

The Impact of U.S.-China Relations on Taiwan's Military Spending, 1966-92: An Analytical Error Correction Model

TSUNG-CHI YU*

This study seeks to address Taiwan's security in general and to investigate the variation of Taiwan's military spending in particular. Previous research has shown that Taiwan's military security is affected by both China's military buildup and the U.S. military pipeline. This study investigates whether the ongoing U.S.-China relationship also affects the island's security. Three major findings are derived from the statistical analyses. First and foremost, the level of conflict between the United States and China has a positive effect on the increase of Taiwan's military spending. Second, the volatility of U.S.-China relations has a negative effect on Taiwan's military spending; this finding suggests that instability in U.S.-China relations will prompt Taiwan to decrease its military spending due to a higher amount of perceived security on the one hand, with Taiwan also desiring to avoid further provoking China on the other. Third, analyses indicate that an error correction model (ECM) fares better than a simple budgetary incremental model (BIM) in explaining the re-equilibrating effects of GNP growth on Taiwan's military spending.

TSUNG-CHI YU (余宗基, Ph.D., University of North Texas, 2002) is an assistant professor in the Department of Political Science, Fu Hsing Kang College (政治作戰學校), Taipei. His most recent publication is "Regional Conflicts after September 11th and Their Impact on Taiwan's National Security," in *2003-nian Taihai zhanlue huanjing pinggu* (Strategic assessment across the Taiwan Strait, 2003) (Taipei: National Defense University Press, 2003), 81-96.

*The author would like to thank Sandrine Tung for assistance in editing this article.

©Institute of International Relations, National Chengchi University, Taipei, Taiwan (ROC).

KEYWORDS: U.S.-China-Taiwan relations; Taiwan's military spending; economic growth; arms race; error correction model (ECM); budgetary incremental model (BIM).

* * *

Despite some interesting bargaining chips,¹ Taiwan's lack of diplomatic relations with most countries in the world makes actions by Taiwan's chief ally (the United States) and Taiwan's chief adversary (China) critical to Taiwan's military security. Foremost of these actions stem from the general ebb and flow in the relationship between the two powers. Since the founding of the People's Republic of China (PRC) in 1949 and Washington's eventual derecognition of the Republic of China (ROC) in 1979, levels of conflict and cooperation between the United States and China have affected Taiwan's perception of its own military security.

Some scholars have argued that a good U.S.-China relationship is likely to benefit Taiwan and thereby enhance Taiwan's security.² There are others, however, who hold that an improved U.S.-China relationship actually hurts Taiwan's interests and therefore compromises the island's security.³ There is yet a third group that contends that the U.S. strategic policy of maintaining the status quo makes U.S.-China relations irrelevant

¹Taiwan is an emerging, boisterous democracy with an equally vibrant economy. Today, Taiwan holds the world's third largest foreign exchange reserves, is among the world's top fifteen trading nations, and supplies close to 60 percent of the world's information technology products. Taiwan is strategically situated in one of the world's most important searoutes, and—with armed forces of about 370,000—is one of the strongest military forces in East and Southeast Asia. See Paul J. Bolt, "Economic Ties Across the Taiwan Strait: Buying Time for Compromise," *Issues & Studies* 37, no. 2 (March/April 2001): 93.

²See, for instance, Chi Huang, Woosang Kim, and Samuel Shioh Guan Wu, "Conflicts Across the Taiwan Strait, 1951-78," *Issues & Studies* 28, no. 6 (June 1992): 35-58; Stanley O. Roth, "The Taiwan Relations Act at Twenty and Beyond," in *The Legacy of the Taiwan Relations Act* (Taipei: ROC Government Information Office, 1999), 207; Cheng-Yi Lin, "The U.S. Role in Taiwan-China Military Relations" (2000), available online at <<http://www.taipei.org/tra/sinica/sinica-04.htm>>; and C. Alexander Tan and Tsung-chi Max Yu, "On Taiwan's Security: An IPE Perspective," *Pacific Focus* 16, no. 2 (2001): 115-27.

³For one such proponent, see Wang Shaoguang, "The Military Expenditure of China, 1989-98" (Paper presented at the War and Peace in the Taiwan Strait conference sponsored by Program in Asian Security Studies, Duke University, Durham, N.C., September 20, 1999).

to Taiwan's security.⁴ These three contrasting scholarly views, as will be shown below, cannot possibly be supported by the same empirical reality. The question that this study examines, therefore, is the following: What is the impact of the U.S.-China relationship on Taiwan's military security? More specifically, does conflict or cooperation between the United States and China affect Taiwan's perception of its military security as operationalized by the island's military spending?

As far as Taiwan is concerned, the island's military spending is shaped by external factors, such as the perceived risks of abandonment and entrapment emanating from the ongoing U.S.-China relationship, and by internal factors, including such domestic economic constraints as growth of gross national product (GNP), savings rate, and foreign investment. The empirical findings of this study reinforce the belief that both internal and external factors have to be considered simultaneously if one is to fully understand the dynamics of Taiwan's military spending. The error correction model (ECM) will be shown by this study to aid researchers in understanding the short- and long-run effects of GNP on Taiwan's military spending (this has been ignored in previous studies adopting the budgetary incremental model, BIM). In addition, in all cases, the model will be shown to be highly resilient and able to explain approximately 90 percent of the variance in the evolution of Taiwan's military spending. This paper thus argues for the need to utilize two models.

Three major findings are derived from the statistical analyses. First and foremost, the level of conflict between the United States and China has a positive effect on the increase of Taiwan's military spending. Second, the volatility of U.S.-China relations has a negative effect on Taiwan's military spending; this finding suggests that instability in U.S.-China relations will prompt Taiwan to decrease its military spending due to a higher amount of perceived security on the one hand, with Taiwan also desiring to avoid further provoking China on the other. Third, analyses indicate that an ECM fares better than a simple BIM in explaining the re-equilibrating effects of

⁴One example is Chen Chien-min (陳建民), "The Impact of U.S.-China Interactions on Taiwan's Security" (Ph.D. dissertation, University of Chinese Culture, Taipei, 1999; in Chinese).

GNP growth on Taiwan's military spending. The findings presented in this study fully explain the interplaying effects of international and domestic environments on Taiwan's military spending.

The results may be of interest to researchers in the areas of U.S.-China policy, East Asian security, alliances, and arms control who wish to have a better understanding of the effects of U.S.-China dyadic interactions and the underlying motivations of Taiwan's military spending as these are important to stability and security in the Asia-Pacific region.

This paper consists of five parts. Section one develops the research project by reviewing the existing literature on such issues as arms racing, external threats, military spending, and economic growth. Section two establishes both the theoretical framework and a set of hypotheses to be tested empirically. Section three focuses on describing data and the operationalization and measurement of variables. Section four presents the tests of hypotheses. Finally, section five summarizes the findings and discusses their implications for the future U.S.-China relationship and its possible effects on Taiwan's security and military spending.

Literature Review

Traditionally, two principal types of theories have been used to explain the causes and effects of military spending. The first type of theory focuses on influences exogenous to a country, while the second type of theory focuses primarily on internal considerations.

External Factors

Research on external threats and military spending abounds. Most researchers utilizing the action-reaction perspective rely on the pioneering work of Lewis Richardson. Richardson holds that an arms race is a process in which changes in a nation's military spending are driven by its opponent's defense expenditures.⁵

⁵See Lewis F. Richardson, *Arms and Insecurity: A Mathematical Study of the Causes and*

Although conceptually quite compelling, Richardson's model has met with at best mixed empirical success, particularly when applied to the case of Taiwan. Steve Chan indicates that the Richardson model of reciprocal armament escalation can at best only partially explain Taiwan's military spending, arguing that PRC defense behavior is far more likely to be influenced by such traditional and potential adversaries as India, Japan, Russia, or the United States.⁶ Chan's empirical findings bolster his argument that China's military outlays at time $t-1$ have a negative and statistically insignificant effect on Taiwan's military spending.

Richardson offered two possible explanations for such a negative relationship.⁷ First, an inverse relationship is consistent with the adoption of the virtuous precept to return good for evil. The small state aims to appease the strong state by forsaking its own military buildup. The second reason, submissiveness, refers to the special condition in which a weak nation is dwarfed by the strength of its adversary and would submit rather than engage in a hopeless arms competition.⁸ These two explanations are not applicable to the case of Taiwan because, with the aid of the United States, Taiwan is more likely to prepare for war than for peace.

Having pointed out the limitations of applying Richardson's model to the case of Taiwan, this study investigates how the ongoing U.S.-China relationship affects Taiwan's military spending. In "Taiwan's Calculation on Military Spending," Chan states: "The effectiveness of the U.S.'s coat-tailing (providing a security umbrella [for]) Taiwan in part depends paradoxically on Washington's leverage in Peking, which in turn reflects

Origins of War (Pittsburgh: Boxwood Press, 1960). For a work that applies this theory to Taiwan, see Xiaobing Li, Xiaobo Hu, and Yang Zhong, *Interpreting U.S.-China-Taiwan Relations: China in the Post-Cold War Era* (Lanham, Md.: University Press of America, 1998), 169.

⁶See Steve Chan: "Defense Burden and Economic Growth: Unraveling the Taiwanese Enigma," *American Political Science Review* 82 (1988): 913-20; and "Taiwan's Calculus on Military Spending," *International Interactions* 14 (1988): 267-81.

⁷Richardson, *Arms and Insecurity*, 62.

⁸See also Ido Oren, "Capability and Hostile Behavior in Arms Race Models," *International Interactions* 21 (1996): 323.

and perhaps even presumes to some extent an ongoing Sino-American relationship."⁹

Following Chan's suggestion, this study investigates the impact of U.S.-China relations on Taiwan's military spending. In his article, Chan simply tested both the impact of the PRC threat (measured by PRC military outlays) and the U.S. pipeline (measured by U.S. military outlays) independent of each other. This study goes further by assessing the combined and dynamic effects of U.S.-China relations on Taiwan's military spending.

