THE MATHEMATICAL-STATISTICAL METHODOLOGY OF THE CONTEMPORARY SOVIET FAMILY BUDGET SURVEY

VOLUME II

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PART C

THE PROCESSING AND ANALYSIS OF FBS DATA

CHAPTER C1

IN AN OBLAST' BUDGET SURVEY OFFICE

PROLOGUE

A Soviet office: the Sector of Workers' and Employees' Budgets, Department of Budget Statistics, Statistical Administration of X oblast'. On one side of the room sits Senior Budget Economist Ilyakova, drafting the annual report of survey results to the Executive Committee of the oblast' Soviet. On the other side of the room sits Junior Budget Economist Krikovskaya, a telephone by her left elbow, while on her right sits the interviewer Bashmachkina. Together they are going over one of Bashmachkina's Forms No.1, "Budget of worker and employee".

Krikovskaya places her finger under a figure. "Ninety-nine," she intones ominously. "Ninety-nine what, may I ask? Roubles?"

"Don't be daft, Yelena Yakovleva. Ninety-nine roubles? What would they be spending ninety-nine roubles on cabbage for? Ninety-nine kopecks. Anyone can see that."

"You can see it, Anna Fyodorovna. I can see it. Unfortunately, the computer can't see it. If you're going to write just '99', they'll punch it in as ninety-nine roubles. Save me a little trouble, Anna Fyodorovna. Write '0.99', so."

The 'phone rings. Krikovskaya grimaces, stares at it for a few seconds, but it doesn't stop. She picks up the receiver.

"Plotkov here. Computer centre. We still haven't had your input, and it's the fourth already. You know the schedule."

"We all know the schedule, Pyotr Andre'ich," repeats Krikovskaya while

she weighs up what to say next. "But, unfortunately, life doesn't always run to schedule. We've a new interviewer here, her stuff's in no fit state to send in. It'll be ready this afternoon without fail, and if not, by tomorrow at the latest."

"Well, it's your lookout," says Plotkov, and slams the 'phone down.

"How do you like that?" Krikovskaya asks nobody in particular. "You'd better be on your way, Anna Fyodorovna. Haven't you an interview at three? And remember the zeros!"

As Bashmachkina leaves, Director Volnov comes in from his side-room.

"Well, Tanya?" he asks Ilyakova. "Let's see how the report's coming along." He picks the paper up and reads aloud. " 'The standard of living of the toilers of our oblast' continues its gradual but steady ascent.'... blah, blah... 'For example, the consumption of dairy products by workers in the engineering and metalworking industry shows an increase of three per cent over the corresponding period of last year, a fact of enormous significance for the improvement of the health of the population.' The telling illustration, eh? But 'enormous significance'? Three per cent? Overdoing it a bit, aren't you?"

* * * * * *

1 Introduction

Thus our imagined glimpse into one of the offices of a Department of Budget Statistics (Otdel Byudzhetnoi Statistiki, or OBS) of an oblast'-level administration (oblastnoe statupravlenie, or OSU) to which budget survey interviewers deliver primary data for initial processing. Such an office is staffed by a force of interviewers ("budget statisticians"), supervised by one or several "budget economists" under a Director. Each economist is responsible for supervising and processing the work of three or four interviewers (Sidlyarenko 1964), each of whom handles the budgets of 20-25 households forming one "cluster" in a given enterprise, establishment,

State or collective farm. The Director may personally supervise one interviewer (Vladykin 1955). If the OSU surveys the budgets both of workers and employees and of collective farmers, its OBS will be divided into two Branches or Sectors, one for each category.

To illustrate the staffing structure of an OSU OBS, let us take a fairly small office, that of East Kazakhstan oblast' in 1965 (Konovalov 1965). Thirteen people worked in it: the Director, three economists and nine interviewers. Thus each economist supervised three interviewers. The OBS surveyed budgets from two collective farms, one State farm and five large enterprises, or eight organisations in all. Two of the nine interviewers therefore were attached to the same enterprise, probably the largest of the five, from the workforce of which two "clusters" had been selected.

In this chapter we review the activity of such a budget survey office. In Section 2, we introduce the cast of characters, the interviewers and economists - their qualifications and training, pay and sex composition. We have already discussed problems of interviewing and the relations between interviewers and families (Chapter B5), but interviewers also have clerical tasks, and we discuss these and their development over time in Section 3. In Section 4 we attempt to analyse the time budget of one month's work of an interviewer. The arrangements for checking the work of interviewers - "the struggle for reliable data" (Soveshchanie... 1953) - are considered in Section 5. In Section 6 we review the other tasks (apart from checking interviewers' work) of economists, including their activity in processing and analysing data. We attempt to work out their time budget in Section 7. We conclude in Section 8 by commenting on the implications of all this activity for the quality and significance of survey results. A short note is appended on the design of the survey forms.

2 Interviewers and economists

It is considered desirable that both interviewers and economists have the minimum qualification of having graduated from a "special secondary" technical school (tekhnikum) after specialising in statistics. Graduation is often from one of the statistical tekhnikumy run by TsSU itself. By this standard many interviewers are underqualified; fewer economists are underqualified, though we have even less information about the qualifications of economists than the little we have about those of interviewers. Sidlyarenko (1964) states that more than half (but presumably not much more) of the interviewers in Krasnodar krai have higher or special secondary education, and all the economists. (One supposes that any with higher education are economists.) On the other hand, 18 out of 22 interviewers in Kiev oblast' (Shkrebel' 1957) had completed statistical tekhnikum.

Let us consider this point in the light of the fact that 38 per cent of all staff in TsSU statistical offices still lacked any post-school education in 1977 (Sovershenstvovanie... 1979 p.18). Interviewers, as "budget statisticians", belong to the lowest category of employees in these offices ("statisticians"). It seems likely that the situation in Krasnodar krai, with about half of the interviewers lacking special training, is more typical than the exemplary situation in Kiev oblast'.

We may of course question the assumption that tekhnikum courses have much relevance to work on the budget survey. We do not have the curricular information to assess this properly. Kalinovskaya, Head of the OBS of the Ukrainian TsSU, at any rate, blames the fact that "some (interviewers) have a poor knowledge of the (survey) forms, do not follow instructions and conduct interviews poorly" on their inadequate qualifications (Krasnoshchekov 1962).

Perhaps one of the functions of special secondary education is simply to improve the basic literacy and numeracy skills of future employees.

There is much evidence that in the rural areas Soviet (ordinary) schools fail to equip their pupils with such skills. Rural employees charged with keeping administrative records seem often unable to handle their jobs. We may think of Amalrik's (1970) account of his exile in a Siberian village in 1965-6 - of the semi-literacy of the woman who writes the collective-farm newsletter and of the semi-numeracy of the collective-farm bookkeeper[1]. From a more official source we learn of the inability of Chairmen of village Soviets to keep proper registers of population movements (Shubina 1973). It is reasonable to assume that the proportion of interviewers without post-school training is even higher in rural areas than in urban areas. One may entertain serious doubts about the ability of these people to cope successfully with their complex and demanding tasks.

Under these circumstances on-the-job training assumes crucial importance. Among the varied forms it may take let us mention the following: the training of a novice interviewer by an experienced colleague who takes her under her wing and accompanies her on her first few interviews; annual three-day or four-day training seminars conducted by the oblast' or Republican statistical administration; the explanation of errors (in conversation or by post) by the economists (and other people) who check interviewers' work; instruction courses by correspondence for interviewers who live far from their oblast' office; and "homework" set for interviewers by economists, even as often as twice a month (Kalinichenko 1963, Konovalov 1965). We are not in a position to assess the effectiveness of these methods. Very occasionally complaints appear in the literature that turnover among interviewers is too high (for example, that of Monakhov, Deputy Head of TsSU USSR - Vsesoyuznoe soveshchanie... 1954). If high turnover is a serious, but rarely publicised problem, it must obviously impede training efforts.

The only information we have on the pay of survey staff comes from the

1951 decree on the budget survey (Resheniya... 1968). Here it is laid down that urban interviewers are to be put on the same wage scale as "senior statisticians" or "economists", while rural interviewers are to receive 10 per cent less than this. That is, although interviewers only have the official rank of "statisticians", they are paid no less than their senior colleagues the economists - an anomaly perhaps considered a necessary incentive to compensate for a very demanding job.

The decree also states that interviewers are to receive, in lieu of travelling expenses, fixed money supplements, differentiated by area but averaging 90 (old) roubles per month in rural and 30 in urban areas. The "best" staff are to be rewarded with annual bonuses.

It is interesting to observe from the grammatical evidence and the many names mentioned in the literature that interviewers seem always, and economists usually, to be women. Directors, however, are often men. Soviet commentators assume that women are best suited to the work of interviewing families. Thus, complaining about the deficiencies of another survey, A.G.Volkov (a demographer in NII TsSU) points out that it uses untrained staff borrowed from enterprises, who are "not always even women" (Vsesoyuznoe.. 1969 p.256). This is an attitude common in Western survey work also.

3 The clerical tasks of interviewers

As well as interviewing each family at least twice a month throughout the year, interviewers are required to do a great deal of clerical work. This work can be classified into four parts:

(a) entering primary data on income, consumption etc., on to Form No.1;

(b) initial processing of primary data (forming subtotals etc.) and entering the results on to Form no.1 and other forms;

(c) accumulating data relating to different families (before this was computerised in the 1970s); and

(d) keeping a record of "basic indicators" in the Check Notebook.

The primary data (a) are collected from the following sources:

(i) interviewing families;

(ii) families' auxiliary records of income and expenditure;

(iii) available expenditure documents (for rent, service payments etc.);

(iv) documented income data obtained from the bookkeeping office at the participant's workplace (enterprise, collective farm etc.) and at the workplaces of other members of his family. These are accounting records of wages and bonuses paid to workers and employees, of grants and pensions, of payments to collective farmers in products and money, and of workdays worked by them and State agricultural requisitions fulfilled by them (when the relevant systems were in force).

The "other forms" referred to in (b) were in 1963 (DePauw 1965 p.63):

For workers and employees -

Form No.2 Family composition, money income and expenditures;

Form No.3 Food products received and consumed

Supplement to Form No.3 Number of livestock and poultry on the private plot.

For collective farmers -

Form No.4 Animal husbandry;

Forms No.5 and 5-a Product turnover;

Form No.6

Section 1 Family composition and labour outlays;

Section 2 Acquisition and consumption of manufactured food products;

Section 3 Acquisition of products from the fund for counter sales[2]

Form No.7

Section 1 Acquisition of manufactured non-food products;

Section 2 Money income and expenditure.

The form which had to be completed (for workers) in 1963 under (c) was Summary (svodnaya) Form No.1, containing cumulative indicators for all the workers surveyed at the enterprise to which the interviewer was attached (and for skilled and less skilled workers separately).

The interviewer must also transfer the monthly totals of "basic indicators" from Form No.1 into the Check Notebook, used to follow significant changes in the budget of the family from month to month as a way of checking for discrepancies and likely errors. A new Check Notebook is started for each family each year; at the first interview of the year page 1 is filled in with background information about the family, including a section on living conditions (Instruktsiya... 1960).

