC) has selected several developing countries (Brazil, China, Mexico, Russia, and Taiwan) as potential sites to build a plant. The plant will manufacture intermediate goods that will be purchased by the parent company in the U.S. for assembly of a final product marketed throughout its domestic and international network. In order for this MNC to manage its risks, it must first identify and measure them. Accordingly, the survey asks respondents to evaluate the country-specific risk factors defined in Table 3.

Other factors, such as inflation or interest rate differentials, were to be considered equal for the purpose of this study. The AHP model and the logic of its procedures were explained to the respondents and illustrated with simple examples by a group of graduate students who met with them. The same group of students met with respondents after the survey was completed to go over the answers and record their opinions. Note that the respondents did not choose the criteria by which the optimal host country will be determined, nor did they select the five alternative countries for the investment.

The first part of the questionnaire asks the respondents to use their perspectives as expert global investors (without regard for a particular country) to evaluate the relative importance of each country-specific risk. They did this through a series of pairwise comparisons of each risk to every other risk. The AHP matrices of levels two and three of the hierarchy in Figure 2 are calculated from these pairwise judgments.

In the second part of the questionnaire, the respondents are asked to make pairwise comparisons of the five potential host countries with respect to each risk in levels two and three of the hierarchy. Responses to the second part of the survey are used to construct level four of the hierarchy. All responses were combined to estimate the relative priorities using the geometric mean for each pairwise judgment. The resulting (geometric) mean judgments are evaluated using Saaty's eigenvector method to estimate the priority of each risk in terms of its contribution to constraining the investment's return and its subsequent weight in selecting the OHC.

## FINDINGS

As aforementioned, decision support and expert systems software known under the product name Turban was used to process the data yielded by the survey. Responses are arrayed to comprise matrices of expert judgment. There follow five tables that illustrate the three basic principles of logical analysis assumed by the AHP.

Table 4 shows respondents' evaluation of the seven direct country-specific risks of level three of the hierarchy in relation to each other (pairwise) and with respect to the selection of the host country. The vector of priority weights in the bottom row can be interpreted to describe either the importance of one risk factor over another or the relative attention that each should be paid in the selection of a host country. Table 4 also shows the consistency ratios (CI). These ratios indicate how consistent the respondents were in their judgment of the risk factors when comparing them against each other. Recall that the acceptable upper limit for these ratios is 0.10. Table 4 consistency ratios are well below this threshold.

One result of the pairwise comparison of elements within the matrix structure is that a diagonal that runs from the upper left corner of Table 4 to its lower right corner is composed entirely of cells with the value "1." This depicts the comparison between a risk factor and itself. Once the upper triangular portion values above the "1 diagonal" are known, the lower triangular portion values of the table can be determined because the transpose values are reciprocals (Saaty 1982).

The priority weights of Table 4 indicate that "Breach of Contract," Expropriation and Nationalization," and "Repatriation of profit," account for 67.7 per cent of the direct country-specific risk factors. They exert the greatest impact on the selection of the OHC. In the judgment of the sampled experts, a global investor would favor the country that facilitates conversion of earnings into foreign exchange for the repatriation of profits, permits foreign companies to write detailed contracts that will not be renegotiated or breached, and has no recent history of expropriation of foreign private interests.

These risk factors are followed by "Cost of Doing Business," "Tax Structure," and "Trade Restriction." Although far less dominant, the combined weight of these criteria (32.3 percent) suggests that they are also of significant importance to the MNC or the global investor at large. It is logical to assume from the results that an MNC would not favor a country with one or more of the following characteristics: a hostile tax structure and tax administration, which makes evaluation of a proposed project especially difficult; excessive fees and charges on foreign businesses (e.g., labor, utilities, raw materials costs, and land use fees), which often bear no relation to the quality of the goods or services provided; or stringent quotas that restrict foreign businesses' imports and exports.