Until now, three kinds of arguments have been made concerning the nature of the relationship between the United States and China and its impact on Taiwan's military spending. First, Ezra F. Vogel suggests that the key to managing the Taiwan problem is for the United States to have a better relationship with China. Enjoying a better political and economic relationship with the United States, the PRC might feel confident that the peaceful integration of Taiwan could eventually be achieved and thus Beijing would show less hostility toward Taiwan. In addition, Beijing would be more likely to accommodate Washington on the Taiwan issue,¹⁰ because it feels more confident that the United States will be less likely to support the independence of Taiwan.

On the other hand, American policymakers expect that improved U.S.-China relations, having been achieved by approving China's permanent trade benefits and helping China enter the World Trade Organization (WTO), may drastically change Beijing's cost calculation in resolving conflicts by the use of force. In other words, U.S. policy thinking is based on the premise that the better are U.S.-China relations, the less likely the PRC would invade Taiwan.¹¹

In addition, Stanley O. Roth points out that the improvement in U.S.-PRC relations not only has not harmed Taiwan, but also has significantly contributed to Taiwan's extraordinary economic and political develop-

⁹Chan, "Taiwan's Calculus on Military Spending," (cited in note 6 above).

¹⁰Ezra F. Vogel, ed., *Living with China: U.S.-China Relations in the Twenty-first Century* (New York: W.W. Norton, 1997), 268-69.

¹¹Tan and Yu, "On Taiwan's Security" (cited in note 2 above).

ment.¹² Huang, Kim, and Wu in their empirical investigation found that the better the U.S.-PRC relationship, the less likely that the PRC would come into conflict with Taiwan.¹³ This finding, however, is opposite to their expectation that an improvement in the U.S.-China relationship will increase the likelihood of China's initiating a conflict against Taiwan.

Second, Richard Fisher of the Heritage Foundation warns that closer U.S. ties with the PRC at the expense of Taiwan could jeopardize the island's military security. Washington would be more likely to yield to PRC pressure to reduce U.S. arms sales to Taiwan. Without these weapons, Taiwan would eventually lose its qualitative advantage in terms of military capabilities, which, in turn, would greatly impair Taiwan's military security. Moreover, Taiwan's leadership treats U.S. arms sales to Taiwan as a very important indicator of U.S. political support, which is crucial to Taiwan's survival.¹⁴ Stephen J. Yates states that U.S. arms sales to Taiwan are crucial because Taiwan's military strength promotes peace through deterrence, while weakness will only invite aggression and invasion. If arms sales are more apt to occur when U.S.-China relations are poor, then it follows that poor U.S.-China relations are good for Taiwan.¹⁵

According to this view, Taipei cannot afford to lose Washington's military and political support. Moreover, improved U.S.-China relations may lead the PRC to adopt a more adventuresome military strategy toward the Taiwan issue, by leading Beijing to anticipate that Washington would compromise U.S. defense commitment to the island. Wang and Lin argue that the occurrence of the 1996 Taiwan Strait crisis partially resulted from the compromising attitude of the Clinton administration to-

¹²Roth, "The Taiwan Relations Act at Twenty and Beyond," 178.

¹³Huang, Kim, and Wu, "Conflicts Across the Taiwan Strait," 56.

¹⁴"Lee Teng-hui views weaponry more as a symbol of reassurance and resolve than as a key component of a larger force structure designed to attain genuine warfighting objectives, because he values U.S.-supplied weapons systems as a critical indicator of greater U.S. support (military as well as political) for Taiwan." See Jasen Castillo et al., *Military Expenditures and Economic Growth* (Santa Monica, Calif.: RAND, 2001), 16.

¹⁵Stephen J. Yates, "Restoring Perspective and Priority in U.S. Relations with China," in *Priorities for the President*, ed. Stuart M. Butler and Kim R. Holmes (Washington, D.C.: The Heritage Foundation, 2001), 15.

ward the PRC.¹⁶

Third, Chen Chien-min's study suggests that U.S.-China relations do not have a prominent effect on Taiwan's military security. He further argues that only when a balance of power exists in the Washington-Beijing-Taipei trilateral relationship can the military security of Taiwan be ensured. If the United States only attempts to play a balancing role between China and Taiwan, Washington will not anticipate any specific resolution of the Taiwan issue and will thereby let the problem be solved by both sides of the Taiwan Strait on their own.¹⁷ If this is the case, the U.S.-China relationship in actuality is irrelevant to Taiwan's military spending or security because neither China nor Taiwan can affect the U.S. policy of status quo. This is a typical example following the classical rule of international relations that "the strong do as they please and the weak do as they must." It is with these inconsistencies in mind that this study aims to examine the relationship between U.S.-China relations and Taiwan's military spending.

Internal Factors

The second line of thought that will be pursued in this study focuses on internal rather than external considerations in explaining variations in military spending. Among these internal factors are the nature of the budgetary process and the political economy of military spending.

The budgetary process: Harris examined the importance of endogenous economic factors on military spending levels in five member countries of the Association of Southeast Asian Nations (ASEAN)—Indonesia, Malaysia, the Philippines, Singapore, and Thailand. He concluded that "a nation's GNP sets a broad limit on its domestically-financed defense expenditure, and that defense expenditure in the previous year is a good indicator of its level in the next year."¹⁸

¹⁶Wang, "The Military Expenditure of China" (cited in note 3 above); and Lin, "The U.S. Role in Taiwan-China Military Relations" (cited in note 2 above).

¹⁷Chen, "The Impact of U.S.-China Interactions on Taiwan's Security," 5.

¹⁸Geoffery Harris, "The Determinants of Defense Expenditures in the ASEAN Region," *Journal of Peace Research* 23 (1986): 41-49.

This argument is congruent with the theory of the budgetary process, which maintains that the dynamics of military spending are based primarily on organizational inertia within the state. The main proposition underlying the theory is that decision-makers employ standard operating procedures (SOPs) for implementing the rules of bureaucracies. It can be further inferred that the best indicators of new increments to military spending are simply those which obtained in the immediate past.¹⁹ One can therefore predict the current military spending budget based on the immediately preceding time *t-1* budget. Rattinger found that past expenditures are the best single indicator in explaining military spending for all members of European NATO and the Warsaw Treaty Organization.²⁰ Thus one potential determinant of military spending is the bureaucratic politics of the budgeting process represented by incrementalism.²¹

Guns and butter: The theory of the political economy of military spending focuses on the relationship between military spending and economic growth. Three main views of the defense-growth relationship are incorporated into the theory of political economy and military spending. The military Keynesian and Marxist theoretical formulations contend that the direction of the defense-growth relationship runs from military spending

¹⁹Ibid.; Chan, "Defense Burden and Economic Growth" and "Taiwan's Calculus on Military Spending"; Sam-Man Chung, "Causes and Effects of U.S. Military Expenditures: Time-Series Models and Applications" (Ph.D. dissertation, University of Missouri-Columbia, 1996); Li, Hu, and Zhong, *Interpreting U.S.-China-Taiwan Relations*; Aekyung Lee, "Interaction Across the Taiwan Strait: Changes in Relations between the PRC and the ROC, 1985-1992" (Ph.D. dissertation, George Washington University, 1995); and Henry Solomon, "Defense Planning and Military Expenditure in Korea: An Analysis of National Security Policy for an Uncertain Era" (Ph.D. dissertation, George Washington University, 1998).

²⁰H. Rattinger, "Econometrics and Arms Races: A Critical Review and Some Extensions," *European Journal of Political Research* 4 (1976): 421-39.

²¹According to Ward and Mahajan, incrementalism is perceived to be especially important in the budgetary decision-making process because it implies historical base. That is, what was spent or allocated last year is a given from which to proceed in making calculations about what is needed and/or plausible in the subsequent or current period. Combined with assumptions about normal organizational behavior, this incremental aspect suggests that military expenditures tend to increase themselves over time: next year's budget will be based on this year's, plus a little more. See Michael Don Ward and A. K. Mahajan, "Defense Expenditures, Security Threats, and Governmental Deficits: A Case Study of India, 1952-1979," *Journal of Conflict Resolution* 28 (1984): 382-419.

to economic growth, not vice versa. However, "rich country, strong army" (富國強兵, *fuguo qiangbing*) theorists propose that the direction of the relationship runs from economic growth to military spending. They argue that increased state activity and the corresponding increases in military spending are an inevitable accompaniment of economic growth.²²

Joerding first conducts a Granger Causality test on economic growth and defense spending. He finds that it is economic growth that causes military spending, not the other way around.²³ Castillo and others further point out two plausible reasons why economic growth will lead to increases in military expenditures. The first is because as nations become wealthier they believe they have more to protect. Second, greater wealth allows nations to pursue aggressive foreign policy objectives considered unobtainable before.²⁴ Given these findings, one can plausibly assume that countries with rapid economic growth are more able to indulge themselves in the luxury of defense programs.²⁵

This study focuses mainly on the "rich country, strong army" assumption in the case of Taiwan because it is congruent with the theoretical formulation posited by this study. Taiwan is the 14th biggest trading country of the world and one of the richest countries in Asia; therefore it is more likely to transform from a wealthy state into a strong one.

The Integrated Model

In addition to the action-reaction theory, when modeling an arms race Richardson also takes into account both hostility and the economic burden of producing and maintaining arms.²⁶ Bolks and Stoll argue that most of

²² Chung, "Causes and Effects of U.S. Military Expenditures," 157; and Richard S. Thorn, "The Evolution of Public Finances During Economic Development," *The Manchester School of Economic and Social Studies* 37, no. 3 (1967): 215.

²³ W. Joerding, "Economic Growth and Defense Spending: Granger Causality," *Journal of Development Economics* 21 (1986): 135-50.

²⁴ Castillo et al., *Military Expenditures and Economic Growth*, 36.

²⁵ This argument is also made by Chung, "Causes and Effects of U.S. Military Expenditures" and Ralph N. Clough, *Cooperation or Conflict in the Taiwan Strait?* (Lanham, Md.: Rowman & Littlefield, 1999).