It is occasionally claimed that, in addition to routine data processing, interviewers analyse data. Kalinichenko (1963) states that from 1962 interviewers in Kirgizia began to compile "comparative tables" - that is, time series - of "basic budget indicators" for each household over a run of years. These served as a basis for discussion with families, probably in order to check the reliability of data. It seems highly unlikely that interviewers would have either the time or usually the ability for genuine data analysis.

"In record-keeping one must avoid errors which make data valueless" (Milner and Gilinskaya 1981). We shall describe the three parts of the

interviewer's clerical work, focusing on the errors to which they are susceptible:

(a) The problems of collecting primary data from interviews have been considered in Chapter B5. It remains to consider the problems of obtaining documented income data (iv);

(b) The system of processing the monthly budgets of individual families that was in use up to the early 1960s ("the old system") will be described, and the reforms that this system underwent in the mid-1960s;

(c) We then deal with the calculation of cumulative values of budget indicators across families ("summaries" or svodki). Finally we shall comment on (d) the quality of interviewers' clerical work.

(a) Problems of obtaining documented income data

There is no indication that obtaining documented income data from enterprise managements involves any difficulties, but there is repeated reference to the problems of drawing upon the data of collective-farm accounting. Shkrebel' (1957), remarking that the survey depends on the quality of collective-farm accounts, urges that collective farms covered in the survey be helped in their accounting. By implication the accounts are of unsatisfactory quality. Konovalov (1965), likewise, refers to "troubles in collective-farm accounting".

The problem is not only that of the quality of accounting data but also that of the timeliness of its provision to the interviewer. In Krasnodar krai the statistical administration thought it necessary to ask the Soviet Executive Committee to send letters to collective-farm Chairmen "drawing their attention to the need to provide interviewers with information on time" (Sidlyarenko 1964). As a result, many collective farms instructed their bookkeepers to work on the records of families participating in the

survey first.

Once again we face the problem of the semi-numeracy of rural employees. Moreover, errors arise from corruption as well as from incompetence. Thus, Amalrik (1970) recounts how, in his Siberian village, a collective-farm official spent on drink money intended for the distribution of bonuses, handing out a mere rouble per person. Presumably the records were falsified to cover up his dereliction[3].

Konovalov (1965) tells of a different kind of "error":

> One family told the interviewer Maznitsina that they had doubts concerning the correctness of the collective-farm accounts. She checked the accounting documents and discovered that there indeed was an error. The family had received 132 roubles instead of the 71 roubles to which they were entitled. The extra money was returned.

Konovalov believes that this error, and similar cases of muddled accounting such as double payment of agricultural tax, distort survey data. From the point of view of observing regulations, of course, mistakes have been made; but, as there is no discrepancy between income recorded as paid out and income actually paid out, there is no error from the point of view of the survey. The interviewer here has gone beyond her statistical task to act in the capacity of a State Inspector of the veracity of collective-farm accounting. This is symptomatic of the lack of independence of the statistical function proper in the Soviet system, of its interpenetration with administrative, supervisory and disciplinary functions.

In the story we have cited, assuming it is not just an instructional fable, it appears either that the family concerned were extremely honest people or that they did not realise the muddle in the accounts was to their advantage. In general we might expect collective farmers to urge the interviewer to put the accounts to rights only when they believe this will be to their benefit. Therefore the phenomenon must entail an upward bias in the average income of collective-farmer participants as the latter have

a means of raising their income not available to those not in the survey. This exacerbates the problem of upward bias in the income of the collective farmer sample due to the exclusion from the survey of the disabled, single-person households and families sharing a cow with neighbours (see Chapter B4).

(b) Processing of the monthly budgets of individual families

We have shown the format of the auxiliary records of income and expenditure kept by families (Table B5.1). Under the "old system" of processing, the interviewer had to use these records to fill in Form No.1, a typical format for which is shown in Table C1.1. This is an extract from the Table on p.56 of DePauw (1965), used for workers' and employees' budgets in 1963; the example could equally well have been taken from Form No.1 for collective farmer budgets.

The auxiliary records of expenditures kept by families show purchases consecutively on separate lines: product, quantity, expenditure, source (State trade, cooperative trade, collective-farm market, private citizen). There is a separate page for each day of the month. Form No.1 has a separate line for each item on a fixed product nomenclature (divided into two sub-lines for State/cooperative and other purchases respectively). The conclusion was drawn (at some point before 1960, but we do not know quite when) that the task of converting the information in the auxiliary records into the format required by Form No.1 without any formalised intermediate steps was too laborious and was using up too much of the interviewer's time (Zuyeva 1965). Perhaps also it strained the ability of many interviewers.

TsSU USSR accordingly introduced a new form, called the "Table of Selected Expenditures" (TSE, tablitsa vyborki), in which the most frequently purchased items (bread etc.) were listed as row titles on both sides of

TABLE C1.1

EXTRACT FROM FORM NO. 1, "BUDGET OF WORKER AND EMPLOYEE"

Section III. Purchase of manufactured non-food products; purchase of wooden framework, houses, livestock, poultry etc

Line No.	Product designation	Where purchased	I		II		III		Total	
			Q'y	Am R k	Q'y	Am R k	Q'y	Am R k	Q'y	Am R k
	1	2	3	4	5	6	7	8	9	10
. . .										
73	Cloth (metres) Cotton	1								
		2								
74	Wool	1								
		2								
75	Silk (without staple fibre)	1								
		2								
. . .										

Key: Where purchased 1 in State or cooperative trade
2 from private citizens

Source: DePauw (1965 p 56)

I, II and III - subtotals for ten-day periods

Total - total for the whole month

Q'y, Am - quantity purchased (units indicated), amount spent in rubles (R) and kopecks (k)

a sheet. The interviewer copies page totals from the family records on to the TSE, the columns of which correspond to days of the month, and calculates total amount of each item purchased in the month and total expenditure on it as row totals. These data can then be copied on to Form No.1. Presumably some other method still had to be used for those residual items not listed on the TSE.

Table C1.1 suggests that this explanation, taken from Zuyeva (1965), is a slight oversimplification. The TSE must provide for the calculation not of a single total for the whole month, but for the calculation of three subtotals for parts of the month, which are copied on to Form No.1 under the columns I, II, and III, the whole-month totals being calculated from Form No.1. The aim is no doubt to obviate errors from summing too many figures at once. Presumably the month is divided into three ten-day periods (dekady), as in industrial work scheduling. On this assumption, we present (Table C1.2) a reconstruction of the format of the Table of Selected Expenditures.

Zuyeva argues that use of the TSE is an unwieldy, confusing and time-consuming method, and still unnecessarily difficult. As the TSE is printed on both sides of the paper, the need continually to be turning the paper over wastes time and leads to muddle and mistakes. The discrepancies between the format of the TSE and that of Form No.1 lead to frequent errors in transferring information from one to another.

The personnel of the OBS of Kharkov oblast' - so we are told by their Director, K.Zuyeva (1965) - accordingly set to thinking how to improve the procedure for filling in Form No.1 for workers and employees.

> At first we worked on a one-sided Table. But then we decided to unify the Table with Form No.1. In 1963 our (statistical) administration experimentally printed the new Forms No.1, incorporating the Table... Our interviewers all came to see how much quicker and more convenient it was to work with the new form. In 1964 TsSU USSR accepted our proposal and produced the new form.

TABLE C1.2

RECONSTRUCTION OF THE FORMAT OF THE "TABLE OF SELECTED EXPENDITURES"

Selected items		Where purchased		1	2	...	10	I	11	12	...	20	II	21	22	...	31	III
1	Potatoes	1	Exp Q'y (kg.)															
		2	Exp Q'y (kg.)															
2	Cabbage	1	Exp Q'y (kg.)															
		2	Exp Q'y (kg.)															
	. . .																	
24	Cotton cloth	1	Exp Q'y (m.)															
		2	Exp Q'y (m.)															
	. . .																	

TABLE C1.2 (cont'd)

Key:	Where purchased	1 in State or cooperative trade
		2 from private citizens
	Exp, Q'y	Expenditure, Quantity purchased (in the units indicated)
	1 2 ... 31	Days of the month
	I, II, III	Subtotals for the three parts of the month

Note: The use of separate lines for expenditures and for quantities is recommended by Zuyeva (1965). In another version of the Table of Selected Expenditures, quantities and expenditures are placed side by side on the same line, which sometimes leads to quantities and expenditures being added to one another.

At a meeting of budget survey staff of the Ukraine held at Kiev at the end of 1964, it was reported that the new method was being used in Kharkov, Zaporozhye, Dnepropetrovsk and other oblasti and that it had been found to reduce the time taken to complete Form No.1 by about 15 per cent (Zavrin 1965). Whether TsSU USSR adopted the new form for compulsory use throughout the USSR from 1965 onwards, or whether it was merely approved as an optional variant, is uncertain. The Kharkov office proceeded to work on the simplification of the forms for collective-farmer budgets, but it is not known how this worked out.

An alternative innovation, motivated by similar criticisms of the TSE method, was worked out by the office of Krasnodar krai in 1963 (Sidlyarenko 1964). Their urban interviewers were put on to a system of coding recorded expenditures, but this method apparently failed to spread.

Having filled in the lines of Form No.1 corresponding to different items of expenditure (and of income) and all the other parts of the form concerning family characteristics, labour outlays, acquisition of products and so on, the interviewer must then calculate a large number of subtotals indicated on the form. Data on family composition and the occupations of family members must be copied on to 25 different pages of the form. A summary consisting of many totals is compiled, and serves as the source for filling in other forms - for example, in the case of collective-farmer budgets, Forms Nos. 4, 5, 5-a, 6 and 7[4]. This "enormous purely technical labour by interviewers and economists" (it is not clear where the work of the former ends and that of the latter begins) had the sole purpose of making it possible to derive oblast' totals on keying machines (Khoroshun 1965)[5].

The transition to punched-card machinery, however, did not free survey staff from this labour, nor even did the transition to computers at the end of the 1960s. It seems that the totals were calculated manually and again by computer as a check (speech by Pompeyev, Soveshchanie... 1969). In 1979

a new unified Form No.1, in a single version for workers', employees' and collective farmers' budgets, was introduced, but we have no information on its structure. The most recent description of the computer system for processing budget survey data (the "Budget Statistics" subsystem of ASGS) is that of Karapetyan (1980 pp.239-267). Under "Stage 1 - initial processing of budgets" he lists three operations: deriving the annual totals for individual families by summing their monthly budgets; obtaining monthly cumulative summaries (svodki) by summing the appropriate set of individual monthly budgets; and accumulating these monthly svodki into quarterly, half-yearly and yearly totals. The starting point of computerised processing is therefore the monthly budget of the individual family, with all subtotals already calculated. It appears that, in this area of work at least, the mechanisation of data processing has had no essential impact on the workload of budget survey offices.

(c) Calculation of svodki for groups of family budgets

Data processing in the Soviet statistical system is mostly organised according to the principle of "decentralised summarisation" (detsentralizovannaya svodka). Corresponding indicators of primary units (for example, outputs of individual enterprises) are summed across an administratively defined group of such units to give summary (svodnye) indicators of secondary units (for example, outputs of industrial branches in an oblast', each branch comprising a number of enterprises). The "summaries" (svodki) consist of total or average values, and there is no way of extracting from them any information about primary units. Indicators of secondary units are similarly combined to give summary indicators of tertiary units (for example, outputs of industrial branches in a Union Republic), and so on. Successive stages (or groups of stages) in this process are carried out by agencies at successively higher administrative

levels (eg. enterprises, OSU's, Republican TsSU's).

