

Modeling the Paradox of Military Build up in East Asia^{*)}

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Abstract: The end of the Cold War did not seem to deter governments in East Asia from raising military spending. But the recent financial crisis did. This paper demonstrates how a method using ratio scales in a benefit/cost framework can be effectively employed to unravel intangible factors that played a pivotal role in the paradox of military buildup in East Asia. It is shown that the paradox is even more likely to occur when the risk factors, the most important of which is regional instability (that may lead to limited wars), are neglected. However, when more complete factors are considered, one can convincingly argue that the cost of increased military spending actually far outweighs the benefit. Another sensitivity analysis shows that when the recent financial crisis is taken into account, countries in the region are clearly forced to cut back military spending. But as is shown by model simulation, this also points to a worrisome trend that once the region's economy is back to a positive growth path, the region's military spending may increase once again. Hence, the paradox remains.

1. INTRODUCTION

It is intriguing that so many discussions about the economic 'miracle' of East Asia seem to overlook the role of the region's security stability. Most of them centered on economic policies, e.g., market driven, external-oriented, prudent macroeconomic course. None of these issues would be sufficient to produce the observed economic progress had a series of conflicts, tensions and territorial wars marred the region. Yet, the potential of such sources of instability is far from negligible.

Furthermore, although many believe that power in the next century will be defined more in an economic sense, some correctly argued that military strength will still determine the structure of power in the region (Derek da Cunha, 1996). In this sense, an analysis of military expenditures and general security issues remains crucial.

Three main issues are of concern for East Asian security relations: those emanating from territorial disputes especially in the South China Sea (Evans, 1994; The American

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Assembly, 1996; Azis, 1997b), the problem of conventional and nuclear weapons proliferation (APRC, 1996; Watanabe et.al., 1996; Hawkesley & Holberton, 1996), and the threats of social and ecological dumping (Azis, 1996a). The analysis in this paper is on the military build up related to the first two factors. Unlike a conventional analysis of military expenditure, e.g., Lipow & Antinori (1995) and Li (1997), in this paper the emphasis is put on the paradox of military build up viz. peace dividend. Unfortunately, a major bottleneck for an analysis of this kind is the presence of numerous intangible factors. Such an undertaking can be done only through the use of a specific model and certain types of scales.

By using *Analytic Hierarchy Process* (AHP) that utilizes ratio scales, it can be shown why the peace dividend as promised at the end of the Cold War (Klein, 1997) has not been consistent with the increased trend of military expenditure in the region. Through a benefit-cost framework and sensitivity analysis one can investigate more precisely the implications of alternative scenarios. In particular, two sensitivity analyses are made: (1) changing the weight of a fear over power vacuum, (2) taking into account the recent financial crisis in the region.

The organization of the paper is as follows. After illustrating the trend of military expenditure in the region, the next section is devoted to the quantitative analysis of the paradox. The analysis begins with the identification of critical elements that determine the trend, then the intricate interrelations among those factors are specified through a list of factors that leads to the forming of a hierarchy. A brief description of a methodology, also known as *Analytic Hierarchy Process* (AHP) is given in the section. In a subsequent section, an alternative scenario of increased military expenditures is simulated and placed in a benefit/cost framework including the risk factors. In the last two sections, the two sensitivity analyses are conducted.

2. INCREASED MILITARY BUILD UP: A PARADOX

It was predicted that the end of the Cold War would change the nature and intensity of military competition such that the geo-political factors will be less important than geo-economic consideration. Yet, while numerous changes have taken place in East Asia, no signs of reduced military spending was detected during the 1990s, at least until 1997. From

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Korea to Indonesia, from China to Singapore, virtually there was no cut in defence spending. On the contrary, many countries in the region have undertaken new arms purchases either through their own production or international transfers.

In 1996, the Royal Thai Navy (RTN) first agreed to postpone the acquisition of its coveted submarines as the Thai government struggles to deal with an increasing current account deficit. In 1997, however, just as the IMF reached agreement on a US\$17 billion bailout program, the RTN obtained a seven billion baht new aircraft carrier *Chakrinaruebet*, making Thailand the first country in Southeast Asia and the second in Asia (after India) to operate such a vessel. Yet, there is no compelling military imperative for Thailand to possess such a carrier. At this time, no specific O&M costs have been announced, but operating an aircraft carrier is certainly an expensive undertaking.

In the same year, Malaysia took delivery of two Italian missiles. There was also no sign indicating that the construction of a new major naval base at Sandakan Bay was going to be postponed. It is said that increased naval activity in the South China Sea is the chief reason for the continuation of the project. Toward the end of 1997, Indonesia, another casualty of the regional financial crisis, acquired the first of its four Type 206 submarines from Germany. Since early 1990s, the country has bought some 39 naval vessels from Germany. Meanwhile, the Philippines opted for Peacock-class corvettes from the Royal Navy's Hongkong Squadron.

In the north, Taiwan is in a rather different situation. The continuing China-Taiwan problem, disputes in the South China Sea, and a huge amount of foreign reserves, put Taiwan in a 'better' position to increase its military spending. One source pointed out that Taiwan's emphasis is now on the building of mobile forces, focusing on combined operations by air, land and sea units on a battle space broader than that of a beachhead (based on remarks made by the publishing director of the *Jane's Information Group*).

Next is Korea. Many observers tend to consider the crisis in the Korean peninsula as the most serious flash point in the region. It is estimated that in 1999 South Korea will deploy 100 anti-radar unmanned aerial vehicles (UAVs) which have a 400-km range with a high explosive warhead. The planes will be acquired from Israel. Although reliable data on North Korea's military expenditures are less accessible, it is generally believed that its armed forces are well equipped and well disciplined.

Having deployed Scud-C and Rodong-1 missiles with a range of 550km and 1,000km, respectively, North Korea is currently developing Taepodong-2 and -3 missiles, able to reach both Alaska and Hawaii, enough to send shivers not only to South Korea but also to other countries, including Japan and U.S.

Increasingly, countries in East Asia are also engaging in domestic defence industrialization programmes. China is a well-known case with several examples of expanded domestic production of weaponry. Just to name a few, some 200 Su-27 Flanker aircraft are to be produced by this country in the next year or so. Also, if not deterred by the cut-off in the flow of Western naval technology following the 1989 Tianamen Square incident, China would have used its own shipyards to produce truly modern warships.

China is equally active in undertaking arms purchases, including some from Russia. At a time when many nations are finding it difficult to finance even a single tactical aircraft programme, no less than 6 development programmes for fighter aircraft will be developed by China with Russian help. Furthermore, two of Russia's most advanced warships with a price tag of US\$800 million were purchased, marking a quantum leap for China's navy in terms of modern radar systems, integrated air defence technology and anti-ship missile capabilities. The constant increase in China's military expenditures has always generated concerns among other East Asian countries. Even the official figures (often lower than the actual) released in 1997 by Beijing show that arms spending is close to US\$10 billion, which is a 12.7 percent increase from the preceding year.