²⁶ Michael D. Intriligator and Dagobert L. Brito, "Richardsonian Arms Race Models," in

the arms race literature ignores hostility in the international environment that can have an impact on armaments decisions. They observe that failure to include a measure of environmental hostility will underspecify significantly the external factors that drive decisions about the level of military spending.²⁷ However, these two scholars (as well as others) argue that both the internal and external environments affect a country's defense spending.²⁸ To unravel the Taiwan enigma, this author suggests that external threats, real or perceived, be taken into account along with domestic economic constraints.

Theoretical Formulation and Hypothesis Testing

The ROC (Taiwan), in addition to cementing its links with the United States, has also sought to develop mutually beneficial interaction with the PRC, as a means of strengthening the security of Taiwan.²⁹

Theoretical Formulation

The argument of this study is that the level of commitment signaled by Washington to Taiwan is refracted through U.S. bilateral interactions with China, and conditions Taiwan's military spending and perceptions of external threat.

An alliance with the United States (external balancing) can provide Taiwan with additional strength and a better posture from which to deter China. Therefore, as far as Taiwan is concerned, a stronger U.S. commitment is equal to greater security or lesser external threat. Consequently,

Handbook of War Studies, ed. Manus I. Midlarsky (Ann Arbor: University of Michigan Press, 1993), 179; and Li, Hu, and Zhong, *Interpreting U.S.-China-Taiwan Relations*, 6.

²⁷Sean M. Bolks and Richard J. Stoll, "The Arms Acquisition Process: The Effects of Internal and External Constraints on Arms Race Dynamics," *Journal of Conflict Resolution* 44 (2000): 583.

²⁸See, for instance, Robert E. Looney, "Internal and External Factors on Affecting Third World Military Expenditures," *Journal of Peace Research* 26 (1989): 33-46; and Charles W. Ostrom, Jr., "A Reactive Linkage Model of the U.S. Defense Expenditure Policy-making Process," *American Political Science Review* 72 (1978): 945-57.

²⁹Clough, *Cooperation or Conflict in the Taiwan Strait?* 24.

this will lead to a decrease in Taiwan's military spending. In addition, if Taipei perceives a weaker U.S. commitment due to an improved U.S.-China relationship or a higher external threat due to heightened U.S.-China hostilities, the island will boost its military buildup in order to avoid the risks of abandonment or entrapment. Abandonment is the fear that the United States may fail to come to Taiwan's aid in the event of war. Entrapment is the fear that any entanglement in a dispute between the United States and China will turn detrimental to Taiwan's security.³⁰ As further argued by Sorokin, "If a state chooses to rely on an asymmetric alliance for security, it is more concerned about the risk of abandonment than the risk of entrapment."³¹ It is noteworthy that states need economic support to undertake their military buildup (internal balancing). That is, higher economic growth will provide Taiwan the resources to carry out its military buildup.

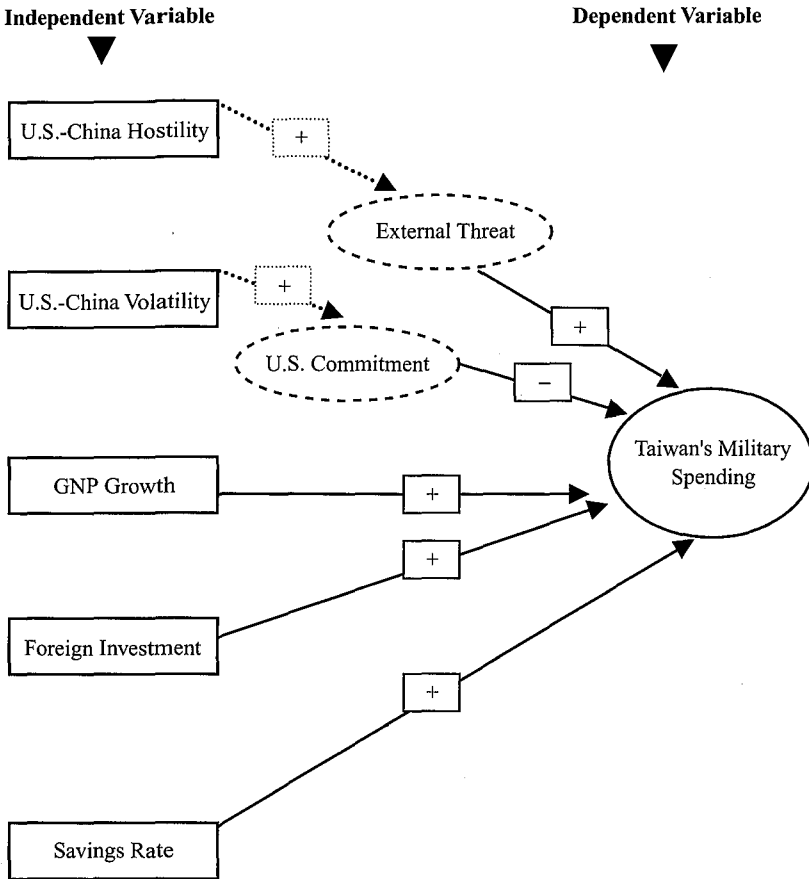
Thinking of the potential costs of relying on U.S. commitment as refracted through the fluctuations of U.S.-China relations puts security, external threat, and military spending into a meaningful context. That is, *threat* and *security* are seen to be two sides of the same coin: a high degree of threat implies a low level of security while a lower threat is equivalent to a higher level of security. Thus, a greater amount of security should, *ceteris paribus*, be associated with no, or only a small increase in, military spending; a greater amount of threat should be accompanied with a greater increase in military outlays.³² The theoretical expectations of Taiwan's military spending discussed above can be diagrammed as shown in figure 1.

³⁰Glenn H. Snyder, "The Security Dilemma in Alliance Politics," *World Politics* 36 (1984): 461-95.

³¹Gerald L. Sorokin, "Arms, Alliances, and Security Tradeoffs in Enduring Rivalries," *International Studies Quarterly* 38 (1994): 425.

³²William R. Gates and Katsuaki L. Terasawa, "Commitment, Threat Perceptions, and Expenditures in a Defense Alliance," *International Studies Quarterly* 36 (1992): 101-18; Victor D. Cha, "Abandonment, Entrapment, and Neoclassical Realism in Asia: The United States, Japan, and Korea," *ibid.* 44 (2000): 261; and Vesna Danilovic, "The Sources of Threat Credibility in Extended Deterrence," *Journal of Conflict Resolution* 45 (2001): 341-69.

Figure 1
The Theoretical Framework of Taiwan's Military Spending



As shown in figure 1, those on the left-hand side are the independent variables, which, I hypothesize, should have effects on the evolution of Taiwan's military spending. The first two variables—U.S.-China hostility and volatility—are the two major external factors to be investigated in this study. The other three—GNP growth, foreign investment, and savings rate—are control variables as suggested by previous studies and should be incorporated into any attempt to investigate the dynamics of Taiwan's

military spending.³³ The anticipated correlations in the diagram will be specified in greater detail as the theoretical formulation progresses.

As shown in figure 1, this author hypothesizes that Taiwan's military expenditures increase because of a rise in either economic strength or threat perception flowing from the bilateral interactions between the United States and China.

In most countries, security issues are viewed primarily from the perspective of potential external threats, with the role of the armed forces being to defend against such threats.³⁴ As Kim has noted, "Protection against external aggression provides the *raison d'être* for all armed forces, and external security considerations are most often used to justify increases in military spending."³⁵ This author contends that the external threat to Taiwan is not based solely on the total amount of China's military spending, but also on China's bilateral relationship with the United States.

This study concentrates on military spending as an indicator of military security because military budget is observable and can cover the entire spectrum of military activities, including such elements as research and development. In addition, money is the most general of all metrics providing considerable flexibility in assessing how specific security requirements are met through reallocation of military resources.³⁶

³³Chan, "Defense Burden and Economic Growth" and "Taiwan's Calculus on Military Spending"; Chi Huang, "The State and Foreign Investment: The Case of Taiwan and Singapore," *Comparative Political Studies* 22 (1989): 93-121; and Chi Huang, "The Impact of Defense Spending on Economic Growth in an Export-Led Developing Economy: A Model and Case of Taiwan" (Paper presented at the annual meeting of the American Political Science Association Conference Group on Taiwan Studies, 1997).

³⁴Nicole Ball, "Defense and Development: A Critique of the Benoit Study," *Economic Development and Cultural Change* 32 (1983): 105; and Bolks and Stoll, "The Arms Acquisition Process," 580-603.

³⁵Tae Joon Kim, "Military Expenditure and Its Political and Economic Consequences: The Case of South Korea from 1961 to 1988" (Ph.D. dissertation, Michigan State University, 1996), 266.

³⁶Abraham S. Becker, *Military Expenditure Limitation for Arms Control: Problems and Prospects—With a Documentary History of Recent Proposals* (Cambridge: Ballinger, 1977); and Chung, "Causes and Effects of U.S. Military Expenditures."

Hypotheses Testing

Based on the above discussion, we can come up with three separate hypotheses each for the impact that U.S.-China *hostility* and U.S.-China *volatility* have on Taiwan's military spending. Each independent variable will be examined in turn.

1. *U.S.-China hostility and military spending*: The relationships (positive, negative, and nonexistent) between the level of U.S.-China hostility and the level of Taiwan's military spending are hypothesized as follows:

Hypothesis 1: *The greater the level of conflict between the United States and China, the higher the level of Taiwan's military spending.*

This hypothesis states that a more conflictual U.S.-China relationship will lead to a higher level of Taiwan's military spending due to the higher perceived risk of entrapment. In other words, a peaceful U.S.-China relationship will lead to a lower level of Taiwan's military spending because of the lower perceived risk of entrapment. Thus, a better U.S.-China relationship is not only advantageous to both China and the United States but also beneficial to Taiwan by leading the island to decrease military spending.