The FBS is also organised on these lines. The OBS OSU calculates svodki for the oblast' for submission to the OBS of the Republican TsSU, which in turn calculates Republican svodki for final summarisation in TsSU USSR. The full implications will be considered in Chapter C3.

Within an oblast' office the process of svodka goes through two stages. At the first stage, described in the official instructions for interviewers (Instruktsiya... 1960), data are combined from the budgets of staff at all enterprises of a given industrial branch covered by the survey at a given population point in separate svodki for skilled workers, for less skilled workers and for employees (if covered). It appears, however, that budgets of workers in construction, on State farms and on the railways are combined in svodki which do not distinguish qualification groups. At the second stage similar svodki are produced combining all population points covered in the oblast' (Chapter C3).

There may be one or more enterprises in one branch covered by the survey at one population point. Suppose there is only one. If a single interviewer is located at the enterprise, she compiles svodki for the enterprise for submission, together with the individual budget forms, to the oblast' office. If two or more interviewers are located at the enterprise, they collaborate to compile the enterprise svodki. If there are a number of enterprises, all the interviewers located at them collaborate to compile svodki for the branch at that population point.

For example, Vladykin (1955) tells us of such a group of ten interviewers located at three engineering plants covered by the survey at a place in Kuybyshev oblast' (probably Kuybyshev itself). They used to submit 60 Summary Forms Nos. 1, 2 and 3. After rationalisation of the work to reduce the number of unnecessary intermediate svodki, they submitted 28 Summary Forms Nos. 2 and 3.

The instructions also require interviewers to compile annual totals for individual budgets observed throughout the year from the monthly data on the basic indicators recorded in the Check Notebook.

Thus, while the mechanisation of data processing remained at the stage of keying machines, interviewers were burdened with a great deal of summarisation work. In 1964 Zuyeva reported at a meeting that the introduction of punched-card machinery was freeing interviewers from having to compile enterprise totals manually (Zavrin 1965). As noted under (b), this whole area of work seems now to have been computerised.

(d) The quality of interviewers' clerical work

The first experiment in computerised processing of budget survey data at the end of the 1960s brought to light the deficiencies in interviewers' clerical work (Soveshchanie... 1969). Many errors arose as a result of the poor quality of the Forms No.1 submitted for processing: in particular, there were many uncorrected discrepancies between the entries in the body of tables and row and column totals.

At the meeting called by TsSU USSR to assess the first effort at computerisation, the Deputy Head of the Department of Economic Information of TsSU Moldavia drew attention to a curious phenomenon:

> Interviewers are often negligent in filling in the forms submitted to Machine Calculating Stations. Thus, on Form No.1 indicators are very often written without zeros, distorting the totals obtained on the computer (Soveshchanie... 1969)

However, the practice of writing indicators "without zeros" is not simply a matter of negligence, as it was recommended by the Head of the OBS of Kharkov oblast':

> Significant time (almost one-half) is saved by recording expenditures in whole numbers (Zuyeva 1965).

Thus, 7 kopecks is written as "7", not "0,07" and 1 rouble 17 kopecks is written as "117". Obviously not everyone was aware that missing out zeros was standard practice in some offices.

4 Time budget of an interviewer[6]

In considering budgets of working time of survey staff, we shall take as a benchmark a standard working month of 174 hours, corresponding to a 40-hour week. Krasnoshchekov (1964) informs us that there were 2200 interviewers working at a time when the sample comprised 51,000 families, giving an average of 23 families per interviewer. As we have seen in Chapter B5, the interviewer must visit each of her families (at least) twice a month, and an interview is expected to last three hours. Interviewing occupies 23 x 2 x 3 = 138 hours of the 174-hour working month, leaving 36 hours for all other purposes. If we allow a modest half-hour's travelling time per interview, we have only 13 hours left.

Yet the interviewer must also spend time reporting back to the oblast' office to discuss her work with the supervising economist, getting documented income data from enterprises and collective farms, undergoing training (eg. doing set "homework") - and has in addition a substantial burden of clerical work. We are forced to the conclusion that she can do her job really conscientiously only by working a week considerably longer than 40 hours.

This seems to be just what Vladykin (1955) is demanding. The timetable he recommends involves no less than four interviews on many days. At three hours an interview and half an hour associated travelling time, this means a fourteen-hour day (for example, 8 am - 10 pm). Other days are then left free for clerical work.

To keep her working hours within tolerable limits, the interviewer must have to cut corners wherever she can. Little time can be spent in

training, going over one's work with the economist or in "mass-explanatory work". The interviewer must want to get as far as possible in filling in Form No.1 during the interview itself, even if some points remain insufficiently clarified with the family. Finally, much clerical work for which the interviewer is formally responsible must devolve in practice upon the economist.

5 Checking interviewer's work

The enormous effort put into checking the work of interviewers has two components: comprehensive periodic checks of the performance of each interviewer, and the continuous less thoroughgoing checking of interviewers' work by economists.

The decree of 1951 on the budget survey (Resheniya... 1968) lays down that the periodic checks be carried out at least twice every quarter by the staff of the statistical administrations and by raion (town) Inspectors of State Statistics. Our account of these checks is taken mainly from the textbook for statistical staff at raion level, Posobie... (1980 pp.375-6). Usually one of the two quarterly checks is conducted by the OSU and the other by the raion Inspectorate. However, the instruction is not always observed. In Pechora raion of the Komi ASSR where (atypically) the raion Inspectorate directly supervises the interviewers, their work is checked only once a quarter (Filippov 1961). A meeting of survey staff in the Ukraine in 1964 approved a suggestion that the most experienced interviewers be exempted from checks (Zavrin 1965).

The checks are conducted in the first half of the month, when the interviewer has finished compiling the budgets relating to the previous month. Thus a check is made in two months out of three. TsSU USSR instructions require that a check include one or two "control interviews" conducted by the interviewer and the checker jointly to review the previous

month's budget. Kalinichenko (1963) claims that the Kirgizia office does not limit itself to this minimum requirement.

The auxiliary records kept by the family should be examined in a check, though "it happens that... attention is not paid to (their) reliability". Logical checks like assessing the outlay of fodder in the light of the number of livestock owned should be made. The reasons for any substantial month-to-month changes in indicators should be looked into; one is reminded of the statisticians' motto that "anything that looks interesting is probably wrong". The reasons for the interviewer's errors should be analysed so that she can be given the necessary help. The checker is also told to find out whether the family trust their interviewer, what "mass-explanatory work" the interviewer has been doing with the family (presumably, whether she has talked with them about the "significance" of the survey and of their role in it) and the reasons for families falling out of the survey. Finally, the checker should help the interviewer keep up contacts with the management of the enterprise she covers. The checker is no doubt in a position to help out here because she is of a higher status than the interviewer.

Klyuchanskii (1955) also advises on the many points which should be checked. One is impressed by the amount of work a check involves if done properly.

If the check is being carried out by the raion Inspector, she records her proposals for overcoming deficiencies in the interviewer's work in an Akt, sending one copy to the interviewer and one copy to the OSU. But if she has no comments of importance to make, it suffices to send a short note to the Head of the OSU (Klyuchanskii 1955).

The role played in this work by raion Inspectors is rather problematical. If the interviewer lives and works far from the oblast' centre, it must be more convenient for an Inspector stationed in the locality to do the check than for an economist to travel out from the oblast' office for the purpose.

Perhaps also it is desired to involve somebody external to and in some degree independent of the budget survey office, which has an interest in giving a good impression of its own performance. In all other respects, however, the involvement of the Inspectors does not seem a sensible arrangement.

Inspectors are local all-purpose statistical officers, responsible for a wide range of work covering many different fields of statistics. There are indications that Inspectors find it a problem to familiarise themselves with the work they are to check. V.I.Valuykina, the Inspector of the Krasonoselskii raion of Leningrad oblast', complains that Inspectors receive insufficient instruction and help from budget survey offices (Vsesoyuznye... 1954). It is suggested that, in order to "learn more about the work", Inspectors attend interviews, do joint checks with economists, take part in training sessions at which hypothetical budgets are worked through,and attend the monthly meetings held on the results of checking work (Klyuchanskii 1955, Vladykin 1955). Yet one wonders how Inspectors, most of whose many duties surely enjoy higher priority, are to find the time to learn about and conduct checks effectively.

Valuykina says, in fact, that reliance on Inspectors is minimal. Moreover, her argument that they could be especially useful to the survey in "mass-explanatory work" among the families and in setting up liaison with Party and social organisations sounds like an admission that she does not feel too confident about the more substantive aspects of the job[7].

Let us now turn to the continuous checking of interviewers' work by economists. This does not involve the presence of the checker at interviews but only the examination of documents. Form No.1, the Check Notebook and the documents from enterprises which provide income data are studied. The data in different documents are cross-checked, and comparisons are made with the previous month's figures (or the previous year's figures for wages), in

order to spot anomalies. A special aide-mémoire for checkers is mentioned by Sidlyarenko (1964). The aim, not always achieved, is to check every single budget.

A more thorough type of check entails a full examination of the auxiliary family records as well as the other documents. This is applied to the work of new interviewers for their first two or three months on the job, and periodically to a sample of the budgets of other interviewers (Vladykin 1955).

It is considered best for the economist to do the check with the interviewer sitting at her side in the office, so that she can point out mistakes as she finds them. If, however, the interviewer cannot manage to visit the office, she should be sent detailed letters about her work (Kalinichenko 1963).

Checks by economists are commonly criticised as being superficial. Many speakers at one meeting said that checks were not prepared properly and failed to uncover the reasons errors were made (Vsesoyuznye... 1954). At a meeting of the Collegium of TsSU USSR held to assess work on the survey, several oblast' offices and their Directors were attacked by name for "unsatisfactory organisation of work checks": they had contravened TsSU USSR instructions on the checking procedure, failed to help interviewers and taken no measures to improve matters as a result of checks (Krasnoshchekov 1964).

It is unlikely that economists have the time to make checks of the thoroughness required. An economist who supervises four interviewers, each responsible for 25 families, has a hundred budgets to check every month. Before the work of the Kuybyshev oblast' office was rationalised, not all economists managed to get round to checking all the budgets in time (Vladykin 1955). Because some budgets went for processing without being checked first, errors were sometimes discovered only during the compilation

of the oblast' svodki. Time norms were therefore established: economists were allowed 15-20 minutes to check one budget and three hours to check the monthly summary materials of each interviewer. As a result all budgets were checked in time. But we may doubt the penetration of a check limited to 15 minutes.

We must add that checking which is limited to the examination of documents can, strictly speaking, only expose discrepancies and not errors. A discrepancy between two documents, or between a subtotal and the figures making it up, may have two or more possible explanations, and the checker is in no position to determine the true one (except when only one explanation is plausible). Thus, even in theory, the continuous checking can only guarantee internally consistent data, not - as Soviet writers seem to believe - correct or reliable data. In practice, this may often be so even when a check includes a control interview.

The extensive arrangements for the checking of data are a tacit admission of the poor quality of the primary data. Summing up after a staff meeting in 1964, B.T.Kolpakov, the Head of TsSU RSFSR, recognised this point, a recognition rarely found in published sources available to us:

> Our most important task is to raise the reliability of collected data. It is not by chance that many people are occupied in checking work. But such checking often leads to loss of a sense of responsibility, as some people reason: "If I make a mistake, others will correct it" (Soveshchanie... 1964).