**Table 4. Second and Third Levels of the Hierarchy: Comparison Matrix of the Direct Risks**

| <b>Direct Risks</b>                           | Breach of Contract | Cost of Business | Expropriation & Nationalization | Repatriation of Profit | Tax Structure | Trade Restrictions |
|---|--------------------|------------------|---------------------------------|------------------------|---------------|--------------------|
| Breach of Contract                            | 1                  | 2                | 1                               | 1                      | 2             | 2                  |
| Cost of Business                              | 1/2                | 1                | 1/2                             | 1/2                    | 1             | 1                  |
| Expropriation & Nationalization               | 1                  | 2                | 1                               | 1                      | 2             | 2                  |
| Repatriation of Profit                        | 1                  | 2                | 1                               | 1                      | 3             | 2                  |
| Tax Structure                                 | 1/2                | 1                | 1/2                             | 1/3                    | 1             | 1                  |
| Trade Restrictions                            | 1/2                | 1                | 1/2                             | 1/2                    | 1             | 1                  |
| Priority Weights                              | 0.220              | 0.110            | 0.220                           | 0.237                  | 0.103         | 0.110              |
| $\lambda_{max} = 6.019$ C.I. 0.004 C.R. 0.003 |                    |                  |                                 |                        |               |                    |

The indirect country-specific risks at level three of the hierarchy are also compared in a pairwise fashion. Table 5 summarizes the results of these comparisons in descending order. "Political Stability" is the dominant factor, with a weight of 0.439. It is approximately four times more important than "Internal Turmoil." Hence, a secure political climate is deemed the most important feature in the selection of a host country. The weight of "Government Interference" (0.265) shows that it is the second most dominant factor. It suggests that an MNC would also prefer a country where government agencies are not known to interfere with the performance of the subsidiary, affecting its profitability. Also, the combined weight of "International Relations" and "Internal Turmoil" (0.297) indicates that these two factors have significantly less bearing on the decision of the MNC.

The pairwise comparison procedure was also used to determine the priority ranking of the five alternative countries vis-à-vis the six direct and four indirect country-specific risks. The question asked at this level is: "Of the two countries being compared in terms of a specific risk criterion, which one should be favored by the MNC?"

Tables 6 and 7 show the calculated matrices and the resulting country priority weights vis-à-vis the selected criterion. These matrices also show reasonable consistency indices. The priority weights summarized in Table 6 show the overwhelming preference given to Taiwan. It is favored in four of the six aspects of the direct country-specific risks: "Trade Restriction," "Tax Structure," "Repatriation of Profits," and "Expropriation and Nationalization." As for "Breach of Contract," Taiwan shares with Brazil and Mexico the preference of the respondents.

**Table 5. Second and Third Levels of the Hierarchy: Comparison Matrix of the Indirect Risks**

| <b>Indirect Risks</b>                         | Government Interference | Internal Turmoil | International Relations | Political Stability |
|---|-------------------------|------------------|-------------------------|---------------------|
| Government Interference                       | 1                       | 2                | 2                       | 1/2                 |
| Internal Turmoil                              | 1/2                     | 1                | 1/2                     | 1/4                 |
| International Relations                       | 1/2                     | 2                | 1                       | 1/2                 |
| Political Stability                           | 2                       | 4                | 2                       | 1                   |
| Priority Weights                              | 0.265                   | 0.110            | 0.187                   | 0.439               |
| $\lambda_{max} = 4.062$ C.I. 0.021 C.R. 0.023 |                         |                  |                         |                     |

**Table 6. Fourth Level of the Hierarchy: Country Pairwise Comparison Matrixes with Respect to Direct Risks**

| Matrix 1                                      |       |       |       |       |       | Matrix 4                                      |       |       |       |       |       |
|---|-------|-------|-------|-------|-------|---|-------|-------|-------|-------|-------|
| <b>Breach of Contract</b>                     | 1     | 2     | 3     | 4     | 5     | <b>Repatr. of Profit</b>                      | 1     | 2     | 3     | 4     | 5     |
| 1. Brazil                                     | 3     | 1     | 4     | 1     | 1     | 1. Brazil                                     | 3     | 1     | 3     | 1/2   | 1/3   |
| 2. China                                      | 1     | 1/3   | 2     | 1/3   | 1/3   | 2. China                                      | 1     | 1/3   | 2     | 1/4   | 1/5   |
| 3. Mexico                                     | 3     | 1     | 4     | 1     | 1     | 3. Mexico                                     | 4     | 2     | 5     | 1     | 1     |
| 4. Russia                                     | 1/2   | 1/4   | 1     | 1/4   | 1/4   | 4. Russia                                     | 1/2   | 1/3   | 1     | 1/5   | 1/6   |
| 5. Taiwan                                     | 3     | 1     | 4     | 1     | 1     | 5. Taiwan                                     | 5     | 3     | 6     | 1     | 1     |
| Priorities:                                   | 0.064 | 0.278 | 0.101 | 0.278 | 0.278 | Priorities:                                   | 0.055 | 0.168 | 0.079 | 0.320 | 0.379 |
| $\lambda_{max} = 5.018$ C.I. 0.004 C.R. 0.004 |       |       |       |       |       | $\lambda_{max} = 5.076$ C.I. 0.019 C.R. 0.017 |       |       |       |       |       |