An improved U.S.-China relationship also might be beneficial for Taiwan's security because of the perceived lesser risk of entrapment from the United States. Moreover, China might be more willing to put aside the Taiwan issue when its relationship with the United States is steady and good.³⁷

However, other China experts, politicians, and scholars argue that a higher level of U.S.-China hostility will lead Taiwan to decrease military spending. As claimed in *The China Threat*, a conflictual U.S.-China relationship is conducive to Taiwan's security because the United States would

³⁷Zalmay Khalilzad et al., *The United States and a Rising China: Strategic and Military Implications* (Santa Monica, Calif.: RAND MR-1082-AF, 1999), 56.

be more likely to beef up Taiwan's defense capabilities.³⁸ In addition, a strong U.S. posture toward China is beneficial to Taiwan's security as demonstrated in the 1949, 1954, 1958, and 1996 Taiwan Strait crises. R. K. Campbell points out that "the common sense of helping Taiwan's defense is an easy way of preventing a war in the Taiwan Strait that could involve the United States."³⁹ Moreover, a wobbly U.S. commitment would lead China to misinterpret that Washington both would be willing to reach an accommodation with Beijing over the Taiwan issue and would not stomach a military defense of Taiwan if the island were attacked.⁴⁰ Following this logic, a conflictual U.S.-China relationship would presumably decrease Taiwan's need to boost its own arms spending. From this we can derive a negative correlation hypothesis, i.e.:

Hypothesis 2: *The greater the level of conflict between the United States and China, the lower the level of Taiwan's military spending.*

Finally, if the United States is, as proclaimed, simply to play a neutral or balancing role between China and Taiwan, one would expect that there will be no significant impact of U.S.-China relations on Taiwan's military spending because the United States, a hegemon, will not tilt toward either side of the Taiwan Strait. A nonexistent relationship can therefore be hypothesized as follows:

Hypothesis 3: *Hostilities between the United States and China have no significant effects on Taiwan's military spending.*

2. U.S.-China volatility and military spending: This study also investigates the extent to which historical volatility in the U.S.-China rela-

³⁸Bill Gertz, *The China Threat* (Washington, D.C.: Regnery, 2000), 138.

³⁹Cited in *ibid.*, 51.

⁴⁰Martin L. Lasater and Peter Kien-hong Yu, *Taiwan's Security in the Post-Deng Xiaoping Era* (London/Portland, Oregon: Frank Cass, 2000), 234.

tionship affects Taiwan's military spending. I hypothesize that a volatile or unstable U.S.-China relationship is conducive to Taiwan's security because of a perceived higher U.S. commitment or lower risk of abandonment. Taiwan's leadership will be more likely to perceive that Washington will be less likely to sacrifice Taiwan when the U.S.-China relationship is unstable and turns sour. Such a perception of heightened security will lead to a lower level of military spending. In order to test this theoretical argument, I operationalize the volatility of U.S.-China relations and measure its impact on Taiwan's military spending. Ideally, this relationship should be observed with a lag, as described below:

Hypothesis 4: *The higher the volatility of U.S.-China relations, the lower the level of Taiwan's military spending.*

This hypothesis makes sense because a volatile relationship between the United States and China will open windows of opportunity for Taiwan to obtain greater political, economic, and military support from the United States. An unstable U.S.-China relationship will spur American willingness to develop a closer relationship between Taipei and Washington than would be achieved otherwise.

Taiwan is very cautious not to offend China while forging closer ties with the United States, however, and will be more likely to avoid increasing military spending in the wake of some "triumphs" over China on the diplomatic battlefield. The reasoning is twofold. Militarily, China could retaliate by flexing its military muscle and launching a disastrous assault against Taiwan. Economically, China could sanction Taiwan by closing off access to its enormous markets, a serious threat to Taiwan's economic livelihood.⁴¹

3. *Economic growth and military spending:* After testing the effects of U.S.-China relations on Taiwan's military spending as stated above, I

⁴¹J.D. Kenneth Boutin, "Cross-Strait Trade and Investment: Economic and Security Implications for the Republic of China," *Issues & Studies* 33, no. 12 (December 1997): 70-93.

will next test economic effects. This paper adopts the ECM in order to capture the dynamic impact of economic growth as an alternative to the BIM, which is unable to achieve the goal. Specifically, I hypothesize:

Hypothesis 5: *The higher Taiwan's GNP growth, the greater its military spending.*

This hypothesis is congruent with the "rich country, strong army" argument that the causal arrow goes from economic growth to military spending—wealthier countries simply have more resources available to apportion. Therefore, economic growth is treated as an important factor to ensure Taiwan's national security, as more financial support can be given to cover military expenditures.

4. *Budgetary incrementalism and military spending:* Finally, according to the theory of budgetary incrementalism,⁴² one is able to predict that Taiwan's military spending at time t is a function of its immediately preceding spending at time $t-1$. This might help the researcher to decide the expected level of military spending in the absence of external shocks.

Hypothesis 6: *The higher Taiwan's military spending at time $t-1$, the greater its spending at time t .*

Model Specification

These hypotheses presented above can be incorporated into the following model:

Model 1

$$\Delta \text{Taiwan Military Spending}_t = c + d_1 \Delta \text{Military Spending}_{t-1} + d_2 \text{U.S.-China Hostility}_t +$$

⁴² Aaron Wildavsky, *The Politics of the Budgetary Process* (Boston: Little Brown, 1964); Ostrom, "A Reactive Linkage Model"; Michael D. Ward, "Differential Paths to Parity: A Study of the Contemporary Arms Race," *American Political Science Review* 78 (1984): 297-317; and Mark S. Kamlet and David C. Mowery, "Influences on Executive and Congressional Budgetary Priorities 1955-1981," *ibid.* 81 (1987): 155-78.

$$d_3\Delta\text{GNP}_{t-1} + d_4\text{Savings}_t + d_5\text{Foreign Investment Rate}_t + d_6\Delta\text{China's Military Spending}_{t-1} + d_7\text{U.S.-China Volatility}_{t-1} + \varepsilon_t$$

The dependent variable on the left-hand side of the equation is the change in Taiwan military spending from year $t-1$ to year t . The independent variables, displayed on the right-hand side, include: change in Taiwan's military spending at lag time $t-1$, the degree of U.S.-China hostilities in year t , Taiwan's GNP at time $t-1$, the savings rate at time t , foreign investment as a percentage of gross domestic capital formation (GDCF) at time t , China's military spending at time $t-1$, and the volatility of U.S.-China relations at time $t-1$ (the last four are control variables). The ε_t is a stochastic error term assumed to be normally distributed. In the model, several variables are differenced. This is a remedy to make a series mean stationary and hence avoid the threat of spurious relationships.⁴³

Because simply adding a lagged endogenous variable in the BIM does not obviate the threat to inference of spurious regression, thus when time series are long memorized, model specification requires careful attention. An ECM is particularly appealing because the model addresses the spurious regression problem without neglecting possible long-run relationships among variables of interest, such as what would occur if one were to rely solely on first-differencing variables suspect of being nonstationary.⁴⁴ In the ECM, Taiwan's military spending *level* and *difference* are both used; thus one is able to capture the relationship between differenced and level values of Taiwan's military spending and economic growth without any inference problems in either the theoretical or methodological sense. In addition, using the ECM is useful relative to the BIM, which explains the dependent variable, based on BIM's own history of providing a little explanatory or theoretical contribution to the extant literature. Thus an ECM model is tested as an alternative to the BIM:

⁴³Clive W.J. Granger and Paul Newbold, "Spurious Regressions in Econometrics," *Journal of Econometrics* 2, no. 1 (1974): 111-20.

⁴⁴Robert F. Engle and Clive W.J. Granger, "Co-integration and Error Correction: Representation, Estimation, and Testing," *Econometrica* 55 (1987): 251-76.

Model 2

$$\Delta \text{Taiwan Military Spending}_t = c + d_1 \text{ECM}_{t-1} + d_2 \text{U.S.-China Hostility}_t + d_3 \Delta \text{GNP}_{t-1} + d_4 \text{Savings}_t + d_5 \text{Foreign Investment Rate}_t + d_6 \Delta \text{China's Military Spending}_{t-1} + d_7 \text{U.S.-China Volatility}_{t-1} + \varepsilon_t$$

The concept of an ECM is basically applicable to a situation where external shocks perturb an equilibrium state between two cointegrating series (explanations detailed in appendix 4).⁴⁵

In order to know which model has stronger explanatory power (i.e., whether the lagged endogenous model as the BIM or the ECM is preferable), I will estimate both models, compare their degree of fit, and perform various diagnostic tests. The next section discusses several variables that are included in these two models.

Data Analyses

Data Description

The empirical analysis focuses on the period 1966-92, due to limits imposed by data availability on U.S.-China interactions as found in Charles McClelland's World Events Interaction Survey (WEIS) data set (1966-87). In 1998, Rodney Tomlinson at the U.S. Naval Academy updated the data set up to the year of 1992. The most recent released version of WEIS data (1966-92) contains 1,750 events in total for China-U.S.-Taiwan triadic interactions during the period studied. One should be wary of using short time series (this study contains only 25 observations). As explained later on, however, with enough cases (degrees of freedom) the Eview statistical package employed by this study is able to estimate the parameters in these two models. Multiple sources of data are employed. Taiwan's military

⁴⁵Nathaniel Beck, "The Methodology of Cointegrating," in *Political Analysis*, vol. 4, ed. John R. Freeman (Ann Arbor: University of Michigan Press, 1993); and Suzanna DeBoef and Jim Granato, "Near-Integration, Cointegration, and Error Correction Models" (Paper presented at the annual meeting of the APSA Political Methodology Section, Bloomington, Indiana, 1995).

expenditure (T_MILEXP) and GNP figures (T_GNP) are collected from the U.S. Arms Control and Disarmament Agency (ACDA) and Taiwan's Council for Economic Planning and Development (CEPD *Taiwan Statistical Data Book 1997*), respectively.

ACDA's estimates are selected over other estimates because they provide military expenditure figures in U.S. dollar values with reference to GNP. Alternative sources, such as the Stockholm International Peace Research Institute (SIPRI), do not provide GNP estimates.⁴⁶ Other independent variables—such as savings rate (T_SAVING), foreign investment as percentage of gross domestic capital formation (T_FORINV), and China's military expenditures (C_MILEXP)—are collected from the *Taiwan Statistical Data Book 1997* and the ACDA data set. External threat (dyadic interactions) variables are taken from the extended WEIS data set, updated by Rodney Tomlinson, which contains 1,750 events for both the China-U.S. and China-Taiwan dyads during the period studied.

