Statistical Sampling in Auditing

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1. INTRODUCTION

In every audit the accountant performs, he must make sufficient tests of the records to support his opinion on the fairness of the financial statements. The auditor must not test an excess number of items to form his opinion nor test too few transactions. He must find a median which will keep the cost reasonable for the client and yet will allow the auditor to test enough transactions to substantiate his opinion. In this paper, the advantages of statistical sampling methods will be discussed along with illustrations of the ways the auditor can use statistical testing methods.

2. GENERALLY ACCEPTED AUDITING STANDARDS

Generally accepted auditing standards require that for each audit "there is to be a proper study and evaluation of the existing internal control as a basis for reliance thereon, and for the determination of the resultant extent of the tests to which auditing procedures are to be restricted."[1] The AICPA's Committee on Statistical Sampling believes that statistical methods can be used in the evaluation of compliance with internal control procedures for items which leave an audit trail such as vouchers and sales invoices. The committee is of the opinion that

samples taken for this purpose should be evaluated in terms of the frequency and nature of deviations from any procedures the auditor considers essential to his preliminary evaluation of internal control, and that their influence on his final evaluation of internal control should be based on his judgment as to the effect of such deviations on the risk of material errors in the financial statements.[2]

Obviously, for reviewing internal control procedures which don't leave an audit trail such as the segregation of duties, statistical sampling methods are not useful.

Generally accepted auditing standards also require that "sufficient competent evidential matter is to be obtained . . . to afford a reasonable basis for an opinion regarding the financial statements under examination."[3] The relative strength or weakness of the system of internal control will determine the amount of evidential matter which will have to be gathered. Statistical methods which will show the amount of evidential matter that must be gathered will be discussed in a later section. Statistical sampling methods allow the auditor to place more reliance on the evidence he has accumulated because it has been gathered on the basis of mathematical probability which makes it more representative of the entire amount.

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[1] American Institute of Certified Public Accountants. *Generally Accepted Auditing Standards,* c. 1963, p. 16.

[2] "Relationship of Statistical Sampling to Generally Accepted Auditing Standards," *The Journal of Accountancy,* Vol. 118 (July, 1964), p. 58.

[3] AICPA, *op. cit.*

Egyptian policy abruptly shifted for a number of reasons not all of which are readily identifiable. One possible explanation was the need to respond to Jordanian-Saudi charges of softness by taking some concrete though incremental action against Israel. If this was the only motivating factor, then Nasser's subsequent steps represented too rapid an escalation, in view of the grave risks involved. As mentioned earlier.

CONCLUSION

In an attempt to explain Nasser's decision to close the straits of Tiran with its consequences, we applied the three models used by Graham T. Allison in his study on the Cuban missile crisis.

In the rational model, it was illustrated why Nasser decided to close the Straits of Tiran, his objective to deter potential Israeli attack on Syria, the alternatives he had, and the actions he selected as means to achieve his objective.

In the organizational process, the structure of the Egyptian government was explained. The role of the military in Egypt's decision-making process, and its control of the govermental organizations were also illustrated. Finally, it was pointed out how these factors helped in bringing to Nasser misleading information about the real strength of his army and which led him to base his decision on that fact.

Finally, it was shown how another model, the bureaucratic politics, can be used to describe Nasser's decision. It was shown how the political bargaining internally, especially among the military elite, and externally, in the wider politics of the Arab world, was the essential element to bring about that decision by Nasser.

Thus the decision of any given decision-maker can be approached by three different models, and the same decision can be explained by different, and sometimes contradictory, reasons.

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17. Dekmejian, *op. cit.,* p. 239.
18. Howard and Hunter, *op. cit.,* p. 14.
19. Nasser, *op. cit.,* pp. 13–14.
20. Allison, *op. cit.,* pp. 162–164.
21. Kerr, *op. cit.,* p.16.
22. Howard and Hunter, *op. cit.,* p. 19.
23. Nasser, *op. cit.,* p. 9.

viewed in the Arab world as a major deterrent to Israeli intervention in Jordan or Syria (21). The circumstances in which the May 1967 crisis arose, in which Nasser attempted to pose this deterrent on behalf of Syria, illustrate the point precisely. Thus the possession of a supposedly powerful army and air force led the Government at length into a tangle of moral and contractual commitments to Syria and Jordan. That severely limited the U.A.R.'s ability to keep clear of risks of a war with Israel for which she was not really prepared.

