

Inspection of Economic Records as an Arms Control Technique¹

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The purpose of this paper is to examine the nature, usefulness, and limitations of the inspection of economic records as an arms control technique. Although there has been some discussion of records inspection in the recent literature on arms control,² further study of the technique appears to be in order.

The following discussion presumes some broad arms limitation program, rather than

simply a nuclear test ban, and focuses on the inspection of economic records as part of an effort to verify adherence to (detect evasion of) an agreement limiting weapons production. The special problems involved in inspecting different kinds of weapons production—for example, aircraft, missiles, and fissionable materials—are not considered. Also, although it is assumed that records inspection would be part of an inspection system involving various other inspection techniques—such as, possibly, physical on-site inspections, monitoring of the utilization of scientific and technical personnel, transportation monitoring, psychological inspection, aerial inspection, etc.—the relationship of records inspection to each of these other techniques is not examined in detail.

The first section of the paper considers the nature and use of economic records monitoring. The second reviews some of its problems. The third offers some conclusions.

Nature and Use of Records Inspection

This section examines in turn the concept of economic records, the nature of records monitoring as an inspection technique, and its relationship to other inspection techniques.

CONCEPT OF ECONOMIC RECORDS

The concept of economic records used in

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² Philip Noel-Baker (1958, Chap. 40) summarizes the findings of League of Nations experts in 1932–34 on budgetary inspection. The original detailed studies contain material that is still of interest. See League of Nations (1933, Vols. I and II; 1935a, Vol. III; and 1935b).

Jesse Burkhead (1958, pp. 75–84) analyzes the effectiveness of fiscal inspection of United States government expenditures in verifying adherence to an arms control agreement.

The inspection of production records is examined in John B. Phelps (1961, pp. 104–22).

Records inspection is also discussed, more briefly, in Bernard T. Feld (1961) and Jerome B. Wiesner (1961).

this paper is a broad one. It includes records (1) which relate to all sectors of economic activity (industry, mining, transportation, etc.); (2) which are expressed in physical or value (i.e., money) terms; (3) which pertain to various levels of economic organization (shop, plant, enterprise, trust, regional supervisory body, national administration); and (4) which are available at centralized records collection and storage centers or at the individual record-keeping and reporting units which originate the data.

This concept of records thus comprises, for example, both the number of units produced by an individual plant and the total size and composition of the budget of the armed forces. Moreover, it includes not only published information but also internal data not customarily published (for one reason or another). Finally, this concept far exceeds the notion of inspecting merely published (and perhaps at least some unpublished) financial records relating to military budgets.³

Economic records, so defined, clearly can be of great significance for arms control inspection. Records in physical terms include, for example, data on production, inventories, shipments, and foreign trade; the location, size, and characteristics of natural resources, plants, equipment, laboratories, and other facilities; and the size, composition (including occupational skill), and location of the labor force. Financial records in money terms include both the budget and various money flows outside the budget, such as wage payments and inter-enterprise payments. However, to analyze and interpret such money flow data, it is necessary to have a full knowledge of the corresponding prices, in order to ascertain accurately the

physical counterpart of a given financial transaction. With changes in prices, the commodity flows corresponding to a given money payment would of course differ. For this reason, records in physical terms are the most useful for arms control.

The types of documents which constitute the economic records pertinent to arms control include, for example, the following: budgets, treasury disbursement forms, production schedules, plan fulfillment reports, allocation orders for scarce materials, price handbooks, purchase orders, inventory records, shop work orders, blueprints, shipping orders, bank drafts, time cards, and personnel records.

NATURE OF RECORDS MONITORING

The essence of records monitoring as an inspection technique consists of (1) locating records pertinent to the activities covered in the arms control agreement, and (2) verifying their authenticity in order to establish whether the inspectee is adhering to the agreement.

It is clear that for both of these requirements the inspectorate must have a thorough, highly detailed, and highly sophisticated knowledge of the inspectee's past and present economic structure, organization, and techniques, including not only such aspects as record-keeping, accounting, and statistical forms, practices, and procedures but also its technology, production methods, financial procedures, and transportation practices—at least insofar as they relate to activities to be inspected. Successful records inspection therefore requires a team of highly qualified specialists.