What about Japan? The already impressive Japanese Self Defence Force (SDF) is expected to continue acquiring more modern equipment. Judging from the number of submarines, destroyers and frigates, Japan is currently among the top five navies in the world. Despite its economic difficulties since early 1990s, The Japanese defence budget is probably the second highest in the world.

There is actually a bigger issue commensurate with the future trend of Japanese forces. A more active role for the SDF in future regional crises seems increasingly more of a sure thing. The enhancement of the US-Japan alliance relationship under the Clinton-Hashimoto Joint Declaration issued in April 1997 can only affirm such a trend. While neighboring ASEAN countries have generally accepted this arrangement because they see that the US presence is vital to the stability and peace of the region, China is more inclined

to see it differently.¹ To them, the alliance is mistakenly based on the premise that China is a potential threat and, consequently, a policy of containing China is the aim of the alliance.² History is also an important reason for China's rejection of a more active regional role for the SDF. To be realistic, however, China's resentment is unlikely to alter the course of modernizing the SDF in the coming years.

This narrative can easily be continued. The point is, the peace dividend as promised by the end of the Cold War does not seem to be consistent with the current trend of military spending in the East Asia region. Why?

3. ANALYZING THE PARADOX

3.A. Constructing the Hierarchy

A number of reasons can be given as to why the increase in military spending has become significant in East Asia. First and foremost is a pervasive--though probably false--belief that the decline of US military presence in the region will create a power vacuum, and this raises fears of the Asian great powers. There is also a strong argument for the need to modernize the defence forces in anticipation of a new evolving regional security environment as well as all kinds of old and new internal threats.³ Similarly, the contention that there is simply a need to upgrade the old outdated forces with the new ones is viewed by some to be sufficient enough to justify the increase in military spending.

The growing dependence of East Asia on energy sources from outside the region is another compelling reason for military build up. With the exception of a few energy

¹ This does not preclude, however, the fact that Southeast Asian countries are vigorously monitoring a number of discernible trends in the Japanese behavior, e.g., raising its diplomatic profile both within the Asia-Pacific region and beyond (for example, desiring a permanent seat on the UN Security council), and the apparent ascendance of heightened Japanese nationalism (an increased number of visits to Yasukuni shrine by Japanese politicians). In the past, Japanese development assistance was seen as a substitute for the lack of a security role. It is in the interest of many countries in the region to see whether such a stand will gradually shift in the face of changing geo-political environment.

² Such a perception was aggravated further by remarks made by the Japanese Chief Cabinet Secretary, Seiroku Kajiyima, that the security treaty between Washington and Tokyo could be extended to cover Taiwan.

³ This includes a perception that a country may be a friend of its neighbor today, but circumstances could change tomorrow.

producing countries, other states in the region have in their top agenda, either explicitly or implicitly, a long run plan to secure enough energy from Middle Eastern nations. Even those states that are rich in energy resources (e.g., China and Indonesia) began to witness the depletion of their non-renewable resources, while their energy demand rises persistently as their economic growth continues to rally.⁴ It is in this context that the build up of naval forces to secure the sea-lanes has become a strategic plan for many countries in the region.⁵

While these factors are likely to contribute to increased military spending, constraints on their financial resources could have deterred such an increase. But obviously there was no serious financial constraint in East Asia, at least not until the financial crisis hit the region in July 1997. The economic growth of East Asia has been unprecedented, at three times the rate of the established industrial nations. In an interview during his trip to Asia prior to the APEC economic summit in Manila, President Clinton alluded to the region's dramatic shift from "dominoes to dynamos." The buoyant economy during the last two decades has provided most countries in the region with sufficient financial resources to be spent for military expenditures. Other nations can easily use a standard argument regarding the need to upgrade outdated military and naval forces. If that were the case, many countries in Latin America and Africa would have followed the East Asian trend. But unlike these countries, East Asia can afford to finance their build up.

However, the other side of the issue can not be ignored. There are costs, which the region can neither avoid nor be ignorant about. Continued accumulation of destructive capabilities can increase the likelihood of intra-regional tension. This is a destabilizing force. The existing territorial disputes over islands believed to be rich in oil and natural gas in the South China Sea, over the Taiwan-China situation, and over the future of the Korean

⁴ In 1993, for the first time, China has become—irreversibly—a net oil importer. It is predicted that within less-than 10 years, Indonesia will fall into the same category.

⁵ China has also taken alternative routes. Given the volatility of the world's oil markets and the political instability of the oil-rich Middle East, China has made aggressive overseas acquisition through a series of Sino-foreign deals to secure a long-term energy supply. The urgency of the matter can be judged by the number of contracts signed during 1997 alone. In January, the state-owned oil monopoly, i.e., *China National Petroleum* (CPNC) signed an agreement with Iraq to develop a major oilfield with estimated reserves of 1 billion barrels. The following day CNPC signed a 20-year contract with Venezuela to operate and expand an oilfield in that Latin American country. The two contracts are valued at close to US\$1.5 billion. Then a majority stake in Kazakhstan's main oil company was purchased with a price tag of more-than US\$4 billion. Contracts were also made with, among others, Saudi Arabia, the Italian Oil Company *Agip* and a Malaysian-Canadian consortium. The list is expected to get longer in the coming years.

peninsula will be less likely to be resolved when tensions among states in the region are aggravated. In turn, the strong economic performance characterizing the region's economic 'miracle' thus far will be less likely repeated.

There is also concern that an arms race may be sparked if increased military spending continues. When this happens, the overall stability of the region will be called into question. Again, the economic repercussions could be undesirable. But a decline in economic growth can also be prompted simply by the unproductive use of resources (a resource drain) due to excessive military spending. In such circumstances, the region's allocative efficiency is bound to be affected adversely.

To recapitulate, there are four contributing factors affecting the decision to increase military spending in East Asia, and there are three costly scenarios that make such an increase unattractive. The following list summarizes them:

Contributing factors favoring increased military spending ('benefit'):

- Insuring transshipment of energy sources from outside the region by way of strengthening their naval forces (**EnergyTr**)
- Pervasive--but maybe false--belief that there is a power vacuum following the US military reduction in the region (**PowerVac**)
- High economic growth and prosperity creates greater financial resources in the region (**EcBoom**),⁶ and
- The need to modernize defence forces or simply to replace the old outdated weaponry (**OldForce**)

Costly scenarios that may arise from increased military expenditures ('cost'):

- Unproductive use of resources or simply a resource drain jeopardizing the allocative efficiency of the region (**ResDrain**)
- Increased tension aggravating disputes and conflicts in three major flashpoints, i.e., over the Korean peninsula, the Taiwan-China situation and the islands in the South China Sea (**Tension**)

⁶ Alternatively, one also can assert that there is a need for defence spending to be in line with overall economic growth.

