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DSA Report #844

October 1987

**RECONSTRUCTION OF SOVIET
NATIONAL ECONOMIC ACCOUNTS, 1970-1983**

PROCEEDINGS OF THE PANEL MEETING

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**RECONSTRUCTION OF SOVIET
NATIONAL ECONOMIC ACCOUNTS, 1970-1983**

PROCEEDINGS OF THE PANEL MEETING

INTRODUCTION

With the completion of DSA's study of Dmitri Steinberg's methodology for reconstructing the Soviet national economic balance accounts, a panel of distinguished experts was convened, at the request of the DoD Office of Net Assessment, to review the reconstruction and to provide advice on the potential applications of the methodology. The Panel Review was held on 28 July 1987 at the DSA office in Arlington, Virginia. The members of the Panel were:

- o Dr. Abraham Becker (Chairman), RAND Corporation
- o Professor Vladimir Treml, Duke University, and
- o Professor Richard Ericson, Columbia University

This report contains the actual proceedings of the panel discussion. Report No. 843 provides a summary and the recommendations of the panel.

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After some welcoming remarks, George Pugh turned the panel meeting over to the chairman, Abe Becker, with the following comments:

Pugh: The objective of this panel discussion is to try to obtain for Andy Marshall some of the answers to the questions defined in the *Terms of Reference*. We should probably focus more on what one should do, or could do, with this kind of data base rather than on an attempt to evaluate whether or not the data base is right.

My expectation is that we will try to produce a summary of this panel discussion and then circulate it to you for comment.

One of the questions on my mind is whether or not you would find it useful to have a short introductory briefing to remind you of issues, or whether it would be better to just dive into the process.

I think we will probably need to have some sessions with the two authors present and some sessions where the panel can talk independently. What I am suggesting is that this morning we first have a brief period where you people can identify what you want to do as a panel. I've asked Abe Becker to act as Chairman.

After you have gotten organized as to how you want it to proceed, we have the latter part of the morning set aside for questions. The afternoon might then be spent on answers or on the sets of questions outlined in the *Terms of Reference*. I intend this suggested schedule to be very flexible. I am offering it only as a way of being helpful, not as a way of trying to control the way things proceed.

I would suggest at this point making a transition to an executive session.

Becker: I anticipate this will not take very long. I don't think it should take us more than a few moments to agree on how to proceed and on what questions we want to tackle.

It occurred to me that we've got four sets of questions that we have to deal with:

- 1) Is the accounting framework represented in the reconstruction a correct reflection of what we understand to be the Soviet National Economic Balance?
- 2) Is the empirical reconstruction correct?
- 3) What can we do with the Soviet National Economic Balance, assuming that we are satisfied with the answers to the previous questions--in terms of maintenance of the data base, and in terms of comparisons and improvements with the way we do things now, and in terms of mining it for information we do not have now and for the light it may cast on other things?
- 4) Finally, what technical steps can we take in order to make the whole process work?

The agenda asks us to start with a discussion of the reconstruction itself and then adhere to the question of uses. I have a sense that we are likely to spend a lot more time on questioning the reconstruction. This is likely to take more of our time than any other aspect of our proceedings. So I want to suggest starting at the back, as you suggested, George. In fact, beginning with questions of what can we do with it, and what technical steps would we want to recommend to study. Having disposed of that we can then go look at the issues of balances and their validity in terms of reconstruction on the empirical side.

Ericson: I believe I have looked at it more from that perspective than from the perspective of how the numbers were generated.

Becker: As far as I'm concerned, there is very little in this discussion that I would find difficult to do in front of the two authors.

Pugh: I want to give you the option of doing it either way, but I will be happy to have them here throughout or any time that you feel it is appropriate.

Becker: It seems to me there are a lot of points of this discussion in terms of both issues--in terms of what we can do with it as well as in terms of examination of the National Balance--in which the authors contribution will be useful.

Ericson: Another question we ought to address is what does the reconstruction really represent, assuming that it is technically correct, and that there is a national economic balance, and how significant is it? Deciding on that is going to be more difficult than deciding what one might be able to mine from it.

Becker: All right, let's deal with that. Let's start with the question, is the Soviet National Economic Balance the comprehensive integral system that is the unspoken assumption of this whole reconstruction? We will go on from here to address the issue of what we can do with it.

Pugh: If I could summarize briefly, I think Abe has reached the conclusion that, if they go into details of the reconstruction first, the panel is likely to spend the whole day on it. So the first place to start with is with some of the afternoon questions. The thought is that it might go better if the author were available to respond to these questions.

Becker: We're going to start with a question which we think is basic to any discussion of what one does with this. This is an implicit or semi-explicit assumption that underlies the whole effort of reconstruction--namely, that there exists a system of national accounts that is constructed in the Soviet Union regularly, systematically, comprehensively, with very great attention to detail; and that it is intended to represent the underlying reality. Great efforts are made to make it systematic and comprehensive. Therefore, that system--which we are attempting to simulate here--does in fact reflect reality.

Steinberg: That last statement is difficult to interpret. Reality according to whom? Reality according to Soviet planners, reality according to their critics, or reality according to Western economists? Reality according to the way planners perceive it, given the constraints of information available?

Becker: What would be the critiques? You say that there would be different realities of their critics and different realities of the West. What is the critique?

Steinberg: The critique would be as follows: the official Soviet data base leads one to conclude that the Soviet economy grew by 90 fold when in reality it grew only by 8 fold; planned resource allocations distort what actually takes place in the Soviet economy. According to Western thinkers, we have to readjust all official prices in order to get an idea of what the resource allocations are.

Becker: What you're saying is another way of stating that the balances are in current prices. Looked at as constant prices, we will get a different picture of real growth? I will adjust my statement to say that what we are talking about is reality in current established prices..

Steinberg: The way Soviet planners perceive it. The CIA doesn't accept Soviet prices and adjusts them according to Bergson's method.

Becker: Again, we are talking about established prices.

Ericson: Even accepting established prices is a problem of *pripiski*. Automobile traffic data some people claim are up to 80 percent fictitious. The volume is reported in ton-miles. Construction may have 30 - 50 percent fictitious output. The question, is does this represent what the planners think it is, based on what is being reported, or does it represent some sort of adjustment to take into account that those may be unreal figures?

Steinberg: I don't know the answer to those questions. I'm not sure that anybody does.

Becker: I start thinking about the kind of instrument that this reconstruction represents. It is a very sophisticated, well-integrated, complex, and well-articulated device. On the other hand, there exists an image of Soviet planning which is just the opposite. For example, the kinds of remarks that were made in a round table discussion published in *Literaturnaya Gazeta* in early June, in which the image of planning is one of utter contempt. It is hard to reconcile these two. This was not very quantitative, it was not very detailed, and there was not much there that you could use as hard data. Nevertheless, the images are extremely inconsistent. Are we really dealing with something that appears as what you have suggested, or in fact is the National Economic Balance a gleam in an eye - a device that is done *pro forma*, not regularly, not very systematically, and is something that is slopped together? I am just setting up a question.

Ericson: Or wishful thinking of what should be done for planning to be rational.

Becker: That seems to me to be a fundamental question before we go any further.

Steinberg: I would perceive that there are different levels of Soviet planning. We are dealing here with the highest level, where planning is done by *svodniy otdel*--the unified section that exists in all Soviet planning agencies. Their work is totally classified and nobody knows what they are doing except for a very few leading economists who would occasionally come there for brief interviews. They are told about new changes. Their work has now been published in the Soviet Union. As a matter of fact, balances created by *svodniy otdel* were last published in 1922. They don't share the details of their work with anybody outside. Their work is only intended for policy makers in their agencies. How do they use these balances? I don't know. There is no data available, and I doubt policy makers have enough knowledge to understand all the intricate details. But I am sure they are used somewhere, otherwise they would not be created. We know for sure that this work has been done. We know people who work there; they are very knowledgeable. As a matter of fact, when they write openly they give us new developments in accounting systems at the top level.

Then, you deal with branch departments working in specific areas of planning. Their knowledge of what is happening is much more limited. It is limited to their sector of knowledge. It is compartmentalized knowledge. People dealing with the details of branch planning know very little about the whole situation. I think that explains why most Soviet economists who come to this country, having worked in these branch departments, have very little knowledge of how to operate with the Soviet statistics and how to use them to reconstruct comprehensive national accounts. They don't have the experience. They were not allowed to do that in the Soviet Union, and I am sure they don't even know how to start. You can ask most Soviet economists who have come to this country. It's just that their experience was not directed toward comprehensive reconstruction. At the lower level, the branch ministries deal with more specific detail with regard to their branch statistics; and this takes them a step away from the unified planning process. So the image we have in the West is of planning that is most exposed, most public, which is not what the Soviets try to keep secret. We have to deal with the highest level of management. It is not only limited to Soviet statistics, it is in all other areas. When you look at the local, regional work compared to work done on the central level, it is much more disorganized. This is their historical product of trying to keep secrets.

Becker: Let's start with an elementary question. How do we know that a set of national balances is compiled accurately?

Trembl: What I found to be a shortcoming of these reports is the somewhat unorthodox use of terminology. I was confused by what you were just saying. In my mind, there's one definition of the term branch which is *otraslivaya* and the ministerial would be the other, *vedomstvennaya*. Now you give us three levels. Let me give you an example, so we know what terms we are using. When you indicate second level of planning as branch, are you saying that the second level is *otraslivaya* planning that represents the shift made from ministries to the product level?

Steinberg: I was just dealing with the three administrative levels of planning. The highest level is *svodnoye planirovaniye*. When I talk about second level, I am talking about branch departments of planning agencies. There are two levels of ministry planning for the chemical industry, for instance. One level is done on what planners call the *first level of Soviet planning*. It is the chemical department of Gosplan, the chemical branch of the bureau for heavy industry, which is under the Council of Ministers. It is one level higher than chemical ministries. The ministry level is one level lower. So we have three levels--one would be *svodniy*, second would be branch level of planning agencies, and the third one would be a ministry level.

Ericson: So what is branch level on the level of the ministries? When they say chemicals on branch level ministry--do they mean the ministry of chemical production?

Steinberg: Yes, there are several ministries involved in chemical production. They would all be on the level of the ministry, and they are all supervised by top planning agencies which are responsible for coordinating their activities with other industries and with agencies that stem supply, prices, standards, and so forth.

Becker: At this stage of the game, I think the issue concerns the character of balances that are being compiled in Gosplan. I think the question that we are really trying to get at first order is the nature of that activity, its regularity, its comprehensiveness, etc. That is the key to understanding if what we have got here is in fact a set of national accounts that is really worth worrying about. The first question I would really like to get at is whether we can really say anything about the character of that equity.

Steinberg: The Soviets complete a comprehensive set of national accounts every year.

Becker: You know that to be correct?

Steinberg: Yes, as a matter of fact I think it is accepted as given by all Soviet planners and economists.

Trembl: You said national income accounts.

Steinberg: No, national accounts which consist of the GSP balance, national income balance, financial balance, balance of capital, balance of labor, and balance of reserves. These are compiled annually and they are part of the comprehensive set of what planners call *balans narodnovo khozyaystva*. I think they are compiled at the end of the year, or even next year after the fact.

Trembl: I found it confusing because you refer to the National Economic Balance as being the main planning instrument, so it should be prepared *ex ante*.

Steinberg: It is prepared in a cyclical way. They base their plans for the new year on the basis of the plans for the previous year.

Becker: In other words, you have *balans* as the instrument that serves as the basis for the plan. Rick, in your Moscow experience did you have contact with this? Did any information come to you on the nature of this operation?

Ericson: No, but I heard some discussion about the reliability of statistics.

Pugh: Looking at this as a mathematician, these tables are very large. They are not the kind of thing that is easy to put together before the fact. Any time your set of statistics is this large and this internally consistent, there is a high probability that the data is collected after the fact--rather than predicted ahead of time. It seems to me that to some extent the existence of the statistics themselves is a testimonial to the fact that somebody spent a lot of time and effort collecting the data and putting it together.

Becker: There are collections of different statistics that may emerge from different kinds of planning, not necessarily from the sort being described here. That is the question we are trying to get at. Is this in fact a reality? I must say that I still have some uneasiness in my mind when I contrast the views that are increasingly coming out from the Soviet press about the character of Soviet planning--contrasted with the ascetic pleasure with looking at an instrument as comprehensive and nicely fitted together as this appears to be. That represents a difficulty in my mind which I have not quite overcome.

Ericson: There is an aspect in the aggregateness of all this data relevant to what has to be operational detail which allows one to say that this data has been collected with the purpose of providing a consistent picture of the current state of the economy as a basis for making very generalized decisions as to what to do. But when it comes to actually making a plan, actually telling the chemical industry what they are going to be doing next year, you have to work with more specific data. And *ex post* you can gather the consequences of that and put in into the table to see what happens, and use that in an aggregate sense, and adjust whatever you are doing. I don't see how this could ever be an instrument for practical planning.

Steinberg: Soviet planners use it for one purpose: to plan global proportions. It is a most general instrument of planning. They cannot do their detail planning unless they know how it affects the whole economy. If they plan defense expenditures to increase by 10 percent, they have to know how it affects the overall levels of consumption and investment.

Becker: I have no trouble with that. It doesn't disturb me at all that this would not be an appropriate instrument for a detailed plan of the individual sectors of the economy. Obviously, you want to go much more deeply into each of them, and that would be the function of the activity of various lower levels of the planning apparatus. I am still wondering if in fact this artifact exists as we have reconstructed here.

Steinberg: I have submitted extensive bibliographies in the end of this volume. Just pick those books which refer to *balans narodnovo khozyaystva SSSR*. There should be at least 10 to 15 books on the subject. You can open any of those books going from 1950s to 1980s. You always see standard balances which have been prepared for 100 decades. They have usually been presented by Gosplan officials, even those working in *svodniye otdely*. There have been innovations, for example, in the input-output tables prepared in 1959 and in 1966. In 1975 they began to prepare an input-output table every year on a limited basis without having much detail. The same goes for the financial balance. They used to have a lot of difficulties integrating the financial balance of households with financial balance of the state and collective sector. But according to the Soviet literature of the 1970s, they have managed to integrate them into a unified financial balance, even though one can still argue it is still in an experimental phase. But we already have the general scheme of how they want to do this. The same goes for the foreign trade. For many years foreign trade balances were prepared separately from the NEB balance; it is only in the late 1960s and early 1970s that the foreign trade balance was prepared as part of the general NEB balance. That's important. We can see the allusions in the work in the 60s, 70s, and 80s to new improvements in the balances. So you can see the same balances existed for all those years, basic GSP tables have existed since 1920s. The basic balance of national income has existed at least since the 1930s. The basic financial balance has also existed since the 1930s. Labor resources have existed since 1921, for example, as essentially the same balance.

Trembl: Let's not try to cover too much ground. There are a few points. One is, you have been talking about integrated balances. In my opinion, still by the early 1960s no integrated balances existed--there are rows but not columns. They are piecing together endless numbers of material balances which have existed in terms of rows but they don't fit in terms of columns. On input-output tables, what they started to finish in 1975 was a total different animal. The 1959 - 1972 tables were based on a sample survey, which would not have been necessary if there had been an integrated balance. The 1975 table was aggregated and adjusted--they simply took 1972 and manipulated the coefficients. We also now have 1982, which is also based on a sample survey. There are so many critical remarks, the whole system does not hang together. Even in terms of input-output, you say this is an innovation in the national income balance, but at the same time Edel'man and a number of people have been saying that, unfortunately, input-output is not integratable with planning instruments because they are two steps away. All of their magnitudes are unaddressable. When they talk about chemistry in input-output terms, they refer to aggregate chemical products and there is no one in Gosplan who wants to talk to them because there is a minister of chemical industry and there is a minister of nonferrous metals which is producing one third of all chemical products. But of course, here the responsibility is for nonferrous metals. They tried producing three variants of the input-output table--one in purchaser's prices, one in physical units, and the third one in ministerial or *vedomstvennaya* categories--and they failed.

Steinberg: You have raised several issues. First issue is on their needing something and already having something. There was talk about the need to have a unified balance in the late 1950s, but they had problems working it out. However, if you look at the works of Soviet planners written in the 1960s and 1970s, the table appears as the standard table that they already had. I am saying there was an improvement in the work. This is true when you look at certain periods. They talk about the need to have certain tables, and then those tables appear later as standard tables of NEB accounts. You can look at it historically and see the evolution.

I forgot about the second point because I was paying attention to your third one. Your third point is very crucial. I would present the whole system of Soviet national accounts in three units. One is input-output, the second is NEB, and the third is financial. The input-output balance is based on the commodity series, NEB is based on the enterprise series, and the financial balance is ministerial. You raised an interesting point that there are a lot of difficulties using the input-output tables as a planning tool.

Becker: I want to stay with the issue of the reality of the comprehensive planning instrument that we are dealing with.

Steinberg: Let's talk about what is comprehensive here?

Trembl: I do not agree. If the national economic balance is the main instrument of planning ...

Steinberg: I am not saying it is the main instrument of planning. I'm saying there are three methods of collecting data in the Soviet statistical system.

Trembl: But the plan is Gosplan--in terms of what they publish as a plan and in terms of what they publish as plan fulfillment.

Steinberg: I am talking about the official statistical data they present at the end of plan fulfillment and about how they present the statistical data. They present statistical data using three methods of national accounting, which are called the input-output method, the NEB method (essentially the GSP and national income balance), and the financial method.

Trembl: You say enterprise, and I would say ministry.

Steinberg: The NEB balance is based on statistics collected from all enterprises, not only the ministries. It is financial data that is collected from ministries.

Ericson: But how are those statistics aggregated?

Steinberg: For example, some industrial enterprises have agricultural production or construction done under them. In the NEB accounts subsidiary construction and agricultural activities are taken out from enterprise reports and reported together as agriculture and construction. In ministries, they will be reported together inside the same ministry. But what is more restricting in the input-output table is that some enterprises produce both steel and MBMW products. When looking at it on an enterprise basis, planners ignore that. In the input-output table, these products are separated according to commodity production. So the difficulty that people talk about is that it was impossible to integrate the input-output tables with financial tables because the enterprise phase was lost. Planners could not use an input-output table for their planning purposes, because it was impossible to integrate the commodities series with the financial series. That's why, I think, they changed the procedure in preparing an input-output table in 1975.

Becker: It would appear difficult to integrate input-output with the NEB.