This is necessary in order to apply the consistency test which is at the heart of records inspection. The accuracy of reported information on the use of materials, production, inventories, deliveries, etc., can be tested (although not verified absolutely)

³ The weaknesses of budgetary inspection, by itself, have been pointed out by Burkhead (1958) and need not be discussed here.

by checking it for consistency with the appropriate related data. For example, in attempting to verify by records inspection the reported production of a critical item (say, missile engines or tank shells), inspectors would analyze records pertaining to the inputs of components, manpower, equipment, etc., into its production—in order to determine, taking the technology of production (and allowances for rejects) into account, whether reported output was consistent with reported inputs. The inspectors would identify both the sources of supply and the customers for a given enterprise, in order to discover any changes in patterns of supply and distribution. The purchase and sales data of enterprises would also be compared with transportation records, to establish that quantities, sources, destinations, and dates of shipment for specific transactions were consistent.

If the inspectors had access to an appropriate quantity and variety of detailed data, it would be both difficult and costly for the inspectee to carry on the large-scale double bookkeeping which would be necessary to furnish a convincing set of internally consistent false data. For example, it would be much easier for an inspectee to deceive the inspectors if the latter were limited to examining rather aggregative budget appropriation and expenditure records at the national headquarters of the ministry of finance, than if the latter had access as well to such additional information as (1) central records concerning materials allocation, investment, and manpower, and (2) individual plant records concerning these and other aspects of production. The reliability which may be attached to the consistency test therefore depends on the access of the inspectors (measured in quantity, variety, and degree of detail of records), as well as on their qualifications to analyze the records.

In this connection, the importance of access to *past* records should be recognized. Access to past records is very important in assessing the consistency of current records. Furthermore, it would add to the difficulty and cost of falsification if the process had to include past records as well as current ones. First, past records provide necessary perspective for assessing the data in records for subsequent periods. Records for past periods, moreover, are likely to be especially useful in the effort to discover any facilities in existence when the arms control agreement is signed (or enters into force) which are hidden rather than declared. Second, the burden of falsification is increased precisely because it is true that different relationships must have prevailed in the past in regard to production patterns, commodity flows, inventory ratios, input coefficients, technological processes, etc. In order to falsify past records convincingly, it would be necessary for the inspectee to simulate for each past period an entire economy with a different structure. This structure, moreover, would have to be both (1) internally consistent for the given time period and (2) consistent over time with the structures of the preceding and following periods. Assuming access on the part of the inspectorate to the appropriate records, the task of meeting these requirements would be immense.

It appears that records monitoring could play a useful part in the effort to discover clandestine production in undeclared facilities as well as in declared facilities. The basic approach would be the same in both cases—to disclose discrepancies and inconsistencies which suggested a failure to comply with the terms of the arms control agreement.

In the case of declared facilities, inspection of records pertaining to production, materials use, transportation, etc., would seek

to verify that the reported production rate—presumably equal to or less than that specified in the agreement—was indeed the true one, by identifying any discrepancies between the inputs used and the specified output.

In the case of undeclared facilities, the task would be to determine their existence and, if possible, location and activities. Records inspection could provide clues to the existence of undeclared facilities by disclosing evidence regarding construction, the use of transportation services, unaccounted for residuals in the use of critical materials, etc.

RELATIONSHIP TO OTHER INSPECTION TECHNIQUES

It seems clear that records inspection could not be sufficient by itself. Rather, it would have to be part of an inspection system in which other techniques were also used which could (1) support records inspection and (2) investigate further the clues provided by records inspection.

1. As noted above, at the heart of records inspection is the consistency test. However, it would not be sufficient merely to establish that all of the appropriate records were mutually consistent. It would be necessary in addition to establish that these mutually consistent records in fact depicted reality, by conducting selected physical (on-site) inspections to verify the authenticity of selected records. For example, plant inspections could verify the accuracy of records regarding equipment, inventories, etc. Such selective physical inspection, on a random sample basis, would establish the accuracy of individual records, from which the reliability of other records, found to be consistent with them, would be inferred.

2. Likewise, physical and other inspection techniques, included in the over-all inspection system, would be used to follow up

any evidence provided by records inspection that there was, or might be, clandestine production in declared or undeclared facilities.

These two instances suggest the complementarity which exists between records monitoring and other inspection techniques. At the same time, it is true that, to some degree at least, records monitoring can be a substitute for other types of inspection. For example, more extensive records inspection could reduce (but not to zero) the amount of on-site physical inspection needed to monitor satisfactorily a declared facility or to search for undeclared facilities. Such a trade-off between types of inspection, for a given task, must be considered in designing alternative inspection systems.

Problems of Records Inspection

The preceding discussion has indicated that records inspection can play a useful role, in conjunction with other inspection techniques, in enforcing an arms control agreement. However, there are a number of problems and unresolved questions concerning records monitoring, of which three will be discussed below. They are (1) the quantity and kind of economic records available which might be inspected; (2) the extent of access to them; and (3) the capability of records monitoring to detect violations and the cost of a "successful" records monitoring program.