- Promote an arms race that will become a destabilizing factor in the region
(**ArmRace**)

Understanding these factors will help us to analyze the situation in a more systematic manner, and to understand why military spending in East Asia continues to increase in spite of the reduced prospects of global war to near zero and the decreased number of Cold War-inspired military interventions. By assigning numerical weights to each factor, the analysis can be made even more precise. Our understanding of the degree of importance of those factors can not be complete unless some ranking and weights are assigned, and certain indicators are used. In the next section, the use of an approach capable of generating consistent weights and ranking to the problem is shown. But before we proceed, there is another critical aspect that one needs to consider.

In addition to costly scenarios generated by increased military spending, the act of accumulating destructive capabilities in the region might also pose long-run--yet more pervasive—repercussions. Such repercussions, equivalent to the risks of increased military spending, can take the form of a permanent economic slowdown in the region. The phenomenon can be due to either a resource drain, increased tensions, or arms races, i.e., the three costly scenarios discussed above.

Another risk that can develop as a result of the continuing presence of those three costly scenarios is a regional instability that may even lead to wars. A military conflict is plausible, albeit not inevitable. Although the allied victory over Iraq was seen first as the end of the conventional war, many still believe that conventional war with varying degrees of intensity will remain a dominant feature of conflict in East Asia. The maneuvers involved will be likely more lethal as modern weaponry and the use of information warfare tends to be intensified.⁷ In short, increased military spending could risk a scenario that no one wishes would happen.

What about the subsequent spread effects of the three costly scenarios described earlier? There is no reason why regional arms races can not go global. Similarly, there is no compelling reason why military conflict in East Asia will not invite the involvement of super powers. In their latest controversial book, Hawkesley & Holberton (1997) posed a set of intriguing questions. Among others, if the Chinese navy and air force were in combat in the

⁷ One of the defence study groups in Australia is of the opinion that the probability of medium-intensity conflicts breaking out in the Asia Pacific over the coming decades is quite high.

South China Sea, how would the United States respond to being excluded? If China risks threatening the United States with nuclear attack, how would the United States respond to such a threat? It is hard to imagine that China does not recognize that any use of military force will only lead to confrontation with the US and Japan. At any rate, in the face of such unpleasant scenarios, the risk that an arms race can go global is not entirely remote if the accumulation of destructive capabilities in East Asia continues.

Hence, there are three possible risks that may need to be faced: economic slowdown (**EcSlow**), regional instability with the possibility of limited wars (**Instab**), and the promotion of global arms race (**GlobAr**). These risks, while less certain than the three costly short-term scenarios likely generated by increased military spending, can not be totally ignored. It is, therefore, necessary to include them in the indicator to be used, because the choice in terms of the amount of resources spent for military expenditures will be based on them.

In Figure 1, the issues and all relevant elements (factors) are arranged in a hierarchical structure. Since the indicator to be used will need to take into account all components discussed so far, i.e., the 'benefit' the 'cost' and the 'risks' involved, a 'benefit'/'cost' ratio type of indicator is derived. As the longer-run risks would normally bloat the weight of the 'cost,' the exact ratio would therefore be:

$$(\mathbf{Benefit}) / (\mathbf{Cost} * \mathbf{Risks}).^8$$

[Figure 1 is about here]

3.B The Use of Ratio Scale Through Pair-wise Comparison

The next step is to measure the priority ranking of all factors in the benefit, the cost and the risk. The ratio of two weights, each reflecting the order of priority, however, can not be taken if an ordinal number is used. Alternatively, a ratio scale with all its desirable properties is applied in the analysis. One of the most attractive features of ratio scale is its

⁸ Note that since we use ratio scales in the analysis, and all decisions are based on relative importance, one should not be confused by a lower absolute values of the cost when it is multiplied by the scale (less-than unity) representing the risk. It is the ratio of benefit to cost, not just the cost itself, and it is its relative comparison with other alternative (strategy) that one has to base the decision on.

ability to be used for relating alternatives of tangible elements to criteria and values that are intangible.⁹ Such a scale can be derived through a series of pairwise comparison, and the eigen-vector of the resulting matrix has been shown to possess all the necessary properties for consistency. A more detailed explanation of this subject, using both mathematical and non-mathematical approach can be seen in Azis & Isard (1996), and examples of application are found in Saaty (1994), Azis (1996a), and Azis (1996b).

The following description clarifies the procedure. Let $A_1, A_2, A_3, \dots, A_n$ be n elements in a level. The quantified judgments on pairs of elements (A_i, A_j) are represented by an n -by- n matrix $\mathbf{A} = (a_{ij}); i, j = 1, 2, 3, \dots, n$. A set of numerical weights $w_1, w_2, w_3, \dots, w_n$ reflects the recorded quantified judgments. Hence, in paired comparisons:

$$\mathbf{A} = \begin{matrix} & \begin{matrix} A_1 & A_2 & & & A_n \end{matrix} \\ \begin{matrix} A_1 \\ \\ \\ A_n \end{matrix} & \begin{bmatrix} w_1/w_1 & w_1/w_2 & \dots & \dots & w_1/w_n \\ \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots \\ w_n/w_1 & w_n/w_2 & \dots & \dots & w_n/w_n \end{bmatrix} \end{matrix}$$

In terms of Figure1, with respect to the benefit of increased military spending, the four contributing factors, **PowerVac**, **EnergyTr**, **EcBoom** and **OldForce**, are represented by A_1, A_2, A_3, A_4 . These factors are compared pairwise. Since every row is a constant multiple of the first row, \mathbf{A} has unit rank.

By multiplying \mathbf{A} with the vector of weights \mathbf{w} , one will have

$$\mathbf{A}\mathbf{w} = \mathbf{nw} \tag{1}$$

To recover the scale from the matrix ratios, the following system ought to be solved:

⁹ Unlike the ordinal scale, the ratio scale is invariant (i.e., their ratio remains the same) under a positive similarity transformation, that is, multiplication by a positive number, of the form $a.x$, $a > 0$. Different ratio scales can be multiplied and divided and still give rise to a ratio scale because

$$(\mathbf{A} - n\mathbf{I})\mathbf{w} = \mathbf{0}$$

Clearly, a nontrivial solution can be obtained if and only if $\det(\mathbf{A} - n\mathbf{I})$ vanishes, i.e., the *characteristic equation* of \mathbf{A} . Hence, n is an *eigenvalue* and \mathbf{w} is an *eigenvector*, of \mathbf{A} . Given \mathbf{A} having unit rank, all its eigenvalues except one are zero, and the only non-zero eigen value is consequently maximum. Thus, the *trace* of \mathbf{A} is equal to n .