The WEIS data set is a collection of international events based on the *New York Times Indexes*, in which data such as the country/countries triggering the event, target countries, date, and nature of event (conflictual or cooperative) are recorded.

The interaction variable, U.S.-China dyadic interactions (UC_HOSTILITY), is operationalized as the summation of "conflictual" scores, with intensity accounted for, manifested by interactive events involving the United States and China in a given year. The initial dyadic interaction variable is composed of sixty-two levels, representing events of different degrees of cooperation or confrontation ranging from Yield, Comment, Consult, Approve, Promise, Grant, Reward, Agree, Request, Propose, Reject, Accuse, Protest, Deny, Demand, Warn, Threaten, Demonstrate, Reduce Relations, Expel, Seize, and Use of Force. The variable UC_HOSTILITY is aggregated to provide annual data to match with ACDA's variables (more explanations will be provided below).

After comparing different situations for different countries, I decided

⁴⁶As pointed out in Qian Sun and Qiao Yu, "Determinants of China's Military Expenditures: 1965-93," *Journal of Peace Research* 36 (1999): 23-33.

to follow Oren's as well as Huang, Kim, and Wu's⁴⁷ measurement of external threat by taking the levels of environmental hostility into account because this approach allows one to take into account dynamic effects in the dyadic interactions, which are ignored by many previous studies. In this study, I use the levels of U.S.-China hostility ranging from 1 to 28 as indicators to measure the degrees of external threat to Taiwan. As argued above, the level of U.S.-China hostility is the appropriate variable to capture dynamic exogenous effects on Taiwan's military spending.

Operationalization and Measurement

Before discussing testing procedures, measurement, and dynamics, several key variables must first be presented:

The dependent variable: The dependent variable in this study is Taiwan's annual military spending, 1966-92. According to the ACDA, military spending is defined as current and capital expenditures to meet the needs of the armed forces.⁴⁸ In most of the arms race literature, however, military spending has been operationalized as a single-dimensional indicator entitled "military spending."⁴⁹ This study follows this latter operationalization because the military expenditure decision processes oftentimes vary across countries, making comparison difficult. Total military expenditures in the form of money outlays can, however, easily be compared and collected from the ACDA data set.⁵⁰

Taiwan's annual military spending collected from the ACDA was measured in millions of constant 1993 U.S. dollars. From 1966 to 1992, Taiwan's annual military spending increased upwardly from about US\$2.637 billion to US\$10.6 billion.

Other major independent variables: The first continuous independent

⁴⁷Oren, "Capability and Hostile Behavior," 309-34; and Huang, Kim, and Wu, "Conflicts Across the Taiwan Strait," 35-58.

⁴⁸S. Charles Scribners, *Encyclopedia of Arms Control and Disarmament* (New York: Macmillan, 1993), 317-24.

⁴⁹Hugh G. Mosley, *The Arms Race: Economic and Social Consequences* (Lexington, Mass./Toronto: Lexington Books, 1985), 97.

⁵⁰Chung, "Causes and Effects of U.S. Military Expenditures," 136.

variable is the index of U.S.-China conflict. The index of U.S.-China conflict is operationalized as the sum of the conflictual scores from Reject (11) to Force (22) events manifested by the dyadic interactions between China and the United States from 1966 to 1992. The interaction data are available in the extended WEIS data set.

Converting WEIS data into a conflict-cooperation continuum, I found that the relatively rare frequencies of conflictual events were obliterated by most of the cooperative events; thus no significant variations could possibly be captured. Therefore, I explored the possibility of re-coding the scales by simply counting the number of conflictual events beginning from Reject (11), which is the eleventh category in the WEIS data set (see appendix 1), with its two subcategories 111 and 112 being coded as value 1 and 2, respectively. Throughout this procedure, I coded the last category Force (22) and its three subcategories 221, 222, and 223 as values 26, 27, and 28, respectively (see appendix 2). After these data transformations, U.S.-China hostility becomes an ordinal variable, which ranges from 1, the least conflictual score, to 28, the most conflictual score. Larger values represent higher levels of conflict or hostility between China and the United States. The lowest raw score of hostility, 1, reflects the occurrence of actions such as turning down proposals or rejecting protests, demands, or threats between the United States and China (detailed in appendix 1); the highest raw score of hostility, 28, reflects military engagement—as at the subcategory 223 (see appendix 1). This study aggregates the hostility scores by each year. Taking the total accumulated scores for each year allows us to detect the impact of the accumulated intensity of U.S.-China hostility on Taiwan's military spending on an annual basis.

The second continuous independent variable is the volatility in the U.S.-China conflict index. To analyze the nature of the U.S.-China relationship and its impact on Taiwan's military spending, this study also employs a volatility variable, which measures fluctuations in the extent of conflict in U.S.-China relations. Specifically, the variable is the variance of the sum of conflict scores in each year. By using these mean scores, I calculate standard deviations and variances for each year. For any given year, a larger variance indicates a more volatile or unstable U.S.-China

relationship.

As far as judging measurement validity is concerned, accuracy is not a given but has to be argued for.⁵¹ This study has demonstrated at least a very strong construct validity by building a theoretical network that surrounds the concept, yet recognizes that the validity of these measurements can always be contested.

Results and Discussion

Statistic Results

Preliminary statistical analyses (see table 1) pertaining to the two competing models posited in this study suggest that the ECM fares better than the BIM. A battery of diagnostic tests (see appendix 3)—such as standard error of regression, Akaike's criteria (AIC), Durbin-Watson statistic, and adjusted R^2 —suggests that the ECM is superior to the BIM. In addition, the ECM not only is able to capture the short-run effects of GNP but also the long-run ones, which are ignored in the BIM. As shown in table 1, the lagged endogenous variable in the BIM becomes insignificant when incorporating the GNP variable. Judging from this fiat, I would like to suggest that the BIM is not a robust model at least in the case of Taiwan (see the statistical outcomes in table 1). This further supports the view that the ECM is a better model relative to the BIM. Therefore, the following discussion will focus mainly on the empirical evidence provided by the ECM (see appendix 4) as demonstrated in table 2.

As shown in table 2, all independent variables except China's annual military spending are statistically significant with appropriate signs. The adjusted R^2 indicates that the ECM can explain more than 90 percent of the variance in Taiwan's military spending.

The findings shown in table 2 strongly suggest four important points. First and foremost, the dyadic interactions show that the U.S.-China hostile-

⁵¹David de Vaus, *Analyzing Social Science Data: 50 Key Problems in Data Analysis* (London: Sage, 2002).

Table 2
ECM Estimates on Taiwan's Military Spending, 1966-92

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Δ Taiwan's GNP (-1)	0.003074	0.000383	8.032618	0.0000
ECM (-1)	-0.293872	0.097832	-3.003843	0.0095
Index of U.S.-China Hostility	1.463099	0.668489	2.188667	0.0461
Δ Taiwan's Savings	4,081.057	1,487.720	2.743162	0.0159
Δ Taiwan's Foreign Investment	93.10624	26.84120	3.468781	0.0038
YR1977	500.1026	241.2861	2.072654	0.0571
YR1984	-769.7153	259.4940	-2.966217	0.0102
YR1987	-2,255.457	277.7492	-8.120484	0.0000
YR1991	-665.9224	256.9485	-2.591657	0.0213
Volatility in U.S.-China Conflict Index (-1)	-8.371837	3.773091	-2.218827	0.0435
C	-53.63775	136.8916	-0.391827	0.7011
R ²	0.942112	Mean dependent variable		319.9200
Adjusted R ²	0.900764	S.D. dependent variable		687.9171
S.E. of Regression	216.7057	Akaike info criterion		13.89514
Sum Squared Residual	657,459.0	Schwarz criterion		14.43144
Log Likelihood	-162.6892	F-statistic		22.78482
Durbin-Watson Statistic	1.903713	Prob (F-statistic)		0.000001

Dependent variable: D(T_MILEXP); **Method:** Least Squares; **Date:** 12/06/01, **Time:** 09:46; **Sample (adjusted):** 1968, 1992; **Included observations:** 25 after adjusting endpoints.

Taiwan's annual fiscal year began in the period under study on July 1. This allows Taiwan's military spending to respond to the level of external threat in a very timely way.

This finding also implies that the higher the hostility in the U.S.-China relationship, the more apt Taiwan would be to increase military spending in order to avoid the risk of entrapment, which occurs when a state is drawn by an ally into a conflict it otherwise would have avoided.⁵³ This also may imply that Taiwan would be more likely to obtain sophisti-

⁵³Sorokin, "Arms, Alliances, and Security Tradeoffs," 421-46.

Table 1
A Summary Test Report

Variable	ECM Score	BIM Score
Δ Taiwan's GNP _{t-1}	0.003***	0.0028***
ECM _{t-1}	-0.29**	
Δ Taiwan's Military Spending _{t-1}		-0.16 (non-significant)
Index of U.S.-China Conflict	1.46*	1.69*
Δ Saving Propensity Rate	4,018.1*	3,866.6*
Δ Foreign Investment as % of GDCF	93.1**	100.5**
YR1977	500.1*	641.9*
YR1984	-2,255.5*	-1,095.9**
YR1987	-769.7***	-2,726.7**
YR1991	-665.9*	-538.3
Valtality in U.S.-China Conflict Index	-8.37*	-2.02
S.E. of Regression	216.7	242.6
AIC	13.895	14.1
Durbin-Watson Statistic	1.903	1.97
Adjusted R ²	0.901	0.87

Significance level: * at 0.05 ** at 0.01 *** at 0.001

ity has a statistically significant impact ($p < .05$) on Taiwan's defense spending. Not China's military outlays but the level of hostility between the United States and China is the major external factor affecting Taiwan's military expenditures. In other words, the U.S.-China hostility has a contemporaneous positive impact on Taiwan's military spending—greater hostility between China and the United States will lead Taiwan to increase its military spending immediately. This implies that a deteriorating U.S.-China relationship is not good for Taiwan in the same calendar year because the latter must spend more funds on its annual military budget, which is not good news for the island's economic prosperity in the long-term perspective.⁵²

This latter finding is interesting because, unlike the United States,

⁵²See Jacques S. Gansler, *Affording Defense* (Cambridge, Mass.: MIT Press, 1991), 79-94.

cated weapons from the United States when the U.S.-China relationship turns sour. This might explain in part why there exists a positive relationship between U.S.-China hostility and Taiwan's military spending.