AVAILABILITY OF RECORDS

This problem involves such questions as the following: Are the necessary detailed records kept? Where are they located—only at the individual enterprise, or also at one or more central organizations, such as the ministry of defense, the ministry of finance, the state planning commission, etc.? Are they in a convenient form for inspection purposes, for example, punched cards for

automatic data-processing equipment rather than typewritten or even handwritten ledgers?

A preliminary examination of record-keeping practices in the U.S.S.R. and the United States suggests that it should not be excessively difficult, from a technical standpoint, to design a records monitoring program which could be applied to these two countries, and to others as well.

Despite marked differences between the U.S.S.R. and the United States in regard to the goals, organization, and control of their economies, there are a number of similarities in regard to economic records.⁴ In general, United States budgetary, banking, production, and transportation documents have their approximate counterparts in the Soviet economy, although their specific features (i.e., the precise information on the forms) may differ somewhat, reflecting institutional differences. This is, of course, what one would expect, given that both nations have large, complex industrialized economies with similar problems—and records—in organizing and controlling transfers of goods and funds among enterprises, within enterprises, and between the treasury and enterprises.

This similarity is attributable in large part to the fact that Soviet industrial enterprises are organized and operated on a basis of *khozraschet* (literally, “economic calculation”). Under this arrangement, an enterprise has its own fixed and working capital and bank account; buys materials and components from other enterprises and sells its product to other enterprises (or, in the case of military production, to the armed forces) on the basis of state supply plans and contracts; hires its workers; and is supposed to earn enough sales revenue to cover current

(i.e., noncapital) expenditures and show a profit. It receives budget grants only for investment and for certain kinds of operational expenditures, including some research and development activities.

The similarities between the Soviet and United States economies are greatest in those sectors, such as the development and production of strategic delivery vehicles, in which the armed forces constitute the final consumer. In the United States, government planning and control are, necessarily, predominant in these sectors, in contrast to most of the rest of the economy, where the government’s role is much less direct and specific.

There are, however, a number of differences between Soviet and United States economic records which stem from the basic differences in the nature of their economic systems. A much greater proportion of the total existing economic data is available at statistical and other governmental agencies in the U.S.S.R. than in the United States. In the U.S.S.R., the data collected at the center are the result of a comprehensive census of the corresponding activity, which is conducted as part of the process of economic administration and control. In contrast, in the United States, where the role of the government in the economy is much smaller and much less specific, official statistics are obtained by sampling methods to a much larger extent than in the U.S.S.R. While the census method does not necessarily imply (significantly) greater accuracy, it does mean that a greater amount of information about individual enterprises is available at the center—and at the various intervening levels. In addition, in the U.S.S.R. there are control channels, with economic records of interest for arms control, which have no counterpart in the United States—for exam-

⁴ On Soviet economic records, see Gregory Grossman (1960), Murray Feshbach (1960 and 1962), and Robert W. Campbell (1962).

ple, the State Planning Committee and the State Bank.

Another difference concerns the coverage of the national budget in the two countries. The budget embraces a much larger share of total economic activity in the U.S.S.R. than in the United States—although in both countries many transactions and commodity flows significant for arms control are outside budget and treasury operations. One reason for the difference between the two countries in the importance of the budget is that a larger share of total resources is diverted, through budget revenues and expenditures, from household consumption to government investment and military programs in the U.S.S.R. than in the United States. Also, the Soviet national budget is a consolidated budget which subsumes the budgets of lower levels of government, such as the republics, oblasts, etc., while the United States federal budget does not include all of our state and local budgets.

The question is sometimes raised as to how useful Soviet economic records would be for arms control purposes, in view of evidence in the Soviet press and in the speeches of Soviet leaders that falsification of economic records and statistics is not uncommon in the U.S.S.R. The issue here is not whether the statistical data *published* by Soviet statistical agencies are accurate and trustworthy, but rather whether the underlying *internal* data received by these agencies and other supervisory organs from subordinate organizations are accurate. Thus, while there are many reasons for questioning published Soviet data as incomplete, ambiguous, misleading, or otherwise distorted, serious shortcomings in the published data need not impede a records monitoring program which would in any case be concerned with detailed internal, operational records.