Besides the role of the army and the military elite which, virtually, control the decision-making process in the U.A.R., another factor played a crucial role in bringing about Nasser's decision. This factor is related to the inter-Arab relations, and to the conflict among the Arab regime in their seeking for the masses' support by appealing to the most sensitive and effective issue in Arab's modern history, that is the issue of Palestine. Both Syria and Jordan complained loudly of the Egyptian failure to do anything to help them, taunting Nasser with sheltering behind the U.N.E.F. After the mounting tensions and the military clashes between Syria and Israel, pressure from all over the Arab world was mounting on Nasser to do something. Critics and admirers alike were agreed that Egypt had too long enjoyed the protection of the U.N.E.F. in Gaza and Sinai. Why did he not at least close the Straits of Tiran to Israeli shipping? Amman Radio had taunted Nasser, in very typical fashion, with the dilemma he faced. "This is the question all Arabs are asking: Will Egypt restore its batteries and guns and close its territorial waters in the Tiran Straits to the enemy? Logic, wisdom, and nationalism make it incumbent on Egypt to do so...If she fails to do so, what value would there be in military demonstrations?" (22) Another factor was in the process. Nasser's alliance with Syria had backfired: instead of restraining Syria from provoking Israel, it had

had the effect of increasing the Syrian's boldness and saddling him with the responsibility of coping with Israel's threats of retaliation. If he tried to deter Israel he risked war; if he left the Syrians unprotected he revealed himself to the Arabs as untrustworthy, irresolute, and incapable of providing protection. He chose to run the risks of deterrence.

First of all, we demanded the withdrawal of the U.N.E.F. Then we once again exercised the right of Egyptian sovereignty over the Gulf of Agaba. We had been pressed many times prior to that date by our Arab brothers to take this move. Naturally, the move had many effects both regionally and internationally (23).

What is presented here is a brief analysis of the most visible factors in the conflict which had a direct bearing on the Egyptian political system. Of these, the role of the Palestine Liberation Organization (PLO) and the continuing struggle among the Arab states were perhaps the most important. One of the primary catalysts that triggered the fateful process of events leading to the June War was the PLO and its units operating against Israel.

In keeping with its traditional practice of massive retaliation, on 13 November 1966, Israel attacked the Jordanian village of Samu, reportedly a guerrila base. One immediate effect of the raid was an intensification of the Arab cold war. The border conflict continued unabated during the first four months of 1967 mainly along Israel's frontiers with Syria and Jordan. The Egyptian border, guarded by U.N.E.F. units, remained conspicuously quiet, as it had been since 1956.

In early April 1967,Egypt's de facto hands-off policy came under growing challenge by Jordan and Saudi Arabia as being "soft toward Israel". Indeed, because of its domestic economic problems and military involvement in the Yeman, the leading Arab State had done little to provoke Israel, except rhetorically. However, by mid-May

responsibilities under the Mutual Defense Pact with Syria. The information he had from his organization about the Israeli troops against Syria, the information he had about the readiness of his own army. All these factors led Nasser toward his decision to act in response to Israel's threat, and the actions followed subsequently and logically.

In the final analysis we have the organizational implementation of the orders. Nasser said:

> *On Friday, June 2, I went to the High Command of the Armed Forces and attended a meeting of the high military officials. I explained to them my viewpoint before I heard their explanation of the situation. I stated at the meeting that we should expect a blow from the enemy within 48 or 72 hours, a blow that would never be delayed for after this time limit. I said this on the basis of the developments that took place. I also said that I expect that the aggression would take place on Monday, June 5, and that the first blow would be dealt at out Air Force (19).*

Apparently, the organizational implementations, specifically in the armed forces, were far from the President's orders and warnings. It is another evidence of the difference between the decision-maker orders and the organization's actual implementations.