Steinberg: No, it would not be difficult because planners rely on special questionnaires which they submit to enterprises every 5 or 6 years. They have spent a lot of money and manhours collecting these questionnaires. Enterprises have to report detailed statistics on what type of production they're engaging in. On the basis of those surveys, they are able to deal with a commodities series.

Becker: So for every year after each survey and until the next one, the first quadrant of the NEB is based on coefficients derived from the survey.

Steinberg: They have a special system that helps them to adjust coefficients on the basis of expected changes. We don't have the details of how they do that because they don't publish their system.

Becker: But there is a certain artificiality on the first quadrant as a consequence of the fact that this must be based on the survey.

Steinberg: They ignore some little details. They know the enterprise was producing some amount of steel last year, and they have given a new plan for next year. So they can make instrumental adjustments to account for changes. They are not worried about commodity series every year. They ignore commodity series in the NEB, because they only care about the output of the whole enterprise. So the first quadrant would appear very different in the NEB balance than in the input-output tables. The first quadrant of the input-output tables is based on the commodity series, while the first quadrant of the NEB balance is based on the enterprises series. The NEB is thus artificial with respect to the commodity series.

Becker: We are talking about artificial in relation to the commodity series--artificial relative to what in fact it would be if they had annual reporting by enterprises.

Steinberg: Planners' concern is for the total output of enterprises. They ignore subsidiary production shops that produce steel, for example.

Ericson: What is the dimension of this NEB, or the first quadrant of it?

Steinberg: I compared my work with that done by Trembl's team, and there were very little differences with respect to total output of particular branches.

Becker: You're asking about the number of branches.

Steinberg: On the level of 18 branches, as Soviet planners report, the differences were within one to six percent; so they can really work very well within this margin. .

Becker: You say they reported 18 branches and they work at what level of detail?

Steinberg: I do not know exactly what level of detail they work at. I know from articles written by TSU officials that the differences between NEB and commodity series is one percent. But how detailed the NEB series is, I don't know. I've never looked at this as a question. I was only concerned with the aggregate data. There is no data available to make it very detailed. With the exception of 1959, 1966, and 1972, all the data published in the NKh is extracted from the NEB and financial balances, not the input-output table.

Trembl: Writing in the early 1960s Soviet planners were afraid to use the term "balance." The general equilibrium was a taboo. There was an undercurrent which mitigated against this thing. It was discredited by Stalin.

Steinberg: I would agree that no progress was made during Stalin's time. Most progress was made after Stalin's death. I think the major work was done in the latter part of the 1950s.

Becker: They were reintroduced in the Conference of Statisticians in 1957. The first real serious discussion of it was in 1960. All the essential work was done in late 1950s and early 1960s.

Steinberg: The essential elements have not changed.

Becker: Unless there's anything critical to be said on it, let's assume for working purposes that the National Economic Balance exists as a regular instrument of the accumulation and recording of data in an orderly framework. It is comprehensive, an effort is made to make it consistent, and to update it regularly in approximately the kind of framework we are talking about.

The next question--to what extent is the NEB affected by various problems of Soviet economy in terms of padding, falsification, and distortions at various levels?

Steinberg: My purpose in doing this report was to duplicate the tables that appear on Gosplan's computer. That is, to go from what was reported officially by TSU and to go back from these control totals and reconstruct Soviet national accounts comprehensively. The question is to what extent are the Gosplan tables distorted? It is a very difficult question.

Becker: For what reason?

Steinberg: Planners just don't have the precise data that we would like to have. For example, they don't know exactly how much was stolen from different enterprises. They don't know if all material expenditure was written off as losses. Take for example the production of light industrial products. It is known that a lot of workers steal from the plant to make their own dresses. In the enterprise report, this material appears as material outlays. So in the NEB balance this loss would appear as material outlays in the first quadrant in the column for light industry. But in reality, you have to place it as part of the consumption column of this light industrial product, because stolen material is actually consumed by households. I would repeat this example for many, many industries. Control totals for the total supply of light industrial products would remain the same. The change would have to be done by readjusting material inputs and consumption.

Becker: In other words, what we are saying is that because of the existence of exaggeration, falsification, etc., and because the authorities do not know the extent of that, the NEB is inevitably flawed in the sense that they distort the actual flow. They remain consistent, but they are distorted in that sense.

Steinberg: In respect to proportional representation of material inputs, with respect to consumption, investment, and so forth.

Trembl: It is an extremely complex issue, I wish you wouldn't mention this reality. There are different ways of looking at it. Suppose there is the real world. In the real world, peasants buy bread and bakery products in retail trade and feed it to livestock. Now the real world is measured and reported by separate agencies such as Gosplan. They may perceive a measure of the real world differently. My main goal in this work is to reconstruct the document we have never seen. I know something it is wrong--quite simply private livestock holdings would not exist if you look at the sales of feed to private individuals. Construction of private housing would not be affected. Heating of private housing would not be affected if you accept the statement that they consume 3 billion rubles of construction material and use 1.6 million tons of coal a year. They would be frozen to death in nonexistent houses. What bothers me is that this reality is measured from different points of view *ex post* by statisticians and *ex ante* by planners. Different images are consequently created.

Becker: Let's help ourselves along by making the following distinction. Let's not worry about the *ex ante* balances compiled by Gosplan. We are going to be talking about several accounts that are compiled *ex post* by TSU. Let's talk about those exclusively. This is the animal we are dealing with, examining, and attempting to evaluate. With respect to that, we agree that the set of balances is a distortion of reality, even though it may be consistent within itself. Later, we will consider the impact that this has on our consideration of how useful it is for various analytical extensions. For the time being, what we agree is that the statisticians are unable to put together a set of accounts that take into account the falsifications, the distortions, etc. The only question that I think should concern us at this moment is whether there are deficiencies in the system such that, not only is this a distorted reflection of reality, but that it affects the ability of the statisticians to compile an integrated consistent set of balances. Are there areas of that kind--falsifications that completely distort things?

Steinberg: It is possible to explain how they preserve the internal consistency.

Becker: The great cotton scandal is an example. The local party connived in the production of statistics of cotton production which were totally at variance with the actual reality. How is that reflected in the balance?

Steinberg: (Steinberg is at the chalkboard) We're dealing with rubles, we're not dealing with pounds of cotton. We have "n" rubles of cotton before it was falsified. Somebody purchases cotton and somebody sells it. Purchasers are bribed. The light industry official is also bribed. The goods are purchased as material inputs into light industrial production. You have an input figure which is falsified in the reports.

Becker: So material outlays were raised to take into account the missing elements.

Steinberg: You have padding on both the supply and demand sides. The emerging picture is that the Soviet economy is much more inefficient than it is.

Ericson: Everybody that is reporting something in tremendous detail has to report something that looks consistent on paper, or they'll be called on the carpet. So you have a system, because of the incentive of the fact that everybody is in a hierarchy performing to someone else's standards where it is in their interest to keep it looking consistent; they will shave here, there and elsewhere as long as the same consistent figures that are justifiable keep flowing in and out.

Steinberg: If you look at the statistics on consumption, it looks so low per capita that it makes the Soviet Union a backward nation. I think official statistics make the Soviet Union look much more inefficient than it really is. The problem is how to show that. Further work needs to be done in this area.

Becker: My problem with the explanation is I feel it may be more complex than that, and therefore more difficult to understand. It seems to be relatively easy to see that the material input coefficients were unusually high.

Steinberg: Indeed, there are problems in justifying incredible variations in the amount of agricultural losses. Planned agricultural losses are excluded from national income for end use. They are considered as losses in produced national income. Assuming some of these losses are unreported, procurement agencies are bribed to report much more cotton than they produce. Somebody who is bribed is put in the situation of figuring how he could report this input to light industrial product. So he says it is lost, spoiled or destroyed in the process of distribution. In national income it will appear as a loss. My estimates of agricultural losses show a very big variation from year to year. I would assume that these variations are due not only to weather but also to changes in the bribery pattern.

Trembl: I've never seen the term "planned agricultural losses." It does not exist in national income literature.

Steinberg: Soviet planners call it *planoviye poteri*. When they discuss *planoviye poteri*, they discuss it in two ways. The first part pertains to losses of agricultural products, and the second part pertains to abandoned construction sites.

Becker: How can they be planned?

Steinberg: It's indeed a misleading term. It's not that they plan in advance. It is something that was done by planners in the preparation of national accounts. In other words, planners are only responsible for making these adjustments in the preparation of the balance. There's no way they can plan it.

Trembl: I don't agree, the word planning is not used very well.

Becker: I propose we close this section of it. We tentatively adopt the view that what we are dealing with is an instrument that is regularly performed, is comprehensive, flawed in the sense of planners unable to overcome the inherent problems of a planned economy, but nevertheless operating with an instrument that is articulated in detail and systematically.

The second question is whether the conceptual accounting framework of this apparatus is correctly transmitted. That's the question we should consider now.

Trembl: We raised the question of planned losses as an element of quadrant 2. Whatever the term is, there exists a category of losses as a distinction between net material products produced and net material products utilized, or national income utilized. This is one of the two differences the other being foreign trade balance. Now conceptually, should that category be understood as involving not only agricultural losses and construction installations abandoned, but also a variety of other losses? For example, all losses of capital rising from national disasters?

Steinberg: That could also be included, but only those losses that are covered by insurance payments.

Becker: Not excluding losses covered by insurance.

Ericson: For example, how is the destruction of Tashkent accounted for in the NEB?

Steinberg: (Steinberg is at the chalkboard) It would appear as replaced capital. Soviets have two capital balances--one is called undepreciated capital balance which is reported in physical units. The undepreciated balance has two sides--additions and withdrawn capital. Net additions equals the difference. Another is called the balance of depreciated capital. Again, we have the same addition of capital but to get the net we subtract depreciated capital. What is depreciated capital? This is part of depreciation deductions--first you account for total depreciation, and then subtract from it performed capital repair works.

Becker: That's the same thing as saying additions plus capital repair minus depreciation.

Steinberg: (Steinberg is at the chalkboard) Everything is in current rubles. Current rubles are not reported in the official statistics. They only have 1973 rubles. I am talking about the NEB balance, which you have to construct independently. What happened to Tashkent? Here it would be only that part of the buildings in Tashkent that is not yet depreciated.

Becker: The fundamental question is whether national disaster is treated as simply another form of capital withdrawal or is treated as an element of loss of national income.

Steinberg: In most cases they treat it as withdrawal of capital that is not yet depreciated.

Becker: That depends on which accounting system you're using.

Steinberg: I'm talking about the one used to prepare GSP and national income balances.

Becker: You're saying that national disasters will be treated in the capital account.

Steinberg: That's right. It's treated as part of the depreciation. In the productive sectors, it appears outside national accounts. In service and defense sectors it would appear as part of the public consumption. However, exceptional cases of agriculture are covered by the insurance payments. Edel'man discusses this. For example, livestock would appear as a loss.

Becker: So what then are the losses and the differences between produced and utilized national income?

Steinberg: It consist of two parts. One would be the value of abandoned construction sites. In respect to agriculture, it would be agricultural materials that were lost in the distribution process plus livestock loss due to murrain

Becker: Why shouldn't that also cover coal that spills out of the freight car?

Steinberg: That would be treated as a production loss

Becker: Why isn't agriculture treated as a production loss?

Steinberg: They have a special system of accounting set up.

Becker: It is not plausible.

Steinberg: It is plausible.

Treml: If we are talking about reality, it is one thing. But basically, I've done a lot of studying, and that is what they say. They simply say that a loss of coal in the coal enterprise is recorded within the balance there. It distorts reality. They have difficulty linking agriculture in losing industries, and the losses are recorded only if fire destroyed a warehouse of grain that was already accepted on the account of, let's say, the food industry. It is losses in the transition from one sector to another.

Becker: This loss category only consists of two things? Losses in agriculture and losses in abandoned construction sites?

Treml: There's a third one. it is *stikhiniy*--the random, unpredictable, and uninsurable losses of livestock. This would also include the cost of drilling oil and gas wells which ultimately prove to be dry.

Steinberg: Drilling would be treated as part of a construction project that had not been completed.

Trembl: Now they say that the value of discounts of trade is also added. This is new. They started discounting up to 50 percent. When a shipment of merchandise is delivered, the retailer pays for it at a discount. So they purchase something for a 1000 rubles and 1000 rubles has gone up to the ministry of light industry. Now since no one wants to buy it, they have to sell it. And they have to sell it at discount. So they sell it for 500 rubles. So the 500 rubles is an accounting loss.

Becker: And that's included in the losses? The difference between net material products produced and utilized?

Trembl: There are some regulations that direct part of this to be covered out of trade profit. But basically, what is not covered out of profit is considered an element of the difference between national income used and national income produced.

Becker: In other words, trade has had profits throughout this period. So they don't simply reduce profits down to the point where they get rid of these discounts.

Trembl: The money to cover the difference of 500 rubles came from the state budget. We have several very detailed papers on how to measure it. Agricultural losses fluctuate roughly between .8 and 1.4. This is roughly 1 percent of national income. Strangely enough, losses go up before the agricultural harvest.

Steinberg: I believe planners have tricks in estimating additions to strategic agricultural reserves. In constructing a balance of agricultural production, one always arrives at a large residual which fluctuates. One part of this residual is a loss and other parts are stockpiles of strategic reserves that were not used. I believe there is some type of manipulation from year to year to adjust the amount of this addition to agriculture reserves to national income. I think it has to do with hiding the defense expenditures. I don't know how they do it, or the extent to which they falsify strategic agricultural reserves.

Trembl: What bother me is they are fluctuating in the wrong direction.

Steinberg: That's right. I think some manipulation is done with dividing the total agricultural residual. The residual itself does not fluctuate. I feel some manipulation is done to help hide defense expenditures in the national economy.

Ericson: Do you think these categories are separated in the actual NEB?

Steinberg: Yes, they are separated. The losses appear as the difference between produced national income and national income for end use. The reserves appear as part of the investment residual.

Ericson: So this is purely a problem of reconstruction.

Becker: Let's consider the next problem, the relationship between depreciation as a row in quadrant 3 and the treatment of capital investment in quadrant 2.

The columns you have in the investment part of quadrant 2, could you lay them out on the board?

Steinberg: (Steinberg is at the chalkboard) The investment column appears differently in the GSP balance than in the national income balance. The total fixed investment consists of two parts - one is new investment (new construction) and the other is capital repair.

New construction consists of four parts: construction works, agricultural capital, light industry, and machinery. Agriculture is primarily additions to livestock and gardens.

Treml: Additions to gardens is more like landscaping.

Steinberg: So all of this will appear as additions to fixed capital. In the national income balance, they have columns for net fixed investment and depreciation in production and service sectors.

Treml: Is fixed what they call *vlozheniye osnovnykh fond or kapital'noye vlozheniye*?

Steinberg: It is *chistiy prirost* (net additions) which appeared before 1975 in the investment table (NKh) on national income.

Becker: Why isn't net fixed investment the result of total additions plus capital repair minus depreciation?

Steinberg: Yes, that is what it is.

Becker: Why do you put capital repair separately?

Steinberg: It is the way they treat it.

Becker: Depreciation is certainly an addition to consumption

Steinberg: And capital repair is part of total depreciation. This (net additions) is part of investment and this depreciation in nonproductive sectors is part of consumption. The part that is missing here is depreciation of nonproductive capital.

Becker: Therefore the depreciation in quadrant 3 is going to represent depreciation for productive repair and depreciation for all renewal.

Treml: The third quadrant row is the financial statement which is based on norms and has nothing to do with real wear and tear of capital.

Steinberg: Gardening appears not as part of construction but as part of agricultural works.

Becker: But this is in fact part of construction.

Steinberg: No, it is part of agricultural works.

Becker: But it is a sub-category of construction

Steinberg: No, four sectors participate in capital stock which is financed by *kapital'noye vlozheniye*: one is the construction sector, second is MBMW and the wood processing sector, third is the agricultural sector which contributes to the capital in the form of livestock and gardening, and fourth is light industry. It is in every standard book of Soviet statistics. Here we have depreciation. We have two columns. Here is productive depreciation and here is nonproductive depreciation. Productive is excluded from national income, while nonproductive depreciation is included.

Becker: What is the accounting relationship, and what extent is there supposed to be an identity between depreciation in the row and the elements of investment as columns?

Steinberg: In the NEB there would be no representation as such. In the unified balance, it is constructed more like in the GSP balance. You have a very simple relationship: total fixed investment plus capital repair minus net fixed investment equals total depreciation.

Ericson: Where's capital replacement?

Steinberg: If you only have total fixed investment, you get total depreciation. Subtracting capital repair gives you capital replacement.

Ericson: Depreciation is then replacement plus repair.

Trembl: But Dmitri, depreciation consists of renovation depreciation and capital repair depreciation, so you can cancel capital repair

Steinberg: Precisely.

Becker: They are not the same thing.

Steinberg: Yes, they are the same thing. Total capital repair will consist of the depreciation allowances of *khozraschet* enterprises plus budgetary allocations for capital repair of *non-khozraschet* enterprises.

Becker: When I was doing this two cons ago, even *khozraschet* enterprises financed their actual capital repair from different sources.

Steinberg: Yes, it is a complicated procedure. Most of it (95 percent) is financed through allocations for capital repair. There is a lot of movement between the replacement part of depreciation and capital repair. From total depreciation allowances given in the NKh, only 90 percent of capital repair allocations is actually spent every year. That is why, when I speak of replaced capital--which is part of depreciation--I speak of total depreciation allowances minus performed capital repair to get replaced capital. Therefore, capital replacement is larger than it appears in the NKh statistics.

Becker: Are the columns for investment consistent with the row for depreciation?

Steinberg: They must be consistent.

Becker: But depreciation allowances seem to be incomplete.

Steinberg: I think they are complete. In GSP balances, you only care about the productive sectors. When you take the productive sectors plus all nonproductive sectors you get total depreciation. In the total for nonproductive sectors, you not only account for depreciation, but also for budgetary allocations.

Ericson: What you get in the depreciation row under defense and services--is that derived from capital stock in some sense?

Steinberg: No, it is derived from national income balances. We have the total for depreciation of nonproductive capital stock from Rutgaizer. Then, using depreciation rates for particular nonproductive sectors, you derive depreciation for each service sector. You end up with a huge residual for so-called administration and other nonproductive sectors. In constructing the GSP and national income balances, I didn't care about *khovraschet* or budgetary enterprises. I first estimated total depreciation for productive sectors, which is excluded from national income, and then I separately estimated depreciation for nonproductive sectors.

Becker: I think it is probably useful now to go to the core issue of the role of defense in the national accounting framework.