| Matrix 2                                      |       |       |       |       |       | Matrix 5                                      |       |       |       |       |       |
|---|-------|-------|-------|-------|-------|---|-------|-------|-------|-------|-------|
| <b>Cost of Business</b>                       | 1     | 2     | 3     | 4     | 5     | <b>Tax Structure</b>                          | 1     | 2     | 3     | 4     | 5     |
| 1. Brazil                                     | 1     | 1     | 2     | 1/3   | 1/2   | 1. Brazil                                     | 3     | 1     | 3     | 1     | 1     |
| 2. China                                      | 1     | 1     | 2     | 1/4   | 1/3   | 2. China                                      | 1     | 1/3   | 1     | 1/3   | 1/4   |
| 3. Mexico                                     | 4     | 3     | 6     | 1     | 2     | 3. Mexico                                     | 3     | 1     | 3     | 1     | 1     |
| 4. Russia                                     | 1/2   | 1/2   | 1     | 1/6   | 1/5   | 4. Russia                                     | 1     | 1/3   | 1     | 1/3   | 1/4   |
| 5. Taiwan                                     | 3     | 2     | 5     | 1/2   | 1     | 5. Taiwan                                     | 4     | 1     | 4     | 1     | 1     |
| Priorities:                                   | 0.061 | 0.127 | 0.111 | 0.429 | 0.273 | Priorities:                                   | 0.084 | 0.266 | 0.084 | 0.266 | 0.300 |
| $\lambda_{max} = 5.036$ C.I. 0.009 C.R. 0.008 |       |       |       |       |       | $\lambda_{max} = 5.013$ C.I. 0.003 C.R. 0.003 |       |       |       |       |       |

| Matrix 3                                      |       |       |       |       |       | Matrix 6                                      |       |       |       |       |       |
|---|-------|-------|-------|-------|-------|---|-------|-------|-------|-------|-------|
| <b>Exprop. &amp; Nationaliz</b>               | 1     | 2     | 3     | 4     | 5     | <b>Trade Restrict.</b>                        | 1     | 2     | 3     | 4     | 5     |
| 1. Brazil                                     | 4     | 1     | 4     | 1/2   | 1/2   | 1. Brazil                                     | 3     | 1     | 3     | 1     | 1/2   |
| 2. China                                      | 1     | 1/4   | 2     | 1/4   | 1/5   | 2. China                                      | 1     | 1/3   | 1     | 1/4   | 1/4   |
| 3. Mexico                                     | 4     | 2     | 5     | 1     | 1     | 3. Mexico                                     | 4     | 1     | 5     | 1     | 1     |
| 4. Russia                                     | 1/2   | 1/4   | 1     | 1/5   | 1/5   | 4. Russia                                     | 1     | 1/3   | 1     | 1/5   | 1/5   |
| 5. Taiwan                                     | 5     | 2     | 5     | 1     | 1     | 5. Taiwan                                     | 4     | 2     | 5     | 1     | 1     |
| Priorities:                                   | 0.054 | 0.208 | 0.075 | 0.324 | 0.339 | Priorities:                                   | 0.068 | 0.221 | 0.074 | 0.296 | 0.340 |
| $\lambda_{max} = 5.099$ C.I. 0.025 C.R. 0.022 |       |       |       |       |       | $\lambda_{max} = 5.045$ C.I. 0.011 C.R. 0.010 |       |       |       |       |       |

Mexico seems to be a particularly recommended choice when an MNC worries about the “Cost of Doing Business” overseas. The respondents also see Mexico as a relatively safe place (after Taiwan) in the direct risk aspects of “Trade Restrictions,” “Tax Structure,” “Repatriation of Profits,” and “Expropriation and Nationalization.” Brazil, while not nearly as favored as Taiwan or Mexico, is judged, far more hospitable for an investment than China or Russia. The respondents' judgment of Brazil, however, still shows concern for “Repatriation of Profits” and “Cost of Doing Business.” Finally, the respondents judged all aspects of China's and Russia's direct business practices as potential deterrents to foreign investment.