MODEL III: BUREAUCRATIC POLITICS

A third model, by which Nasser's decision to close the Straits of Tiran can be explained, is the bureaucratic politics model. Governmental behavior can be understood according to a third conceptual model not as organizational outputs, but as outcomes of bargaining games. In contrast with Model I, the bureaucratic politics Model sees no unitary actor but rather many actors as palyers, who focus not on a single strategic issue but on many diverse intra-national problems as well, in terms of no consistent

set of strategic objectives, but rather according to various conceptions of national, organizational, and personal goals, making government decisions not by rational choice but by the pulling and hauling that is politics. Model III's explanatory power is achieved by revealing the pulling and hauling of various players, with different perceptions and priorities, focusing on separate problems, which yielded the outcomes that constitute the action in question (20).

To understand Nasser's decision as a bureaucratic bargaining outcome, it is necessary to point out that the bargaining process in this particular case involved internal and external elements which played an essential role in the bargaining process. This fact can be understood if we keep in mind the special characteristic of the political system in Egypt, and the other Arab countries and the relations between them.

We have already mentioned the army role in the organizational structure of Egypt. Therefore, the army presents a strong bargaining power. Throughout the years after the 1952 coup, the army officers tried to strengthen the tendency to build up the military establishment. Thus it seems likely that arms were acquired, and the ranks of the military services expanded, not only because of demonstrable national need but also to satisfy the organizational appetite of the corps of military officers. But once these resources were in their hands, it behooved the military leadership, politically and psychologically, to justify what they had given, by emphasizing the utility of Egypt's military power as an instrument of foreign policy. Two notable kinds of utility, intervention and prestige, thus gained added emphasis.

As for intervention, the primary and obvious case is the Yemen war. Distinguished from intervention has been the use of the military machine for prestige purposes. Here, the significant case in point has been the confrontation with Israel. Egyptian military strength before 1967 was widely

The president had been an officer, as were all of the vice presidents. The five men who successively occupied the premiership were also ex-officers. In addition, several key ministries — Defense, Local Adminis-tration, Military Production and the Ministry of State (for Intelligence)—have been headed by officers from the very outset. The highly sensitive Interior Ministry be-came the preserve of ex-officers. The Ministry of National Guidance, the state's supreme propaganda agency, had been headed by ex-officers since 1958 (15).

In retrospect, three basic control strategies have been discernible since the military's direct involvement in government begin-ning in 1953. The first and crudest strategy was outright takeover of key ministries by leading RCC members, who employed civilians as sources of expert advice in second-level slots. In later years, as vice presidents and deputy premiers in charge of clusters of ministries, or "sectors", the leading officers continued to exercise direct supervisory functions over the subordinate ministries, which were often headed by civilians. The second strategy employed was to maintain a military presence in the civilian-led ministries by placing officers in number two positions. Depending on the organizational make-up of the parti-cular ministry, the military appointment could come at the deputy minister (a cabinet post), or undersecretary (below cabinet) level.

The military's most ingenious method to maintain control centered on the appoint-ment of a new breed of officers identified here as "officer-technocrats". Most of these men began to appear in leading positions in the late 1950's and soon achieved cabinet or higher status, often displacing civilians and other military men. In essence, the rise of the officer-technocrats was the military's answer to its civilian critics. For now the mili-tary had trained its own experts to cope with the new and diverse complexities of an indus-trializing society. Through these men the military could extend its scope of effective

control further than ever, simultaneously reducing its reliance on the civilian experts (16).

After the unexpected cabinet shake-up of 10 September 1966, ex-officers not only controlled almost half of the cabinet posts, but also the most important ones which included industry, communication, and supply and internal trade. The rise in the military component could have been a mani-festation of Nasser's desire to take a more active and comprehensive role in policy formulation and/or the need to placate the army. One should also note the appointment of General Shams al-Din Badran as war minis-ter, the significance of which was not fully understood at the time. The appointment of Badran represented a victory for First Vice-President Marshall Amir, whose strange on-off relationship with the president after 1961 remained a secret until the June War. As a close associate of Amir, Badran was instru-mental in further isolating the army from direct presidential control (17).

Thus the decision-making process was controlled by the military elite. The out-puts of the different organizations would be logically, shaped by the military elite view and images. The information would come from military-controlled organizations. The information about Israel's intention to attack Syria came from different sources. First, on May 13, Mr. Eshkal de-clared, both in press conference and in a live broadcast, that Israel would react in her own fashion to the harassing of her borders. At the same time General Rabin, speaking to a military audience, was reported as saying that so long as the government continued in power in Damascus the guerilla raids were likely to continue (18). Secondly, the information from Syria to the effect that Israel had mobilized eighteen brigades, and which was assured to Nasser by his own intelligence. Finally, through Soviets, Egypt received reports that Israel was massing troops near the Syrian frontier for a decisive blow against Syria.