As far as the internal, operational records

are concerned, it is clear that enterprises, and regional authorities as well, do have strong reasons for filing false reports. There is a powerful incentive to overstate output—and also to file false reports about cost, quality, and commodity assortment (product mix)—in order to simulate fulfillment and overfulfillment of ambitious and often unrealistic production assignments for the enterprise and for the region. On the other hand, the various supervisory and control organs in the Soviet economy are keenly aware of this tendency and make a vigorous and continuous effort to combat it. It is to be expected that these efforts to combat falsification have been and are much more successful in closely supervised, high-priority, military-oriented activities than in, say, agriculture, where for various reasons successful (for a time at least) falsification is more easily accomplished. Hence, the internal records of interest for the purpose of arms control inspection are likely to be sufficiently reliable to justify a records monitoring program.

Although record-keeping is highly developed in both the U.S.S.R. and the United States, most of the record-keeping is not devoted primarily to establishing the kind of detailed input-output relationships of interest to a records monitoring program for arms control purposes. For example, most business record-keeping in the United States, particularly at more aggregative levels of the enterprise, is for tax and other financial purposes and is primarily in value rather than physical terms. In the U.S.S.R., in contrast, a relatively greater share of record-keeping is devoted to the kind of relationships of interest to a records monitoring program. In the centrally planned and administered Soviet economy, the control authorities rely primarily upon detailed, specific instructions, commonly stated in physical rather than (or

as well as) value terms, to direct and regulate economic activity. Thus, for example, input coefficients ("norms") are specified as part of the planning process, and production results are examined to ascertain adherence to these norms.

Nevertheless, in the U.S.S.R., as well as in the United States, it is likely that additional record-keeping would be required to furnish the kind of detailed information which would be necessary for an effective records monitoring program. Moreover, an international inspectorate might wish to have all of the inspectee countries adopt uniform record-keeping procedures (forms, reporting schedules, etc.) in order to facilitate the training and assignment of inspectors, to avoid the appearance of "discrimination" against one inspectee, etc. Thus, adoption of a records monitoring program as part of an inspection system would require additional record-keeping on the part of inspectee countries. This would be one of the many costs involved in the country's adherence to an arms control agreement.

To avoid being swamped by a mass of records—which by their volume and complexity would provide opportunities for concealing violations—the inspectorate would want to minimize the scope of its records monitoring, focusing it on selected records concerning activities of prime concern. In general, it appears desirable for the inspectorate to concentrate on a close examination of detailed records for a limited range of activities, rather than to monitor more loosely more aggregate records on a wider range of activities.

For this purpose it is essential to identify a minimum number of "critical" items especially characteristic of the weapons covered by the agreement (e.g., rocket engines, guidance systems, etc.), and to relate the intensity of inspection to the "critical-

ness" of the item. Records of activities directly pertinent to the production of critical items would be most closely inspected. Records regarding less critical items (or less directly related to the production of more critical items) would be inspected less thoroughly. Records of activities not involving critical items would be ignored.

The records monitoring program might thus consist of (1) regular and detailed monitoring of selected key records, (2) random sample inspection of selected other records, (3) random sample on-site inspections to confirm the accuracy of records, and (4) follow-up on-site inspections to investigate apparent violations suggested by discrepancies in the records. Such a program of records monitoring would keep down the amount of records inspection, as well as its cost.

ACCESS

Even a selective inspection program of the scope suggested may require a greater amount of access to the inspectee's economy (and society) than some countries, notably the Soviet Union, are willing to grant.

The basic opposition of the Soviet Union to inspection is well known. In general, it rests on the Soviet regime's desire to keep its "closed" society insulated from the disturbing effects of foreign influences. More specifically, the Soviets believe that inspection (including records inspection) intended to detect violations of an arms control agreement inevitably would also reveal much information not bearing directly on the enforcement of the agreement which they wish to conceal. This includes both "strategic" information, such as the location and development of industrial facilities, and "non-strategic" information which the Soviet government nevertheless regards as "sensitive," such as data on wages and prices which reveal facts about the standard of

living and the distribution of income. The Soviet regime considers disclosure of such information harmful to its position in the "peaceful competition" between it and the West which it contemplates would continue even after the conclusion of an arms control agreement.

Dougherty has summarized the Soviet position on inspection as follows:

It is not surprising, then, that although the Soviets have expressed a willingness in their more comprehensive disarmament plans to propose the establishment of ground control posts at large ports, airfields, railway junctions and along main motor highways (all of which in the U.S.S.R. would add up to only a few dozen fixed locations), they have always shied away from the notion of uninhibited access by mobile inspection teams. Within the United Nations Disarmament Commission, after accepting in principle the verification of agreed arms reductions by an international inspectorate, the Soviets later interpreted this to mean nothing more than inspection of "declared facilities." Thus the Soviets would allow the inspectors to examine the actual sites where military forces had supposedly been deactivated and military installations had supposedly been dismantled. But they would not allow the inspectors to roam freely throughout the country to make sure that the forces had not been moved to another location or that the weapons systems had not been reassembled and emplaced elsewhere [Dougherty, 1961, p. 356].