Ericson: I would like to ask a preliminary question regarding the meaning of the financial balances and the various categories there. My uneasiness with the balances is that finances are very much the tail of the dog and financial constraints don't really mean anything.

Becker: But if I understand the way this whole thing is constructed, defense is an issue even in respect to the four quadrants. Because what we have here is a system with a core of the four quadrants. Affixed to that are segments that are not quadrants but are partially involved with quadrants. These segments are independent of them and really not integrated.

Ericson: The question is to what extent are those segments consistent? Is there any necessary consistency across those quadrants?

Becker: This is a very important question. But I don't think it relates to defense. The defense issue is really foremost. The treatment of defense involves a couple of characteristics. First, all material and components to the defense production are now treated as outlays within quadrant 2--as elements of the defense column in quadrant 2. Second, the value added to defense production is an element in quadrant 4 rather than in quadrant 2.

Ericson: Is there any value added in quadrant 4 or is it purely redistributed from quadrant 3?

Steinberg: It is redistributed from quadrant 3. I would rather say that quadrant 4 is value produced within the productive field and redistributed to nonproductive and defense sectors.

Ericson: There should be an additive consistency with quadrant 4 and quadrant 3 if you summed up everything in quadrant 4 that had to be produced in quadrant 3.

Steinberg: Not necessarily, because there are insufficient resources. The budget has an enormous deficit--budgetary outlays are insufficient to cover defense expenditures.

Ericson: This is why I was worried about financing, because you need some sort of financial quadrant that generates the extra value.

Steinberg: I derived quadrant 4 independently of quadrant 3. I only use budgetary statistics in the very end to prove that when I estimate independently all the components of budgetary financing, I arrived at a total that far exceeds the official budgetary plan. It is clear from my work on Soviet national accounts that budgetary statistics are largely irrelevant in estimating quadrant 4.

Ericson: The logic of this National Economic Balance would dictate that all values that get allocated in quadrant 4 to the nonproductive sectors had to come from somewhere.

Steinberg: Yes, we estimated them independently. Part of quadrant 4 includes household outlays for services, which are not from the budget. The budget participates very heavily in financing wages and capital investment in the nonproductive and defense sectors. However, we cannot use budgetary statistics to estimate quadrant 4. We have to use other means to estimate quadrant 4. You say the financial statistics are not integrated, and I say they are integrated if you start not from the budgetary statistics but from the core--the national income balance--and then go outward. Then you can integrate them and prove that official budgetary outlays are insufficient to cover defense expenditures. You cannot go from budgetary statistics to national income statistics.

Ericson: But then how are the discrepancies between the sum of values created in quadrant 4 and the sum of values distributed in quadrant 4 accounted for in the equilibrium system? The question addresses the consistency of these balances.

Steinberg: They are consistent with respect to the national economic balance and with respect to household budgets. But they are inconsistent with respect to official budgetary statistics. I believe that official budgetary statistics cannot be integrated with the NEB balance because it is not designed to be integrated. It is designed to serve as a propagandistic tool and not as a reflection of reality, even for Soviet planners. The way to do it is to estimate independently all components of the budgetary outlays and then compile them and see how they fit with the official data. Then you can see how the official data fails to correspond with the national income balance.

Ericson: I agree with all that. The question is why there is not the following consistency--the total sum of the value distributed to the various nonproductive sectors in quadrant 4 should equal the total sum of the value added in quadrant 3.

Steinberg: I am trying to emphasize again that not only does the production sector participate in financing all activities in the economy, but there is a budgetary sector which has enormous deficits.

Becker: From the point of view of the Soviet accounting system - quadrant 4 is irrelevant. Let's ignore the financial segments. Here is a column of gross supply or the value of gross output at industry prices. Gross supply is going to be equal to gross distribution. That's the fundamental accounting identity. The sum of gross supply is equal to the sum of gross distribution. So that's the basis for the whole system. Quadrant 4 is irrelevant. Is that correct?

Steinberg: You are describing only the GSP balance, not the national income balance.

Becker: The national income, this is equal to that, (Becker is at the chalkboard) when you define final demand in a particular way.

Steinberg: Yes, but they also have a stage of distribution of national income. And this is where quadrant 4 participates very heavily.

Becker: This is true for the Gross National Product. For national income purposes, you have consumption, including depreciation of nonproductive capital, plus net investment that equals the sum of quadrant 3.

Steinberg: You only describe production and end use of national income.

Ericson: How do wages get into that quadrant 4? For example, the services we would normally put in quadrant 3...

Becker: Nonproductive services will be in there.

Ericson: But that is a value that has somehow been transferred from the production sector that implies that there should be some kind of consistency in those values.

Steinberg: In order to have a full picture of quadrant 4, you need a three dimensional space. It is impossible on paper to represent all the redistribution of national income. It goes to nonproductive households and nonproductive households spend on services. Then some profit goes to state budget, which is then allocated to households employed in budgetary sectors. Then these households spend it on services, etc. There are just too many dimensions. What we need to know are the control totals for the wages of the nonproductive sectors and defense. The final picture is the financial resources available to those sectors.

Becker: Let's get back to the fundamental hypothesis of defense being treated in this particular way. First, is there anything in Soviet sources, apart from the Strumilin controversy, that leads us to believe that this is in fact the case, conceptually? You have proofs of an empirical sort that demonstrate that you think you're right. But we have to establish for the record that there is nothing in Soviet sources that leads us to believe that this is the proper treatment.

Steinberg: No, as a matter of fact I'd say that this is the most successful KGB disinformation campaign ever. I think that all or most Soviet economists have been fooled. But what I have heard from Professor Ericson is that in fact some economists do understand that there is a hidden defense sector. Professor Ericson did present an interesting case....

Ericson: It is not clear how it is hidden.

Steinberg: Yes, but the fact is that a graduate student asked Khanin at his talk about hidden defense sectors. Why wouldn't Khanin take into account hidden defense sectors, if they are part of the national income? This means he was referring to those defense sectors that are excluded from the national income. He answered by saying "I can't talk about it now"--a secret he couldn't expose.

Becker: What are you referring to ?

Ericson: He's referring to a conversation we had earlier today about a seminar Khanin gave on the details of his *Novy Mir* article. In a question-and-answer period he was asked if he had taken into account the hidden Soviet military economy; he said yes, but I can't talk about it now.

Steinberg: I am sure he meant defense production because he was talking about national income.

Ericson: The question from the floor was not as specifically put.

Becker: The first point to establish is that the particular treatment of defense is an inference you make not from Soviet sources, but from the nature of the data.

Steinberg: Precisely.

Becker: Why don't you go on to establish, as briefly as you can, the basis for that assumption.

Steinberg: In fully reconstructing the entire system of Soviet national accounts, I found a residual in each major table in presenting the components of Soviet national accounts. When I started analyzing these residuals, it didn't really make sense if I looked at those residuals in terms of the traditional views we have in the West--that the total value of weapons production is hidden in the national accounts we have available for review. So I began to see how these residuals could be combined to make sense. The only conclusion I could reach was that wages and social security deductions of defense industries that assemble weapons were excluded from the national income statistics. How was I able to reach this conclusion? First, I found the residual in the investment component of the national accounts, which in the mid 1980s was 30 billion rubles. This made me very suspicious, because the lowest estimate at that time for the total weapons bill was around 55-60 billion rubles. So I looked at the structure of investment residual, from which I estimated what production sectors participated in the production of goods which are hidden in the residual. And I found that there are a lot of sectors, such as power, wood processing, construction materials, etc., which shouldn't be in that residual. They should be totally accounted for. When you look at the investment component of the national income, it consists of the following components...

Becker: You're talking about the accumulation fund.

Steinberg: Yes, the accumulation fund. It consists of net fixed investment, addition to inventories, additions to unfinished construction, and that's about it.

Trembl: The three categories are: productive fixed, unproductive, and reserves.

Steinberg: It is inventories and reserves. In the official table that is published, you have to subtract additions to unfinished construction and additions to inventories and state reserves.

Trembl: Right.

Steinberg: So I found the residual. The total residual was around 30 billion rubles in the mid 1980s.

Trembl: Well, you don't have it from the 1980s because...

Steinberg: I said I estimated net fixed investment and compared it for consistency with the data published until 1975. We just went through the whole procedure on how to estimate net fixed investment. I estimated the investment residual independently and I arrived at 30 billion rubles. Then I wanted to know, what is the structure of this residual? In other words, what production sectors participated in the production of goods that is hidden in that residual? To reconstruct the GSP balance, I had to independently estimate total supply of all goods in the economy, and then estimate their end use in terms of what is hidden in the first quadrant, in the consumption fund of national income, for public and private consumption, for total fixed investment, and so forth. Starting with power, metallurgy, MBMW and so forth, I estimated the residual component that is not used by any other activity. If I followed the logic of traditional Western thinking, then I should have found that residual in only two sectors--MBMW and chemicals. Instead, I found a lot of sectors which produce material inputs to MBMW--intermediate products like power, metallurgy, fuels, construction materials, etc. They were all there and I couldn't get rid of them. So I was presented with a picture that the residual consisted of non-military products--I thought maybe it was reserves. But there could not be such a large amount of reserves each year.

Becker: How can you reserve power?

Steinberg: That is precisely what I am saying. It couldn't be reserves. So it was used for some purpose during that year, for what purpose I didn't know. I also thought that I made a mistake in my calculations--maybe the residuals are not there and all of the residuals should be in MBMW and in chemicals. Then, I said if it is not weapons, what else could it be? I had to look at the fourth quadrant, and see if maybe there is something in that residual relating to wages and social security deductions. Indeed, after I reconstructed household budgets, by estimating separately all components of household financial revenues and then estimating all components of household outlays, including savings, I arrived at the incredible conclusion that household outlays significantly exceed household revenues. In other words, households spend much more in stores and services than they receive from the state. Some people argue that this has to do with the second economy and the distribution process. The response to their argument is quite simple--since the state is the only source for all money available to households and since the state gets back the financial resources during the year, all the second economy and the circulation of money within the household sector does not generate more money. It just redistributes wealth in terms of the financial resources. So, the residual cannot be explained only by the fact that there is a huge source of additional revenue on the part of households from the state. Certainly, part of that is received by Army officers and so forth, which are excluded from the official statistics. But still around 1985, 26 billion rubles were received secretly by the household sector from the state and we did not know its source. Of that amount I estimated roughly 7 billion was received by the Army, KGB and so forth. Still, this left 19 billion rubles which I could not account for. Who received that money I did not know. I thought maybe there were secret employees working for the Soviet state who received that money, because the state would not just give the money to the households because they like Soviet citizens. It would be exchanged for some type of labor.

Then, I looked at the demographic statistics. I had to account for all categories of population as closely as I could. There is some problem with prisoners, for example, and the unemployed, and I tried to give as high a statistic as I could to those categories. I still arrived at a residual for the Soviet population which increased from 3.4 to 4.2 million people. I estimated the difference between the people counted in the official statistics and in the census as fictional unemployment. In other words, there would be people who worked part time during the year and could not be accounted for totally. That is how we account for the difference. I arrived at a residual of 10 million. After accounting for the army as consisting of 5 million people, I am still left with this residual. We've got this 4.2 million employees who receive 19 billion rubles from the state secretly. So I assumed hidden wages to be in the fourth quadrant, because there are employees. But who are they working for?

Then, I look at the social security statistics for revenues and outlays. Again I found the residual there. It sharply corresponded to the wages paid to the secret employees. So I had to put it in the fourth quadrant because they were the wages paid to somebody outside the productive sphere and outside the nonproductive field. They have to be entered under the residual column in the fourth quadrant. Then, I looked at the depreciation accounts for the nonproductive sectors and found a huge residual there for the administration sector. As you know, the administration sector is large but not that large. The depreciation and total capital stock of administration and other nonproductive sectors exceeded the entire science sector, which is absurd. Furthermore, a lot of capital flowing into the administrative sector was machinery. So I put it under the residual column in the second quadrant. I got the whole residual column running vertically from the second to the fourth quadrant, and I got a total. The total corresponds roughly to the CIA total for Soviet weapons production. On that basis, I concluded that it must be the weapons procurement bill because I could not find any other explanation for that.

Becker: There are in effect three categories of evidence

Steinberg: Five categories--labor, wages, social security deductions, depreciation, and the investment residual.

Becker: Let's take the investment residual first. (Becker is at the chalkboard) He dealt with the national income figures, so we'll use that and the replacement column, and that will be gross. We've got inventories, investment, unfinished construction reserves--we'll include in here the equipment requiring installation.

Steinberg: In the Soviet economy, there is either unfinished construction or inventories.

Becker: Equipment requiring installation that is not installed is in fact added to inventories in the national account.

Steinberg: No, actually it would be unfinished construction.

Becker: Your argument is that after you estimate these categories, you've got 30 billion rubles left over in the early 1980s.

Treml: How about 1974?

Steinberg: In 1974, the residual is around 15 billion rubles.

Treml: But have you subtracted the 36 billion rubles?

Steinberg: No, that 36 billion includes the residual.

Treml: Then we don't disagree.

Steinberg: Of course, there are only two components of accumulations--they have fixed and working capital. It is part of the working capital.

Treml: So let's say there's a new machine and it's delivered to the army and placed in a warehouse, I think it is here. (Treml is at the chalkboard)

Steinberg: No, what you have there are the components to make this machine.

Becker: So there is in fact another category of other uses. Dmitri argues that there are flows from various sectors, in addition to machine building and chemicals, that end up in other uses.

Treml: If this is 1974, 36 billion rubles is reported here, which we now agree does not include machine parts but steel. Is this totally subtracted there?

Steinberg: This is total national income. Up to 1975, the Soviets reported two components of investment--net fixed investment and the rest. The rest consists of four components--inventories, unfinished construction, additions to reserves, and something else which we don't know yet.

Becker: There are two aspects of that. This is too small for procurement, the 36 billion?

Steinberg: No, 36 billion includes additions to inventories, additions to unfinished construction....

Becker: I understand. Suppose you have overestimated reserves and unfinished construction.

Steinberg: We can estimate these accounts very precisely.

Becker: If the reserves are lower than estimated, then the residual would be larger.

Steinberg: I account for reserves as part of state inventories. The category that I included in reserves only included additions to agriculture strategic reserves. So in a way I took the smallest estimate of reserves. I could only overestimate and I couldn't underestimate. I talked to Gillula and others. We concluded that state reserves included inventories. This can be proved by studying the structure of inventories called "commodities held in reserves."

Becker: How do you disallow the possibility that some weapons production is allocated to net fixed investment?

Steinberg: This is a totally different matter. My 60 billion rubles (for the mid 1980s) excludes some weapons that I didn't take into account--that is your question?

Becker: No, you started out by saying that (a) the other uses category is too small to account for procurement, that (b) had allocations in it from branches that do not belong there if this was only weapons production.

Steinberg: The first category (a) would actually be a sixth component because we have the investment residual, depreciation, wages, social security, and labor. Let's say that I have made mistakes in estimating all of those six components of weapons procurement. If I made all those mistakes, is it true that weapons can only be found in other uses? Let's demonstrate that weapons cannot be found in fixed investment. There's a very difficult problem of defense construction, which is also excluded from fixed investment. Weapons are excluded from fixed investment. Let's use 1975 (Steinberg is at the chalkboard). Whatever source includes fixed investment, after you subtract depreciation you have to arrive at net fixed investment. So we have fixed investment plus capital repair minus depreciation. We arrive at net fixed investment that appears in the NKH. Next, we estimate fixed investment and capital repair and depreciation for all the sectors of the economy. We can do that with available data. Our task is to convert capital investment from constant prices to current prices, because capital investment is always reported in constant prices while net fixed investment is reported in current prices. We know that capital investment consists of three components--new construction, machinery, and additions to gardens and livestock.

Then, how do we estimate new construction? Let's look at construction GVO and subtract from this two elements--one will be capital repair works performed by construction, and the second will be additions to unfinished production in the construction sector which is part of inventories. We then derive new construction.

Treml: The gross output of project-making organizations.

Steinberg: No, this is the GVO that they report in the NKH every year.

Treml: Yes, and this includes the output of project-making organizations.

Steinberg: Construction GVO reported in the NKH is the only estimate we have of construction works in current prices. We then estimate capital repairs in current prices and estimate inventories from the NKH table on inventories which is also in current prices. You subtract these and you get new construction in current prices, the way it is estimated in GSP and the national income balance. Machinery is also in constant prices. From 1973 constant prices you have to convert to 1969 prices. You can estimate coefficients independently by combining the import price index with the domestic price index. So you estimate derived net fixed investment in current prices for all sectors of the economy. We do the same for capital repair. You also estimate depreciation as the sum of capital repair and capital replacement.

Becker: But you have done this in aggregate for the whole economy?

Steinberg: For the whole economy. Since you have a control total for the whole economy, you know there are no tricks here. You estimate this for each sector of the economy. You arrive at only one residual. The residual is found in administration and other sectors. In other words, you can't find weapons anywhere except in this residual.

Becker: How do you know it isn't within industry?

Steinberg: If you assume that fixed investment into productive industry indeed includes weapons, then all of Soviet national accounts do not make sense. If you include weapons as part of capital investment into productive industry, the whole logic of the way you treat capital flows within the productive industrial enterprises would be destroyed.

Becker: I am not sure I see why that is the case.

Steinberg: Okay. All their planning, in terms of depreciation allocations, allocations from profit, and success indicators, are based on the fact that planners know the amount of capital stock and capital flows within industrial enterprises. Otherwise, the whole planning procedure would be destroyed. If capital flows to industry includes weapons, you are then saying that statistics on capital stock operating in industry includes depreciation of industrial capital stock as well as weapons. Then nothing makes sense. Planners have to preserve internal logic by assuming that all the data that relates to capital flow in productive industrial enterprise is the actual capital that industries use for productive purposes. Otherwise, the whole exercise is meaningless, because everything depends on the capital flow and how you account for depreciation and so forth. If you depreciate weapons, then it would appear that depreciation on industrial capital stock would be excluded from national income available for use. Then you would argue that weapons are not actually in national accounts for end use but outside of it.

Becker: You lost me. What I am talking about is the column of net fixed investment and the intersection with the row of industry.

Steinberg: (Steinberg is at the chalkboard) If you're suggesting that weapons are included somewhere here or here, then you would have to assume that weapons are here. And I am saying that this would not make sense because if weapons are here, then you would also have depreciation for weapons stock in industry. And it would mean that this depreciation would be excluded from the national account for end use. Then you'd have to say that weapons production in terms of depreciated weapons stock is hidden outside national income accounts for end use. So it would not appear here.