A second point demonstrated by table 2 is that volatility in the extent of U.S.-China hostility has a statistically significant negative effect on Taiwan's military spending at the time lag $t-1$. In other words, unstable U.S.-China relations in a previous year leads to a lower level of Taiwan's military spending in a current year. This finding implies that when the U.S.-China relationship is stable, Taiwan will increase military spending because Taiwan's leadership will feel increased uncertainty about U.S. commitment toward Taiwan. Conversely, when the U.S.-China relationship is unstable, Taiwan perceives a relatively greater security because Taiwan's leadership is more confident that the United States will stick to its defense commitment and will be less likely to put its economic and commercial benefits in China ahead of its security commitment to Taiwan. This also may imply that the volatile U.S.-China relationship in the last year is in Taiwan's favor because Taiwan will decrease its military spending accordingly, which is conducive to the island's overall economic livelihood.

Third, the relation between Taiwan's military spending and GNP registers a very strong significance at a level of 0.00001 with a t -statistic of 8.03. In other words, growth in GNP is found to be strongly significant in determining Taiwan's military expenditure growth. Also, according to the results in table 2, the ECM operating at time $t-1$ is statistically significant ($p < 0.001$), and suggests that the re-equilibrating adjustment is 29 percent. Put differently, Taiwan's military spending could be buffered from economic downturn, which would erode 29 percent of shock each year (i.e., the external impact will be reduced by about one-third each year over time) until the original level of military spending is realized. This finding further supports the assumption of the "rich country, strong army" argument, i.e., the importance of economic effects on military spending or, in more general terms, national security.

Fourth and finally, Taiwan's savings rate is positively related ($p < .02$) to the growth of military expenditure. Facing a constant military threat from China, Taiwan is more willing to save money to support its military

Table 3
Variable Control for Major Political Shocks, 1966-92

Year	Major Political Events
1977	<ol style="list-style-type: none"> 1. Mao Zedong (毛澤東) died in 1976. 2. Chungli (中壢) political uprising occurred in Taiwan in December 1977.
1984	<ol style="list-style-type: none"> 1. Chiang Nan (江南) political incident occurred in the United States. 2. Ronald Reagan visited Beijing and restated his "six assurances" to Taiwan.
1987	<ol style="list-style-type: none"> 1. The Democratic Progressive Party (DPP, 民主進步黨) established in September 1986. 2. Taiwan lifted martial law in July 1987. 3. Chiang Ching-kuo (蔣經國) passed away in January 1988; Lee Teng-hui (李登輝) stepped into power.
1991	<ol style="list-style-type: none"> 1. Strait Exchange Foundation (SEF, 海峽交流基金會) in Taiwan and Association for Relations Across the Taiwan Strait (ARATS, 海峽兩岸關係協會) in China were established. 2. Taiwan renounced the use of force for the pursuit of national unification.

buildup to counter external threats. This finding is consistent with Benoit's psychological-linkage explanation that people are more likely to save in threatening situations, especially when facing the possibility of war.⁵⁴ In addition, a high savings rate can be allocated to physical investment or capital provisions that further increase a nation's capital stock and reinforce GNP growth that leads to the growth of military spending.⁵⁵

This is analogous to the positive relation between Taiwan's foreign investment and Taiwan's military spending ($p < 0.01$). Foreign investment provides very important support to finance a military buildup necessary to alleviate external threats. The positive relationship between Taiwan's military spending and foreign investment supports this hypothesis.

The dummies for 1977, 1984, 1987, and 1991 are all statistically significant in the expected directions. The major events that occurred in these years are listed in table 3.

⁵⁴E. Benoit, "Defense and Economic Growth in Developing Countries," *Economic Development and Cultural Change* 26 (1978): 271-80.

⁵⁵Steve Chan and Cal Clark, *Flexibility, Foresight, and Fortuna in Taiwan's Development: Navigating between Scylla and Charybdis* (New York: Routledge, 1992), 113.

These four dummy variables are controlled for statistically technical reasons. The graphical analyses show that the data derived in these four years generate some noise among the residuals, which are out of the 2-standard-error boundary, while the cases in 1972 and 1979 as pointed out are within it. To clean up this noise and give the model a better fit, these dummy variables must be controlled in the ECM.

With the exception of 1977, these political events as listed in table 3 all had negative effects on the growth of Taiwan's military spending. The political events listed in 1977, because they created higher perceived threats to Taiwan's external and internal security, resulted in a higher level of military spending—a finding that supports the argument of this study.

In sum, the ECM provides a clear picture of Taiwan's military spending, which is strongly affected by both perceived external threats and internal economic factors. The hypotheses posited by this study so far are strongly supported by the statistical outcomes. Before final conclusions can be drawn, however, the size of the effects must be determined.

Assessing the Size of Effects

In addition to the above discussion of the significance of variables, we must also assess the substantive importance of these statistics by examining the effects of changes in the independent variables on the dependent variable. This procedure is warranted since a significant or non-zero effect can still be quite trivial in terms of its coefficient and size of effect. Examination of substantive importance is no easy task, however, because of the various measurements and variability existing in the independent variables of interest. Fortunately, the coefficients in the ECM estimated in table 2 are a linear function; therefore, the calculation of the size of major effects is straightforward, as illustrated in figure 2.

As shown in figure 2, the U.S.-China Conflict Index exercises a substantial effect. The mean (range: 13-327) is 124, with an impact of 181 million (U.S. dollars) on Taiwan's military spending. This coefficient indicates that a one score increase in U.S.-China hostility would make Taiwan's military spending rise by 1.46 million. The difference between the smallest conflict score, 13, to the largest score, 327, would be associ-

Figure 2
Effect of U.S.-China Hostility

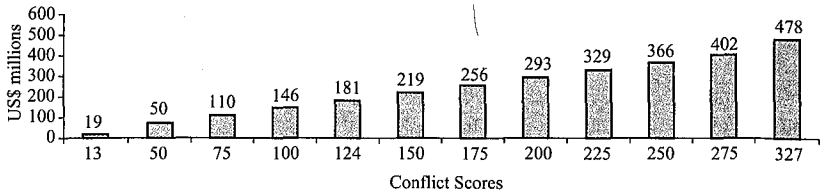
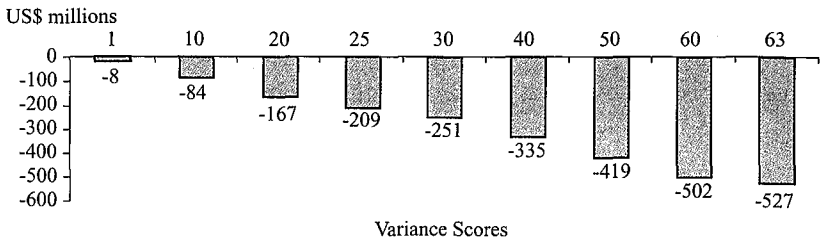


Figure 3
Effect of U.S.-China Volatility

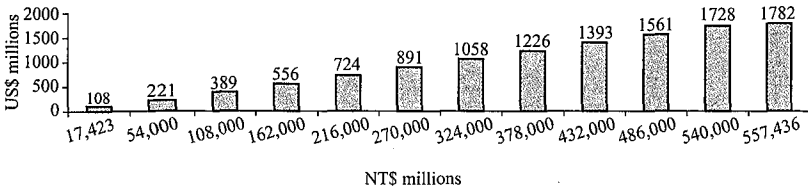


ated with an almost 459 million increase in Taiwan's military spending over time.

Second, the mean volatility expressing the unstable relationship between China and the United States is 25 (range 1-63), which would lead to a 209 million decrease in Taiwan's military spending (see figure 3). On average, a one unit increase of volatility in the U.S.-China relationship would make Taiwan's military spending drop by 8.24 million. The difference between the largest score and the smallest score would be associated with a 519 million decrease in Taiwan's military spending over time.

Third, the magnitude of GNP effects—both short- and long-run—should be taken into account separately. The long-run is a state of cointegrating equilibrium where GNP and Taiwan's military spending are in balance and there is no tendency to change, while the short-run depicts the

Figure 4
Taiwan's Annual GNP—Short-Run Effect



disequilibrium state where adjustment to the equilibrium is occurring.⁵⁶ The calculation of GNP's short-run impact is relatively easier to estimate than in the long-run. To estimate GNP's long-run effect, one needs to calculate the coefficient parameters in the ECM in advance.⁵⁷

As shown in figure 4, an increase in Taiwan's GNP (short-run effect) from a value of 0.17423 trillion to 5.57436 trillion (New Taiwan dollars) would increase Taiwan's military spending by 108 million (U.S. dollars) in the first year, and by 1.782 billion over time. In contrast to the long-run effect, I derive a coefficient $\beta_1 = .0068$ of long-run effect relative to .0031 of the short-run. Judged from almost the double magnitude of the long-run coefficient than that of the short-run, one can predict that the long-run impact should be larger than that of the short-run.

⁵⁶Richard Harris, *Cointegration Analysis in Econometric Modeling* (New Jersey: Prentice Hall, 1995), 25.