If each entry in \mathbf{A} is denoted by a_{ij} , then $a_{ij} = 1/a_{ji}$ (reciprocal property) holds, and so does $a_{jk} = a_{ik} / a_{ij}$ (consistency property). By definition, $a_{ii} = a_{jj} = 1$. Therefore, if we are to rank n number of elements, i.e., \mathbf{A} is of the size n -by- n , the required number of inputs (from the paired comparison) is less than n^2 ; it is equal to only the number of entries of the sub-diagonal part of \mathbf{A} . When there are four elements (targets) in the hierarchy, such as in the example cited above, only six input judgments are required.

But in general case, the precise value of w_i/w_j is hardly given, simply because the input judgment is only an estimate. It suggests that there are some perturbations. While the reciprocal property still holds, it is no longer so for the consistency property. By taking the largest eigenvalue, denoted by λ_{\max} ,

$$\mathbf{A}^p \mathbf{w}^p = \lambda_{\max} \cdot \mathbf{w}^p \quad (2)$$

where \mathbf{A}^p is the actual, or the given, matrix (perturbed from matrix \mathbf{A}). Despite the difference between (1) and (2), if \mathbf{w}^p is obtained by solving (2), the matrix whose entries are w_i/w_j is still a consistent matrix; it is a consistent estimate of \mathbf{A} , although \mathbf{A}^p itself does not need to be consistent. Notice that \mathbf{A}^p will be consistent if and only if $\lambda_{\max} = n$. As long as the precise value of w_j/w_i can not be given, which is common in real case due to bias in the judgment, λ_{\max} is always greater than, or equal to, n . Hence, a measure of consistency can be derived based on such deviation of λ_{\max} from n (the conditions for existence of an *eigenvalue under a small perturbation, and for the stability of eigenvector, are shown in Saaty (1994)).

the invariance of their products and quotients is derived from the invariance of each one of these scales. For further discussions on the ratio scale, see Saaty (1996).

A *consistency index* (CI) is equal to $(\lambda_{\max} - n)/(n - 1)$. Comparing CI with *random index* (RI), which is the same index, calculated from a randomly generated reciprocal matrix, one could generate a *consistency ratio* (CR), which is the ratio of CI to average RI. This ratio can also be considered as the *overall inconsistency index*. The threshold point is usually $CR \leq 0.10$.

When more than two elements are compared, the notion of consistency can be associated with the assumption of *transitivity*: if $A_1 \succ A_2$ and $A_2 \succ A_3$, then $A_1 \succ A_3$. It should be clear, that in solving for \mathbf{w} , the transitivity assumption is not strictly required. In words, the inputted judgments do not have to reflect a full consistency (in fact, in addition to permitting some degrees of inconsistency, another strong point of AHP is its allowance for a rank reversal to occur. See Saaty (1994)). Yet, as shown earlier, the resulting matrix and the corresponding vector remain consistent. It is the consistent vector \mathbf{w} that reflects the priority ranking of the elements in each level of the hierarchy.

3C. Simulation Results

Typical ranking and weights for the East Asian case is shown in the bracketed numbers in each box of elements in the hierarchy (see again Figure 1). For example, in the 'benefit' hierarchy, power vacuum following the decline of US military forces in the region (**PowerVac**) is ranked the highest (.483) in terms of its contribution in the decision whether or not to increase military spending. The financial resource is not a binding constraint due to the region's economic prosperity. Its role in the decision regarding military expenditure (.076) is not as significant as the other criteria.

Having ranked all the elements in the contributing factors, the next question would be: which decision is likely taken under each contributing factor? Hence, as shown by the weights with respect to **PowerVac**, the decision to increase military spending denoted by the "**Yes**" box in Figure 1 is 7 times more preferred than the "**No**" scenario (.875 versus .125). The rest of the comparisons are examined in the same manner. Taken all together through matrix-multiplication, the decision to increase military spending receives a priority approximately 5 times greater than the alternative (.838 versus .162).

With the same procedures we can obtain the ranking of costly scenarios under the 'cost' hierarchy. Clearly, increased tension in the region is perceived to be the most serious

(costly) situation. When each of the costly scenarios is related to the alternatives, the relevant question would be: which alternative will contribute more to the occurrence of each of the costly scenarios? As shown in Figure 1, at the end the **“Yes”** scenario is judged to be almost 5 times more likely than the **“No”** alternative. This suggests that, in general, increased military spending will significantly raise (with 5 times intensity) the likelihood of the costly scenario described earlier.

The priorities under the risk hierarchy are derived in the same manner. As indicated by the numbers in the figure, in the long-run the East Asian nation’s increased military spending has more-than 3 times likelihood, compared to the alternative, to generate the undesirable risks that include limited wars in the region. This should augment the cost weight in the benefit/cost indicator. Table 1A depicts the resulting ratio.

[Table 1 is about here]

Clearly, under a no-risk case the decision to increase military spending is selected (1.0 versus .9). This case can be interpreted as reflecting the current situation, whereby countries in East Asia opted for undertaking new arms purchases, both through international transfers and domestic production. Such a decision is taken even after realizing that there is a potential danger of increased tension, which makes the existing territorial disputes more difficult to resolve, that each state will suffer a major resource drain, and that regional arms races will probably become more intense than ever. The weights of contributing factors in the ‘benefit’ hierarchy are simply too strong to deter the decision to increase military spending. The region’s economic boom helps to further facilitate the decision.

However, when put in a broader perspective by considering the risks of real war, albeit a limited one, the potential of further economic slowdown, and the risk of a global arms race, the indicator in the last column of Table 1B shows that increased military spending is absolutely not the permissible choice (4.4 for **“No”** versus 1.3 for **“Yes”**). This scenario would have been the actual case if the longer-run--yet more serious--negative repercussions of increased military spending in the region were taken explicitly into consideration (adopting a non-myopic view).

4. SENSITIVITY ANALYSIS I: LESS FEAR OVER POWER VACUUM

To what extent the priorities or weights assigned in the above case are considered reliable such that the final analysis is taken as robust? More precisely, how would the results of the analysis, i.e., the priorities for the “**Yes**” and “**No**” scenarios, change if adjustments were made in the assigned priorities for either the contributing factors or the costly scenarios? Such a question suggests the use of sensitivity analysis.