Becker: I still don't see it, but I am not going to pursue it.

Trembl: How are we finally going to respond to the questions of George and Andy? Everytime we talk about a residual, in order to do our homework well, we should verify whether in fact Dmitri has accounted for all activities. The whole problem with residuals is that we don't whether we have subtracted all of the elements. Residuals are usually larger, because we simply don't know every single item to subtract. I maintain, for example, under construction you have to subtract the output of project-making organizations.

Steinberg: I would like to respond to what you are saying. He (Becker) is not concerned with the residual right now. He was asking whether my perception of other elements of weapons could be somewhere else in the national income. Would you agree that it is impossible to find weapons outside the residual in investment?

Treml: I am raising a procedural question. You say that you have identified a residual capital R by taking X-Y. I am saying that very often the fault of the residual approach is that we cannot fully account for Y.

Steinberg: You are saying I've overestimated Y.

Treml: How can we proceed without each time verifying that Y was fully accounted for?

Steinberg: There is a very simple way to estimate Y here. What you're saying here is that there are some construction projects excluded from capital investment.

Treml: What you told me is that GVO construction, as given in Gross Social Product accounts, consists of new construction, capital repair, and changes in inventories. I am saying that it is much more than this.

Steinberg: Would you agree with me that supply and end use must equal? All of construction is part of end use. We have total fixed investment, capital repair, and change in inventories. Total supply of construction programs must equal the sum of total fixed investment, capital repair of construction work, and changes in inventories. What you're saying is that construction GVO includes some type of work which is excluded from this.

Treml: The Soviets cannot ever get rid of double counting. The construction GVO includes the value of output of project-making organizations, which has been double counted.

Steinberg: Where is it double counted?

Treml: At one point in the plan to construct a building, the building was designed and people were paid.

Steinberg: It would be part of other construction works, and it would be part of total fixed investment. So what is the problem?

Treml: The problem is with double counting.

Steinberg: Where is the double counting? We have construction GVO which consists of three parts--fixed investment, capital repair, and inventories. How does double counting take place?

Treml: Because the value of a new building already contains the value of project-making for that building.

Steinberg: The value of a new building is additions to capital stock.

Treml: I am not arguing whether it is right or not, but that is what the Soviets do. They say that construction GVO, as shown under gross social product, includes all

new buildings, changes in unfinished construction, capital repair done by formal construction organizations, and geological works.

Steinberg: That is what net fixed investment is. Some geological works and some project works are excluded from construction because they are outlays of science; they are not part of the production sector. They will be treated as nonproductive expenditures in the public consumption of national income.

Becker: I think we are getting away from the central issue. Let's restate the central issue--that your hypothesis of defense treated in this special way results from an examination of several elements in the total reconstruction that includes an examination of depreciation, wages, the distribution of output along the row to quadrant 2, and the distribution of national income in quadrant 4. Do you want to pursue this further or is this something that is going to need special examination?

Trem: I am troubled with this whole issue of the residual and the reconciliation because different explanations could be given. You're wrong when you say that the Western specialists have not looked at it.

Steinberg: For example let's talk about the residual in the population statistics. I talked to Feshbach, Rapawy, and others who told me they were not interested in looking for such a residual. They assume that the residual does not exist. Nobody looked at it.

Trem: The basic problem is that the definitions and census statistics are different from the employment statistics.

Steinberg: That's right. That's one of the problems in reconciling the two.

Trem: We all know this. The Soviet census statistics are derived from totally different set of measures. You ask a person, for example, whether or not they are employed. There's another point. The *sebestoymost'* data that you refer to excludes some part-timing and other labor value which is under other elements.

Steinberg: Let's discuss each issue at a time.

Trem: As long as you use a residual approach, you will end up with overstated residuals. That's my problem.

Steinberg: My problem is that people accuse me of not overstating the residuals but of underestimating the residuals. I'll give you an example. The Defense Intelligence Agency claims that my investment residual is totally absurd--instead of having 30 billion, I should have 60 billion. They accuse me of underestimating it by a factor of two. They are saying that instead of finding 30 billion rubles in the investment fund, I should find 60. I cannot imagine how one can find a 60 billion ruble residual in this account. The reason they find 60 billion rubles is that they ignore national income accounts. They look at total MBMW supply, ignore completely the national income accounts, and manipulate the residual to arrive at 60 billion rubles. They say that these 60 billion rubles is the procurement bill. You can't find these 60 billion rubles in Soviet national income statistics. At this moment, I am not so concerned about one billion rubles here or there in talking about the precision of estimates. I agree with you on this point--we have to sit down together and carefully look at these accounts. But we are talking about the fundamental differences in the approaches to interpreting Soviet national accounts.

DIA looked at the investment fund of national income and found 60 billion rubles, when the maximum we can find is 30 billion rubles. That's what we're looking at--whether the DIA approach is very misleading and fundamentally misrepresents Soviet national accounts.

Treml: (Treml is at the chalkboard) Basically, we're saying that some sort of estimate of supply minus use is equal to a residual. Now what I am saying is that in many studies, including DIA studies and my own, it is virtually impossible to account for all uses. There is a mechanical bias in a lot of the work because we are understating accounts and thus overstating the residual.

Steinberg: I agree with you. You can only accuse me of overestimating. You cannot accuse me of underestimating. If I overestimated the residual, the residual must be less than 30. How can DIA then find 60? I may be off by 1 or 2 billion either way, but I am talking about 60 billion rubles.

Becker: What is the commodity composition of that residual--the other uses of national income?

Steinberg: It pretty much reflects the machine building components of final output.

Becker: But you were saying that one of the problems with the residual is that there are lots things in there that shouldn't be in there, like power, for example.

Steinberg: Precisely, what I am saying is that the structure of material outlays in the MBMW sector very much approaches the structure of the investment residual.

Becker: You are saying the residual vector look very much like the MBMW vector.

Steinberg: There are differences, but it is very suspiciously similar. But the issue here is that when you add all the elements in the investment residual, you arrive at 30 billion rubles. I am not the only one who arrived at this number; Duchene and Nove did, among others. They concluded that CIA overestimated Soviet weapons production by a factor of two. In other words, the CIA in 1975 made a wrong decision in changing their estimates. There is a fundamental difference in the scope of the Soviet military buildup. What I am arguing is that 30 is true, but you don't look at a total of Soviet weapons procurement. You are only looking at one part of it. Those people in DIA who arrive at 60 are manipulating Soviet accounts in a way which doesn't account for all end use. Indeed, they overestimate tremendously. This is what I am arguing.

Becker: Your other uses, which is in fact weapons, is 30 billion rubles, which comprises largely materials, to which you must add wages, depreciation, employment in weapons industry.

Steinberg: Precisely. If you limit yourself to quadrants 1, 2 and 3, in terms of so-called weapons outlays, you emerge only with 30 billion rubles. It is all they are concerned with in their estimates. That is why the fourth quadrant is so secret. Once you look at the fourth quadrant, you see that 30 is only one part of this total weapons procurement bill.

Ericson: This raises sort of an interesting thing that one might want to do to obtain some more circumstantial indirect evidence. That is, you have all the inputs

here for a production function analysis. You're claiming there is a sector that is using capital that you can calculate based on depreciation norms. You have a labor force. You have a structure of material inputs. Have you looked to see whether you can estimate a reasonable production function?

Steinberg: No, I haven't. I would like to do that.

Trembl: I believe that there is a mysterious column beyond national income. I have five or six references that simply say that final demand includes national income and other uses. And since national income and losses presumably accounts for everything, what possible other use could there be? There is one possibility. Everybody is essentially using input-output data to estimate intermediate uses--things which are used to produce other things.

Steinberg: Only the detailed format. But we can have the control totals from the NEB.

Trembl: But we use it. One possible description is the following. Input-output tables are constructed and sample surveys are administered and organized in industry. And, the defense industry, because it is so secret, doesn't participate in this process. Now the question is how to hide it. I'm saying that defense production is in the input-output tables. You're saying it is not. There are two ways in which they could hide it: 1) they could add it to civilian sectors and 2) they would use the civilian Aij's (technical coefficients.) So by hiding it this way, they inadvertently understate intermediate uses.

Steinberg: We have a basic equation here that I always try to work from because it is a very crucial equation. That equation is that we have a total supply in the economy and we have to find a use for it.

Trembl: (Trembl is at the chalkboard) At one point several years ago George and I discussed this. By hiding military, they have to distort inputs or outputs. We're talking about how military output is hidden in input-output tables. In the real world there's a column--subscript c is for civilian machinery and the m is for military machinery. TSU does not have access to military technology, but now they have to incorporate the military output. There are two ways in which they can do this. They can just obtain for the military the second column. The actual derived Aij is then some sort of a weighted average for each sector. The military would probably not deliver to TSU the Aij's of defense plants--it's secret. So, I think that defense delivers to TSU the basic gross output figures; that is, we have produced 4 billion rubles of aircraft, for example, and now you go ahead and hide it. TSU then adds military output to civilian output. This way, the integrity of the second and third quadrant is maintained. The fact is X_m is true accounting value for the aircraft, but the XA_{ij} was created by getting the civilian input.

Becker: They created a set of artificial Aij's.

Trembl: Right. Now the Aij's are civilian--that is my main point. But they multiply by the combined gross output. I have observations which support this hypothesis. I find that as a rule the Aij's in the production of tanks, aircraft ordnance, etc., in the U.S. are 80 percent higher in the defense sector than in the civilian sector. So there is a tendency for material input to be higher. If in fact the same observation is true of Soviet...

Becker: May have failed to account for some material flows--which are slopped over to other uses in final demand.

Treml: Right. In reconstructing the 1959, 1966, and 1972 Soviet input-output tables, we find unexplained negative entries in final demand. One or two can be explained by inventories, but there are just too many of them. So my hypothesis, as supported by logic and by some empirical work, is that there is a balancing entry. It is particularly evident in metal.

Becker: If military Aijs are larger than civilian Aijs, you expect to find positive entries and not negative entries in final demand.

Treml: Yes, they are positive. But by admitting them, you cannot inadvertently create a negative. The uses of metal or power not accounted for in the first or second quadrants are due to the distorted views of technology. A very tenuous assumption is that more than half of the military Aijs are higher than civilian Aijs. This is definitely observable in the U.S. input-output tables.

Pugh: If some of them were lower, those might give rise to the individual negative entries--according to your hypothesis--in the residual, so to speak.

Steinberg: I think the fundamental issue is how to reconcile this input-output analysis with the end use of national income. As we all know, input-output tables are not independent of national income. They are a derivative of national income. How does the explanation offered here affect national income? They have to find a way to hide defense production in the end use of national income. Where is it hidden?

Treml: That is why I found too many puzzling references. You have a first quadrant, and technically speaking the second quadrant should be national income. What Edel'man and others have said is that there is another column called "other uses." One possible explanation for this column is that it is an adjustment column necessary to balance the column totals due to the method of concealment.

Becker: But, he (Dmitri) still raises a valid question. Let's say that the "other uses" column is indeed designed for the slop occasioned by the fact that they do not have full information on the structure of intermediate use in military machine building. Where is final use of military machine building located in that structure?

Treml: Partially under public consumption. Under the activity which goes to R&D.

Steinberg: I hope I have provided some answers. My basic argument is as follows: in order for you to be in agreement with current U.S. national security estimates for Soviet defense, you need to have somewhere around (Steinberg is at the chalkboard) 60 billion rubles here.

Treml: If we go to the mid 1970s, Abe did find 15 billion rubles.

Steinberg: I found 15 billion rubbles too, but the problem is that for 1975 the CIA had already found 30. In other words, there is always a consistent difference of a factor of two. You have to multiply whatever residual you have by two. In 1975 the CIA projected around 30 billion rubles--the maximum we could find was 15.

Where do they find it? We have to come back to basic fundamental assumptions. That is why I prefer to work from national income, because that's where things must be hidden. There are no other explanations possible. We have a control total for consumption and for investment. So you look in detail in the consumption columns and all the investment columns and you must find where defense expenditures are hidden. Where do we account for the remaining 15 billion rubles for weapons procurement? Here is where we have to find answers to begin to disprove my methodology. This is where I find the most difficulty. We can account for all the components of national income.

Becker: The argument is that you insist it cannot be in investment.

Steinberg: It cannot be in investment. There are only two representative components of total investment in national income; one is net fixed investment, and the other is depreciation in the nonproductive sectors. In order to look in the investment component, you need to look at those two. We have demonstrated that it cannot be in either of those two. Now you can look at consumption, at the retail trade data. Now you say that weapons production is found somewhere in retail trade. You can't find weapons purchases in the retail data.

Trembl: Rockets which were produced and experimentally fired could be in consumption.

Steinberg: Not in the retail trade data. You are left with one single item which is not that large. In 1975 there are 10 billion rubles for science and administration. This is current public consumption in science and administration.

Trembl: Estimated by you.

Steinberg: No, it's in here in the NKH. It is called public consumption. You have 10 billion rubles essentially for science and administration. That is current consumption. We have very detailed data from Rutgaizer. Let me give you an example. We have 10 billion rubles. MBMW is around 4 billion rubles. We know very well that science organizations use a lot of MBMW components to do experiments and so forth. Essentially, you cannot find weapons in public consumption, because you have to account for material expenditures in science and administration. Science is around 9.1 and administration is around .9. If you want to argue about weapons purchases in consumption, you have to look at this .9 billion rubles. This is sufficient to account for current material purchases in state administration. In other words, we really have to be very specific if we want to talk about finding weapons somewhere else, and there's nowhere else to find them.

Becker: If MBMW accounts for 4 of 9 billion rubles for science, that is not likely to be major equipment. That's going to be under investment. So there's a serious question of what that 4 billion rubles represents. It could hardly be the kind of instruments that are under 300 rubles in value and have less than a year of service life. There is a serious question of what that 4 billion rubles is.

Steinberg: There's a very good explanation for this. There are a lot of science organizations which are experimental plants where they make final MBMW products for the space program.

Trembl: Where is it in your scheme of things?

Steinberg: They're in current consumption purchases of science organizations. They're a nonproductive use by science.

Trembl: There is very good evidence that if you look at the 1972 capital reevaluation which was done for *khozaschet* organizations, there is a large residual in the first quadrant. This meant to me that there is some science, some R&D -- both of the known and unknown nature -- in the first quadrant.

Steinberg: I would agree with you that there some science organizations which are part of the production conglomerates which would be in the first quadrant. But we don't know whether they are military or not. There's no proof of that.

Becker: Let's leave that argument for the time being. Let's go over to one other element. That is the one of the main proofs--the wages. I would like you to set up the line of reasoning that leads you to believe there is a large wage element in the fourth quadrant which is part of defense. Or, more correctly, the defense industry.

Steinberg: In the beginning of my analysis, I did not know it was defense industry. I could only find a huge spending spree on the part of Soviet households which accounted for unreported income. If you look individually at the household budgets, I cannot tell you this is the defense industry. I can only tell you this is a hidden income on the part of Soviet households. I don't know where they get it from. I only know they receive it. (Steinberg is at the chalkboard) In Soviet household budgets, we have an income side and an outlay side. We account for different items in income and different items in outlay. They don't correspond. Their totals only need to correspond. The total on the outlay side will include total savings to account for the difference between income and outlay. Total savings include organized savings in all the state banks plus the money people put under their mattress.

Becker: How do you know about the mattress part?

Steinberg: Let's discuss that. We have organized plus unorganized savings. What do we know about income? We know what is reported in the official statistics. We have official wages. We know about all the income received by households from the state budget -- pensions, all the allowances. There is some budgetary income we don't know about in the form of secret awards and so forth.

Trembl: We only know the Soviets publishes total transfer payments. And they say more than 50 percent is cash. We do know what pensions are. What we want to show here is cash transfers to households, and this is very difficult to estimate.

Steinberg: I assumed, for our purposes, that if I overestimate income it is going to work against me. In other words, I purposely overestimated cash income received from the state budget. There is a small part of allowances that they receive not in cash form, but in some other form. We don't know how it is registered in household accounts. We have monetary revenues received by farmers producing their own products. This is hard to estimate, because collective farms have retail trade outlays. We have to use secondary data, but essentially what I have done is to estimate total sales of agricultural products by individuals to the state (private income). I've excluded sales to individuals because of double counting. Only private income from the state is here.

Tremi: I've gone through all this. For example, you say the NKh publishes data on procurement by the private sector.

Steinberg: They started publishing data on private sales in 1981. They have a separate category for private sales. There is another way of doing it, using the commodity agricultural spheres.

Tremi: But I am just saying that there are all these gray areas. What I was saying is that they publish the data for state procurement from the state sector, from the cooperative sector, and from private individuals. And also the collective sector. However, there is another element which is called purchases of agricultural products by cooperative sectors. This is the trade cooperative sector which is not broken down.

Steinberg: I'm not using it. I don't consider it part of private income. It is entered eventually as wages of the cooperative sector.

Tremi: Using these tables, we cannot estimate total payments to the private plots by the public sector because there is one element missing, which is the sales to the cooperative sector.

Steinberg: The table has three components: sales of state, sales of collective farms, and sales of individuals.

Tremi: No, there's a fourth, and that's what's been bothering me.

Steinberg: Do you want to come back to it later? There are a lot of other incomes such as interest payments, and repayments of state bonds. There are also unofficial wages, or those wages that are not reported in the NKh. This is additional income received by production sector employees, and this is all the data we have on that. The total wages of productive sector employees can be derived from the input-output tables. This is all income of the households which work in the productive sector. Then we have to subtract nonmonetary income in agriculture, and in the construction sector. You then have this difference which you compare to the sum of official wages in the official sector and private financial income. You then arrive at what I call other earnings of productive sectors. This includes business trips and all the bonuses that are not included in the official wages. The biggest part of these other earnings, which can be found in secondary sources on social consumption funds, is called one-time bonuses. This data has been published. The other earnings are around 3 percent of total wages of productive employees. So we can account for productive sectors.

The nonproductive sectors are very difficult to estimate, because official data on nonproductive wages is very much underestimated. There are a lot of things received by writers, artists, health officials, etc., which are not part of official wages. The only way to estimate nonproductive wages is to look carefully at the social consumption fund data. It includes total current expenditures, which consist of:

- (1) current material expenditures and
- (2) total wages as reported for culture, education, health, and social services.