⁵⁷The calculation of the long-run effect is as follows:

$$\Delta Y_t = B_0 + B_1 \Delta X_t - \alpha(Y_t - C_0 - C_1 X_t)_{t-1} + E_t$$

$$Y_t - Y_{t-1} = B_0 + B_1(X_t - X_{t-1}) - \alpha Y_{t-1} + \alpha C_0 + \alpha C_1 X_{t-1}$$

$$Y_t = Y_{t-1} + B_0 + B_1 X_t - B_1 X_{t-1} - \alpha Y_{t-1} + \alpha C_0 + \alpha C_1 X_{t-1}$$

$$Y_t = (1 - \alpha) Y_{t-1} + B_0 + B_1 X_t + (\alpha C_1 - B_1) X_{t-1} + \alpha C_0$$

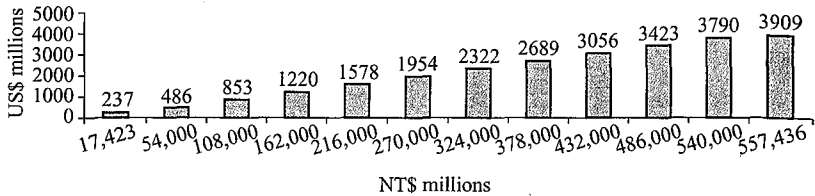
$$\text{short-run effect} = B_1 = 0.0031$$

$$\text{long-run effect} = B_1^* = B_1 + (\alpha C_1 - B_1)/(1 - \alpha) = \alpha C_1/(1 - \alpha)$$

$$\text{Given ECM coefficient } \alpha = -.2939 \text{ and } C_1 = .0016$$

$$\therefore B_1^* = .2939 * .0016 / (1 - .2939) = .0068$$

Figure 5
Taiwan's Annual GNP—Long-Run Effect



Here one can see that if the GNP coefficient estimate accurately takes the error correction mechanism (cointegrating relationships) into account, the minimum impact of the parameter change would be from 108 to 237 million in the first year. The over-time impact of that consideration would be about a 3.909 billion increase in Taiwan's military spending. The difference between the long- and short-run effects is about 2.127 billion over time (see figure 5). Such a huge difference further justifies the adequacy of the ECM employed in this study.

Finally, one should note that any sizable change in Taiwan's military spending would often be the result of changes in different combinations of these major variables and control variables when other things are held equal. Nonetheless, examinations of the substantive importance of each parameter do convincingly demonstrate that many of the independent variables analyzed in this study have decidedly nontrivial effects on Taiwan's military spending.

Conclusions

As suggested by this study, the U.S.-China relationship has statistically significant, substantively important effects on Taiwan's military spending. According to the findings, Taiwanese perceptions of external threat, along with domestic economic strength, are the key factors in determining the dynamics of Taiwan's military spending.

The contemporaneous and positive impact of U.S.-China hostility on

Taiwan's military spending implies that a hostile U.S.-China relationship is not good for Taiwan because the island must spend more funds on military buildup, which is bad news for its economic prosperity. Conversely, a better U.S.-China relationship is beneficial to Taiwan in the short term because hostility has an immediate impact on Taiwan's military spending in the same calendar year.

In contrast, the U.S.-China volatility has a lagged (time $t-1$) and negative impact on Taiwan's military spending, implying that a volatile U.S.-China relationship is in Taiwan's favor because it may prompt Taiwan to decrease military spending, which, in turn, is conducive to the island's overall security and economy in the long term. These two statistical findings indicate the complexity of how the U.S.-China relationship affects Taiwan's military spending. As mentioned in the beginning of this study, three contrasting scholarly views are heatedly debated, and answers to these questions have baffled policymakers in Washington, Beijing, and Taipei. However, the empirical evidence provided by this study suggests that Taiwan's defense spending behavior implies that a hostile U.S.-China relationship is harmful to Taiwan in the same calendar year while a volatile U.S.-China relationship in one year is in Taiwan's favor as it would be associated with a lower level of military spending in the next year. This finding may explain why U.S.-PRC normalization in 1979 indicated a lower degree of hostility but a high volatility between the United States and China. As expected, this normalization did result in a decrease in Taiwan's military spending the following year (1980). In other words, the immediate impact of hostility alone cannot fully capture the dynamic interactions between the United States and China; one also needs to take the impact of historical volatility into account in order to gain a complete understanding of the effects of U.S.-China relations on Taiwan's military spending.

According to these statistical findings, this study further suggests that if the well-being of Taiwan is a key consideration, the United States should establish cooperative instead of competitive relations with China, while forging stronger and closer ties with Taiwan. The former will reduce Taiwan's perception of the risk of entrapment, and the latter will relax Taiwan's worries about the risk of abandonment. Furthermore, an im-

proved U.S.-China relationship and stronger U.S. commitment to Taiwan's security will encourage Taiwan to engage more confidently with China politically as well as economically. This not only will lead Taiwan to spend less on military buildup and prevent a possible arms race from taking place, but will also promote mutual understanding and cooperation between China and Taiwan. An improved China-Taiwan relationship, in turn, is in the interest of the United States because it will greatly reduce the dangerous possibility of direct military confrontation between the United States and China, and will eventually contribute to the security and stability of the Asia-Pacific region as a whole.

Six Recommendations for Future Research

Finally, the findings discussed above prompt recommendations for future research. First, the WEIS data set should be updated to the present, allowing for a much larger time frame for analysis. Meanwhile, different sources of data—such as military expenditures and U.S.-China dyadic interactions—should be employed to cross-check the robustness of empirical evidence reached by the ECM introduced by this study. This analysis employed the military expenditure data collected by the U.S. Arms Control and Disarmament Agency. However, other available data sources—such as China's and Taiwan's official statistical data books and the Stockholm International Peace Research Institute data—also should be employed in order to provide multiple measures of military spending.

U.S.-China dyadic interaction data collected from the WEIS data set should be compared with the Brecher and Wilkenfeld International Crisis Behavior Project data set from 1918 to 1997, available from the Inter-University Consortium for Political and Social Research (ICPSR). In addition, Azar's Conflict and Peace Data Bank (COPDAB)⁵⁸ from 1948 to 1978 could be merged with the WEIS data set; thus a longer time span

⁵⁸Edward E. Azar, "Conflict and Peace Data Bank (COPDAB), 1948-1978" (Computer file), 3rd release (Produced by University of Maryland Center for International Development and Conflict Management, College Park, Maryland, 1993; distributed by Inter-University Consortium for Political and Social Research, Ann Arbor, Michigan, 1993).

can be created to overcome the over-determination or the problem of having both too many variables and too small a sample size. By using and comparing different sources of data, future studies can re-estimate and extend the research presented in this article.

Second, although this study suggests that China's military spending does not have statistically significant effects on Taiwan's military spending, it is remiss to say that China's military capability has no relationship to Taiwan's security. Perhaps, the impact of military capability does not stem from military spending per se but rather weapons counts. It is plausible that China does not necessarily change its military expenditures the same way Taiwan changes its expenditures (or vice versa). For example, China often reacts to an increase in Taiwan's military spending by improving weapons destructiveness without showing any apparent increase in its military budget. Therefore, one must be skeptical about findings in previous studies that are based on analyses of China's military spending.

Future studies may begin with the approach that weapons stockpiles—in particular the number of ballistic missiles aimed at Taiwan—are a better single measure of the external threat posed by the PRC to Taiwan.

Third, the results published in this study should be investigated by additional statistical analyses of other relevant relationships. If it is true that Taiwan is only a pawn of the United States as described by this study, then Taiwan's interactions with China should be affected by U.S.-China dyadic interactions. For future studies, the Weak Exogeneity Test should be employed to investigate whether the U.S.-China relationship is exogenous to the Taiwan-China relationship. In contrast, if the United States is more likely to sell sophisticated weapons to Taiwan when the U.S.-China relationship is unstable, then there should exist a negative correlation between the total amount of U.S. arms sales to Taiwan and the volatility of the U.S.-China relationship. In other words, a simple negative correlation coefficient should be observed between them.

Fourth, the uncertain reliability of U.S. commitment has caused Taiwan to probe the strength of U.S. resolve to defend Taiwan. Future studies should investigate such factors as American public opinion, Congressional involvement in the Taiwan issue, regime changes, and human rights effects

that have directly led to U.S. intervention in the Taiwan Strait in the past and which are apt to increase or decrease the probability of future U.S. intervention in the Taiwan Strait.

Fifth, apart from the United States, Japan's role in Taiwan security also should have some influence on Taiwan's military spending. Given the island's status as Japan's former colony and important economic partner, Japan has been Taiwan's second most important supporter. Under the revision of the 1978 U.S.-Japan security guidelines, Japan can provide support, including the supply of fuel and the transport of soldiers, for U.S. forces in areas surrounding Japan when Japan's peace and security is threatened. Thus, Japan's attitude and commitment toward Taiwan is another external factor requiring further exploration.

The sixth and last recommendation is to construct a forecasting model. For example, one might employ a transfer function model developed by Box and Jenkins⁵⁹ where the U.S.-China relationship is the input variable and Taiwan's military spending is an output variable. This model is designed to capture the input-output relationship between time series, and is thereby able to establish the dynamic nature of the process between the U.S.-China relationship and Taiwan's military spending. By manipulation of the input variable, one can determine by how much and over how many years Taiwan's military spending is going to change as a result of increases in the level of hostility between the United States and China.

⁵⁹George E. Box and Gwilym Jenkins, *Time Series Analysis, Forecasting and Control*, revised edition (San Francisco: Holden-Day, 1970).

Appendix 1

WEIS International Event Codes

Yield (01)	
011	Surrender, yield or order, submit to arrest, etc. This category requires explicit statement/action.
012	Yield position, retreat, evacuate. This category involves actual physical movement.
013	Admit wrongdoing; retract statement.
Comment (02)	
021	Explicit decline to comment by an official spokesperson. This category does not include a reported "failure to comment."
022	Comment on situation—pessimistic. This category is used only when the actor explicitly expresses the feeling that the situation is adverse or foreboding.
023	Comment on situation—neutral.
024	Comment on situation—optimistic. This category is used only when the actor explicitly expresses the feeling that the situation is favorable.
025	Explain policy or future position. This category is used when governments express their goals, hopes, policies, or future plans to others.
Consult (03)	
031	Meet at neutral site, or send note (including meetings between a resident ambassador and the host country). This category applies, in addition, when notes are sent between nations but their content is unknown.
032	Visit, go to.
033	Receive visit, host.
Approve (04)	
041	Praise, hail, applaud, condole. This category includes "politeness" events such as expressions of gratitude, condolences, and ceremonial salutations.
042	Endorse other's policy or position, give verbal support.
Promise (05)	
051	Promise own policy support.
052	Promise material support. This category specifies men and/or resource aid forthcoming.