Table 7 summarizes country weights assigned for indirect risk factors. Taiwan is less overwhelmingly dominant. The respondents believe that an MNC would normally favor Taiwan when “Internal Turmoil” and “Government Interference” are the aspects of risk most important to a company. Mexico's International Relations”, on the other hand, are deemed healthier than Taiwan's. This less than favorable result is likely due to the ongoing sovereign tension with China. As for “Political Stability”, Mexico and Taiwan are equally favored by the respondents.

**Table 7. Fourth Level of the Hierarchy: Country Pairwise Comparison Matrixes with Respect to Indirect Risks**

| Matrix 1                                      |       |       |       |       |       | Matrix 4                                      |       |       |       |       |       |
|---|-------|-------|-------|-------|-------|---|-------|-------|-------|-------|-------|
| <b>Govt. Interference</b>                     | 1     | 2     | 3     | 4     | 5     | <b>Int'l. Relations</b>                       | 1     | 2     | 3     | 4     | 5     |
| 1. Brazil                                     | 1     | 1     | 2     | 1     | 1/3   | 1. Brazil                                     | 2     | 1     | 3     | 1     | 1     |
| 2. China                                      | 1     | 1     | 2     | 1     | 1/2   | 2. China                                      | 1     | 1/2   | 2     | 1/3   | 1/2   |
| 3. Mexico                                     | 1     | 1     | 3     | 1     | 1/2   | 3. Mexico                                     | 3     | 1     | 4     | 1     | 1     |
| 4. Russia                                     | 1/2   | 1/2   | 1     | 1/3   | 1/4   | 4. Russia                                     | 1/2   | 1/3   | 1     | 1/4   | 1/3   |
| 5. Taiwan                                     | 2     | 3     | 4     | 2     | 1     | 5. Taiwan                                     | 2     | 1     | 3     | 1     | 1     |
| Priorities:                                   | 0.082 | 0.164 | 0.176 | 0.193 | 0.385 | Priorities:                                   | 0.075 | 0.253 | 0.125 | 0.293 | 0.253 |
| $\lambda_{max} = 5.040$ C.I. 0.010 C.R. 0.009 |       |       |       |       |       | $\lambda_{max} = 5.031$ C.I. 0.008 C.R. 0.007 |       |       |       |       |       |

| Matrix 2                                      |       |       |       |       |       | Matrix 5                                      |       |       |       |       |       |
|---|-------|-------|-------|-------|-------|---|-------|-------|-------|-------|-------|
| <b>Internal Turmoil</b>                       | 1     | 2     | 3     | 4     | 5     | <b>Political Stability</b>                    | 1     | 2     | 3     | 4     | 5     |
| 1. Brazil                                     | 2     | 1     | 2     | 1/2   | 1/2   | 1. Brazil                                     | 4     | 1     | 2     | 1     | 1     |
| 2. China                                      | 1     | 1/2   | 1     | 1/3   | 1/2   | 2. China                                      | 4     | 1/2   | 1     | 1/4   | 1/4   |
| 3. Mexico                                     | 2     | 2     | 3     | 1     | 1/2   | 3. Mexico                                     | 8     | 1     | 4     | 1     | 1     |
| 4. Russia                                     | 1     | 1/3   | 1/2   | 1/6   | 1/5   | 4. Russia                                     | 1     | 1/4   | 1/4   | 1/8   | 1/8   |
| 5. Taiwan                                     | 3     | 2     | 2     | 2     | 1     | 5. Taiwan                                     | 8     | 1     | 4     | 1     | 1     |
| Priorities:                                   | 0.037 | 0.178 | 0.110 | 0.260 | 0.344 | Priorities:                                   | 0.039 | 0.238 | 0.104 | 0.309 | 0.309 |
| $\lambda_{max} = 5.134$ C.I. 0.034 C.R. 0.030 |       |       |       |       |       | $\lambda_{max} = 5.139$ C.I. 0.035 C.R. 0.031 |       |       |       |       |       |

Respondents also recommend Brazil to a certain degree, especially when an MNC is not overly concerned with the host country's "Internal Turmoil" or "Government Interference" with foreign businesses. Again, the respondents perceive that investment conditions in China, as identified by the indirect country-specific risks included in this study, are not as suitable as Taiwan or Mexico's for foreign business operations. In the case of Russia, the respondents showed particular concern for "Internal Turmoil" caused by the Chechen rebels' anti-government activities and the state of lawlessness of the 1990s and the resulting negative impact on Political Stability.