In those years for which we have Rutgaizer's data, I estimate current material expenditures for those services. I gather a residual here which is called total wages of those services. Total wages exceed substantially the official wages published in the NKh. I then extrapolate using the ratio of official wages to total wages to get estimates for other years. This ratio is about .90 - .92. That's how I estimate unofficial earnings of nonproductive sectors. This then is the total, and this total excludes military personnel. I don't want to deal with it at this point. So now I look at total outlays.

Trembl: There is another item--the net credit extended in retail trade.

Steinberg: I dealt with it in terms of the difference between issued credit payments and credit payments received. What I do is balance it out on the outlay side. It is a minus.

Becker: One thing that emerges from this is that there are numerous uncertainties about the calculations.

Steinberg: Let's discuss these uncertainties. Where are the uncertainties in this calculation? I really don't think there are large uncertainties here.

Ericson: Is this where hired agricultural labor is included?

Steinberg: No, this will be included in official wages. Agricultural labor hired from outside will be included as part of the official wages. It is the part of the additional wage funds of collectives and state farms which they report in official statistics.

Ericson: What about the *artely*?

Steinberg: It is part of the official statistical coverage of the state-cooperative labor. Let's talk about unofficial wages, which accounts for 3 percent of total wages. Furthermore, 80 percent of these other earnings in the productive sector we account for separately by looking at one-time bonuses which are part of the total consumption fund. The only uncertainty we have is the other 20 percent, which is called business compensation expenditures, which are very small and change very little. So, the uncertainty here is nonexistent. There is uncertainty regarding the other earnings in the service sectors. I continued the trend established in the 1960s and early 1970s. I could be wrong. What works in my favor, is that we have a total for the current material expenditures of the service sectors which increases very slowly over time. I would assume that by extrapolating, the error would be very small. I essentially assume that the total for other earnings in the service sectors--if you really want to be very generous--would be no more than that, .5 - .8 billion rubles for the late 1970s.

Becker: What happens to the earnings of people who have connections abroad or have worked abroad; for example, they come back and get purchasing privileges?

Steinberg: What happens is the following: If part of their official wages does not correspond to their purchasing power, they would spend their wages in a way that is advantageous for the average Soviet citizen. Their wages would be considered the same, but they would go to special stores and it's considered retail purchases of Soviet households. The quality of their goods would be better; the only advantage they get would not be in additional wages, but in additional buying privileges.

So, we have retail trade data which is also tricky, because retail trade includes purchases by public organizations. You have to subtract that. You have to subtract commissions received by trade organizations from the sale of secondhand goods, which is around 10 percent. You have to subtract secondhand goods, because it's a transfer of payments between households. It's households selling to other households. After you subtract that, you get retail trade purchases by households. Second, you have purchases of nonproductive services. The Soviets began to publish that data in 1985. Then you have payments or the transfers to the state budget, which includes a lot of things: dues, bonds, lotteries, etc. We can account for all of them.

Trembl: Purchases of services, you seem to over count them.

Steinberg: When I count purchases of services, I only count for those purchased by households. I don't take into consideration services provided by enterprises and the state budget.

Trembl: Repair of footwear, for instance.

Steinberg: Repair of footwear would be in the retail trade data because it is productive services. I'm talking about services which are nonproductive. Also, payments for cooperative housing. Much of it is purchased in cash. In the whole equation there are only two uncertainties: how large is the unofficial income for defense, and how large are additions to unorganized savings? Already what we see from this, is that if you've got unorganized savings, outlays exceed income by a significant amount.

Becker: One thing you have not added is income spent on items you've indicated by military personnel.

Steinberg: (Steinberg is at the chalkboard) We don't have military personnel on this side of the equation. We have not accounted for the income by military personnel. Our task is to estimate the total wage bill which would include all wages--official and unofficial--to get total wages. If I estimate total wages, I would have total income, which I can subtract from outlays.

Becker: What do you mean by unofficial income again?

Steinberg: By unofficial income I mean all the wages of defense employees that we don't know about, or anything I cannot account for.

Becker: Let's call that defense income.

Steinberg: Okay. So this is unknown, and Soviet unorganized savings are unknown. If I can account for total wages of Soviet households which includes military wages, then I can estimate unorganized savings. Total wages would include military wages. My purpose now is to estimate total wages of all Soviet households. The only way to do it in current prices is to use published Soviet household budgets. These budgets are very bad. Most items in that budget are no good because they are biased. There are two items, however, in that budget which are worth looking at. One is total wages, and the second one is benefits received from social consumption funds. I find a lot of inconsistencies in that table. However, the ratio between total wages and the benefits from the social

consumption fund is published regularly in the NKh. We can plug in benefits from the social consumption fund and apply the ratio to total wages. What you get is a total wage bill of Soviet employees compared to their social consumption privileges. This is part of standard Soviet statistics that they estimate every year. I get total wages. From this total wages I subtract official wages and arrive at military wages. These total wages, allow me to estimate additions to unorganized savings. I get a figure of approximately 3 to 5 billion rubles in the 1970s.

Becker: You lost me. In the literature on household budgets, you get total wages of members of the state cooperative sector and the benefits from social consumption. The percentages are implicit in the household budget.

Becker: What you've done is take all the wages in your distribution in the state cooperative sector and you've multiplied. . . .

Steinberg: No, I subtracted all the wages for the civilian sectors and got military wages.

Becker: Are those family budgets or individual budgets?

Steinberg: They are household budgets which are very imprecise with respect to purchases. Some purchases and some income in terms of transfers between households are from illegal activity. The ratio between total wages and benefits from social consumption funds is part of standard statistics. After arriving at total wages, I estimate total income and compare it to total output. In 1984, the difference between the two is 3 billion rubles, which indicates that there was a negative cash flow from unorganized savings. Throughout the 1970s and 1960s there was a positive flow of a billion rubles. Right now, I think Soviet households must have 150 billion rubles circulating outside state control.

Pugh: It seems to me that by one count you go to a limiting case. You get defense-related income (estimated at about 24 billion). If you try another approach for estimating defense-related income by subtracting, in effect, civilian wages from total wages, you get like 27 billion.

Steinberg: I don't have the exact figures with me.

Pugh: I was only guessing at 27 billion because you told me that you came out with about 3 billion rubles in unorganized savings. If you look at this thing from the gross perspective, there's some number close to 25 billion rubles which appears to be going into defense-related income.

Steinberg: Only 6 or 7 billion rubles are received by the armed forces, no more than that. It is the most generous allowance. So we are left with around 19 - 20 billion rubles.

Becker: That 20 billion rubles represents the wages of defense employees.

Pugh: If you take that 20 billion rubles and think of it as a defense expenditure, you then add it to the 30 billion rubles allocated to defense raw materials. You have an order of magnitude of 50 billion rubles, putting in the implicit profit. . . .

Steinberg: There's no profit. You have to add social security deductions in the amount of 2 billion, and you have to add to that depreciation of capital stock.

Becker: How do you know that that 20 billion does not appear in quadrant 3?

Steinberg: Because we can estimate the official wages of production sectors. This is a control total for all income by employees in the production sector. From that we subtract monetary income and nonmonetary income. We can account for additional wages of production employees. The only difference that there was, was 3 percent for bonuses and business income reported by Soviet authors. These are one-time bonuses and business expenditures which are excluded from official wages derived from the NKh.

Trembl: I have an independent estimate because the NKh publishes lousy household accounts. But 4 out of 7 regional handbooks actually report what we want to know, which is the money income of the total population. I'm getting like 2.3 percent for one-time bonuses. But what I call business transfer payments are estimated completely independent. My problem is that each time you indicate an item, I know of a gray area. You talk about public purchases--the last reliable figure was published in 1971.

Steinberg: No, I have data for 1980. In 1980, public organizations purchased 4.5 percent of total retail trade.

Trembl: But at the same time, some say about 5 percent.

Steinberg: I've never seen anybody citing 5 percent.

Trembl: There's some 1 to 2 percent uncertainty. Commissions are very difficult to estimate.

Steinberg: We have data that it is about 9 percent of total secondhand sales.

Trembl: But you don't know the total.

Steinberg: Secondhand goods sales? We do have this data from Lokshin who published an article about cars. Cars account for about 90 percent of secondhand sales.

Trembl: Less than this. I've done this and a number of others have done this. Everytime we come to some uncertainty. We talk about the adjustment for services. Now services are published. For one thing, they are published inconsistently in terms of prices. Sometimes it's in current prices and sometimes it's in 1966 prices, for example. Secondly, they give you total value of services and then they give you the value for separate services.

Steinberg: I estimate by adding separate services. I use the ratios for education, health, and other services which are very small--5 to 6 percent of total household purchases of services. Then, I look at transportation and communication services purchased by households.

Trembl: I am referring to the adjustment between retail trade and service purchases.

Steinberg: What I am doing is only accounting for nonproductive services which are not part of retail trade. When I estimate retail trade, I do not account for

nonproductive services. I only account for productive services and I don't bother about nonproductive services.

Trembl: There are large residuals which you don't know how to handle.

Steinberg: Where? This is a very simple example. We have two parts of services. One is included in GSP and the other is treated as nonproductive services. You will agree with me that all services that are included in GSP are part of retail trade. So essentially when we account for household purchases in retail trade, we account for all purchases of productive services. So, what do nonproductive services consist of? Are you referring to education and health for which households pay very little money? *Vestnik Statistiki* publishes data on household purchases of education services.

Trembl: That is not what I am referring to.

Steinberg: What I did is this. I estimated the total volume of nonproductive services for each sector--education, culture, health, transportation and communications, housing and communal services, banking and insurance, and so forth. I estimated the sum of wages, material expenditures and profit for all these sectors. I looked at health, where you notice, for example, that household purchases 5 percent of health services--a very steady percentage. For education it was 6 percent--you have more exact data on household purchases of education services from *Vestnik Statistiki*. The same way I estimate totals for transportation and communications and for communal services where you have rent payments estimated. You can account for each item of household purchases.

Trembl: That's my problem. What's the total for the transportation and communications sector? This is the difference between total earnings of the transportation and communication sector and productive transportation and communications services.

Steinberg: You also have to account for budgetary support. There are two ways of doing it. One way is to use data published for the 1970s for household purchases of transportation and communications services. It's published in many sources. Then you compare this with the 1985 data and you get a trend. Another way of doing it is to use the labor statistics on transportation and communications found in the CEMA handbook. Here they put the entire labor data on transportation and communications services for households together with data on productive services. What is left there is treated as nonproductive services. So you can derive a ratio from that.

Trembl: What I am saying is that all of this involves a lot of rough estimates.

Steinberg: If you go into detail, what emerges here is that we have a good handle on most household purchases of services. For example, we have very precise data on purchases of education and health services.

Becker: Does that include purchases of health and educational services from the private sector?

Steinberg: No, we don't need to include that. It's a transfer of income between households. We have very precise data on rent payments for communal services.

Ericson: You say precise. Do you make any effort to get an upper and lower figure?

Steinberg: By precise I mean within .1 to .2 billion rubles.

Ericson: Yes, but an error of .2 or less than 1 billion rubles across 7 different categories could represent a very large number. In order to handle the argument that there seems to be a large number of estimates being made, it would be nice to have a confidence level of some sort.

Steinberg: I agree. I'm not saying that my numbers are the final ones. I'm sure additional work needs to be done. This type of work needs to be done in an institutional setting. But I don't want to be lost among the trees and not see the forest. I am not alone to find this difference of 27 billion rubles. Birman looked at it and found huge differences between household income and outlays. My contribution is that I think I've done a more accurate job than Birman. He has very rough estimates while I've tried to be more precise.

Becker: I think maybe we've explored this as far as we need to go.

Ericson: There's one other check I have to ask about and that is the structures of the MBMW sector and the defense sector.

Steinberg: There are a lot of sales between MBMW enterprises, which is not done on the same scale as in the defense sector because the latter is more like final production.

Ericson: So there's a plausible relationship.

Pugh: One other area which we might want to look at is the employment data which indicates a gap. Is this something worth talking about briefly--or should we go on to other things?

Becker: I think perhaps the same sort of issue arises, a reconciliation effort which depends upon a number of estimates. There are two questions: 1) verifying the estimates, and 2) developing sensitivity tests to give you some sense of what the accumulative error could be as a consequence of making different estimates. I think you have the same general problem in all aspects of these proofs for that particular treatment of the defense sector.

Steinberg: I think we should have more effort done in this area. We should have more people working on this.

Becker: That's hardly likely. Unfortunately, the likelihood of you having an army following you is very small. Maybe we ought to go on now to the question of the utility of the reconstruction and what we can do with it.

Let's summarize where we have been. We first asked ourselves whether the Soviet National Economic Balance is--as this whole reconstruction presupposes--a regular, comprehensive, systematic, well-developed, and carefully-tended kind of instrument.

Secondly, whether the distortions, which are inevitably part of Soviet economic functioning, have an impact on the National Economic Balance. And in what sense do they have an impact?

Then we asked ourselves whether Dmitri's reconstruction reflected a proper understanding of the accounting framework of the National Economic balance. This question bridged over into a consideration also of the degree to which some of the major cells were filled correctly. We have not really gone into detail into the empirical reconstruction, since none of us has had the chance to follow this up in any great detail.

We are now about to get to the question of what do you do with this? These questions are going to be intertwined--what can be done with the instrument and what should be done to refine the work already done. So I see several questions that come under the heading of what can be done with this.

First of all, Dmitri has done a tremendous amount of work. This is evident from looking through all this. Can this be maintained and updated, over the next 5 years, with reasonable effort? "Reasonable" being a lot less effort than what Dmitri put into it, because I cannot imagine finding that group of people anywhere, in or outside the government, that is prepared to put into it the kind of work that Dmitri did. There's a question of whether or not this can be maintained with a fraction of the effort made by Dmitri.

The second question that I see into this is--is this accounting framework superior to the GNP accounts? What is related to that is what additional information does the National Economic Balance contribute? So let's start with the first question.

Dmitri, what's your sense of the kind of maintenance effort that is required, assuming that what you have done is reasonably correct?

Steinberg: I expect that there will be much less effort in the future, because the Soviets have promised to publish much more data. Much less effort will be required because I'll have to estimate far fewer indicators, because they are going to provide much more detailed accounts.

Secondly, when I started this work, nothing was computerized.

Thirdly, when I started this work, there was a lot of uncertainty about the relationship between many components of the Soviet national account. I've spent a lot of time sorting out methodological difficulties with the help of other people.

These are three factors which will make it a lot easier, but how much easier is hard to say.

Pugh: We're faced with the question of trying to estimate how big a job it would be to annually update the data base. Our feeling was that, in view of the fact that almost all of the mathematical relationships involved would be the same in year $n+1$ as they were in year n , the process would go through fairly easily.

The first approximation is that you put the numbers into the raw data base and it comes out on the other end. By second approximation, you better look at

things as they go along. I don't think that it would represent anything like the magnitude of effort that initially went into trying to decide on the data structure.

Steinberg: There's some difficulty here because the Soviets do change accounting procedures. For example, the Soviets have now changed the retail trade account. I don't have the 1986 NKH, so it is very hard for me to judge what changes they have made; foreign trade as well has been changed. I believe some effort will be needed to sort out their changes in accounting methodology. A lot of effort was spent on trying to sort out their price changes in inventories. Not only did their inventories jump tremendously in 1982 statistics, but they stopped publishing the structure of inventories.

Treml: I still would say that one would have to go back over the methodology, I simply cannot accept it as final and accurate, because there are a number of us that have done it before, have given up in frustration, or have arrived at answers which contain a certain percentage of uncertainty. Even with the commissions sales, you have to adjust them. Total credit is not easy to determine. Regarding the employment data, you (Dmitri) get the official data by using the official employment data; I use part of the census employment data.

Steinberg: I didn't use census employment data for total wages, and I only used it for total employment. I used official wages from the official statistics, and then, I accounted for the total wages.

Treml: What employment did you use?

Steinberg: For official wage statistics, I used official wage data, but I didn't use demographic statistics for wages.

Treml: But I've used a number of other statistics.

Steinberg: Did you use demographic statistics?

Treml: Yes, from the census data. For employment.

Steinberg: For employment, yes, but not for the wages.

Becker: Apart from the question of verification of what's there and what years have been looked at, anybody that has done national accounts recognizes that each new annual set of data always presents a new set of problems. You can't just plug in a number to continue the series. Sometimes the series changes, a definition may be clarified, or a number comes in that makes a previous series inconsistent. Then you have to go back and redo things. There are always difficulties that arise in that regard, so the original model has to be reexamined at each time you do an update.

The second question is, in what way is this system superior to the standard GNP accounts framework, taking into account that in national accounts done in the GNP framework, you can do a lot more by way of distinguishing the nonproductive and productive sectors. This is not unique to this particular accounting framework.

Steinberg: We have a good handle on control totals--wages, for example. For the GNP account, the CIA takes the official wage fund and ends their story. I'm

saying this is only the beginning of the whole process. You have to take into account additional wages received by productive sector employees, additional wages received by nonproductive sector employees. Furthermore, you have to take into account the huge wage bill of the defense sector.

Becker: Now in what sense is this simply a CIA error, rather than a deficiency of operating in a particular framework?

Steinberg: Because if you operate in a GNP framework, you don't take into account the totals for national income. The total for so-called labor; which is part of Soviet national accounts, is not taken into account because it does not exist in the West. CIA analysts estimate the total wage bill--they have no better way of doing it--by taking the average monthly wages from the NKH and average employment, multiplying the two to get the total wage bill. It is very simplistic and very imprecise.

Second, CIA analysts have a problem with distinguishing between productive and nonproductive activities, which is needed to estimate the civilian sector better. They have a lot of difficulty estimating service activities, because they don't use national income data. Again, they just take profit, depreciation, and wages in a very crude way to estimate total volume. Secondly, in order to estimate GNP, you have to take into account payments to service sectors made by enterprises. In the West those payments would be excluded from value added as business expenditures. Soviet national accounts, transfers from production enterprises to services are part of produced national income. So when you go from produced national income to GNP, you have to take into account these transfers made by production enterprises, because those transfers have to be excluded from national income to arrive at GNP. Again, the CIA doesn't take into account this fact and distorts reality.