The most recent Soviet proposal, in its "Draft Treaty on General and Complete Disarmament Under Strict International Control," submitted to the Eighteen Nation Committee on Disarmament on March 15, 1962, takes essentially this approach toward inspection. As far as records inspection is concerned, it mentions only financial inspection of budgetary allocations,⁵ the limi-

⁵ Art. 13, Par. 2: "The International Disarmament Organization shall verify the implementation of the measures referred to in Paragraph 1 of this Article [reduction of military expenditures during the first stage of disarma-

tations of which are by now generally recognized.

Even in the case of the United States, whose disarmament proposals have emphasized the necessity of inspection, there are serious constitutional and other legal barriers to the invasion of personal and business privacy which records inspection (and other kinds of inspection) would represent.⁶

RELIABILITY AND COST

As in the case of other inspection techniques, there are as yet no really satisfactory estimates—so far as I have been able to discover—of (1) the probable reliability and (2) the likely cost of a records monitoring program.⁷

We do not yet know with any precision—for each of the various weapons systems likely to be covered under an arms control agreement—the answers to such questions as the following: Just what records would have to be inspected? What specific consistency tests would be used? To what extent would other kinds of inspection, such as physical on-site inspections, be needed to support records inspection? What is the relationship between the kinds of records inspected and the qualifications of the inspection team,

ment] through its financial inspectors, to whom the States parties to the Treaty undertake to grant unhindered access to the records of *central financial* offices concerning the reduction of the *budgetary allocations* of States in connection with the elimination of the means of delivering nuclear weapons, the dismantling of foreign military bases and the reduction of armed forces and conventional armaments, including the relevant decisions of their legislative and executive bodies on this subject." (Emphasis added.)

Similar provisions apply to the second stage (Art. 26, Par. 2) and the third stage (Art. 35, Par. 2).

⁶ See Louis Henkin (1958).

⁷ Some rough, illustrative calculations are given in Phelps (1961, pp. 116–19).

on the one hand, and the probability of detecting evasion, on the other? How difficult would it be for a potential evader to falsify records successfully?

It appears doubtful that sufficiently reliable answers to these questions can be found simply by consulting the opinion of experts regarding each of the various weapons systems. Rather, further research seems desirable, along the following lines. (1) Detailed information should be collected on the records used in the production of each of the principal weapons systems (both in the United States, and, to the extent possible, also in the U.S.S.R.). (2) It would then be possible, at least in a preliminary way, to determine the specific records required for inspection and to design various inspection techniques, such as consistency checks of specific records, sample verification of selected records by on-site inspections, etc. (3) Tests should be carried out to apply these techniques to the actual records of an enterprise engaged in weapons production. (4) Data requirements and inspection techniques would then be modified on the basis of the results of these tests. (5) Finally, games should be conducted to determine the effectiveness of records monitoring—with various combinations of records inspection techniques and inspection personnel—in detecting various hypothetical cases of undeclared production. They would be conducted by a group of specialists possessing the appropriate kinds of expertise, including auditors, engineers, scientists, and others familiar with United States and Soviet practices in the production of different weapons systems. At some advanced stage, it would probably be desirable to have an evasion game with a team of evaders composed of Soviet defectors and German scientists formerly engaged in

Soviet missile and nuclear production.

On the basis of such games, an assessment could then be made of the potential effectiveness and limitations of records monitoring as an inspection technique—and as part of an inspection system, or of alternative systems involving different combinations of several inspection techniques. The requirements of records monitoring in terms of the number and kind of personnel, equipment, travel, etc., and their cost could then be estimated for alternative records monitoring programs.

Conclusions

The preceding discussion suggests that records monitoring can play a useful role in an arms control inspection system, complementing or substituting for other inspection techniques. There are, however, at least two important reasons for limiting the scope of a records inspection program. On the one hand, it is necessary to avoid the danger of the inspectorate being swamped by a flow of records which by its volume and complexity makes detection of evasion more difficult. On the other hand, limitation of inspection reduces the amount of access demanded of the inspectee—a major consideration in negotiating with the Soviet Union on arms control.

As yet we do not have a precise idea of the effectiveness of different records monitoring programs in detecting evasion, or of the corresponding requirements in manpower and equipment and their costs. To secure this information, as a basis for determining the appropriate role for records monitoring in alternative arms control inspection systems, further research is suggested.