The overall preference for each of the five countries is obtained by summing the product of the risk criterion priority and the priority of the country with respect to that criterion. The outcome of this synthesis, shown in Table 8 presents a basis for the MNC's decision regarding country selection. The derived priority vectors indicate that of the five countries included in the sample, Taiwan is the optimal host country for a foreign investment (Table 8). Regardless of the type of intervention, Taiwan is on the average three times more preferable than China, and four times more than Russia.

**Table 8. Country Weights with Respect to Direct and Indirect Risk Factors**

| <b>Direct Risks</b>             | Brazil | China | Mexico | Russia | Taiwan |
|---------------------------------|--------|-------|--------|--------|--------|
| Breach of Contract              | 0.278  | 0.101 | 0.278  | 0.064  | 0.278  |
| Cost of Business                | 0.127  | 0.111 | 0.429  | 0.061  | 0.273  |
| Expropriation & Nationalization | 0.208  | 0.075 | 0.324  | 0.054  | 0.339  |
| Repatriation of Profit          | 0.168  | 0.079 | 0.320  | 0.055  | 0.379  |
| Tax Structure                   | 0.266  | 0.084 | 0.266  | 0.084  | 0.300  |
| Trade Restrictions              | 0.221  | 0.074 | 0.296  | 0.068  | 0.340  |
| Overall Priority                | 0.212  | 0.087 | 0.315  | 0.062  | 0.324  |
| <b>Indirect Risks</b>           |        |       |        |        |        |
| Government Interference         | 0.164  | 0.176 | 0.193  | 0.082  | 0.385  |
| Internal Turmoil                | 0.178  | 0.110 | 0.260  | 0.037  | 0.344  |
| International Relations         | 0.253  | 0.125 | 0.293  | 0.075  | 0.253  |
| Political Stability             | 0.238  | 0.104 | 0.309  | 0.039  | 0.309  |
| Priority Weights                | 0.215  | 0.128 | 0.270  | 0.093  | 0.323  |

\* Shaded numbers indicate experts' preference for a specific country with regard to a specific risk. For example, Mexico's country weight of 0.428 indicate that our panel sees it as the least costly country for foreign investors.



The respondents rank Mexico immediately after Taiwan, although they express less enthusiasm toward it in terms of indirect risk factors. Table 7 indicates the basic reason for this hesitance is some concern regarding Mexican government interference with foreign businesses (0.193). Brazil is the third destination of choice, far behind Taiwan and Mexico but well ahead of China and Russia. For these latter two countries, especially Russia, the results show problems in all aspects of country-specific risk. The respondents seem to distrust, according to the (geometric) average, the way the governments of these two countries deal with foreign businesses.

Asked why there are so many businesses currently in China, even in relation to Mexico, most of the respondents answered that their reaction to the questions in the survey are based on their current negative perception of the business environment in China. They cite a lack of a corporate governance code, absence of procedures for foreign investors to sue Chinese managers for disclosing false information, still mediocre standards of transparency, difficulties encountered when the best business path is to take over a local company, a banking system burdened by non-performing loans, etc. They also mention that entire sectors of the Chinese economy remain closed to foreign investors such as telecommunication and financial markets. They believe that corporations and other foreign investors have moved entire operations to China based on the perception that its governmental institutions will be more amenable in the future as they learn to deal with foreign investors; which may or may not happen.

## **CONCLUSION**

This study shows that the Saaty's AHP is an appropriate approach to selection of an OHC for foreign investment when country-specific risks are determining factors. It readily lends itself to multi criteria decision-making because of its ability to deal with subjective judgments.

Survey respondents use the AHP-derived priorities to rank five countries in terms of the most significant country-specific risks identified in the literature. The OHC is then constructed by selecting those countries where investment returns are judged least likely to be affected by the most risks. Each stage of the AHP hierarchy contributes to the construction of the OHC.

One of the main challenges faced by this study is to convince enough decision makers to contribute to this research. Justifiably, some might view this challenge as the study's weakness. After all, how many time-pressed executives are going to take the time to fill out similar surveys whenever one wishes to identify an OHC using a knowledge-based expert system? Those skeptics are reminded that an institutional investor intending to use the AHP for the same purpose is not subject to the same challenge. Managers are not likely to sent opinion surveys to senior international

managers but could use a panel of in-house experts and/or outside consultants. Assuming this is the case, this research has built a case for the AHP as an appropriate approach to selection of an OHC for such an investment. There is gain to be made from using the opinion of those with a first-hand understanding of foreign markets and knowledge-based expert systems such as the AHP are best suited to capture that expertise.

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