Another issue is net fixed investment. The CIA doesn't estimate net fixed investment because it is interested primarily in total fixed investment as part of GNP. Net fixed investment is very important to know, because you have to know Soviet depreciation policy. But more importantly, you need this net fixed investment figure after 1975, because the Soviets stopped publishing net investment figures after that year. You need to estimate what part of investment is going for defense. If you can't estimate net fixed investment, you can't estimate the residual that goes to defense expenditures. There's no way the CIA can estimate defense expenditures without knowing net fixed investment. They would say they don't care because they get the defense figures from the other CIA office that uses the building block approach. This doesn't resolve the issue, because you really have to know the allocations of resources in rubles in order to know how the Soviet economy is operating. You cannot have a really good estimate in rubles by relying on satellite data. I think there really has to be work done in integrating GNP accounts with defense expenditures, and the CIA clearly hasn't demonstrated their capability to do so. I believe that this needs to be resolved because their GNP accounts are not structured enough for such an integration procedure. You can only do an integration procedure by reconstructing the NEB balance.

Pugh: From a simple conceptual view, it seems to me that the process of interpreting the Soviet statistics as thoroughly as possible in the framework where the statistics were originally generated, and then transferring to a GNP format, has a lot of advantage in that it makes it easier to use more of the Soviet statistics--

thus leaving it to a subsequent mechanical process to transfer it to a GNP representation.

Ericson: The second question raised about which accounting framework is superior depends upon what you want to do with the material. What the format seems to give, if we accept it as reliable, is the way the Soviets actually look at their own statistics, which to some degree may lie behind the decision making on the macro-economic level of their economy. For pursuing objectives of trying to understand Soviet development strategies or questions of intention in the evolution of the defense budget and so on, this framework is probably more illuminating than the GNP framework. However, because of its intense tie with the labor theory of value, if you were interested in the real economic burden and the mobility of resources between sectors and so on, it might be better to look at the GNP accounting framework or the input-output table for addressing questions regarding opportunity cost. Something that bothers me is the reduction of everything to labor-based factor cost which, though it replicates very closely what the Soviets claim to be the full cost, it is not clear how reasonable that is related to opportunity cost. The idea of excluding profits, among other things, from the value of military output means accepting the Soviet figures for the value of input. It may not tell you a whole lot about the burden of the defense effort, though it may tell you quite a bit more about the Soviet view of what that burden may be.

Pugh: We did an analysis of the U.S. input-output tables in which we reduced the production levels to a labor-based factor cost to see how the official price structure compared with the Soviet theoretical labor-base price structure. The distortions were surprisingly small except for specific areas like crude oil. I could show you some results of that analysis.

Ericson: I think that is a good bit due of the level of aggregation that was used. I mean the level of aggregation was at a very nonoperational level. Nobody makes decisions on input-output technology in those kinds of aggregate terms. If you look at specific pieces of equipment and so on, the price differentials are apt to reflect market pressures to a much greater degree.

Steinberg: I have nothing personal against the GNP framework. I do think it is superior--and most Soviet economists would think it is superior too, because it takes into account the service and defense sectors by which you can see the whole economy in full view. I would agree that the GNP framework is much more useful for understanding what is really happening in the economy. However, this is not the issue here. The issue is how to arrive at this GNP framework. If you arrive at it using the CIA approach, I don't think this is the best way to do it. Even though the framework may be superior, their technique of using Soviet statistical data to arrive at this GNP framework is not as efficient as it could be. Unfortunately, to arrive at much more precise data, we have to reconstruct first the Soviet national accounts and then convert them to a GNP framework. Then we have a much better handle on the data, rather than going straight to a GNP accounting framework.

Becker: This raises a question of the compatibility of segments 6 thru 9 (financial flows) relative to segments 1 thru 4 (material flows). Much of what you have to say relates to the utility of evolving a Soviet perspective with segments 1 and 4. The question of the way the financial segment is attached to the core of the overall unified economic balance is much less clear. It seems to me they are much more attachments rather than integrations. As such, they really represent different

ways in which financial balances, constructed within a GNP account, are attached to the GSP or national income balance.

Steinberg: I would say that this is the only real way of knowing what the real financial balances are. If you look independently at what the real financial balances are--trusting official totals, you have to believe that the official budgetary outlays are really what they are, and you consequently operate within the budgetary constraints that exist. But if you attach them to the core of Soviet national accounts--the GSP and national income balance--you see that the Soviets have to resort to budgetary deficits in order to finance defense activities. By attaching them to the core of Soviet national accounts, you change the whole perspective on the Soviet financial situation and on the whole crisis that is occurring at the present time.

Becker: What do you see as being budgetary surplus?

Steinberg: The official budgetary surplus includes transfers to the credit institutions; it also includes the reserves that they transfer for use in the next year.

Becker: This has been already done. This is the explanation generally used in doing GNP accounts. What new have you added here?

Steinberg: The problem is that when you look at the real budgetary outlays, as opposed to official budgetary outlays you see a gross discrepancy. In other words, if you add all the components of budgetary outlays item-by-item, you arrive at total budgetary outlays which exceed total budgetary revenues by 10-15 percent. In other words, if you look only at the state budget, you miss the whole picture. You miss the whole problem the Soviets have right now.

Becker: I'm missing the argument here. What are the outlays which are not included in the standard budget distribution outlays?

Steinberg: First of all, we don't have a real good perspective on itemized budgetary outlays. We don't have a good breakdown. This is because the Soviets don't want us to estimate precisely budgetary outlays. Essentially, this makes it very difficult to analyze budgetary flows.

Pugh: How about the defense-related salaries? Are they included in budgetary outlays?

Steinberg: We don't know--that's the whole point. We don't know what's included in the budgetary outlays. There's no data on that. So if you look at the budgetary outlay from the GNP perspective, there is not much you can do with it. It's a useless piece of data, because you don't know how to integrate it into national income accounts and GSP accounts. The only way to know that is to attach budgetary accounts to the GSP and national income accounts. Then, you can estimate whether budgetary outlays constitute investment, services, and so forth, including defense. When you attach budgetary accounts to the core accounts--GSP and national income accounts--you can estimate all itemized budgetary outlays and arrive at the total which would reflect the budgetary involvement in the redistribution of economic wealth.

Ericson: What you find is that the sum is about 25 per cent larger than the official expenditures.

Steinberg: That's right.

Becker: Where does that difference come from?

Steinberg: From the fact that state budgetary revenues are not sufficient to finance the defense effort. Essentially, they don't have enough money to pay defense industrial employees. They have to issue credit from themselves, somewhat like the budgetary deficit in this country. The only difference is that in this country we have to cover the budgetary deficits and in the Soviet Union...

Ericson: It is just an emission of money.

Steinberg: That's right. I'm not sure of how the Soviets are doing this because Gorbachev, in a recent report to the Central Committee, stated that even though they face a financial crisis, they have been able to overcome this crisis without a budgetary deficit. I'm not sure whether he was lying or whether someone gave him wrong information.

Becker: But you're also asserting that every year the Supreme Soviet goes through a budget process that is essentially a charade.

Steinberg: Precisely.

Becker: There is in fact a true budget which is larger. Who knows that true budget?

Steinberg: I can present to you an elaborate scheme of the way decision making takes place, but it would really take us far away from our present discussion.

Ericson: In pursuing these accounts, did you make an independent estimate of the volume of high-powered money outstanding? There would seem to be rapid growth in that.

Steinberg: As a matter of fact, the *New York Times* reported that essentially right now there are 50 billion rubles of outstanding debt that enterprises cannot pay back to credit institutions. This is money that enterprises borrowed from the state bank to buy inventories which they can't pay back.

Becker: This is in the NKh, isn't it?

Steinberg: No, you cannot estimate this from the NKh data.

Treml: These are like dead loans.

Becker: Over and above the data on loans outstanding?

Treml: I think most of it is included, but we don't really know how much of this is supported by realistic IOUs.

Steinberg: Precisely. I would add this 50 billion rubles to the billions of rubles they have accrued over the years in terms of the budgetary deficit. So you have to add all that. I would imagine that the total would be 300 - 400 billion rubles

outstanding. It is a severe crisis. They are in really bad shape. The amount of money the state has outstanding approximates savings in the hands of households.

Becker: We're talking about two different kinds of money. For households, we're talking about cash money. In the state sector, we're talking about accounting money. They're not the same thing.

Steinberg: In a way, the state could have taken this money from the households to cover the state debt. All the debt was caused by the inability of the state to generate enough goods and services to return money paid to the households in wages--to get it back from them in terms of goods and services.

Trembl: Another interesting explanation for part of the imbalance arises when you bring the second economy into account. There's all kinds of illegal markets; and if it's purely illegal services, then, it would not affect the balance at all. However, if this is production of real goods and services using materials preempted or stolen from the state, then there's another set of accounts. The second economy provides value added which also creates expenditures. This is fine. All this stuff stolen or purchased at illegally low prices to the state would generate additional income which should be added on the income side.

Steinberg: I would disagree with that.

Trembl: Whether this is half a billion or 20 billion, I'm not sure.

Steinberg: The state is the only source of payment to households. What you have here is a good stolen from the state. The state will have to report this good instead of the good having an end use as material outlays. However, the total structure of flows of financial resources from the state to the households and back again would not be affected, because you would see only a transfer between the embezzler of material outlays who received money from someone to whom he sold his embezzled material. Where did the guy who bought this material get his money from? You can trace it in any given year. The state gives away to households any amount of money on the income side. It receives back from the state a certain amount of money. The situation we refer to would be another transfer within the household sector. Because officially it would be recorded.

Trembl: Look at it this way. In the food or light industries or in trade, emigres report that you could simply not hire trade employees at 95 rubles per month. You have theft--let's say by a salesgirl who leaves the store with goods. I know she is stealing. This is an informal material wage.

Steinberg: But in the national accounts, how would it be recorded?

Trembl: As losses in trade.

Steinberg: Okay, losses in trade. So when you look at the total wage bill paid to households, would the total wage bill be affected by this activity?

Trembl: Yes, because this girl who stole the fabrics will create value added by making and selling the dress. The illegal income will cancel the outputs of income, but the materials stolen from the state will boost the income side. Am I making sense?

Ericson: The difference here is that Dmitri is looking at the amount of money put into circulation in cash.

Steinberg: And taken back from households.

Ericson: But that is not necessarily the same as economic income. This operation increases the velocity of the money and thus generates the value added. Incomes go up but the amount of high-powered money. . . .

Steinberg: But here the concern is only high-powered money. In this particular case, you wanted to know how much money the state gave to households in a given year.

Ericson: But that money is coming and going all the time.

Steinberg: (Steinberg is at the chalkboard) Imagine that the whole household sector is a blackbox. The velocity would be thousands per minute, which generates billions and billions of rubles of wealth. The state gives n amount of rubles to this operation each year and takes back $n-1$ rubles. The difference would be u , or unorganized savings.

Ericson: By that logic, you could make the same argument in regard to the Federal Reserve system in the U.S. and the rest of the economy.

Steinberg: But it works differently in the Soviet economy because it is a closed system. The ruble is not convertible and no money is going out. The money is issued to the household sector and money is taken out of the household sector. We are only interested in this part. We are interested in only how much money was put into this black box in a year and how much money was taken out. We went through this exercise to estimate n (monetary income) to estimate $n-1$ (outlays) to come up with some type of balance. The difference between the two is unorganized data or money that households keep.

Becker: I don't think that you two are arguing against each other. The only difference is that in one case we are asking ourselves--is the Soviet National Economic Balance false in some sense? You're saying that, for some analytical purposes, you want to look at the world in a different way.

Ericson: That really isn't income. I'm just trying to clarify a point. What you have there is more the outlays of the state or labor versus income of the state from the sale to laborers, rather than what would be considered economic income or expenditures. Otherwise, you really do have to worry about what is happening in the second economy.

Pugh: I think that Dmitri is simply arguing that--in terms of his calculation of the difference between outlays and income--this doesn't have any impact, but it does impact the real value of the income of the economy.

Becker: What else can we do with the Soviet National Economic Balance? One thing that we talked about earlier is the degree to which planners use it to test the feasibility of plans. Can we use it to test the plausibility or the feasibility or the general internal consistency of a new plan?

Ericson: It strikes me more as a window on intentions, or more accurately on the information behind the plans, than as way to test the feasibility of the plan. I find it hard to believe that, on this level of aggregation, you'll find gross infeasibilities between the plan and what kind of data this will reveal. If we did find such a plan, I think it would be more likely that we had misread some number or a misprint in the source than that there was some gross inconsistency as this level of aggregation.

Becker: The imbalances that are characteristic of the Soviet planning systems reveal themselves at a lower level of aggregation.

Ericson: This may point to areas that bottleneck in some sense, and that would give us a better understanding of why they pursue a particular investment strategy. In the sense of showing what they perceive to be the burden of their defense effort, one might understand some of the economic reasoning or lack thereof behind policy as a way of understanding how they view their economy; as a very preliminary stage to getting any real analysis, I think the reconstruction is valuable. As something that will tell us actually about the economy, I am very doubtful.

Steinberg: I can give numerous examples of how it tells us what is actually going on. I think one of the things that Soviet economists have been talking about is the gross imbalances between goods that are available to household services on one hand, and their financial resources on the other. It is a problem of the entire incentive system. How do you force the Soviet worker to work? How do you make him more productive? There are two arguments. One side says you have to increase his patriotism, his ideological vigilance, and his social consciousness. On the other hand, those economists who have been exposed to Soviet national economic balance statistics will point out the following: how can you force somebody to work, when he's accumulated such excessive savings, and every year you have such a huge imbalance between financial resources available to households and what households can spend? If you don't have data on this imbalance, then you can't even begin analysis on the financial problem that the Soviet state is facing right now.

Ericson: I think I was saying pretty much the same thing. Would it provide the terms of reference for Soviet internal debate or how they're looking at their situation?

Steinberg: But it also provides us with a solution to avert this crisis, or what types of things they can do. Another area would be, how does the Soviet defense effort affect Soviet economic performance?

Becker: Before you leave the issue of household imbalances, your skeleton reconstruction suggests that in most years you are dealing with unorganized savings (as you termed them) of about 3 billion rubles. Organized savings may be 4 or 5 billion rubles. In 1985, you had dissaving in unorganized savings accounts.

Steinberg: But you have to remember that all this money has been accumulated over the last 25 years. This is only a net increase. You have to take into account the average household saving per month in order to understand the type of financial resources available to the households. In other words, if you do it every year, you can add the financial resources available to households over the last 25 years. You have to deal with the whole financial stock. How has this money

accumulated over the whole 25 year period, as opposed to just one year? Most economists in the Soviet Union don't have any idea of how much money is available. I think it's a major problem that Gorbachev is facing right now--how to force his workers to work if there's so much money floating around compared to resources, services, and goods available. I think you cannot begin this analysis without having statistics.

Ericson: But you can only sort of begin to look at it. As soon as you talk about what you might do, you have to worry about just how real these numbers are. That's the issue that Khanin raises repeatedly. For absolute levels, as an example--what is the capital stock in any of these sectors? Well, it depends on what the rate of hidden inflation has been by subsection of the capital that goes into these different sectors. There are a number of other details: to what extent can you measure what is going on, to what extent can those with a personal interest in falsifying the figures get away with fooling themselves?

Steinberg: Since those things are not known to planners as well, you have to assume then, that essentially they are working in the dark and do not know what is happening in their own economy. One would doubt that the Soviets can survive like that. One would have to assume that since the Soviet economy hasn't collapsed, there must be some validity to the data they deal with. We cannot even know to what extent the Soviets have this problem unless we start with their statistical data base.

Ericson: I'm not arguing against gathering this data and presenting it. It is a question of how useful it is. You really have to address the issue of hidden inflation--to what extent is the data exaggerated and in what sectors is it apt to be most exaggerated? For example, there is a very strong argument being made against Gorbachev's concentration on machine building--the need for investment in this sector. The argument is that machine building gets far too much investment and it should be cut dramatically. Where you want to put your investment is into obsolete sectors like metal working, steel production, raw material, and resources. I think it is argued that the structure of investment is based on a misperception of the economic situation because of the nature of the statistics that are gathered.

Steinberg: You have raised all valid points, and I think we desperately need to do additional work in this area.

Treml: You say the defense production is not in the first or third quadrant?

Steinberg: The only thing you have in those quadrants is material inputs into the final assembly of defense products.

Treml: There are civilian plants that produce military end products, and military plants that are producing civilian products as well. So with regard to the first

question, for example, the civilian Gorky truck factory is producing machine guns. Would this be included in the first, second or third quadrant? How do you define defense? is it just purely the productive effort producing military end items, or not?

Steinberg: There are two types of statistics. One set of statistics, that we deal with is the NEB statistics. In those statistics the output of any given enterprise is divided into three areas: civilian production, civilian services, and defense. All enterprises are divided into these three areas. The civilian productive area would be entered as producing GSP and national income. They would aggregate all the outputs. We have been talking about the level at which such an aggregation would take place. I believe it takes place at the *svodniye otdeli*, or the unified balances at the highest level of planning. They simply take final defense production away.

All defense enterprises which operate secretly are in Department 3, or *tretiy otdel*. I don't know the details of how these work. So there are three types of statistics for enterprises--production that would be part of GSP national income, nonproduction services that would be treated as transfers from production enterprises to civilian services, and defense that would be entered total separately.

Ericson: As transfers to the *tretiy otdel*.

Steinberg: I don't think it would be transfers. I think it would be like budgetary payments to enterprises to produce weapons. The enterprise would not create profits to pay for its defense program. The state budget would allocate funds to this industrial enterprise directly to produce this defense equipment, then purchase it and give it to the army.

Ericson: And labor and *osnovniye fondi* are separated at the same time.

Steinberg: The way I perceive it is that they do it in the same way they prepare input-output tables. They have to go from the enterprise level to the commodity level for each enterprise. Consequently, they have very detailed forms. At the enterprise level, you have to specify what part of time and what effort was used to produce a particular commodity. The same would be done in defense. For example, one worker today could work on a civilian product and tomorrow he could work on a defense product. What central planners really care about is time spent. The same applies to the capital.

Ericson: Everyone of these defense subsection shops or whatever are on *khozraschet*?

Steinberg: No, they're not on *khozraschet* because they don't receive profit for their labor. They have to receive direct budgetary payments.

Ericson: So the defense factories may have one or two *khozraschet* sections?

Steinberg: That produce consumer goods, exactly. This year they could produce civilian, and next year defense. In some areas the change in production lines is very insignificant--to go from producing a car to producing a tank, for example.

Becker: There are two questions that relate to the assumption that defense production is not *khozraschet*. One is that we know that the military representatives have, as part of their function, pressure to reduce prices. Their job

is to make sure that as the factory works down the learning curve and profit is squeezed out.

Steinberg: Profit is squeezed out?

Becker: Well, you start out by not getting a subsidy. But somehow you're meeting your costs as you work down the learning curve and you are in effect producing costs below the level of price received.