We then have a vicious circle: poor data quality necessitates extensive checks, but these checks themselves contribute to poor data quality. Sh.Kh.Kamaletdinov, the Head of the Computer Centre of TsSU RSFSR, urges that the irresponsibility of interviewers be combatted by having errors "corrected by those who make them, not by those who discover them" (Soveshchanie... 1969). But the delays entailed by referring unsatisfactory documents back to interviewers for correction, perhaps more than once,

would surely be considered unacceptable.

Checking efforts use up vast resources without resolving the fundamental problem in the collection of survey data: the attempt to collect a quantity of data which is unrealistically large in the light of the resources available, including the limited skills of the data collectors. A reduction in the scale of the programme would reduce the burden on interviewers and economists, make the time needed for effective training available and thereby raise the quality of work. It would no longer be necessary to devote such a large proportion of the labour resources at the disposal of the survey to checks.

6 Review of the tasks of economists

Let us list the responsibilities of budget survey economists under three heads - tasks which are absolutely essential, high-priority tasks, and tasks of lesser priority.

A. Essential tasks

1. It is obviously essential that economists maintain basic supervision over interviewers - provide them with materials and obtain materials from them on time, make sure they keep to their interviewing schedules etc. Training of interviewers and proper checking of their work is not included here.

2. Economists must carry out the routine data processing needed for the timely submission of the data regularly required by Republican TsSU's and TsSU USSR, as specified in the "Work Plan of TsSU for Budget Surveys"[8]. They must ensure that the computing installation of the OSU carry out their part of the processing work.

3. They must maintain the size of their sample by replacing families who leave the sample. They must make changes in the sample on those occasions

when TsSU USSR decides on a reorganisation or expansion of the sample.

B. High-priority tasks

1. Checking of interviewers' work

2. Writing reports for presentation to local leading bodies

3. Non-routine "analytical work" for TsSU and local bodies

4. Maintaining liaison with the enterprises, collective farms etc., covered by the survey

C. Tasks of lesser priority

1. "Mass-explanatory work" (organising meetings of survey participants etc.)

2. Training of interviewers, including penetrating checks of their work (working out and explaining reasons for errors etc.)

Lastly there are TsSU staff meetings to attend and, no doubt, various miscellaneous tasks.

There is a tendency for more urgent tasks to crowd out less urgent ones. "With bad organisation, (routine) calculating work swallows up the whole of working time, and checks of data quality and data analysis are neglected" (Vladykin 1955). It is affirmed that the mechanisation of data-processing has freed economists to give more attention to checking, assisting interviewers and analysing their results (Sidlyarenko 1964). Attempts are made to prevent some tasks crowding out others by establishing monthly work plans for economists (Konovalov 1965) or by dividing the economists of an office up into separate groups to tackle different tasks (Shkrebel' 1957).

Routine data-processing once carried out by economists has now been taken over by the OSU Computer Centres (and before that some of it was taken over by OSU Machine Calculating Stations using keying and punched-card

equipment). The extent to which economists have been relieved of routine calculation, however, is unclear. The boundary line between the duties of interviewers and those of economists in this area is blurred: as we have argued, much work formally the responsibility of interviewers may actually be done by their economist supervisors - or first by the interviewer, and then a second time by the economist as a check.

A distinction is made between routine data-processing and "analytical work". The data-processing exercises laid down in the TsSU Work Plan are compulsory for all statistical administrations; they must be conducted on a regular schedule according to clearly defined methods. Analyses not laid down from above, on the other hand, depend on the initiative of the economists. True, they are required to submit "analytical reports" jointly to leading bodies at the same level and to higher levels of TsSU[9]. Thus, the Work Plan for 1956 obliges all OBS OSU's to send up two quarterly "analytical memoranda", based on the budget summaries for workers and employees and for collective farmers respectively. But these are reports of a discursive and interpretative nature, the format of which cannot be precisely regulated. They may accordingly be superficial or penetrating, primitive or sophisticated in technique, misleading or frank.

TsSU USSR tend to be dissatisfied with the quality of the analytical reports sent up to them. It was conceded at the 1964 meeting of the Collegium that "TsSU RSFSR and OSU's have improved their data analysis somewhat", but their performance was still judged far from satisfactory. Criticism centred on the following points (Krasnoshchekov 1964):

(a) Reports should make use not only of budget survey results but also of statistics taken from other relevant sources, but this is rarely done. In lectures on analytical work, Sector Heads of TsSU RSFSR suggest the use of trade statistics, of the annual reports of collective farms and of data from the livestock census (Vsesoyuznye... 1954). Konovalov (1965) boasts how

the East Kazakhstan oblast' office use "statistics of agriculture, industry, trade etc" in the reports they prepare for TsSU Kazakhstan and the leading bodies of the oblast' - but then they are the "most advanced" OBS in Kazakhstan! The economic reports regularly sent to the leading bodies of Krasnodar krai combine the use of FBS data with industrial, agricultural, trade and capital construction statistics (Sidlyarenko 1964). One of the likely motives of TsSU USSR in urging that FBS data not be relied upon unless they are collated with data from other sources is their awareness of the poor quality and lack of representativeness of the survey data[10].

(b) Reports do not contain sufficiently full analyses of the position of individual social groups and of individual economic regions of the USSR[11]. At the time of this meeting data breakdowns by per-capita income group were part of the officially laid down processing programme (see Chapter C3); they had been adopted under outside pressure not long before, and not long after were to be dropped again. If the term "social groups" refers to these income groups (and it may well not do so), the reluctance to pay proper attention to data differentiated by income level may reflect resistance to the innovation. As for data on economic regions, the economic region - falling as it does between the oblast' and the Republican levels in large Republics - tends to be neglected as a level of analysis (by comparison with what its importance would warrant) because there is no corresponding level in the hierarchy of TsSU offices.

(c) Reports often lack conclusions and proposals for action.

(d) Reports are too primitive methodologically:

"The analytical reports of certain Republican TsSU's sometimes lack the

necessary explanatory depth, contain methodological errors...," leading to "premature and unconvincing conclusions" (Matyukha in Sukhoruchkina 1970). The standards by which the methodological level is assessed are rather modest to Western (or Soviet academic) eyes. The methods which offices are urged to use more widely are only those of descriptive statistics: tabulations ("groupings", gruppirovki), indices, balance calculations. Elsewhere the construction of time series of indicators of the enterprises, collective farms and households surveyed is also recommended (Vsesoyuznye... 1954). Even now, the idea of statistical offices at oblast' level using methods of mathematical statistics (significance tests, correlation, regression etc.) is no more than a straw in the wind.

7 Time budget of an economist

Let us take as a minimum supervisor load for an economist the supervision of three interviewers each handling 20 budgets (60 families altogether), and as a maximum load the supervision of four interviewers each handling 25 budgets (100 families), with $3\frac{1}{2}$ interviewers each handling 23 budgets (80 families) as the mean load. Using Vladykin's time norms of 15-20 minutes a budget, we obtain a monthly time outlay on checking budgets of 15-33 hours (24 ± 9). To this we must add allowance for the more thorough checking of the work of the least experienced interviewers and of a sample of the work of the other interviewers (say, 6-8 hours a month) and for discussions with interviewers about their work, whether in person or by correspondence, taking perhaps one hour a month for each of them (3-4 hours). Thus we estimate 24-45 hours (34 ± 10) a month in all for checking. If we are considering the time before summarisation work was automated, we must recall that Vladykin allows three hours to check the svodnye materials of each interviewer, and add on another 9-12 hours, giving 33-57 hours (45 ± 12)

a month. Moreover, Vladykin's time norms are probably over-taut and scarcely allow for very intensive checking.

Thus the proportion of her working month of 174 hours which the economist needs to spend checking the work of her interviewers was 19-33 per cent up to about 1965 and 14-26 per cent thereafter, these ranges being on the low side.

In assessing the weight of other components of the economist's work we have to manage without quantitative guidance from Soviet sources. A few hours a month must be allowed for a variety of unavoidable administrative tasks - basic supervision over interviewers (A.1), drafting reports (B.2), maintaining liaison with workplaces covered by the survey (B.4), attendance at staff meetings and so on. It does not seem to us excessive to allow 16 hours a month for this activity. One hour a month on average should suffice to do any necessary work on the composition of the sample. Let us allow six hours a month for "mass-explanatory", training and other miscellaneous work. We still have 94-118 hours a month (before 1965) or 106-127 hours (after 1965) to allocate - approximately two-thirds of the working week. It would be interesting if we were able to divide this up between checking work in excess of Vladykin's norms, routine data processing and analytical work. Unfortunately we lack the information to do this, though we have good reason to think economists still perform many routine calculations, even if these do not dominate their work in the way they did before the mechanisation of data processing.

8 Conclusions

In Chapter B5 we discovered how great a burden the budget survey imposes on the families participating in it. In this chapter we have gone on to discover the burden carried by the statistical staff who conduct the

survey at oblast' level. The size and complexity of the forms involved must tax the capacities of often under-qualified interviewers, leading to a serious rate of occurrence of errors which an enormous checking effort cannot effectively control - and, paradoxically, may even contribute to by undermining the sense of responsibility of interviewers. The supervisory and other routine tasks of the economists distract them from the analytical work which is theoretically the real function for which they have been trained. The methodological level of the analysis which is carried out is rated as too low even by the modest standards of the TsSU leadership.

We now have a fuller impression of the sheer cumbersomeness of the budget survey, of the vast scale of the data collected and processed. We shall be in a better position to assess the cost-effectiveness of this effort when we have considered the substantive nature of the analyses carried out in Chapters C3-C5. It will become clear that most of the information so laboriously collected is irretrievably lost in the course of data processing.

It is doubtful whether the significance of much of the information collected would suffice to justify the cost involved even were less of it lost in transit. As an example let us take the classification of expenditures by source of purchase. Families have to note down in their auxiliary records not only what they purchase, the quantity and what they pay for it, but also where they bought it - in State trade, in cooperative trade, on the collective-farm market or from a private citizen. (We refer to the consumption of workers and employees; the sources from which collective farmers acquire products are more varied still.) We have seen how the size of Form No.1 is increased by this distinction and its format made more confusing to the eye, no doubt raising the frquency of clerical errors. The same is true of the Table for Selected Expenditures. And yet

much of the information in the auxiliary records on this point has had to be thrown away by aggregating a fine classification of source of purchase (see Table B5.1) into a coarse twofold division - State/cooperative trade and private trade. Were this not done, the forms would be quite unmanageable. The fine classification in the original record is futile, most of the effort spent in operating it wasted at the very first step of processing. It is harder to judge what benefit is gained from the remaining twofold classification because of our limited knowledge of the analyses made on the basis of survey data and of the practical use to which such analyses are put. Source of purchase is undeniably an important variable in Soviet consumption patterns, and the data could serve valuable purposes (to the extent that they are reliable and representative). But there are certainly more efficient ways of collecting such data.