Judging from the derived priorities for the “**Yes**” and “**No**” scenarios under all three hierarchies (‘benefit,’ ‘cost,’ and risks), the resulting conclusion seems fairly robust. The ‘benefit’ and the ‘cost’ comparisons both yield priorities more-than 4 times higher for the “**Yes**” option than for the “**No**.” Even priorities in the risk hierarchy produce more-than 3 times higher for the “**Yes**.” However, a closer look at the distributive mode of the ranking opens up the possibility of different results.

A specific illustration will clarify the issue further. For example, when we were asked: which decision is more likely taken if **PowerVac** (the belief that there is a power vacuum) is the dominating factor, the “**Yes**” reply seems much more dominant than the “**No**,” yielding priorities of .875 versus .125. The perception that a power vacuum necessitates increased military spending is extremely strong. But what about the case where the preference for increased military spending is not that strong? If China is not seen as real potential threat, the priority given to the “**Yes**” reply is likely lower.

After experimenting with a number of possibilities, there are indeed cases showing an important change in the conclusion. For example, given the belief that there is a power vacuum, “**Yes**” may be considered “only” 3 times more likely than “**No**.” The resulting priorities are therefore: .75 for “**Yes**” and .25 for “**No**.” Obviously, an intensity of 3 times greater is strong enough to reflect the perception that increased military spending is indeed the logical response to a power vacuum. However, with this new ranking the resulting benefit/cost ratio is now .945 versus 1.267 in favor of “**No**.” The decision to raise military spending would have been deterred under such circumstances. Note that the risk factors are yet to be included.

Such an illustration indicates that the perception toward the necessity of having increased military spending when the belief about a power vacuum is present is rather important. Actually, such an issue can be put in two stages.

First, the question of whether the US military reduction in the region was so significant that a real power vacuum is contrived, and whether the fear of a new great power (e.g., China) is legitimate. In early 1997, the Quadrennial Defence Review (QDR) conducted by the Pentagon had initially created a fear among East Asian states of a major US force reduction in the region. However, it became clear that the review was meant to search for ways to strengthen American forward presence in the Pacific. In the words of Admiral Joseph Prueher, commander of US forces in the Pacific: “The fact that we are reviewing our force structure and posture does not mean that troops will be trimmed in Asia.” Both, President Clinton and the 105th Congress seem to prefer maintaining 100,000 troops in Asia.

On the fear of a new great power, China has repeatedly assured its neighbors as well as the Western world that its growing economic and military power in no way represents a threat to regional (world) peace. The officials also often remark that China has never, in all its long and glorious history, been an expansionist power. The tone of the remarks, however, will be very different when questions are raised about Taiwan, the Spratly Islands and other disputed territories in the South China Sea. Nonetheless, the rationale for a fear of China is not fully confirmed yet. The anxiety over China’s hegemonic potential may be widespread, but most governments in the region are reluctant to voice their apprehension for fear of compounding matters. It is also important to note that in addition to its positive reaction to ASEAN Regional Forum (ARF) initiatives, and its slowly changing attitudes towards the Council on Security and Cooperation in Asia-Pacific (CSCAP), China is also persistently pursuing a closer bilateral security dialogue and military ties with individual countries in Southeast Asia.¹⁰

The second stage alludes to the question of whether such a fear, if any, and at whatever degree, is strong enough to justify the need for military build up. Even if the answer tends to be affirmative, it is unclear how strong is the intensity of such a response. As shown earlier, while an intensity of 3 times greater is still seen unfolding priorities that

¹⁰ In early 1997 Chinese Defence Minister Chi Haotian called for closer cooperation between the armed forces of China and the Philippines. The two countries are in dispute regarding their claims to the Spratly Islands.

“**Yes**” is significantly more preferred than “**No**,” the resulting benefit/cost ratio turns out to be in favor of no military build up.

Hence, changing the perceptions of many countries in the region to the idea of a power vacuum in the face of reduced US military presence and the potential threat of an alternative great power, be it China or Japan, may slow the rapid expansion of the region’s military power.¹¹ A similar analysis can be also applied to other contributing factors in the ‘benefit’ hierarchy. Clearly, a sensitivity analysis is useful for this purpose. It is also needed to ensure that the resulting priorities are not construed as a result of whimsical judgments.

In the final analysis, the cost part of the hierarchy plays an important role in balancing the final priorities. There is a legitimate concern that continued build up of weapons capability among nations in East Asia could be counter-productive to their economic prosperity.

5. SENSITIVITY ANALYSYS II: IMPACTS OF FINANCIAL CRISIS

The financial crisis that struck the region has shelved many of the planned arms purchases. The following examples resonate with the pause in the trend during the recent past. Since three countries are hardest hit by the crisis, Korea, Indonesia and Thailand, the following illustrations are taken from these countries.

In South Korea, three major defence projects have been scrapped from the defence department’s 2.7 billion dollar budget for 1998. These projects include the KTX-2 air force trainer-jet program, an early warning aircraft system (AWACS), and the building of 1,500-tonne submarines.

In Indonesia, as part of a major military budget cut back, about 20 billion dollars worth, the purchase of Russian Sukhoi jet fighters and other military hardware estimated at some 700 million dollars has been postponed. The planned purchase was made after the cancellation of the purchase of nine U.S F-16 fighters following U.S criticism of Indonesia’s elections and human rights record during the Suharto’s regime. The government is also

¹¹ Such a change in perception may be substantiated by a counter argument that despite its demonstrable economic progress and its degree of aggrandizement in the South China Sea, China remains a weak power militarily. Even without American deterrence, China is still far away from a position from which it could mount a successful invasion at acceptable cost.

cutting the number of military attache posts and attache aides abroad by as much as 70 percent.

Since the collapse of the Thai's baht in July 1997, policy makers in Bangkok had made a number of postponements and cancellations on imports of military equipment. The cash-strapped budget has forced them to sell eight F/A-18 fighter jets, the planned purchase of which was approved at the price of over 390 million dollars in the midst of financial crisis in 1997. But problems in selling them to a third party abound. The difficulty rests on at least three factors: (1) A permission from the U.S must be secured; (2) The jet fighters were built to the Thai air force specifications; and (3) Finding alternative buyers, especially among the neighboring countries, is not easy at this moment since the entire region's economy is facing a similar predicament.

Cancellations and postponements of arms purchases, decisions to cut military budgets, including reductions in the number of personnel, are also common trends in other countries throughout the region. How do we appraise them in the model framework?

Having evaluated the entire hierarchy, the most relevant factor to be perturbed is the perception that a serious resource drain could result from increased military spending (**ResDrain**). Indeed, in a belt-tightening program during the financial crisis, expenditures for military purposes are placed among the lowest priority sectors.