Nasser was becoming acutely aware of his

TABLE 1. *Aggregare Breakdown: Military vs. Civilian.*

	Military			Civilian	Total
	Officer	Officer-Technocrat	Total		
N	27	17	44	87	131
%	20.3	13	33.6	66.4	100

infusion of officers into key bureaucratic positions for purposes of control and supervision. Indeed, at least some of the politically unreliable bureaucrats of the old regime had to be replaced by person who combined political loyalty and administrative expertise — qualities that were readily found mostly in military officers. While detailed information on the military's initial presence in the government is unavailable, overwhelming predominance is evident at the highest and intermediary levels.

In purely quantitative terms the precise degree of the military's presence at the very top of the power structure is reflected in Table 1 (14).

Out of an aggregate of 131 leaders, 44 or 33.6 percent had been military officers of various types, in contrast to 87 or 66.4

percent who had a civilian background. However, one should not be misled by the two to one numerical superiority of civilians over officers; while it clearly illustrates the extent of the regime's dependence on civilian elites, especially in technical area, it is not to be regarded as a valid index of their relative power. Most of these civilians were the tools of the military (the members of the RCC and subsequently the president himself). Since each lacked an independent power base, none of the 87 emerged as a political leader in his own right, not even during the turmoil of the postwar (1967) period. This, coupled with Nasser's persistence in placing ex-officers in key ministries, made the military the virtual master of the system.

Obviously, the best index of the officers' position within the leadership is their control of strategic posts.
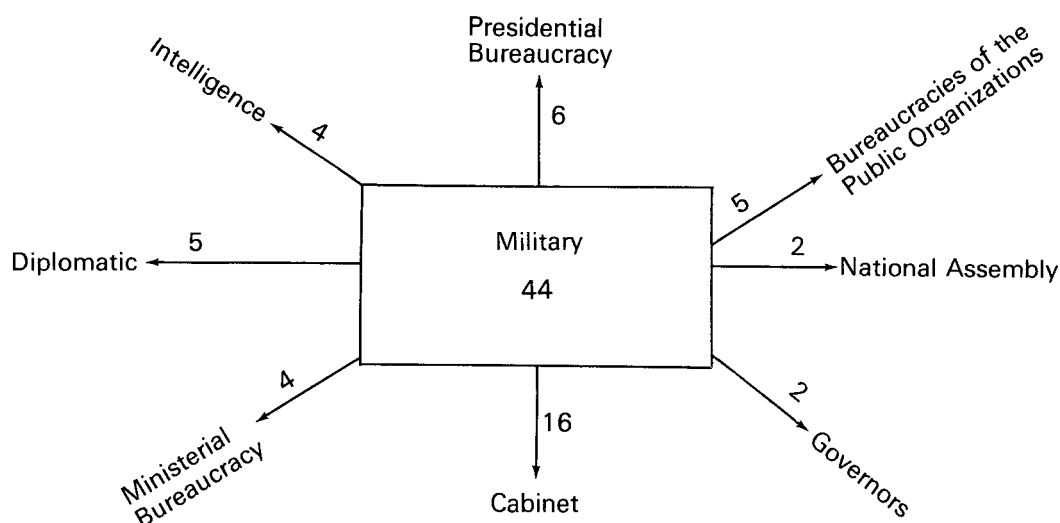

Figure 1. The Military in the Egyptian Government.
Source: Dekmejian, R. H. *Egypt Under Nasser,* p. 192.

and defense planners would console themselves with the rationalization that the war was nonetheless worthwhile as a training operation, and that therefore, with this experience behind them, Egyptian forces were all the more ready for activities on other fronts. One can certainly speculate that in May 1967 this led Nasser, his advisors, and his generals to form an exaggerated estimate of their readiness for war with Israel (10).