Notes to Chapter C1

1 "My friend Vera... (had the) duty to issue bulletins... All the names and facts were invariably mixed up,and there were many grammatical errors." (p.174)

"Most of the propaganda work in the village (was) conducted by Vera... who from time to time somewhat incoherently read out newspaper articles which she barely understood herself and then explained to us - an article on Sinyavsky and Daniel, for example, she reduced to the simple proposition that they were American spies." (p.256)

"Nobody's wages were in fact correctly calculated (by the bookkeepers), partly through illiteracy and partly because the kolkhoz hoped to improve its situation by "economising" on wages." (p.260, Amalrik 1970).

2 "Counter-sales" are sales of industrial goods which have been delivered to collective farms in exchange for agricultural produce (DePauw 1965 p.27).

3 "I must say that the kolkhoz officials in general were not very finicky in money matters. The deputy chairman, for instance, ... once spent on drink all the money for bonuses due to be given to the women who looked after the cows, and when the time came he merely handed them a rouble each with an embarrassed smile." (p.261, Amalrik 1970).

4 For more detail on the contents of forms see DePauw (1965), who reproduces the two variants of Form No.1 in full. Forms Nos.4, 5, 5-a, 6 and 7 contain between them 4000 entries (Khoroshun 1965).

5 The mechanisation of data processing in the USSR has gone through three stages: keying machines, punched-card machines and electronic computers (see Chapter C2).

6 We assume that interviewers work only on the FBS. "It is forbidden, without special instruction from TsSU USSR, to allocate an (FBS) interviewer to any other kind of work" (Instruktsiya... 1960).

7 Inspectors, and also enterprise managements and Soviet bodies, take part in selecting people for recruitment as interviewers (Posobie... 1980 p.374). Recruits may then be drawn from Inspectorate staff for work in the corresponding raion.

8 The Work Plan for 1956 is reproduced by DePauw (1965 pp.69-75).

9 Some quarterly analytical reports are specified in a centralised plan, others are submitted by Republican and oblast'-level statistical offices to leading bodies at the corresponding level "on their own initiative". This often involves Republican TsSU's commissioning additional tabulations from oblast'-level offices (Sukhoruchkina 1970).

10 Yet Matyukha complains of discrepancies among indicators where several different sources are used (Sukhoruchkina 1970).

11 For example, V.A.Samoilov, Deputy Head of the Department of Budget Statistics of TsSU USSR, mentions that the TsSU's of Uzbekistan and Kazakhstan produce little data by economic zone (Krasnoshchekov 1962).

APPENDIX TO CHAPTER C1

DESIGN OF THE BUDGET SURVEY FORMS

The design of the survey forms is occasionally discussed in the literature. Existing forms are criticised; changes are proposed and sometimes adopted. The scattered information available does not allow of a proper assessment. One gains the impression that form design has undergone gradual improvement, though the forms are still probably unnecessarily difficult to handle.

As an example of a criticsm of the forms we may take that by Vladykin (1958), who complains that the collective farmer forms are very inconvenient both for the interviewer and for the data-processor. Data are repeated and copied from one form to another; the numbering of rows and columns lacks system; and there are superfluous subtotals. The worker-employee forms have been simplified in recent years, but still have deficiencies. For example, Sections V (purchase of food products) and VII (acquisition, use and stocks of products) of Form No.1 would be better merged. This would improve interviewing conditions, reduce the time needed to punch and sort cards, and reduce the number of punched cards used. The proposal was not adopted: the two Sections were still separate in 1962, four years later (DePauw 1965, pp.50-51). (Section VII had become Section VIII, showing that the form had been redesigned during this period.)

CHAPTER C2

DEVELOPMENT OF DATA-PROCESSING EQUIPMENT

1 Introduction

In this chapter we consider the types of equipment which have been used at different times to process FBS data and the problems that the transition from one type of equipment to another has involved. This is not only a case-study of the process of technical innovation in the USSR. The practicability of different kinds of data analysis depends crucially on the type of data-processing equipment used. Thus this chapter is a necessary preliminary to the account in the next two chapters of the development over time of the data-processing programme.

First we describe the types of equipment and comment briefly on their modes of operation. In Section 2 we examine the "keying machines" which were once in use, and the punched-card machines which replaced them[1]. In Section 3 we consider the characteristics of different kinds of electronic computer systems: the early Soviet computer systems of the 1970s, the "integrated" systems which are now being developed and minicomputers.

In Section 4 we review the pattern of mechanisation of processing of budget data over time. Sections 5 and 6 deal with the successive transitions from keying machines to punched-card machines and from pre-computer to computer systems respectively.

In Section 7 we assess Soviet experience in this field.

2 Keying machines and punched-card machines

"Keying computational machines" (klavishnye vychislitelnye mashiny, schetno-klavishnye mashiny) are small portable mechanical devices to which data are input manually by striking keys affixed to levers. Arithmetical operations on the data are directed in similar fashion. Data are output on paper tape. Such machines are rarely seen in the West nowadays, but are still in wide use in the USSR in under-mechanised sectors like bookkeeping and retail trade. This writer was surprised to discover in 1981 that they were the only equipment in the possession of the Computational Laboratory of the Faculty of Economics of Leningrad State University. TsSU relied on them for the processing of primary budget data until phasing out their use during the 1960s. Keying machines were at that time no more than simple summing machines, capable of addition and subtraction only[2].

The processing of budget data, and of all other statistical data, on keying machines was extremely laborious. The pressure under which the data-processing installations of TsSU worked was particularly severe in July and in January, when cumulative half-yearly and yearly totals had to be produced from FBS data in addition to the processing of all other quarterly and yearly statistical report data. For example, the Machine Computational Station of the Leningrad Statistical Administration had to add up on keying machines over a period of 20-25 days about one million figures at mid-year and over 2.2 million at end of year (Sabinin 1966).

Operators processing budget data would compile summary totals for different items of income and expenditure in a set of 10-12 family budgets taken together, and then check the balance of income against expenditure for the whole set. When (as often happened) income and expenditure did not balance, there was no way of telling which of the budgets in the set

were at fault. The totals for each budget had to be checked, and sometimes triple checks were needed, so that a single error could increase operating time almost tenfold (Vladykin 1958, Parfenova 1964).

It was an immense task to use keying machines to produce tabulations grouping budgets on various criteria (size of family, per-capita income etc.) and showing average budget indicators for each group. It was necessary to calculate the criteria for each budget in order to assign it to the appropriate group, manually to sort the budget forms by group, to sum up indicator totals for each group and finally to calculate averages. It was "almost impossible" to produce a cross-tabulation on two or more criteria (say, wage by per-capita income): the "millions of additional calculations" required for a single set of such tabulations would have used up as much labour and resources as the whole of the basic data-processing by decentralised svodka (Parfenova 1964).

In the 1960s keying machines were partially replaced by "punched-card computational machines" (perforatsionnye vychislitelnye mashiny, schetno-perforatsionnye mashiny). These are electrical machines, controlled by a programme entered on a keyboard. Information is input on punched cards, which are prepared using a variety of special machines (card-punchers, card-checkers, copy-punchers etc.). Results can be output either on to punched cards, for further processing, or over a printer or on to paper tape. The data processing itself is carried out by machines which sort and order the punched cards in various ways,and by other machines designed for specific types of calculation. In particular, a "tabulator" produces a tabulation of cell totals or averages (a "tabulagramme") from an appropriately pre-sorted deck of punched cards. A basic set (komplekt) of punched-card machines might consist of a tabulator, one or two sorters, three or four card-punchers and two or three card-checkers, perhaps together with some special-purpose supplementary machines (Kryushin, Surin and Uskov 1976).

The chief advantage of punched-card equipment over keying machines is that, once primary data have been encoded on punched cards, the same deck of cards can be repeatedly reprocessed to produce a series of analyses with moderate expenditure of time and resources. While the production of a cross-tabulation on keying machines costs as much as the basic data-processing, the cost on punched-card machines is no more than 20 per cent of the cost of the basic data-processing (Sabinin 1966).

However, as the initial preparation of the punched cards is quite labour-intensive, this potential advantage is realised only if the programme of data processing is fairly intensive. It is not worth using punched-card equipment just to sum up basic svodki, nor to process a small number of budgets (Vladykin 1958). The more analyses carried out, the greater the relative advantage of punched-card machines.

The proper use of punched cards may be regarded as a way of overcoming the fundamental deficiency of decentralised svodka. Even if the deck of cards is used only to calculate summary totals, data relating to individual budgets are not lost but remain accessible on the cards for later re-analysis if desired.

Punched-card equipment also makes it possible flexibly to output large quantities of data in convenient formats. This facilitates efficient and comprehensive data checking, thereby reducing the incidence of errors. Tabulagrammes are printed out showing the values of different indicators for each budget and group of budgets. These are assessed by comparisons and cross-checks - for example, of the number of pension receipts recorded against the number of households known to include a pensioner. Totals printed out on the tabulagramme are compared with control totals on the budget forms. If there is a discrepancy in the data pertaining to a group of budgets, it can readily be ascertained which budget is in error. All that

is then necessary is to replace one or a few punched cards (Vladykin 1958, Parfenova 1964).

3 Electronic computers[3]

The introduction of electronic computers, controlled by automatic computer programmes, greatly increases the potential for speed and complexity of data processing. This potential may, however, be far from fully realised in practice, both because of the limitations of available computer technology and because of failure effectively to use available technology arising out of procedural conservatism. We shall review this problem first in the context of Soviet computing in general, then in the context of the statistical computer system in particular, and lastly as it affects the FBS.

(i) Soviet computing in general

In the USSR computers have tended to be used mainly to speed up pre-existing procedures, and progress in changing procedures to exploit more fully the potential benefits of computerisation has been slow. For example, it was originally intended that computerisation of the work of Gosplan be accompanied by the introduction into planning practice of more advanced mathematical methods, and a Department for the Application of Mathematical Methods and Computers in Economic Activities was established in Gosplan in 1964 for this purpose. This Department did not manage to elicit the cooperation of the Gosplan apparatus, and in the late 1960s it was absorbed into another Department (Katsenelinboigen 1980 p.112). Automation in Gosplan therefore generally takes the form of "combining traditional methods of planning calculations with contemporary computer technology" (Romanenko 1977 p.34).

Soviet writers now hold that computerisation is a process comprising

two broad stages. In the first stage, in many fields completed, computers are used to facilitate existing procedures. Only in the second stage, presently in progress, is the transition made to "integrated systems" within which the procedures themselves are modernised. Thus, according to one textbook, the first stage consists in the construction of "electronic systems of data processing" (elektronnye sistemy obrabotki dannykh, or ESOD), which streamline information flows but leave management methods basically unaffected. At the second stage the ESOD are to be superseded by "integrated systems of data processing" (integrirovannye sistemy obrabotki dannykh, or ISOD), entailing the transformation of management methods (Mashinnaya... 1978 pp.164-6).

A series of technical developments are regarded as essential preconditions of the transition to integrated systems. The four most important such developments are:

(a) Completion of the replacement of second by third generation machines, currently in progress but at an unsatisfactorily slow pace (Academician Glushkov, interviewed by Kanygin 1979)[4].

(b) Improvement in input-output peripherals, the backwardness and shortage of which remain a bottleneck in Soviet computing, limiting the flexibility of data processing (eg. facilities for use of interactive instead of batch mode).