Two stages are followed: the first is simply to raise the weight of **ResDrain**, and the second involves augmenting the intensity of the link between **ResDrain** and the alternatives. Raising the weight from .117 to .614 and simultaneously augmenting the intensity fourteen times (from 1.7 to 24) results in .921 for **"Yes"** and .079 for **"No"**. Using these scales, and holding the priorities for the benefit unchanged, the **Benefit/Cost** ratio gives .910 for **"Yes"** and 2.051 for **"No"** (Figure 2 and Table 2). Thus, even without taking into account the risk factors (a non-myopic but more realistic position), the financial crisis forces the preference to change from **"Yes"** to **"No"** with respect to raising military expenditure. This scenario explains why during the crisis several cancellations and postponements of arms purchases have occurred throughout the region.

[Table 2 is about here]

[Figure 2 is about here]

However, while the trend reflects the true situation in the recent past, it remains unclear whether it is cyclical or structural. A particular question of interest is, what happens when the region's economy resumes its positive growth (recovery)? If the outcome does change, what is the criterion that contributes most to such a change? In order to generate this type of "if-then" scenario, it is necessary to understand the current events and the recent development in the region's security environment, in which worrying signs are still abound.

Despite efforts to resolve conflicts in the Korean Peninsula through four-party peace talks involving the U.S, China, South and North Korea, the prospect of an immediate resolution still seems dim. A show of force in both countries continued. In September 1998, a senior North Korean official was reported to send a warning that the heavily-armed reclusive state will use force to reunify the divided Peninsula next year.¹² The country has boosted its military personnel to 1.16 million, up 13,000 troops from a year ago, and raised its reserve units by additional 900,000 troops to 7.45 million. The number of navy ships, submarines, field-artillery guns and commando brigades have all increased, despite the country's economic hardship. The series of incidences that took place in the recent past simply proves that peaceful reunification is still a long way to go.

Seemingly encouraging signs on the relations between China and Taiwan began to show in the recent past. The landmark visit of Mr. Koo Chen-fu, Taiwan's top cross-strait envoy, to China September 1998, marked an important beginning of a peaceful resolution. However, expecting reunification soon is unrealistic.¹³ Actually, a much deeper division still underlies the relations between the two. China's concept of reunification is close to the "one country, two systems" formula implemented in Hongkong, whereas Taiwan insists that democracy on the mainland, hence touching the issue of *system*, should be a precondition for reunification. At any rate, although the possibility of military conflict may be small, there is no reason to expect that future tensions between the two are not likely to take place.

Moving south, the ASEAN's economic woes have recently exposed the Association's fault lines. Diplomatic differences have emerged, and it has become the most

¹² A few days later, the South Korea's Defence Ministry's White Paper disclosed that if war broke out, "the U.S would deploy combined armed forces to South Korea, mostly from bases in Japan and Hawaii under the United States Pacific Command."

visible sign of the problem facing the Association. Tensions and conflicts, or, as some ASEAN bureaucrats call it “discord,” surfaced among member countries. The crisis really hit at the core of the Association, propagating the question “Is ASEAN still relevant?” Furthermore, a transition from financial crisis to social crisis has taken place throughout the region (it still is and at a fast pace), creating a fertile ground for internal destabilizing forces. The regional security environment can be affected unfavorably by such unstable socio-political conditions.

Concerns over the possibility that tensions in ASEAN will degenerate was also expressed by the U.S Assistant Secretary of State for East Asian and Pacific Affairs, Stanley Roth, during the World Economic Forum in Singapore. On the conflict between Malaysia and Singapore, for example, he expressed the U.S displeasure with the development whereby historic tensions between Malaysia and Singapore have spilled over the security area which has been traditionally an area of excellent cooperation.¹⁴

Since the arrest of Malaysia’s former PM, Anwar Ibrahim, on September 20, 1998, strain relations emerged between a number of countries in ASEAN, notably between Malaysia and Indonesia and between Malaysia and the Philippines. Malaysia even called off a defence cooperation meeting with the Philippines, although the decision was eventually changed.

In short, there is no deficit of concerns over possible rising tensions and conflicts throughout East Asian region. But economic (financial) conditions remain the most forceful factor in the selection of a preference whether to raise military spending or not. Whatever regional security environment will emerge, or new geo-political setting will appear, it would be hard for countries in the region to continue increasing their military expenditures if financial constraints due to the crisis are severely binding.¹⁵ For the purpose of simulating

¹³ In fact, results of Mr. Koo’s visit have precisely shown that efforts to resume political negotiations remained deadlocked. China urged an early start of reunification talks, but Taiwan preferred to discuss practical moves such as investment protection, fishing disputes, etc.

¹⁴ Diplomatic ties between the Singapore and Malaysia were at a low following several disputes and publication of SM Lee Kuan Yew’s memoirs which contains passages critical of Malaysian leaders. Not long after the incidence, the Malaysian government announced that Singapore would need advance permission for its vessels or aircraft to enter Malaysian territory or airspace.

¹⁵ It would be interesting to simulate the model by treating the criterion *Tension* on the cost side as the primary target of experiment. In such a simulation, a different treatment with respect to the link between *Tension* and the alternatives (*Yes* and *No*) is warranted. While in the previous analysis the likelihood of increased tension is greater when there is a rise in military spending,

the impact of economic recovery, therefore, the weight of **EcBoom** and the intensity of its link with the alternatives are augmented. The weight is raised from .076 to .538, and the intensity is increased by as much as twenty fold (see Figure 3).

The resulting outcome shows that the “**Yes**” option on the benefit side would have been far more dominant than the “**No**” option (.931 versus .069). With this new scale, the **Benefit/Cost** ratio reverses the preference, from not raising to raising military spending, i.e., the ratio for “**Yes**” is 1.011 and for “**No**” is 0.873 (Table 3). Hence, as the region’s economy recovers, even without taking into account the recent worrying tensions and conflicts the scenario of increased military spending is still likely to re-appear. The recent trend of halting military purchases, therefore, reflects a cyclical movement rather than a structural one.

[Table 3 is about here]

[Figure 3 is about here]

6. CONCLUSIONS

The regional stability of East Asia, political and security wise, has contributed significantly to their robust economic growth. This fact has been largely overlooked by most analyses on East Asian 'miracle'.

By employing a method that combines theory of hierarchy and theory of scaling, a benefit/cost framework utilizing ratio scales based on experts’ perceptions reveals that there is a strong justification for governments in East Asia to increase their military spending. The most important reason seems to be the belief that there is a power vacuum following the US military reduction in the region. However, once the risk factor is accounted for, the most dominant of which is the potential instability—even limited wars—in the region, the analysis suggests that the cost of military build up outweighs the benefit by a factor of more-than 3.

with the recent developments a possible tension in the future can be responded to by an even rising purchase of imported arms (a classical deterrence argument). Hence, with respect to possible tensions, the **Yes** option would be likely preferred. In this study, however, we prefer to avoid complications by concentrating on only the most relevant triggering factor, i.e., reversal in the economic conditions (**EcBoom**).