Steinberg: The way I understand it is that, at least since 1957, all defense production was subsidized in a way to receive a direct State budgetary allocation to produce military goods. In a way you can call it a subsidy. The Soviets would not call it a subsidy.

Pugh: You're saying that it is essentially similar to a cost reimbursement contract, in which they produce what they can, and the government pays what it costs them.

Steinberg: And they fight to reduce this cost. They fight for efficient labor time spent and the efficient use of materials spent. They don't deal with this profit at all.

Becker: All right, so they fight for reduction of cost.

Steinberg: That's right. The whole incentive system is based on cost reduction.

Ericson: But that's true in all heavy industries.

Steinberg: The main difference is that in all heavy industry that is *khozraschet* there are extensive bonuses paid for profit.

Ericson: From profit but for lowering costs.

Steinberg: The difference is in the way the bonuses are structured.

Becker: Even if that were the case, it still wouldn't disprove the case for *khozraschet*. You may have bonuses from another source and still have a situation where you have profit.

Steinberg: Where?

Becker: In the defense industry.

Steinberg: No, because of the way they construct the bonus system, it is not allocated from profit but from a separate fund which is used depending on whether they lower their cost.

Pugh: Let me make a point on this. It seems to me that your reconstruction wouldn't look any different, if in fact the defense industry were making a profit--because it is in a sense all inside that black box.

Steinberg: No, because we know the total amount of profit received in the economy. We know that profit can be allocated to the civilian production industries. In other words, if they receive profits it is not reported anywhere, and I would doubt it

Becker: You've exhausted the profit from MBMW?

Steinberg: I exhausted it for the whole industry.

Becker: You haven't separated out the civilian component of MBMW.

Steinberg: If I can exhaust profit for the entire civilian industrial sector, then I really don't need to do it for MBMW because the difference between enterprise-based statistics and ministry-based statistics is very insignificant.

Becker: What do you mean you've exhausted the civilian profit?

Steinberg: I can account for total industrial GVO in current prices. This total industrial GVO consists of certain components, of which the two most essential are production outlays and net profit. So I have total industrial GVO. By subtracting total production outlays I get net profit, which is essentially net profit defined in the official statistics. This proves that if the defense industry receives profit, then its output must be published in the industrial GVO. But we have had a whole discussion here that shows that defense industry is not part of published GVO. Therefore, we have to conclude that the defense industry does not receive profit.

Ericson: Why does that follow?

Steinberg: If defense industry receives profit, it must be in the total published profit. This number we can be sure of--nobody is saying that the Soviets are falsifying total profit for the economy. It is considered one of the most reliable numbers in Soviet statistics.

But I am sure there are many additional ways this data can be used. I am not sure that I, DSA, or anybody else has spent much time on considering likely ways to use it. It is something that needs to be done.

Becker: What light can it cast on the second economy?

Steinberg: We can estimate, for example, the structure of official household purchases and outlays from the services and so forth in the economy. Take the example of sugar purchases. We have published information on the normal consumption of sugar by households--for direct consumption purposes. But we know for households that the retail trade purchases of sugar exceeds the normal amounts. The only conclusion you can make is that this additional sugar is used to make moonshine. So if you want to treat the production of moonshine as an unaccounted production activity on the part of planners, then you have to add that type of production activity to the total to account for all the economic activity.

Becker: We already know they're using sugar to make moonshine. You didn't have to go through all of that exercise to do that.

Steinberg: I'm just giving an example of how the official statistical data could be used to shed light on the second economy.

I'll give you another example. This would be purchases of construction material. We know that the purchase of construction material is insufficient to account for the construction or repair of private buildings.

Treml: I don't think you're answering Abe's question.

Becker: My question really is--suppose you have a set of National Economic Balances and you've got to update them over a period of time. In what way does that reveal new information about the second economy?

Steinberg: Okay. One area we will have information on is the amount of additional monetary resources circulating, or what is the additional resources available to households for illegal purchases every year outside of state control.

Ericson: Don't you need to know something about the velocity of circulation?

Pugh: Somehow to me it seems that the reconstruction doesn't tell us anything about the second economy because, as you've shown, the second economy is like a separate black box which doesn't impact the official statistics.

Treml: The second economy preempts certain flows of materials from the first economy. There are connecting pipes between the first and second economies. If the second economy is purely service, then there are no traces of it here.

Steinberg: You can see areas where one cannot imagine how the economy can function on the basis of the data you get. For example, for education or health services you know that there is so little per capita service available that there must be something going on outside. We estimate know through questionnaires completed done by emigres per capita consumption of particular goods and services in the economy and then compare that with what is available in the official statistics. Another way you can do it is to create questionnaires to obtain data on total income and compare that to official salaries. The difference would be the salary received through illegal activities. Most results on consumption I get of course are from the retail trade data. The retail trade statistics are pretty good and you don't need the whole reconstruction for that.

Becker: How about the issues of growth? I take it that you can argue that there are other accounting frameworks which picture growth in a way not revealed by this accounting framework.

Pugh: I think that there is one way this accounting framework can be used. It is possible to use the foreign trade information--the relationship between prices in internal rubles and prices in foreign trade rubles--together with the exchange rate between foreign trade rubles and dollars to in effect assess the value of the Soviet economy year-by-year in foreign trade dollars. That might be used as a way of getting an independent cross check on real growth in the Soviet economy. This might help address the issue of cumulative growth and cumulative inflation over a period of time.

Treml: The problem is that the ruble-dollar ratios are so different in each sector.

Pugh: You have to do it sector-by-sector.

Trembl: Without this approach, I would hesitate translating Soviet GNP into dollars by using foreign trade values, because that would not work.

Pugh: If you're saying that there would be a bias in the process, I'd agree with that. I'm just making an observation that if you did it on a time-series basis, and assumed that the bias doesn't change very much, it might give you some insight on the real growth of real inflation over time.

Steinberg: If you don't have the Soviet national economic balance data, would it be easier for us to solve this question? I don't see how. The value of this data is that it provides us official current prices--prices that are used to purchase and produce goods in the economy. The issue is how can we convert them into constant prices. What I am trying to say is--having these control totals in current prices, I think only helps us to understand long-term trends in the economy. Essentially, what you really need is to make adjustments that reflect actual changes in the quality of goods which official prices do not reflect. The second issue would be the second economy. Again, if you did not have the NEB data, it would be much harder to address these issues.

Ericson: One thing that relates to the second economy--and I'm not sure I've ever seen done without this framework--is a reliable estimate of what the addition to the stock of currency in circulation might be. This framework provides a more or less automatic way of calculating such a number, subject to certain reservations.

Steinberg: The best way to do it is to compare this data year by year in current prices with some physical data to see whether there is hidden inflation in the economy.

Ericson: Do you have any thoughts about how this framework and methodology is apt to be affected, or its meaning apt to be changed by, the adoption in 1991 of the so-called new management methods?

Steinberg: I would believe that essentially it will remain intact. What you'll see is a substantial change in profit margins.

Becker: But the relationship between the budget and enterprises

Steinberg: Is the result of this change in profit margins.

Becker: No, it is a result of the change in the mode of operation.

Steinberg: The reason you have heavy budgetary intervention is that some sectors cannot function without budgetary support, because their production is so inadequate and their profit margin is so small they need budgetary support. The new economic mechanism will provide them with enough resources to finance their own activity. As a result, they will not need the budgetary support. On the other hand, there will be much less excessive profits.

Ericson: Could one argue that, under the new mechanism the military residual will become much more obvious as everything else in the economy goes on *khozraschet*?

Steinberg: No, because it really won't affect the NEB balance very much. If you look at all the indicators, it really wouldn't effect anything unless

Ericson: Unless the service sectors go on *khozraschet*.

Steinberg: No, because what you'll see under NEB public consumption is the same material purchases and depreciation. The only real differences will be in the third and fourth quadrants.

Ericson: Well, in the budget also because in some sense only the military is left.

Becker: Well yes, the structure of financing the national economy changes because there are fewer grants for fixed investment and fewer grants for working capital investment.

Steinberg: I would think that they would clamp down even more on publishing their budgetary statistics. I have a feeling they may stop publishing those statistics altogether. It wouldn't effect much because we already can't use budgetary statistics to begin with for any meaningful reconstruction of accounts. We only use them to show that they cannot finance the economy without incurring budgetary deficits.

Becker: What about technical issues of streamlining the system of the reconstructed Soviet national economic accounts?

Pugh: We've given some thought to it, but I don't know to what extent that should be part of this discussion. I brought it up because I wanted to try to make clear that what the reconstruction attempts to do is to show the flow of rubles in the Soviet economy. The deeper issue is to what extent that the flow of official rubles have a good correspondence to the flow of real resources in the economy.

It seems to me that if the reconstruction we now have represents a reasonably valid representation of the flow of rubles, then it is appropriate to do some analysis with that data to try to get a better understanding of how well that flow of rubles represents the flow of resources. I think that we may be able to obtain some insight with regard to the issue of price distortions, how they've changed over time, and the dynamics of the economy in terms of real growth and inflation, by analysing the economy in terms of the connection to the foreign trade area. But no matter what you do with regard to analyzing the data, there are going to be fundamental distortions, such as the second economy, which I don't think are going to show very clearly. They will have to be added as an overlay to whatever you can extract from this official set of statistics.

There were some other kinds of questions implied here and I don't know if we can address them or not. These are basically issues regarding steps which have to be taken in order to generate some interest within the intelligence community in using this kind of information, or steps which have to be taken to make it possible for the intelligence community to utilize the information.

Becker: Your white paper talked about the software that would enable you to transfer the data base to their own computing system. Is that a formidable problem?

Pugh: No, but I would guess we are talking about 1/2 to 3/4 of a man year to get the system functioning in a way that they could use it on their computer.

Becker: There still remains a question on the validation of the reconstruction. I don't think anybody can read this stuff without being impressed with the enormous amount of work that has been done, especially with the way a lot of the questions that have been dealt with and a lot of the major problems have been explored. Nevertheless, there remain two questions: 1) the validity of some of the major accounting issues, such as the treatment of defense and; 2) the effect of uncertainties on the various estimates and the extent to which the cells have been properly entered and reconciled with data sources. So those two issues remain to be addressed. It is very difficult to know how to deal with that. They require a lot of effort.

Pugh: One of the key questions is, if somebody gave us money and said continue work, we could probably do that. But without some way of having someone looking over our shoulder or working with us as a recognized and independent outside observer who can ask the critical questions at the right time, there is some doubt that continuing work will produce any results which are useful within the government.

Trembl: Certainly gray areas and some bigger questions could be addressed with some additional work. There's some larger reconciliation, such as between demographic census data and state employment. I do not see excess social security payment to the budget. There's no way it's there. Basically, there's a dozen or so issues which could be dealt with as major issues, rather than as minor issues, which would clarify some of the questions in my mind.

Pugh: I think that one useful thing to do--if we tried to continue that work--would be to know some of the specific issues that people raise. If each of you could raise a set of specific issues where you see possible alternative interpretations or where you think things look strange, then you would provide guidance in terms of alternative issues that could be explored. This would be useful.

Am I correct in my assessment that the time and resources to do serious study on this project does not reside in the CIA itself? Those people are so busy that they really cannot give this kind of critical review, so that one would be looking at academic experts to provide that kind of review.

Becker: It's a matter of resource allocation. If they wanted to assign somebody to do that, one or two people would come into consideration.

Steinberg: My major desire is for the CIA to consider it seriously in respect to integrating their GNP accounts with defense expenditures. What I saw when I started this work was the publicized inability of the CIA to integrate their published GNP accounts with their estimates of defense expenditures. I think this work provides a major contribution to the U.S. policy makers. The CIA would then present a comprehensive set of GNP accounts where the defense sector is clearly integrated.

Becker: I don't think that they agree with you that they cannot place the defense industry in their GNP accounts. You disagree with where these things might be.

Steinberg: I've never seen any comprehensive explanation on their part. As a matter of fact, the reason I think they don't explain it is that they feel very uncertain. But I think placing Soviet defense expenditures in GNP accounts would

be very useful for the U.S. policy makers. This would provide a framework in rubles where they can see the allocation of resources in the Soviet economy.

Becker: What are the publication plans of your reconciliation?

Steinberg: I have a book ready, but the problem is I didn't really have a chance to prepare it because there is a lot of additional work that needs to be done.

Pugh: I think that if you have an efficient way of utilizing Soviet statistics and a routine way of compiling them into a reconstruction on a year-by-year basis, along with a computerized process which will convert the result into a GNP format, then you would have a tool which would enable you to understand perhaps more quickly the implications of changes in policy, insofar as they appear in the statistical data, than you might from the current procedures. But given my weak knowledge of the current procedures, I don't know if that is a correct assumption.

Becker: Are you suggesting that they don't have quick ways of developing GNP accounts?

Pugh: No, basically I'm operating on the assumption that this system might give you more reliability and more structure in your GNP accounts.

Steinberg: They don't have a quick procedure for estimating GNP accounts. As a matter of fact, it takes them years to come out with new estimates of GNP in current rubles. They employ a number of people for years to generate those accounts, while using this method it can be done in a much shorter time with a lot fewer people. It would be a more efficient approach.

Pugh: Would the NEB data provide a useful cross check for a way of normalizing the other estimates?

Becker: Well, Dmitri's right in saying that the current work on estimating GNP accounts is in a constant crisis. The accounts in current rubles require special exercise and estimating effort. If this were a system that could be maintained at a relatively low cost, I think this would be a contribution in the right direction.

Pugh: If there turned out to be significant changes in defense spending, then presumably the NEB data would provide an indicator to supplement other sources of information on changes in defense spending. It might give you some insight on the structure of defense spending insofar as one can determine the bill of raw materials that are going into defense production.

Steinberg: We have a detailed structure on the operational expenditures of the defense sector, on the current material outlays, on the armed forces, on defense construction, and so forth.

Becker: You have a resource breakdown?

Steinberg: Yes, with regard to defense construction or even defense science, I know the CIA has very insufficient data in these areas. It is almost like guesswork.

Becker: No, I wouldn't say guesswork.

Steinberg: In terms of current rubles for 1980, I am not aware that they have any handle on this.

Ericson: Let me make a comment on getting these kinds of results into the academic community, if not into the area of practical uses. It seems that this whole exercise is built around a hypothesis, given circumstantial evidence supporting this hypothesis, that there is this third department in Soviet accounting which contains the defense effort. If we are going to sell this, at least in the academic community, it would be nice to have the theoretical model fully worked out and compared against the consequences of having defense expenditures included in the GSP, where they are either randomly allocated among sectors or perhaps split between the machine building and chemical sectors.

Steinberg: There was a whole discussion in the Stockholm conference (SIPRI) on this subject. Essentially, it is very difficult to have a consistent theoretical framework operating in just departments 1, 2, or 3, because you cannot bring consistent logic into defending or rejecting the argument if you should include or exclude department 3 accounts in GSP.

Ericson: That is why you would assume it, build a consistent equilibrium system based on that assumption, and compare the predictions for the statics for that system with those of a more traditional system.

Steinberg: There were two views in the discussion at the conference. One is if defense is included in the GSP, then CIA and DIA have since 1975 consistently overestimated the military expenditure by 40 per cent. On the other hand, if you take my argument about department 3 accounts, you come much closer to the CIA and DIA estimates, confirming their building block approach.

Ericson: Even aside from those two issues, this, as a consistent equilibrium system, has a number of consequences, most of which I don't think we understand. The standard model has a set of consequences. If those could be laid out as an $AX + Y$ framework, then that would be one way of introducing economists to this way of approaching the issue.

Pugh: I think that you've done a pretty good job covering what we have requested. I wish I had a stronger sense of consensus. I think that basically we wanted to try to get two things resolved. One is, if the information is useful, what are we going to use it for? I think we've gotten some general answers to that question. I don't sense that we've gotten any bright new ideas, but maybe that's the way it is. The second is that I think we've gotten a few new ideas that might be useful in deciding or determining what needs to be done in order to further enhance the credibility of the approach. Perhaps an analysis such as Rick outlined, which carries through the consequences of the two interpretations of the defense budget, might be a useful thing to do.

Ericson: For instance, what did it say about growth of GNP when you look at statistics that are in this framework excluding a major sector? What kind of relationship theoretically should there be?

Pugh: One thing that badly needs to be done--and we didn't say much about that in the white paper--is that here we have this huge data base and we haven't had the time to go through that data base to understand what we've learned. There's been no serious effort to compare it with other interpretations of the Soviet

economy to say what is significantly different about using this approach. I told Dave Epstein that I thought this was a desirable thing to do. I believe Dave has felt that before we start doing this kind of work, we need to find out if there is any validity to the reconstruction. So, I guess one of the questions is whether you people have any sense of priority on the extent to which one ought to focus on improving the credibility of the reconstruction, as opposed to trying to understand whether it tells us anything different about the real world from a policy perspective. Or, should the priority be on improving procedures that would enable the CIA to use the NEB data base?

Ericson: From the bias of a theoretician, I think the model should be played with quite a bit. Part of the reason it is difficult to think of something new and exciting to do with it is that I at least have no good feel of what's there. Maybe those who have built it do have that feel, but until it is played around with, I'm not sure you can discover new and interesting things.

Pugh: You're saying that one of the obvious things to do is to work with it and try to understand it.

Becker: There is a need to develop sensitivity testing of the weak spots and to really pursue that to get some handle on how much difference it makes to have various soft spots in the estimation procedures.

Ericson: You might want to have a best case, worst case, then the most likely case rather than a straight point estimate.

Pugh: That's one of the problems at the present time. We have a point estimate and we have no idea for individual entries what the uncertainties are.

Steinberg: You need a special computer program that is able to lay down all the equations and assign a certainty factor. I think there are packages available now which deal with this type of problem.

Becker: You also indicate that the financial balances are especially problematic.

Pugh: Yes, I think Rick Ericson raised the issue as to whether or not there even exists anywhere a coherent version of the financial balances. I think it is an open question, and the problem is that Dmitri hasn't put enough effort into it at this point to be able to make a judgment whether his problems will go away when he looks at it more carefully, or whether they are inherent in the data.

Steinberg: I realized there was a problem with credit payments between the enterprises and the banks. There were really gray areas, because there were not enough statistics to explore it with any validity. So I left it kind of untouched. I realize now why there was a problem--there was a prolonged debt crisis.

Becker: It seems to me that's an area for additional work.