Appendix 1 (Continued)

-
- | | |
|-----|---|
| 053 | Promise other future support action. |
| 054 | Assure, reassure. This category is used for expressions or reiterations of earlier pledges. |
-

Grant (06)

-
- | | |
|-----|--|
| 061 | Express regret, apologize. |
| 062 | Give state invitation. |
| 063 | Grant asylum. This category includes both the announcement of a policy and reported cases of granting of refuge to nationals of other countries. |
| 064 | Grant privilege, diplomatic recognition, de facto relations, etc. |
| 065 | Suspend negative sanctions, truce. |
| 066 | Release and/or return persons or property. |
-

Reward (07)

-
- | | |
|-----|---|
| 071 | Extend economic aid (as gift and/or loan). |
| 072 | Extend military assistance. This category includes both men and materials. Joint military training exercises are also coded in this category. |
| 073 | Give other assistance. |
-

Agree (08)

-
- | | |
|-----|--|
| 081 | Make substantive agreement. |
| 082 | Agree to future action or procedure, or agree to meet/negotiate. This category includes the acceptance of invitations from other states. |
-

Request (09)

-
- | | |
|-----|---|
| 091 | Ask for information. |
| 092 | Ask for policy assistance. |
| 093 | Ask for material assistance. |
| 094 | Request action, call for. This category includes bids from United Nations membership and requests for asylum. |
| 095 | Entreat, plead, or appeal to. This category applies to requests made from a distinctly suppliant position, with the actor nation pleading for aid or support. |
-

Propose (10)

-
- | | |
|-----|-----------------|
| 101 | Offer proposal. |
|-----|-----------------|
-

Appendix 1 (Continued)

102	Urge or suggest action or policy.
Reject (11)	
111	Turn down proposal, reject protest demand, threat, etc.
112	Refuse, oppose, or refuse to allow.
Accuse (12)	
121	Charge, criticize, blame, disapprove.
122	Denounce, denigrate, abuse. This category often applies when derogatory adjectives embellish the accusation.
Protest (13)	
131	Make complaint (not formal).
132	Make formal complaint or protest. Protests are assumed to be formal unless otherwise stated.
Deny (14)	
141	Deny an accusation.
142	Deny an attributed policy, action role, or position.
Demand (15)	
150	Issue order or command, insist, demand compliance, etc.
Warn (16)	
160	Give warning. Occasionally the words "demand" or "threaten" are used in news items which should be coded as warnings.
Threaten (17)	
171	Threat without specific negative sanctions.
172	Threat with specific nonmilitary negative sanctions.
173	Threat with force specified.
174	Ultimatum, threat with negative sanctions and time limit specified.
Demonstrate (18)	
181	Nonmilitary demonstration, to walk out on. This category applies to activities such as marching, picketing, stoning, etc., when they are performed by citizens of one nation against another nation. The category also includes occasions when representatives to international meetings walk out in protest.

Appendix 1 (Continued)

182 Armed force mobilization. Exercises and/or routine ceremonial displays such as weapons parades and "fly-bys" are not included in this category.

Reduce Relations (as negative sanctions) (19)

191 Cancel or postpone planned event.

192 Reduce routine international activity, recall officials, etc. Events coded in this category must be connected with some ongoing international problem, thus the usual rotations of foreign service officers or normal changes in foreign aid are not regarded as "reduction of relations." Embargoes, bans, and smaller activities do fall within this category.

193 Reduce or halt aid.

194 Halt negotiations.

195 Break diplomatic relations.

Expel (20)

201 Order personnel out of country. This category includes the expulsion of foreign individuals and the declaration of individuals as *persona non grata*.

202 Expel organization or group.

Seize (21)

211 Seize position or possessions. The category also may be used when a nation militarily takes or occupies another's territory.

212 Detain or arrest person(s).

Force (22)

221 Noninjury obstructive act. When actual physical destruction is reported, demonstrations are coded in this category.

222 Nonmilitary injury-destruction. This category also includes acts not committed by organized military forces such as terrorist bombings.

223 Military engagement. Notice that this category may often be "double-coded" because when two nations battle, each is an actor and each is a target of force.

Appendix 2

CUDYAD/CTDYAD Variable Recoding Scheme

if (var3 = 'REJ1')	dyad = 01
if (var3 = 'REJ2')	dyad = 02
if (var3 = 'ACC1')	dyad = 03
if (var3 = 'ACC2')	dyad = 04
if (var3 = 'PTT1')	dyad = 05
if (var3 = 'PTT2')	dyad = 06
if (var3 = 'DNY1')	dyad = 07
if (var3 = 'DNY2')	dyad = 08
if (var3 = 'DMD1')	dyad = 09
if (var3 = 'WRN1')	dyad = 10
if (var3 = 'THR1')	dyad = 11
if (var3 = 'THR2')	dyad = 12
if (var3 = 'THR3')	dyad = 13
if (var3 = 'THR4')	dyad = 14
if (var3 = 'DEM1')	dyad = 15
if (var3 = 'DEM2')	dyad = 16
if (var3 = 'RDC1')	dyad = 17
if (var3 = 'RDC2')	dyad = 18
if (var3 = 'RDC3')	dyad = 19
if (var3 = 'RDC4')	dyad = 20
if (var3 = 'RDC5')	dyad = 21
if (var3 = 'EXP1')	dyad = 22
if (var3 = 'EXP2')	dyad = 23
if (var3 = 'SZE1')	dyad = 24
if (var3 = 'SZE2')	dyad = 25
if (var3 = 'FOR1')	dyad = 26
if (var3 = 'FOR2')	dyad = 27
if (var3 = 'FOR3')	dyad = 28

Appendix 3

Diagnostic Outcomes of Ramsey's Test

Ramsey's RESET Test is an omnibus test for autocorrelation, heteroskedasticity, and nonnormal disturbances. It helps one to identify specification errors such as (1) omitted variables (i.e., the right-hand side variables) not including all relevant variables; (2) incorrect functional form—for instance, some or all of the variables in Y and X should be transformed to logs, powers, or reciprocals; and (3) correlation between independent variable and the error term, which may be caused by such things as measurement error in the independent variable, simultaneity, incorporation of lagged endogenous variable, and autocorrelation.*

*Source: *Eviews User's Guide*, Version 3.1 (Irvine, Calif.: Quantitative Micro Software, 1997), 228-29.

Ramsey RESET Test on Specification and Stability of ECM

Ramsey RESET Test:

F-statistic	0.038121	Probability	0.848218
Log likelihood ratio	0.073203	Probability	0.786729

Test Equation:

Dependent Variable: D(T_MILEXP)

Method: Least Squares

Date: 12/06/01 Time: 19:40

Sample: 1968, 1992

Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(T_GNP(-1))	0.002962	0.000700	4.228060	0.0010
ECM(-1)	-0.280583	0.122103	-2.297915	0.0388
UC_HOSTILITY	1.389946	0.787542	1.764918	0.1010
D(T_SAVING)	3974.828	1634.813	2.431366	0.0303
D(T_FORINV)	90.77839	30.26133	2.999815	0.0102
YR1977	484.8203	261.9934	1.850506	0.0871
YR1984	-788.5143	285.6138	-2.760771	0.0162
YR1987	-2368.394	646.0791	-3.665796	0.0029
YR1991	-632.4980	316.5429	-1.998143	0.0671
UC_VARIANCE(-1)	-8.007584	4.332084	-1.848437	0.0874
C	-47.82844	144.9381	-0.329992	0.7467
FITTED^2	3.33E-05	0.000171	0.195247	0.8482

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R ²	0.942282	Mean dependent variable		319.9200
Adjusted R ²	0.893443	S.D. dependent variable		687.9171
S.E. of regression	224.5571	Akaike info criterion		13.97221
Sum squared residual	655536.7	Schwarz criterion		14.55727
Log likelihood	-162.6526	F-statistic		19.29380
Durbin-Watson statistic	1.939041	Prob (F-statistic)		0.000003

Appendix 4 ECM Testing Procedure

Following the procedures, I conclude that both T_MILEXP and T_GNP series are nonstationary and cointegrate. Thus, it is appropriate to model them in error correction form. This allows us to study both short- and long-term relationships between the variables as shown in the following equation:

- (1) $\Delta T_MILEXP_t = B_0 + B_1 \Delta T_GNP_t - \alpha (T_MILEXP - C_1 T_GNP)_{t-1} + E_t$ 1) ΔT_MILEXP_t and ΔT_GNP_t are stationary variables.
- (2) $\alpha (T_MILEXP - C_1 T_GNP)_{t-1}$ is the error correction mechanism (ECM), which is a stationary linear combination of Taiwan's GNP and military spending. The ECM operates with a lag of 1 period, and it captures the long-term relationship between both the dependent variable and the independent variable while ΔT_GNP captures the short-term relationship.
- (3) As described above, α must carry a negative sign, implying that shocks to T_MILEXP will be adjusted or re-equilibrated in subsequent periods by the co-integrating relationship between T_GNP and T_MILEXP. The adjustment rate is determined by the magnitude of α , which ranges between negative 1 and 0.

Issues & Studies

An International Quarterly on China, Taiwan, and East Asian Affairs

INTERNSHIP OPPORTUNITY

Issues & Studies is pleased to offer an internship opportunity in our editorial department. Applicants should be a graduate student in a social science department, be a native English language-speaker, and preferably have research experience in issues related to China, Taiwan, or East Asia.

This unpaid internship is on a semester-basis (fall/spring/summer), with free room & board as well as office, computer, and internet access provided in exchange for part-time help in various duties related to journal publishing.

Interested candidates should contact Andrew D. Marble, *Issues & Studies* Deputy Managing Editor, at <adm@ms2.seeder.net>.

Institute of International Relations (IIR)
Taipei, Taiwan (ROC)