Such conclusion is further strengthened by the sensitivity analysis, in which when the intensity of perception about power vacuum is slightly reduced, even without taking into account the risk factors, the decision to raise military spending would have been deterred. When the latter is accounted for, the cost of military build up is almost six times more than the benefit.

The financial crisis that kicked off in July 1997 provides new dynamics in the regional security environment. Many countries are forced to cut back their military spending due to severe financial constraints. Such dynamics are shown in the model simulation by altering the weights and the influence capacity of both, the risk of economic slowdown and the cost of resource drain in the hierarchy.

But the region remains clouded by conflicts and rising tensions between countries, and unresolved territorial issues. Furthermore, the regional security environment is also likely affected by the increasingly unstable socio-political conditions in some countries, notably in Indonesia, Korea, Thailand and Malaysia.

A possible implication is, as soon as the region's economies are back in a positive growth path, there is no reason to expect that their military spending will not increase once again. Hence, the security environment remains worrisome. It could also hinder the prospect of the region's sustainable growth path.

REFERENCES

Asia/Pacific Research Center-APRC. (1996), *A United States Policy for the Changing Realities of East Asia: Toward A New Consensus*, Stanford University

Arrow, Kenneth. (1995), "Some General Observations on the Economics of Peace and War," *Peace Economics, Peace Science, and Public Policy*, Vol 2, No.2.

Azis, Iwan J. (1996a), "Resolving Possible Tensions in ASEAN's Future Trade," *ASEAN Economic Bulletin*, Vol. 12, No. 3

_____ (1996b) "New Conflicts Between Developed and Developing Countries," *Peace Economics, Peace Science, and Public Policy*, Vol 3, No 1.

_____ (1997b), *Security Challenge in the Asia Pacific Region*, paper presented at ECAAR symposium, United Nations University, September 18, Tokyo-Japan.

_____ (1998), *Uncertainty in East Asia's Regional Security Environment: An Update*, manuscript presented at the ECAAR symposium, UN University, Tokyo, October 27, 1998.

_____ & Walter Isard. (1996) "The Use of the Analytic Hierarchy Process in Conflict Analysis and An Extension," *Peace Economics, Peace Science, and Public Policy*, Vol 3, No. 3.

_____ (1997a), *Resolving Conflict in the Korean Peninsula*, paper presented at the Peace Science Meeting, December 6-7, Sydney-Australia

Derek da Cunha, ed (1996), *The Evolving Pacific Power Structure*, Institute of Southeast Asian Studies, Singapore.

Evans, Paul, M. (ed) (1994). *Studying Asia Pacific Security*, Centre for Strategic and International Studies, Washington D.C

Hawkesley, H., Holberton, S. (1996), *Dragon Strike: The Millennium War*, Sidgwick & Jackson.

Klein, L. (1997), *Peace Dividend*, paper presented at ECAAR symposium, United Nations University, September 18, Tokyo-Japan.

Li, Chien-pin. (1997), "Fear, Greed, or Garage Sale? The Analysis of Military Expenditure in East Asia," *The Pacific Review*, Vol. 10 No. 2: 274-288.

Lipow, J & Camille M. Antinori. (1995) "External Security Threats, Defence Expenditures, and the Economic Growth of Less-Developed Countries," *Journal of Policy Modeling*, 17(6): 579-595.

Saaty, Thomas, L. (1994a). *Decision Making in Economic, Political, Social and Technological Environments With The Analytic Hierarchy Process*, Vol VII, RWS Publications, Pittsburgh.

_____ (1994b). *Fundamentals of Decision Making and Priority Theory with Analytic Hierarchy Process*, Vol VI, RWS Publications, Pittsburgh.

_____ (1996), *Decision Making with Dependence and Feedback: The Analytic Network Process*, RWS Publications, Pittsburgh.

The American Assembly. (1996), *China-U.S. Relations in the Twenty-First Century: Fostering Cooperation, Preventing Conflict*, Columbia University.

Watanabe, A., Tsutomu Kikuchi & Yasuhide Yamanouchi. (1996), *The Policy Recommendations on the Perspective of Security Regimes in Asia-Pacific Region*, The Japan Forum on International Relations, Inc, Tokyo, June.

Table 1A. Benefit Cost Ratio Of Increased Military Spending With and Without Risk Factors

	Benefit (B)	Cost (C)	B/C	Risk	B/(C*Risk)
Yes	0.8380	0.8290	1.0109	0.7860	1.2861
No	0.1620	0.1710	0.9474	0.2140	4.4270

Table 1B. Benefit Cost Ratio Of Increased Military Spending for Sensitivity Analysis

	Benefit (B)	Cost (C)	B/C	Risk	B/(C*Risk)
Yes	0.7833	0.8290	0.9449	0.7860	1.2021
No	0.2167	0.1710	1.2673	0.2140	5.9217

Table 2. Benefit Cost Ratio Of Increased Military Spending With "ResDrain" and its Intensity Augmented: After Financial Crisis

	Benefit (B)	Cost (C)	B/C
Yes	0.8380	0.9210	0.9099
No	0.1620	0.0790	2.0506

Table 3. Benefit Cost Ratio Of Increased Military Spending With "EcBoom" and its Intensity Augmented: After Recovery