Epstein: Andy Marshall and I have two substantive application interests in this. The big questions are real growth and the defense burden. To some extent, there has been some discussion here on real growth and what you might do with this data base to approximate real growth, although I did not sense there was any consensus that this would give us any handle on it. Is there any indication that you can give us any better estimate of the defense burden in terms of real resource

allocation? Dmitri expressed the opinion to me that, if carefully analyzed, this would show a rising defense burden in constant prices over the period he studies. He's not clear as to what the absolute burden should be or what the appropriate price level is to use. Andy's basic problem is that even the CIA estimates are tainted with all these Soviet price distortions. The question is how do we get beyond that.

Becker: CIA estimates of GNP?

Epstein: GNP and defense. It's just that we rely on these ruble prices which I doubt represent real resource costs.

Becker: You're talking about the opportunity cost question.

Epstein: Yes.

Treml: If you had general equilibrium prices in the Soviet economy, then you would get the true defense cost through the distribution of national income to consumption and investment.

Pugh: I'm awfully glad you said that because it gives me the chance to raise a question that I've been wanting to for some time. We at one time wanted to do that. After thinking about it for a long time, I reached the conclusion that in theory there was no way you can get true free market or valid equilibrium prices out of a system where, in effect, you have not operated a free market. I found that computationally I couldn't find any alternative, except to use as a poor substitute labor-based factor values as the foundation for an unbiased pricing system. I ended up doing a comparative analysis of the U.S. and Soviet economy based on this labor theory of value as a way of looking for the distortions in the two economies. Is there a way you can do better than that and come to a price representation that somehow represents real opportunity cost?

Treml: You have labor in physical units, and you have capital in value terms, but these value terms can be corrected. If you make certain assumptions about certain production functions using the input-output tables, you could really estimate true shadow prices.

Ericson: Those are just cost-covering shadow prices of the resource constraints. They take the structure of capital as given. The pricing that generates the aggregates that you're measuring is all given. So, you're always going to find that your distortions are minimal.

Pugh: We have an economic model that we use on both the Soviet and U.S. economy which operates that way. The first thing we do is calibrate our production function so that it gives back the current price structure. After that, all issues about the distortions on the price structure are buried. As little as I am satisfied with this labor factor cost approach as a way of looking at it, I don't know an alternative. I would welcome suggestions if there is a way.

Ericson: One fairly wild possibility would be using a linear programming approach, rather than building around input-output with production functions. You would have a series of technologies boot-strapped from other economies, and given the various factor endowments, you would see what the programming solutions are with more than one constraint. Unless labor turns out to be your only

constraining factor, given your coefficient, you will get prices not proportional to any labor value because you will have some constrained by labor, some by land, and some by capital. Can you then pick your input-output structure from this menu? There's a whole lot of artificiality in doing that. What is the menu of technology, for instance?

Pugh: It raises questions about how you could get a data base that is sufficiently good to which tell you what the real constraints and resources are in an economy that refuses to price things on an opportunity cost basis.

Ericson: You want to use pseudo-physical quantities in some sense and pick your technologies from a portfolio available, and then just see which structure that program picked out, as opposed to the structure that actually existed in the input-output table.

Treml: There was this fellow at the Air Force Academy, James Streets, who looked at this. Ultimately, if you sort of look back at the value of capital to labor again, his shadow prices were not proportional to labor.

Ericson: They shouldn't be, in any nondegenerative programming problem. It's just that when you have an input-output structure where you have one sector for every commodity, then you're automatically going to get back something that is consistently labor-based, or is consistent with being labor-based, or whatever you want to call your one constraint.

Steinberg: There is the Gosplan model, and we only have an outline of it. They re-evaluated capital stock in terms of labor inputs so as to bring them to the same denominator, but this model is very general.

Ericson: I don't know how he did it, but N. Ya. Petrakov in his laboratory has in principal calculated a set of general equilibrium prices for the Soviet Union which have not been published. But the conclusion of that research was the basis of their recommendation that the price of resources has to rise by over 80 percent, and the price of industrial output has to be cut by over 40 percent. They have a whole number of shifts in the prices that they claim will approximate the general equilibrium. I don't know how.

Pugh: I will show you our report (DSA Report #485) that shows the results of our comparison. I think the thing that struck me most forcefully after we'd done it was, how good in aggregate the labor-based evaluation was for most sectors of both economies, after allowing for noise and pricing in the Soviet economy.

Becker: In answer to David's question, although the NEB has a faithful reflection on how the planners see the economy, it is not likely to give you a better view of real resource allocation.

Pugh: Have you seen this or not, Abe? (DSA Report #485) This was done in the context of a study that we did for Andy concerning the issue of cost-exchange on weapons systems. The issue is, if you figure out the cost of the Soviet response to a U.S. weapon system like SDI, for example, how do you make an estimate of what that will cost the Soviets, recognizing that their opportunity costs are very different from ours? This Annex represents an effort to determine to what extent it was necessary to go through a careful conversion. To me, what was interesting was the results that came out about the relationship to labor-based values. There's

a series of tables in the Annex that summarize the findings, and I welcome comments on that. At the moment, it seems to me that it could provide a practical way to get a handle on things.

Ericson: One problem I have is that this is based on an input-output table for each of the economies.

Pugh: It was based on the 1972 Soviet input-output table that Vlad reconstructed and the 1967 U.S. input-output table.

Ericson: But in determining opportunity cost, that sort of fixes the game before you start.

Pugh: No, not the way we did it. What we did was to take into account the labor compensation in each sector of the economy and assume that it represents the value of labor. Then, all we had to do is track the flow of the value created by the labor throughout the entire economy.

Ericson: But you're tracking it through coefficients that are going to give you consistent answers. In terms of opportunity costs, those coefficients should be pre-choice variables.

Pugh: Absolutely, it does not give you opportunity costs. It gives you labor costs, so to speak. Insofar as your performance is limited by the fact that oil is scarce or urban real estate is scarce, there's no reflection of those sources of value or cost.

Ericson: In the determination of total cost, it freezes irrationalities in the structure of capital and the structure of intermediate materials used, which is 70 percent of the cost of anything.

Pugh: I'm a big advocate of free market prices. It's just that as an analyst, I don't know how to calculate them without an existing free market.

Ericson: I've seen proofs such that Hungary is efficient because its price structure comes out just like Austria's if you run it through an input-output matrix. It's something that you just can't buy, yet it falls out of the constraints of the methodology.

Pugh: Dave, do you have any other questions?

Epstein: Of my two questions, Abe answered one of them no, referring to whether we can learn anything about real growth or about the defense burden by working any further with this, that will improve on anything we already have.

Pugh: Did you really say no to that question on the defense burden?

Becker: Yes, I think so because the defense burden really means opportunity cost and NEB gives you the planners' view of what is going on. It does not give you any approximation of the opportunity cost function.

Ericson: But it does give you defense burden as perceived by the Soviet decision-makers.

Pugh: Insofar as you're willing to think of the defense burden as being measured in terms of labor value or distribution of labor value in the economy, it would do okay. But it would not reflect, for example, a shortage in high technology engineers or scientists that might be critical, or other things which might effect the opportunity costs.

Becker: If Gorbachev has his way, by 1991 or 1992 we might have a better picture.

Pugh: If the price structure gets better, this kind of approach might give a better reflection of the real flow of resources of the economy.

Trembl: There's one implicit question that we started this morning. Still basically the majority in the profession think that Soviet statistics are not consistent. They are lousy. There's no clear correspondence of measures used by the ministries, and by Gosplan. And, of course, acceptance of this methodology would mean changing our evaluation. This would be of great interest to the profession. At the same time, if this case for consistency is not strong, then it points out the validity of the accepted approach.

Pugh: There was a question raised on that earlier in the meeting about the issue of how faulty Soviet planning procedures are, given what is being currently said in the Soviet Union. How can one explain the existence of a data base that looks so internally consistent and organized as this? It seems to me that it is not at all difficult to reconcile the apparant incongruity. Probably there is a well-established elite that has been doing this planning for years, and that is gradually improving their procedures, from their point of view. But there are all sorts of problems about the degree to which the numbers they are using have any correspondence to real economic values, which is probably the foundation for this upwelling of criticism of the process. So, I think it is fairly probable to have a mathematically, internally consistent data base and still have a lot of complaints as to whether it has any usefulness to the Soviets or, whether it actually represents the real flow of resources.

Ericson: Even if it is accurate in the numbers and they do have economic meaning, this is not operational detail. Nobody can run an economy, even if you have 400 sectors. You cannot make operational data on that. You need much more detail, and it would have to be done by many more people. You're worried about 25 million industrial products and several hundred thousand other kinds of goods and services.

Steinberg: We've been criticizing the Soviet planners about the second economy, price distortions and so forth. What I've seen coming out of the U.S. Commerce Department about the U.S. economy is that there have been incredible scandals about the fact that they don't take into account enormous amounts of illegal activity. Regarding the issue of slow growth in the U.S. economy, there have been many fascinating articles saying that, if you take into account all those illegal activities, you'd have a totally different perception of the U.S. economic growth. The same goes for the budget deficit. They don't take into account a lot of withholdings from the federal budget. There are many examples of the inadequacies of the commerce department reports, but economists continue to use it and base decisions on the whole United States economy. And yet somehow the issue of illegal activities and such has not been raised. It's just a popular subject. I think by hiding behind the illegal economy, we're losing the perspective on the legal economy. Especially in regard to the defense sector, I'm sure there are no

illegal activities going on there--it is very hard to steal something from the defense factory, although it's done on a limited basis. You see that wages in the defense sector are so much higher than in the civilian industry. You can see right there the difference in labor quality, for example. We can do a lot of analysis of comparative performance between the defense and civilian industries.

Pugh: It seems to me that the Soviet statistical data that is published is the foundation for a very substantial part of our intelligence analysis, and any reconstruction which is based on that Soviet published data is going to share all the flaws in the original published data. On the other hand, it seems to me that a consistent reconstruction of the data in an orderly format should make it easier to utilize the data appropriately for all the purposes for which you want to utilize Soviet statistical data. Is there anything wrong with that argument?

Trembl: There's a lot of shortcomings in these documents, but the intelligence committee and the university people don't simply take it and run with it. They go through all kinds of adjustments and corrections.

Steinberg: I think correction is much easier to do when you have a comprehensive reconstruction, rather than relying on an approach. When you have the whole picture reconstructed, it's much easier to make adjustments rather than doing it piece-by-piece without analyzing how it effects the whole system of accounts.

Pugh: In summary, it seems to me that we may not be there yet, but there's a possibility here of having a more efficient foundation for exploiting or utilizing a large fraction of Soviet statistics. On top of that, you can apply all the judgment factors that you'd normally apply.

Ericson: That requires that you have very explicitly laid out all the mathematical formulas by which this system was created, because when you make an adjustment to one set of data, then you know what you did. In this other case, you adjust some piece of data and it runs through 400 equations and you don't know what the consequences are unless you do have a system.

Steinberg: You need to do that. You need to have a computerized system in which all the cells in the whole integrated system are mathematically related to each other. You need to run uncertainty tests on the sources of this data to show where it is coming from, the certainty of getting it, and how it effects other certainties. I think it would be really fascinating work.

Trembl: That's still using the basic assumption that this is a well integrated balance.

Steinberg: We started with the *svodniy otdel* that integrates the NEB balance. We agreed that the GSP balance is integrated with the NEB national income balance. This comprises the core of Soviet national accounts. We also agreed that we have an integration of national income balances with respect to services and defense. What we haven't agreed upon is whether planners have integrated enterprise data with ministry data--we have information that this was accomplished a long time ago. The problem that remains is the relationship with credit institutions. This is where I am not sure whether it is possible to integrate profit distribution with credit flows. The reason for this is that there is just a lot of faulty debts.

Trembl: What do you mean we agree? Do you mean at this table?

Steinberg: Here at this table. We started with a discussion of how the input-output table is constructed on the basis of already existing GSP and national income balance. In other words, when you take control totals, they have already been integrated.

Trembl: But I have added some reservations. For example, the foreign trade balances are treated differently. For the whole system of subsidies, you have to run through a second round of iterations to achieve the balance.

Steinberg: I would disagree. First of all, the foreign trade balance is very well integrated with the national income balance in domestic rubles. In respect to subsidies, it is well demonstrated how it is reported in

Trembl: What I am saying is that there is a difference. Planners and the statisticians view the same phenomena and measure things differently; from there, it's just mechanical--once a year they get together and they derive what they call normative correction coefficients to force some sort of balance.

Steinberg: I see a totally different picture based on what emerges from Soviet literature. They have a standardized base that both Gosplan and TSU follow to aggregate Soviet NEB balances. They have all the indicators standardized. Otherwise they would not be able to work together, because Gosplan relies on the reports prepared by the TSU in order to make its balances and plan for a new year.

Trembl: The statistical classification system until recently was very different.

Steinberg: Not with respect to the NEB. It was with respect to foreign trade statistics, but both of them have always had a standardized transformation procedure by which to transform foreign trade data to NEB data. When I started my discussion, I said there were branch departments that didn't have some of those procedures, and the work they did was in disarray in many areas, including financial statistics. But the unified sections always had a procedure in which they could transform branch statistics into the unified balance statistics.

Trembl: The question might be how they separate productive from nonproductive activities. The Soviets simply say they're using *expertniye otsenki* or fixed coefficients to go from one set of accounts to another.

Steinberg: They go from one year to the next, and then make adjustments. The reason they do this is that you may only have .1 percent service activities done in a particular enterprise. What they do is have *expertniye otsenki* for which they can project small year-to-year changes in services demanded by a particular enterprise.

Trembl: How can they divide total employment into communications for productive and nonproductive activities?

Steinberg: Every year they use *expertniye otsenki* on the basis of the total volume of services performed. They have a total volume of ton-kilometers and a total volume of passenger-kilometers. Communications are very easy because they have separate reports coming for productive communications services performed for enterprises and separate reports for nonproductive services. They don't have much problem because they perform different functions.

Trembl: What I read is that they take a fixed coefficient and apply it to the labor force.

Steinberg: They've done it with respect to main transportation services. That is correct, because it is impossible to do it on a year-to-year basis. They try to do their best.

Trembl: That's how they arrive at a forced appearance of integration. The same communications--mail service, telegraph service, etc.--is used by the productive sector and by the nonproductive sector. The way I see it--so many mail delivery men multiplied by .71, for example--is how you achieve the Gosplan estimate of total communications employment. Then TSU has to estimate national income using the productive communications employment.

Steinberg: So does Gosplan. The only difference is that TSU has much more detailed statistics. They really just don't have the resources to trace small changes from year-to-year. Every five years they do a comprehensive reevaluation. I would agree with them, it's not worth the money to do such a comprehensive survey every year. It really doesn't change much. The only difference is that some material inputs coefficients would be a little different in the GSP replacement fund or in current consumption. These are valid points, but I don't see how it affects the whole picture of plan unification, because it really is a very minor point.

Pugh: We've reached a rather definitive stage in this work where a judgment needs to be made as to whether this is a promising way of adding information that would be useful in the intelligence process; or whether it is more work than it is worth. I don't know if there is any way to make this judgment, but I think this is a key question. I hear Vlad having a lot of reservations. My sense is that Abe and Rick are on the side that says it looks like interesting work that ought to be pursued, and that it may be a useful addition to the intelligence process. Is that a reasonable representation of where we are at the present time?

Becker: I'm not taking a position on the gray areas that Vlad is raising. I do believe that it is an interesting and useful approach. I would like to see it pursued, starting with a validation of what exists, the pursuit of the gray areas and the uncertainty of the results, as well as an exploration of what the model actually means in terms of its implications. I would like to see those things done. In that sense, I agree with your formulation, but I would also like to see these gray areas examined and pursued.

Pugh: I think that is very important.

Trembl: I don't disagree with this.

Pugh: Your feeling is that it looks promising, but there are a lot of gray areas. Before deciding whether or not it is useful, you'd like to see those gray areas pursued.

Epstein: Abe, do you have any idea what would be the appropriate procedure, or how many people or which individuals it would take to constitute a validation?

Becker: I hesitate to name a sacrificial lamb.

Epstein: Do you mean turn it over to someone who hasn't seen it before and let them have it for a year or what?

Becker: I wouldn't turn it over to someone who doesn't have any acquaintance with the system. I don't think it would be that much of a handicap not to have seen this. It would have to be someone who had a reasonable familiarity with Soviet national accounting.

Steinberg: We have excellent people in the Department of Commerce, like Kostinski and Tretyakova. They've been doing similar work, and I know they've been working on this 1982 Soviet input-output table. They have to face a lot of similar gray areas. I think we're working around the same numbers, and I think it would be useful to have some cooperation and some cross analysis to see who is more valid and precise. This is continuous work, and I would be unhappy to say all areas are resolved because then there would be nothing left to work on. The more people that are working on the same thing, the more there is a chance of success. I'm sure that CIA analysts don't have time to work on this, because they are overworked and understaffed.

Pugh: This sounds like it might be worth looking into the possibility of having some kind of cooperative effort with the people at the Department of Commerce as a way of getting an outside look.

Steinberg: It should be a close cooperation, like having seminars and conferences. I think a joint effort is always more successful, because we'll be able to see each others' mistakes and help each other improve the methodology; because the Soviets haven't published input-output tables, the Commerce people always have to work from the NKh to obtain their data, and they consequently have to deal with almost the same indicators.

Trembl: We're almost through with it and we are improving it.

Pugh: One thing which would be interesting--I understand you're working on updating input-output tables--is one could at the same time place those input-output tables within the context of a reconstruction of the rest of Soviet accounts. You might have a combined tool that would be a substantial advancement on having organized Soviet data.

Becker: I want to repeat that I've been impressed by the amount of work that Dmitri has put into this. This is a really monumental effort. I think that I would like to see it pursued because if it is validated, we really do have something interesting and new in Soviet national accounting.

Pugh: Where do you come out on this, Rick?

Erlison: I think it is extremely interesting to reiterate those comments about the amount of work that went into it. I've just been thinking. What difference does it make whether there is actually a consistent table like this drawn up by the *svodniye otdeli* or not, or whether it's just something that, because the statistics are more or less honestly gathered, one can create this consistent table. The question of validating gray areas comes down to picking the cell and boxing the compass on what could be in there, rather than worrying too much about whether this is really put together. It may be that this consistency would be less interesting if we find that the *svodniye otdeli* pushed all the data into a procrustean bed with artificial

norms. It would be much more interesting if we were to get a consistent picture of the economy coming out of an artificial reconstruction based on data gathered by independent statistical units. I think that would tell us more about the economy than something that was forced to fit a plan.