MODEL II: ORGANIZATIONAL PROCESS

Nasser's decision to close the Straits of Tiran can be examined by the organizational process model. For some purposes, governmental behavior can be usefully summarized as action chosen by a unitary, rational decision-maker. But this simplification must not be allowed to conceal the fact that a government consists of a conglomerate of semi-feudal, loosely allied organizations, each with a substantial life of its own. Government leaders do sit formally, and to some extent, in fact, on top of this conglomerate. But governments perceive problems through organizational sensors. Governments define alternatives and estimate consequences as organizations process information. Governments behavior can therefore be understood according to a second conceptual model, less as deliberate choices of leaders and more as outputs of large organizations functioning according to standard patterns of behavior (11).

In using this model in our study, we confront many handicaps. We do not have information on how the organizations in the U.A.R. work. The relations between the different organizations are not clear. In this study we will try to explain the structure of the U.A.R. government to understand the process of decision-making in the U.A.R.

At the time of the crisis the decision-making elite was composed of a few ex-army officers. Not only the highest position, in the person of the President, but also the whole of the overall direction of the state apparatus and of the government were in military hands. The Higher Executive Committee was composed entirely of the members of the former Revolutionary Command Council. The Prime Minister himself was an engineering Colonel. Three of the four of his deputies were senior engineering General Staff Officers. The Officers of Foreign Affairs, Interior, and War were army officers. Furthermore, this domination and control over the power of decision extended to the key area of the public sector and of the two linked zones of culture and information (12). The presence of a large number of retired officers in civilian jobs was regarded as being at the expense of qualified civilians. It may also suggest that those remaining on active military duty have been blessed with a host of personal connections in the civilian hierarchy, and that apart from whatever influence military officers might seek to exert directly on the President and his Cabinet, their interests have had a broad base of back-door political support from within the governmental structure. The precise character of the regime's political relationship with the army has been informal and hidden from public vies. It was surprising to many, for example, in the wake of the death of Field Marshal Amer in September 1967 to hear the allegation that Amer had succeeded some four or five years before in establishing a measure of independence from President Nasser in military matters, and that an ongoing struggle for control of the War Ministry had raged between them (13). The strong influence of the army officers naturally strengthened the tendency to build up the military establishment.

In the way of background, it should be noted that after three experiments with all-civilian cabinets (July, September, and December 1952), leading RCC members came forth to assume key cabinet posts in June 1953. What followed was a massive

the ceasefire line into the Sharm el-Sheikh post at the mouth of the Gulf of Agaba, Nasser had to choice but to close the Straits of Tiran to Israeli shipping. But what calculations and by what steps President Nasser decided to take this step is still obscure. Indeed it remains the central mystery of the whole crisis. Whatever his reasoning, President Nasser announced his decision in the course of a visit to his forces in Sinai on the evening of Monday May 22.

The armed forces yesterday occupied Sharm el-Sheikh. What does this mean? It is affirmation of our rights and our sovereignty over the Gulf of Agaba, which constitutes territorial waters. Under no circumstances will we allow the Israeli flag to pass through the Gulf of Agaba. The Jews threaten war. We tell them you are welcome, we are ready for war, but under no circumstances will we abandon any of our rights. This water is ours (6).

Anyone of Nasser's experience must have known that war was inevitable.

When the troops were concentrated my view was that there was only a 20 percent possibility of war. Before closing the Agaba Gulf we held a meeting of the Higher Executive Committee and discussed the question of closing that Gulf. At that meeting held on May 22, I told them that the chances of war were 50 percent. At another meeting I told them that war possibilities were 80 percent. It was clear that our work was defensive, that we would launch an attack only if aggression were committed against Syria, and that we should be on the alert. At that meeting nobody talked about attacking Israel; neither had there been any idea of launching an attack on Israel ... On May 23 we declared the closure of the Agaba Gulf to Israeli ships. The political changes in Israel at the beginning of June and our follow up of what was happening inside Israel made us feel that the war is certainly going to

take place, the chances were now 100 percent (7).