(c) Establishment of direct data transmission between computers. In the mid-1970s there was still no system of data transmission linking different computer centres (except the post), so that each centre had a "closed work cycle" (Straumen 1976). In 1978 the first generation of an All-State System

of Data Transmission came into operation, but even the fastest of its three channels had a maximum capacity of only 50 digits per second (Talyzin 1978). The second generation is projected to reach 1200 digits per second, with only the third generation approaching present Western standards (12,000 digits per second) - provided that Soviet telecommunications are in the meantime upgraded to the required quality. The long-term time-scale of this work is indicated by the fact that research into direct data transmission among automated management systems (ASU's) - not to speak of implementation - is scheduled for completion by 1990 (Matveyev 1979).

(d) Creation of "automated data banks" (Avtomatizirovannye Banki Dannykh, or ABD). Data on individual units of observation can be stored in the ABD of a computer and retrieved at any time for reanalysis. Thus the availability of an ABD reduces or eliminates the need to rely on decentralised svodka of the data processed by a computer. If data for different regions (say) are processed by different computers, avoidance of decentralised svodka requires direct data transmission between computers as well as the use of ABD's. That is, (c) and (d) are joint preconditions of flexible analysis. The ABD can be regarded as the computer equivalent of the reusable deck of punched cards mentioned in the discussion of punched-card equipment in Section 2.

The first ABD's were to be created in Latvia from 1979 onwards, in the form of registers of population, enterprises, construction-sites and so on (Straumen 1976 pp.41-8). Experimental ABD's are also being set up in a number of other regions (Belorussia, Estonia, Tomsk oblast'), but their general introduction remains a task for the future (Ananyeva, Ivanova and Khlopina 1980).

(ii) The statistical computer system

Two successive generations of TsSU's Automated System of State Statistics

(ASGS) are distinguished. The first generation of ASGS uses second-generation Minsk computers and was installed between 1970 and 1975. Work on introducing the second generation of ASGS, which is to be based on third-generation machines, began in 1979. The scheduled date of completion is unclear, but probably not imminent (Ivanov and Zavylov 1978).

The two generations of ASGS obviously correspond to the two broad stages posited for computerisation in general. The first generation was designed primarily to speed up data processing on traditional lines of decentralised svodka, with extremely little qualitative change in methodology[5]. As the Deputy Director of NII TsSU, Siskov (1975), observed: "Expensive computer technology is functioning essentially only as a tabulator to accumulate various totals for different indicator values".

Only the second generation of ASGS, which is to be equipped with a developed network of peripherals, data-transmission channels and ABD's, will provide a basis for more "integrated" data-processing. This is taken to involve the wide application of cross-tabulations and mathematical methods, both methods of mathematical economics (eg. calculation of input-output coefficients) and methods of mathematical statistics[6] (for example, regression analysis) (Straumen 1976, Metodologicheskie... 1977 p.5, ASGS 1978 pp.39-41).

The failure of the first generation of ASGS to exploit the analytical potential of computerisation is illustrated by the continuing paucity of cross-tabulations produced. In his foreword to a textbook on ASGS written after the full installation of the first generation, Boyarskii makes a dramatic contrast between past and future (Metodologicheskie... 1977 p.8):

> With the customary old technology, combinatory groupings (ie. cross-tabulations - SDS) of large data-sets is a very laborious business..., so that by the time they are produced they may be too outdated for practical use. ... (But) what with the old technology is feasible only occasionally, essentially only in academic research, will with ASGS be feasible

> as usual systematic practice... The new technology, on which ASGS will be based, can accomplish such tasks as fast as lightning and without great expense. This has been proved by experimental work. (emphasis mine - SDS)

Clearly it is only the ASGS of the future second generation which will provide the desired facility. Meanwhile, we are told, except in basic population and other censuses, cross-tabulations are little used in spite of their generally accepted importance[7].

(iii) The budget survey computer system

The "budget statistics" subsystem of ASGS comprises, as of 1980, four "complexes of electronic information-processing" (kompleksy elektronnoi obrabotki dannykh, or KEOI). Of these, two concern not the FBS itself but the incomes survey (microcensus) and a time-budget survey respectively. Of the two KEOI's dealing with the FBS, one carries out "current processing" of FBS data - that is, cumulates totals and averages of budget indicators by decentralised svodka - while the other produces tabulations of FBS indicators by per-capita total family income and a number of other socio-economic variables relating to family composition. The former of these computerises the basic traditional processing procedure, and belongs to the first generation of ASGS; the latter appears to be based on a separate data bank of individual budgets, and is an element of the second generation of ASGS. A number of new KEOI's remain to be worked out to complete the transition to the second generation. This will involve the application of methods of mathematical statistics in two areas: regression analysis of consumption on family composition, family income and prices; and various sampling-theoretic calculations to improve the data (determination of optimal sample size, assessment of the representativeness of the existing sample, construction and projection of distributions of per-capita income, and the use of corrective

coefficients derived from them to extrapolate sample data to the population) (Ananyeva, Ivanova and Khlopina 1980; see also Chapter C4). Ananyeva, Ivanova and Khlopina do not make it clear whether or not the KEOI for tabulations is yet operational: "Until now it has been difficult to process income data by individual-family indicators, but computerisation has made this possible". Other evidence indicates that tabulations of FBS indicators by per-capita income are still not being produced[8]. In this respect computerisation to date actually represents a setback; tabulations by per-capita income were being produced between 1961 and 1968 on punched-card equipment but were not produced during the 1970s (except in 1970, presumably as a special exercise). With regard to relative ease in circumventing decentralised svodka, punched-card equipment was a more advanced facility than the first generation of ASGS.

At a later stage the creation is envisaged of a machine programme which will generate a bank of individual yearly budget data for tabulations and mathematical analysis at the same time as it carries out current processing (Ananyeva 1976, Planovyi... 1981 p.194).

Minicomputers

The use of minicomputers for the solution of statistical (as well as financial, engineering, mathematical etc.) tasks appears to have been pioneered not by TsSU but by Gosplan (Parusov and Balasanyan 1977). The use of simple models of programmable calculator began there in 1974. A more advanced model, the VANG-2200, for which a broad library of standard programmes has been developed, came into use from 1975. In 1977 thirteen departments of Gosplan USSR had been equipped with minicomputers, which were then carrying out 20-30 per cent of the calculations previously done manually. As well as speeding up traditional data processing, minicomputers were facilitating the application of more analytical methods; in the Department

of Oil and Gas Industry a programme was being worked out to solve optimisation tasks by means of linear programming. Most of the potential of minicomputerisation, however, remained to be exploited: routine data processing was still taking up 50-80 per cent of the working time of rank-and-file planners.

Minicomputers were seen in Gosplan as a way of dispensing with the use of keying machines and other outdated equipment for work which could not conveniently be undertaken by the Main Computer Centre of Gosplan USSR because of its relatively small scale, irregular scheduling or other reasons. The flexible control which the planner directly exercises over the minicomputer also enables him to carry out on it tasks which closely combine formal procedures with elements of expert decision-making. Minicomputers therefore provide, for relatively small-scale tasks,the advantages of "integrated" computer systems, and are a useful partial compensation for the delay in transition to the second stage of computerisation.

Similar arguments apply in favour of the rapid introduction of minicomputers into TsSU offices. Savinkov (1975) advocates their use not only in oblast'-level statistical administrations but at town and raion level as well. Progress has been much slower in TsSU than in Gosplan, however - an example of TsSU's greater technical conservatism.

A special model of minicomputer - the PVK M5000[9], a small third-generation machine - has been designed for TsSU use. The development of computer programmes for it has been the responsibility of the Department of Programming Methodology of VGPTI TsSU USSR. Savinkov (1975) gives general information about the PVK M5000, while Denisevich and Litvinov (1976) discuss the development of mathematical-statistics programmes for it. In 1976 even such basic prerequisites as programmes for floating arithmetic operations, calculation of elementary functions and the solution of problems in linear algebra (needed, for example, for regression by least squares) were still lacking.

The package planned includes descriptive statistics, regression and correlation, time series analysis and the fitting of distributions; analysis of variance and Monte Carlo simulation may be added at a later stage. Denisevich and Litvinov expect that "the creation of a simple, flexible package of programmes for statistical data processing, convenient for users, will make possible the introduction of mathematical-statistical methods of analysis at the oblast' and raion levels of ASGS". This could conceivably affect the processing of FBS data in the long term, but problems of training and technical procurement make it an unlikely prospect for the near future.

Even the programming work must be proceeding at a very slow pace. Mathematical, including mathematical-statistical, programmes are usually written in a programme of the FORTRAN type, adapted to the representation of complex mathematical algorithms. "However, the creation for the PVK M5000 of a translator from a language of the FORTRAN type is not planned for the near future" (Denisevich and Litvinov 1976). The programmers therefore have to compile their programmes directly in the machine language ASSEMBLER, an extremely inefficient and time-consuming procedure. Such a situation is eloquent testimony to the low priority which TsSU accords to the mathematical analysis of its data.

4 The pattern of mechanisation of data processing over time

In order to clarify the basic principles of the functioning of each type of data-processing equipment, we have so far assumed that at any one point in time the same type of equipment is in use throughout the TsSU system. In reality, transitions from one type of equipment to another have taken place over extended periods of time, so that often two types of equipment have been in simultaneous use. Before examining more closely, in the next two Sections, the transitions from keying to punched-card equipment and from pre-computer to computer systems, it will be useful to review the overall

pattern of development of data-processing technology over time.

There have been three main types of computational institution in the TsSU system: the Machine-Calculating Bureau (Mashinoschetnoe byuro, MSB), equipped with keying machines only; the Machine-Calculating Station (Mashinoschetnaya stantsiya, MSS), equipped with punched-card as well as keying machines; and the Computer Centre (Vychislitelnyi tsentr, VTs). The timing of the progression from one computational institution to the next, at All-Union, Republican and oblast' levels, is shown in Tables C2.1 and C2.2[10].

Before the war FBS data were processed mainly on keying machines, though Vladykin (1958) informs us that four oblast' statistical administrations had processed some daily budget records[11] on punched-card machines. After the war, however, there was a return to the exclusive use of keying machines. In 1957 most oblast' statistical administrations were provided with Machine-Calculating Stations equipped with punched-card machines. FBS data were experimentally processed on punched-card machines in several oblasti in 1958, and the Deputy Head of the Machine-Calculating Station of TsSU RSFSR urged that processing schemas be prepared and staff trained with a view to full transition in January 1959 (Vladykin 1958). In fact, it took until the end of 1963 before all statistical administrations were processing workers' budgets on punched-card machines (Parfenova 1964), although some offices, such as Latvian TsSU, made the transition earlier (Krasnoshchekov 1962). Even experimental processing of collective farmers' budgets on punched-card machines began only in 1964 (Soveshchanie... 1964). Likely reasons for the extremely slow pace of mechanisation were the shortage of staff with the appropriate training[12] and the inconvenient format of the budget forms and of the initial punching schema (Soveshchanie... 1964).

Moreover, the use of punched-card machines did not completely supersede

TABLE C2.1

CHANGES IN TYPES OF COMPUTATIONAL INSTITUTION IN THE TsSU SYSTEM (1)

Period	Changes at All-Union and Republican levels	Changes at oblast' level
1927 - 1956	MSB → MSS	MSB
1957	MSS	MSB → MSS
1958 - 1967	MSS	MSS
1968	MSS → VTs	MSS
1969 - 1976	VTs	MSS → VTs
1977 -	VTs	VTs

Key: MSB - Mashinoschetnoe byuro (keying machines only)
MSS - Mashinoschetnaya stantsiya (keying machines and punched-card machines)
VTs - Vychislitelnyi tsentr (electronic computers)
→ transition from one type of computational institution to another

Note: (1) The raion/town level of the TsSU system is omitted from the Table, as it is in general irrelevant to the FBS.