	Benefit (B)	Cost (C)	B/C
Yes	0.9310	0.9210	1.0109
No	0.0690	0.0790	0.8734

Figure 1. Hierarchies for Increased Military Spending

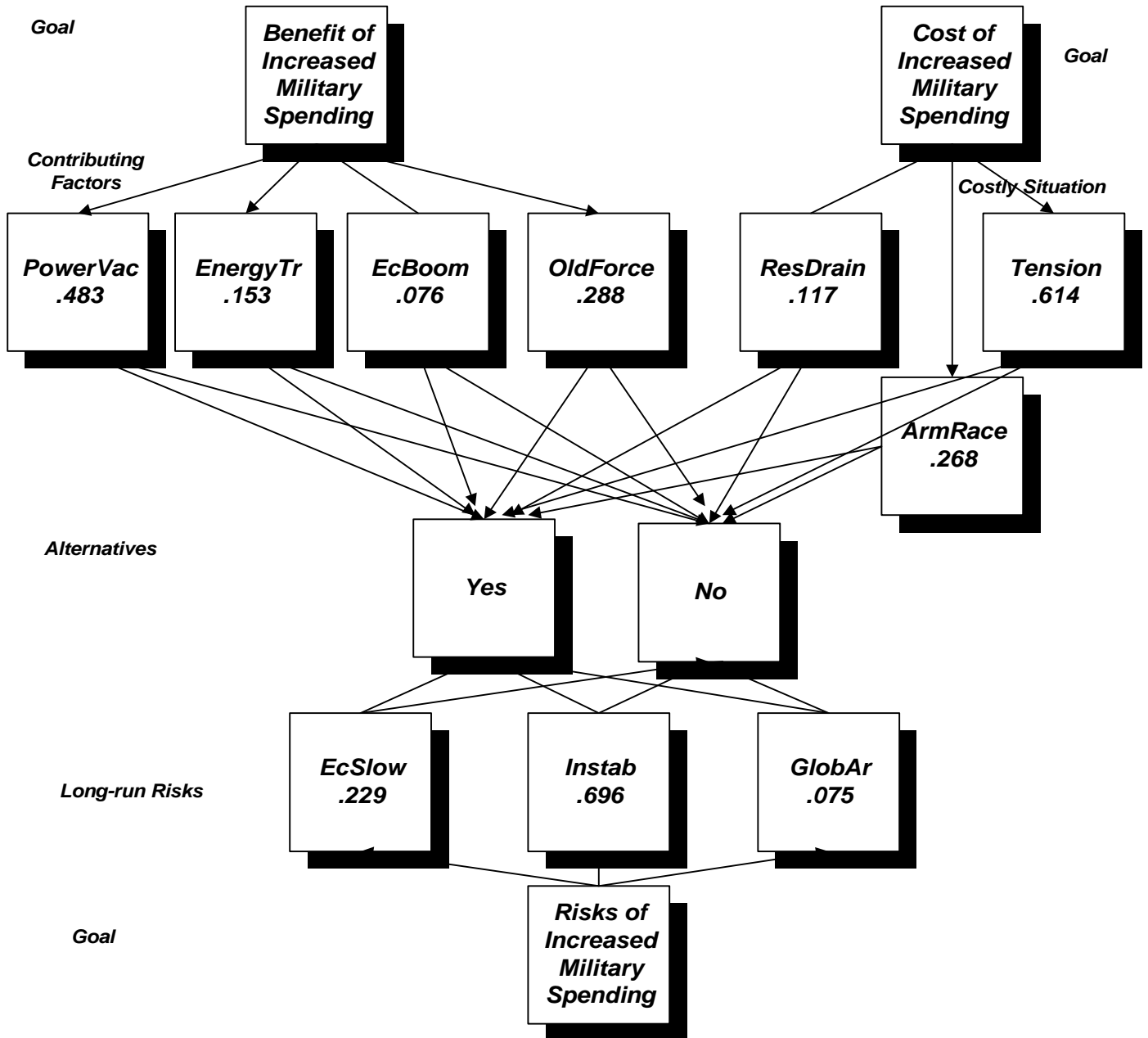
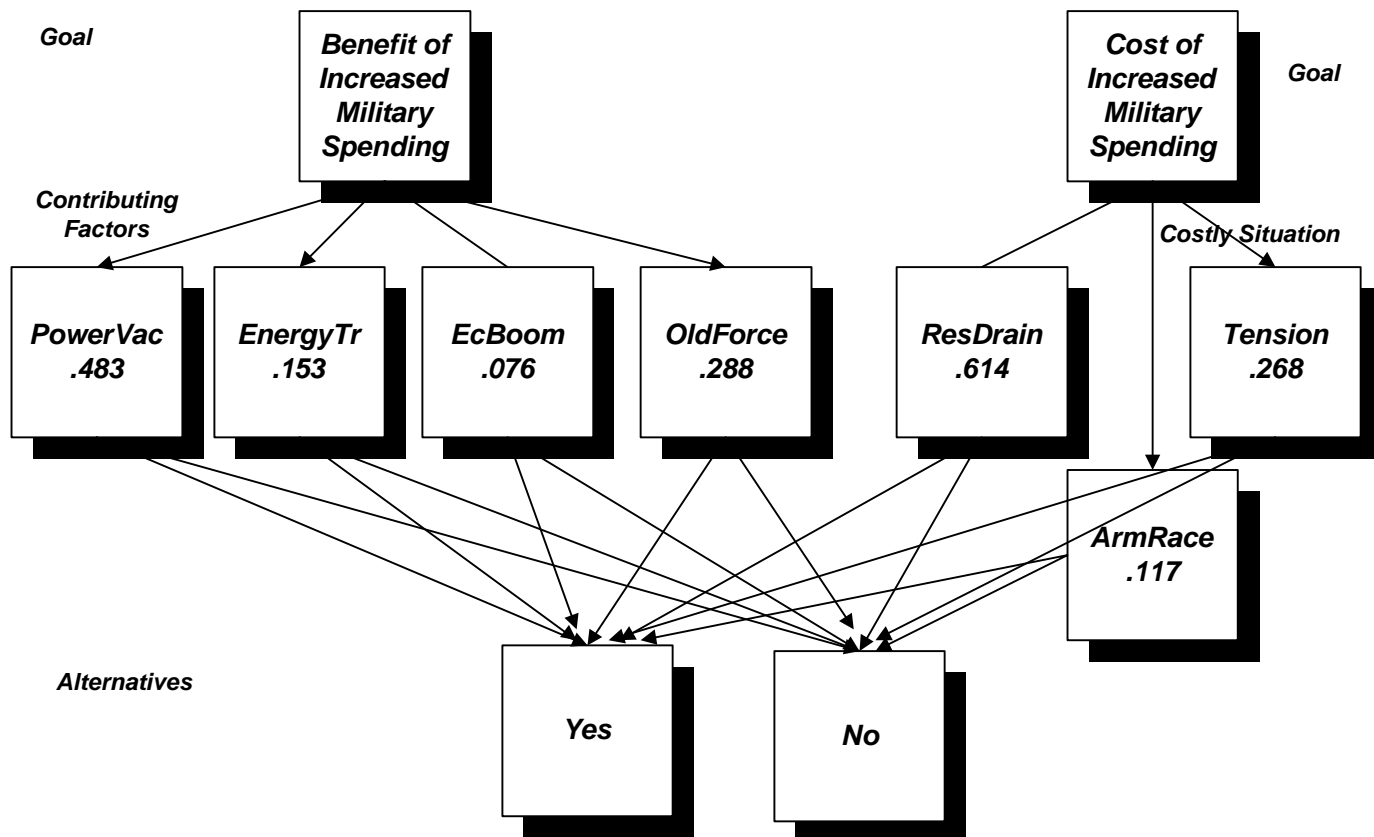


Figure 2. Hierarchies for Military Spending Without Risk After Financial Crisis (Augmented "ResDrain")



**Figure 3. Hierarchies for Military Spending Without Risk
After Financial Crisis And Recovery (Augmented "EcBoom")**