Thus Nasser was aware that his closure of the Agaba Gulf meant the war with Israel. Nasser's awareness of this fact was confirmed when Mohammed Hasanein Haikal, Nasser's confident and press advisor, wrote on May 26:

The closure of the Gulf of Agaba means first and last that the Arab nation represented by the U.A.R. has succeeded for the first time, vis-a-vis Israel, in changing by force fait accompli imposed on it by force...To Israel this was the most dangerous aspect of the current situation — who can impose the accomplished fact and who possesses the power to safeguard it. Therefore it is not a matter of the Gulf of Agaba but of something bigger. It is the whole philosophy of Israeli security. Hence I say that Israel must attack (8).

But the question is: Why did Nasser close the Straits of Tiran? He knew that this action would lead to the war with Israel, and he had 50 thousand of his best and well trained troops in Yemen. In that period Nasser was convinced that his army was ready to fight Israel.

We have completed our preparations and are ready to confront Israel. We are ready to reopen the case of Palestine. The question today is not of Agaba nor is it the Tiran Strait or the U.N.E.F. It is the rights of the people of Palestine (9).

What is difficult to explain is the sudden euphoria which took hold of him in the second half of May and his apparent conviction that the Arabs could defeat the Israeli army. Part of the reason was the undue trust he placed in his closest friend, Field-Marshal Abdul Hakim Amer, who told him that the armed forces were ready. Another reason related to the first can be stemmed from the Yemen War. If the war in Yemen was difficult to bring to a conclusion, inevitably some commanders

bination of the situation's: (a) relevant values and objectives, (b) perceived alternative courses of action, (c) estimates of various sets of consequences (which will follow from each alternative), and (d) net valuation of each set of consequences (2).

Before proceeding in employing the rational model to explain Nasser's decision to close Tiran Straits, it is essential to mention that there are not enough references or official documents explaining Nasser's decision. The main source in this aspect will be Nasser's own speeches, particularly his speech on July 23, 1967 in which he explained why he took the steps which led to the disaster of June 1967.

It is necessary to point out the apparent reasons which led to the crisis. On May 12, 1967 a statement was made by Israel's responsible leaders to the effect that Israel would carry out military operations against Syria. On May 13 the U.A.R. received definite information that Israel had massed between eleven and thirteen brigades on the Syrian frontiers and that she planned to invade Syria on May 17.The U.A.R. which has a defense pact with Syria knew then that she had to act quickly and decisively if she were to succeed in extending effective help to her ally and to put an end to Israel's arrogance and menace against Syria (3). Nasser decided that an Israeli attack was imminent.

> *The information we had about the invasion of Syria came from different sources...But what could we do? We could have maintained silence; we could have waited? We could have only issued verbal statements and cables of support. But if this country had accepted to handle the situation in that way it would have given up its mission, role and personality. There was a joint defence pact between us and Syria. Thus we were forced to move and take action in order to confront the danger threatening Syria... There was not the least doubt concerning the information we had, and consequently no one was allowed time for waiting or for hesita-*

> *tion... our moves entailed certain practical consequences. First of all, we demanded the withdrawal of the U.N.E.F. Then we once again exercised the right of Egyptian sovereignty over the Gulf of Agaba (4).*

Thus the situation was defined. There was a threat against Syria. The U.A.R. had to move because of its mutual defense pact with Syria. The objective was to confront the threat and to repel any aggression against Syria. After defining the situation and objective, the next step was to select the actions to achieve this objective. And as Nasser himself pointed out, the actions followed each other subsequently.

On May 14 Nasser sent General Fawzi, the Egyptian Chief of Staff, to Damascus to coordinate plans with the Syrian Government. During the following week convoys of troops runbled through Cairo as the Egyptians moved something like a division across the Suez Canal into Sinai. From all over the Arab world came pledges of support for the coming struggle against Zionism. This swelling support, the confidence he derived from it, and the realization that if he did not exploit it others would, may do something to explain President Nasser's action over the next two weeks. And the first which require some explanation are those respecting the U.N.E.F. and the Straits of Tiran.

On May 16 Nasser asked the U.N.E.F. in Gaza and Sinai to leave, and the force commander General Rikhye informed the U.N. Secretary-General U Thant, who immediately agreed. Since the force was stationed only on Egyptian territory, the Secretary General had no alternative. But it was suggested that he could have stalled for time by referring to the Security Council. It is very probable that Nasser himself believed that he would have more time to think out his next move and was surprised by U Thant's quick compliance (5).

But once the U.N. Force had withdrawn, and Egyptian forces had moved up toward