TABLE C2.2

NUMBER OF COMPUTER CENTRES IN THE TsSU SYSTEM

Year	Total number of computer centres in the TsSU system	Number of computer centres at All-Union and Republican levels	Number of computer centres at oblast' level	Reference
1966	0			
1968	At least 7			Soveshchanie ... (1969)
1971	30	17	13	Ivanov and Zavyalov (1978)
1975	142	17	125	Ivanov and Zavyalov (1978)
1977	167	17	150	Soveshchanie ... (1979)

the use of keying machines. The Machine-Calculating Station of TsSU RSFSR was still processing 3000 budgets on keying machines in the mid-1960s (Sabinin 1966). In the oblast' offices only one stage of the processing, accounting for about ten per cent of the work, was being carried out on punched-card machines, while the predominant part of the work was still being done on keying machines (Khoroshun 1965).

TsSU chose the FBS for its first major exercise in computer processing. Preliminary steps towards computerisation were taken in Latvia already in the late 1960s (Berzkaln 1968), and the initial computer system was set up throughout TsSU in 1969-70.

The computerisation was a partial one because at this time, although TsSU USSR and all the Republican TsSU's had computer centres, very few statistical administrations at oblast' level had them (Table C2.2). FBS data were processed at oblast' statistical administrations on a newly introduced model of bookkeeping punched-card machine with punched-tape attachment, the "Askota-170", and the punched-tape output was then sent on to the Republican computer centres for computer processing (Soveshchanie... 1969)[13]. Thus computerisation at Republican level and above was accompanied by the final completion of the transition from keying machines to punched-card machines at oblast' level.

By the mid-1970s the great majority of oblast' offices had their own computer centres. However, the basic processing of FBS data was still on the "Askota-170". The only change in procedure was that now the printed tables and punched-tape output from the "Askota-170" were checked by computer before being sent on to the Republican computer centres for the production of quarterly summaries (Dolgushevskii and Khristich 1976 pp.345-6). Even at the end of the decade, by which time all oblast' offices had had their own computer centres for a couple of years, computerisation appeared essentially

restricted to the All-Union and Republican levels[14].

Thus both the transition from keying machines to punched-card machines and that from pre-computer to computer systems have affected only part of the data-processing system, with the less advanced type of equipment continuing to be used for the bulk of basic data-processing.

This pattern of incomplete innovation appears to be typical of Soviet data processing in general. New models of the older types of computational machinery continue to be designed, produced and supplied long after the installation of newer types of machinery has begun. The authors of a recent textbook on data processing for students in university economics faculties find it necessary to describe fifteen different models of keying machines, thirteen models of punched-card machines and twenty-eight models of electronic computer - five first-generation machines, sixteen second-generation machines and seven third-generation machines (Mashinnaya... 1978 pp.8-15)

To put the Soviet development in perspective, let us note the timing of the mechanisation of statistical data-processing in the West. Punched-card (Hollerith) machinery first appeared at the beginning of the century; its first large-scale use was for speeding up the processing of the US population census of 1911. Official statistical offices began to computerise their data processing in the early 1960s.

In some countries, such as Britain, computerisation was a hesitant and difficult process, as it was in the USSR. Teething troubles at first led to the publication of results being delayed rather than speeded up. Computer-isation was, however, carried out in such a way as effectively to broaden the scope of data analysis. Before computerisation, statisticians organised their work to produce, in a single processing, a well-defined set of results, and it was impossible later to retrieve data for individual reporting units. Data files of these units are now constructed and stored on tape, permitting the easy production of further tabulations long after the initial processing

(Armstrong and Lecomber 1968 pp.52, 56; Deville and Malinvaud 1983 pp.335-7).

5 The transition from keying machines to punched-card machines

As we noted in Section 2, the processing of budget data on keying machines was extremely labour-intensive. Khoroshun (1965) even judged that the processing of collective farmers' budgets was "more in need of mechanisation than any other statistical work". However, when punched-card equipment was introduced in the mid-1960s, the processing scheme designed for its use by TsSU USSR "did not essentially change the work process". About ninety per cent of the calculations at oblast' offices continued to be carried out by keying machine (some of them even manually), while only ten per cent were carried out on punched-card equipment. This was "quite a strange mechanisation", comments Sabinin (1966), from which "interviewers and economists have felt in essence no advantage".

The processing procedures before and after the introduction of punched-card machines are shown in Table C2.3. Under the earlier system, the entries in the monthly budget Form No.1 were summed either manually or by keying machine. The Form No.1 totals were summed by keying machine in two ways:

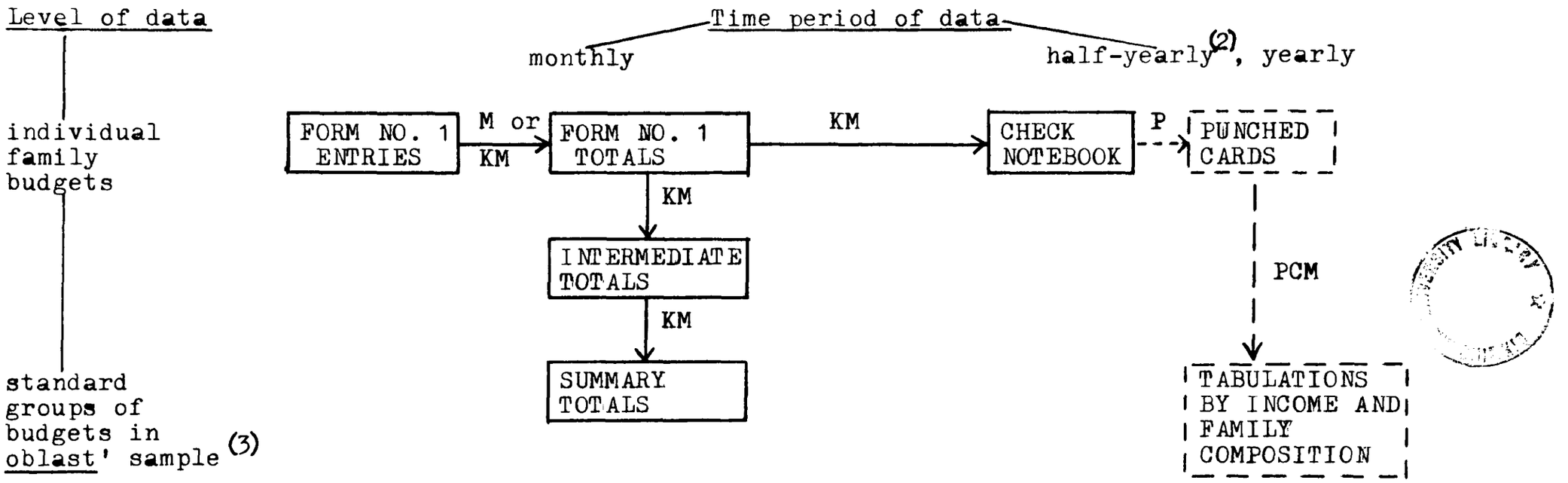
(a) Every month, over the standard groups into which the sample for the oblast' was organised - workers by branch (skilled, less skilled), employees by category, collective farmers by productive orientation of their collective farm. This was "current processing" by decentralised svodka. As the number of figures that could be summed at one go by keying machine was quite limited, it was necessary to calculate and sum intermediate totals.

(b) Every six months, over the first half of the year and over the year as a whole, for individual budgets. The results of these calculations were recorded in the Check Notebook, and were not processed further.

When punched-card equipment was introduced, these procedures remained

TABLE C2.3

COMPUTATIONAL PROCEDURES IN THE PROCESSING OF FBS DATA BY OBLAST' STATISTICAL ADMINISTRATIONS BEFORE AND AFTER THE INTRODUCTION OF PUNCHED-CARD EQUIPMENT (1)



Key:

M	manual processing
KM	processing by keying machine
PCM	processing by punched-card machine
P	punching
unbroken lines	procedures before introduction of punched-card equipment
broken lines	procedures added on to pre-existing system when punched-card equipment was introduced

Notes:

(1) Table based mainly on Sabinin (1966). The account by Khoroshun (1965) is broadly consistent with that of Sabinin but mentions additional clerical operations, eg monthly totals are copied on to a Form G, from which half-yearly and yearly totals are obtained by KM.

(2) ie the first half-year of each year

(3) ie groups built into the organisation of the FBS - workers by branch, collective farmers by productive orientation of collective farm etc

unchanged. The new equipment was used only for further processing of the totals in the Check Notebooks, transferred on to punched cards. In these special twice-yearly calculations, budgets were coded by family income and composition and tabulations by these indicators were obtained. Thus during the greater part of every year punched-card machines were not being used for processing FBS data.

Sabinin (1966) explains the continued use of keying machines by reference to the conviction that only tabulations are worth producing by punched-card machine, and that there would be no saving in operating time and processing costs by transferring the accumulation of monthly svodki from keying to punched-card machines. In arguing against this view he makes four points:

(i) The volume of work on keying machines is increased by up to one-half by the need to calculate intermediate totals, not needed with punched-card machines;

(ii) Checking the output of punched-card machines is less laborious, as well as more effective, than checking that of keying machines;

(iii) The twice-yearly totalling by keying machine puts great pressure on Machine-Calculating Stations at times when they are busy with other work (processing quarterly and yearly report statistics); and

(iv) It is true that the cost of monthly processing of one budget by punched-card machine, using the scheme designed by the Central Machine-Calculating Station of TsSU USSR, is as much as one rouble, compared with only 60-80 kopecks by keying machine. But this is because the design uses poorly adapted forms with superfluous punching. The Machine-Calculating Station of Krasnodar krai has designed a more efficient scheme, reducing the number of punched cards used per budget from over 100 to 70, and the cost per budget from one rouble to 52 kopecks. Here we see how the inefficient implementation of an innovation appears to justify resistance to innovation

as such.

It is significant that what Sabinin advocates is fuller mechanisation of the existing work process. He does not advocate any change in the structure of that process - for example, exploiting the opportunity presented by punched-card equipment for monthly tabulations by family income and composition, or perhaps replacing routine monthly processing by more complex quarterly processing.

A full transition to punched-card machines was carried out in at least two offices: Khoroshun (1965) describes a system developed in the Krasnodar krai statistical administration in 1964-5, while Sabinin (1966) describes a similar system introduced in the Latvian TsSU. Cards are punched directly from Form No.1, leaving two columns on the cards for each budget empty. All punched cards for a six-month period are sorted by budget number, and half-year total incomes and expenditures for each budget calculated on a tabulator. A card-puncher keyed into the tabulator simultaneously punches these totals on to cards. On the basis of the half-yearly (yearly) income, budgets are assigned to income groups: the two empty columns are punched with income-group codes and the cards correspondingly sorted for tabulation[15].

One obstacle to the transition to punched-card machines was that the budget forms were poorly suited to punching schemas. For example, until Form No.1 "Budget of Worker and Employee" was adapted in 1964, it contained many confusing and now superfluous subtotals but too few general totals (Parfenova 1964). Form No.1 "Budget of Collective Farmer" was not adapted until 1965. The ordering of columns also had to be rearranged. Sabinin (1966) complained that, although Form No.1 was now more convenient, the Check Notebook had not been adapted to punched-card processing.

Khoroshun (1965) emphasised the desirability for punched-card processing of as close as possible a correspondence between the budget forms and coding

schemas for workers and employees on the one hand and collective farmers on the other. He argued in detail that the existing differences were arbitrary[16]: Krasnodar krai statistical administration had managed to unify the two schemas (except for codes identifying enterprise, branch etc.). This made uninterrupted operation possible in punching, sorting, tabulation and checking, thereby raising labour productivity. For example, only one commutation schema was now necessary for a tabulation. The Budget Statistics Department of TsSU USSR had worked out in 1963 a Form No.1 for collective farmers corresponding to that for workers, but it had turned out inconvenient for processing. A unified Form No.1 was not to be finally introduced until 1979 (Soveshchanie... 1979).

The processing of some groups of budgets was transferred when punched-card equipment was introduced from oblast' offices to the Machine-Calculating Station of TsSU RSFSR[17] (Parfenova 1964). These were groups the small size of which had made their processing at oblast' level highly uneconomic. Thus, the processing of four groups of employees' budgets, those of primary-school teachers, middle-school teachers, doctors and intermediate medical staff, was centralised from January 1963. There were in the FBS 444 budgets from these groups in 18 oblasti of the RSFSR, about 25 per oblast' on average but fewer in such territories as the Tatar ASSR (17), Tula oblast' (10) and Rostov oblast' (7). For the handful of budgets comprising each such group, each oblast' office had had to compile quarterly summary data on keying machines, an extremely laborious task.

In July 1963 the processing of five more groups was similarly centralised: engineering-technical staff (ITR), employees in industry, construction workers, railway staff and pensioners, 3868 budgets in all, or 4312 budgets including the four groups already centralised. An Order of TsSU USSR called in April 1963 for the centralised processing on punched-card machines of all remaining groups of employees' budgets and of the budgets of State-farm

workers - that is, of all budgets except those of industrial workers and collective farmers - but it is not clear whether this Order was implemented. Parfenova, in fact, advocated that the budgets of industrial workers also be processed more centrally, in 10-12 large Machine-Calculating Stations to be set up in each region of the RSFSR, each of which would receive data from 2-5 oblast' statistical administrations. This idea was not adopted.

Centralised processing had already by 1964 reduced the workload of statistical offices in the RSFSR to an extent enabling them to free thirteen people from budget-processing work (that is, about one person per office), cutting the annual wages fund by more than 8000 roubles. However, much of this economy must have been cancelled out by the increased burden on TsSU RSFSR, especially in view of the fact that much centralised processing remained on keying machines. Of 5000 budgets centrally processed at the Machine-Calculating Station of TsSU RSFSR in 1966, only 2000 were being processed on punched-card machines (the ITR's) while 3000 were still being processed on keying machines (employees and other groups) (Sabinin 1966)[18].

6 The transition from pre-computer to computer systems

The FBS was selected for "the first broad attempt at the computerised processing of statistical information" (Soveshchanie... 1969). Continuous computer processing of data for the whole country, which began with the data for January 1969, was preceded by a trial run on the data for the first half of 1968 for four oblasti of the RSFSR, for Belorussia and for Estonia. This trial run should have been, but was not, completed by the time of a staff meeting at TsSU USSR in February 1969, the report of which is our only source on the problems of transition to computer processing (Soveshchanie... 1969). There it was reported that processing on the "Askota-170" had been carried out at the Machine Calculating Stations of the oblast' statistical administrations involved in the trial run. It had been intended to use the

punched-tape output as input to the new "Minsk-22" computers at the three Republican computer centres in order to try out the computer programme written for the FBS. However, none of the three computer centres had completed the task on schedule.

A wide range of reasons for this failure were alluded to, of which the most important were as follows:

(a) Deficiencies in the supply of "Askota-170" machines to the Machine-Calculating Stations. They were supplied after delay, in insufficient numbers, and without the necessary quantity of spare parts. They were also defective in quality, as was the tape provided for punching their output.

(b) There was inadequate training of operating staff and "weak technical discipline" at the Machine-Calculating Stations. As a result, "the necessary measures were not taken everywhere". In particular, some statistical offices did not prepare data properly for processing or organise the required data checks, leading to numerous discrepancies and errors in the data forwarded by them. The punched tape arriving at the computer centres contained so many errors (as revealed by inconsistent totals etc.) that it had to be returned to the Machine-Calculating Stations for correction, usually more than once and often as many as four times. When the poor-quality tape had been cut into its finally corrected form, it was pasted together in so many places that it was difficult to input it to the computer.

(c) The inexperienced staff at the computer centres had low labour productivity, and there were prolonged computer breakdowns. The computer programme written to process the data was discovered to contain errors and to be inadequate in various ways, some of them fundamental. For example, it lacked any provision for data checks; even failure to input all the data was shown up only when the output was examined.

No claims of success were made in the summing-up speeches at the staff meeting. The problems encountered were explained as "difficulties of growth" arising from insufficient experience. Computerisation would be easier in Latvia and Moldavia, where TsSU staff already had some computing experience. V.N.Starovskii, the Director of TsSU, noted that the experience gained from the trial run would "help us avoid errors in the future".

It is of interest to recall that when proposals for an All-Union territorial network of computer centres for data processing were first being discussed in the early 1960s, the allocation of organisational responsibility for the centres was a matter of fierce dispute (Bartol 1972). Leading cyberneticists argued against TsSU's claim for jurisdiction over the computers: TsSU, they predicted, would prove unable to manage them effectively, as it had "absolutely no experience" with computers, and "repeated discussion of the problem (had) shown that many TsSU officials are incapable even of understanding the problem in all its complexity" (Academicians Glushkov, Dorodnitsyn and Fedorenko in Izvestiya 6.9.1964). Nevertheless, when the official plans for the computer centres were announced in 1966, TsSU was placed in charge of them.

Many of the problems that TsSU encountered in computerising the processing of FBS data, such as delays in the supply of equipment and its poor quality, are endemic in the USSR and would have faced any organisation charged with the job. One gains the impression, however, that much of the poor performance of TsSU can only be attributed to its own especially strong resistance to innovation. Those who warned against entrusting the computer centres to TsSU would have had some justification in feeling that their view had been vindicated by the experience with the FBS.

7 Conclusions

The development of the data-processing equipment used in the FBS provides a fairly typical case-study of the problems of technical innovation in the USSR - extreme institutional conservatism, lack of responsibility, inadequacy of supplies and so on. The tendency to continue producing and installing obsolete types of equipment alongside the successor types has been found characteristic of many branches of Soviet industry, and one of the main factors retarding the diffusion of technical innovation (Amann, Cooper and Davies 1977). This general situation is exacerbated in the field of statistics by the virtual monopoly over data processing enjoyed by an especially hidebound organisation, the Central Statistical Administration.

It is not only that the modernisation of data-processing technology has proceeded and still is proceeding very slowly, with long delays in the implementation of plans. It is not only that the degree of modernisation achieved always turns out on closer examination to be much less impressive than the complex terminology used suggests. The most striking point is that technological modernisation has not to date been exploited to analyse data in new and more penetrating ways, but only to facilitate and speed up very limited traditional methods of data processing. We can put it even more strongly than that: computerisation, at least in its initial stages, has been accompanied by a reversal of the improvements to the data-analysis programme achieved with punched-card machines. That is, the much-needed tabulations by per-capita income and family composition produced in the 1960s were no longer produced in the 1970s and early 1980s. Later stages of computerisation no doubt open up great vistas for data analysis, including the application of the methods of mathematical economics and mathematical statistics, but this remains a matter for the future, in many areas perhaps a matter for the distant future if past tendencies of development continue.

Notes to Chapter C2

1 The main sources on the different types of data-processing equipment are: Kryushin, Surin and Uskov (1976) on the equipment itself; Shurakov (1977) and Braga and Panyushkina (1977) on the processing of statistical report data; Ivanov and Zavyalov (1978) on the development of the technical base of the Automated System of State Statistics; and Mashinnaya obrabotka ekonomicheskoi informatsii (1978).

2 New models of keying machine have appeared in the USSR in recent years with more advanced capacities (multiplication, division and other operations; memories for the storage of intermediate results etc.), some of them containing electronic elements.

3 Computers are called "electronic computational machines" (elektronnye vychislitelnye mashiny, EVM), as distinct from "keying computational machines" (KVM) and "punched-card computational machines" (PVM). There are also certain intermediate types of computational machine, such as electronic machines without programme control, which we do not need to consider.

4 In the West, by comparison, a fifth generation of computers is now being developed for the 1990s.

5 This is explicitly stated in such sources as ASGS (1978 p.39), and is also confirmed by an examination of computer manuals written for the ASGS system. Those which the author has seen are devoted only to the storing, editing and retrieval of data and to the application to them of simple arithmetic and logical operations. The programming language used is an adaptation of Western data-manipulation languages such as COBOL, without any elements of mathematical algorithmic languages such as FORTRAN and ALGOL (Paket prikladnykh programm svodno-gruppirovochnykh rabot, VGPTI, M.1978; Paket prikladnykh programm sistemy upravleniya bazami dannykh, VGPTI, M.1978).

6 The assumption that decentralised svodka is incompatible with the application of mathematical-statistical methods is not strictly valid. Theoretical, though very cumbersome, procedures for incorporating such methods into svodka ("modified svodka") have been proposed; they are considered in Chapter C4.

7 A similar situation prevails in accounting. Special exercises must be carried out when new cross-tabulations are required. There are many complaints in the literature about the great burden which these exercises impose on the work programme of accounting offices (information provided by Derek Bailey, Department of Accounting, University of Birmingham).

8 See Chapter C4.

9 PVK stands for perforatsionnyi vychislitelnyi kompleks ("punched-card computing complex"). The PVK M5000 is similar to the American minicomputer "Honeywell-58".

10 This classification is simplified. Several other institutions are mentioned in the literature. A "machine-calculating installation" (mashinoschetnyi ustanovok, MSU) appears to be similar to an MSB. A "factory of mechanised accounting" or "factory of mechanised calculation" (fabrika mekhanizirovannogo ucheta/scheta) appears to be an early form of MSS. "Information-calculating stations/centres" (informatsionno-vychislitelnye stantsii/tsentry, IVS/IVTs), which we classify as MSS's for the sake of simplicity, in fact have more advanced pre-computer equipment than the MSS's.

11 Before Form No.1 was introduced in 1951, the daily budget records were processed directly.

12 V.Ye.Ovsiyenko, Director of the Moscow Economic-Statistical Institute (MESI), spoke of the acute shortage of trained staff for the mechanisation of data processing in TsSU at the 1957 All-Union conference of statisticians. Although there were then 700 Machine-Calculating Stations, with 107 more due to be set up in the near future, there were only 75 students at the Faculty of Mechanisation at MESI, and this was the only place where specialists in mechanisation were being trained (Vestnik statistiki 1957, 4, 37).

13 Computer centres serving groups of oblasti in the largest Republics were set up in succeeding years, replacing the corresponding Republican computer centres in the middle tier of data-processing (Matyukha 1973 p.137, Ananyeva 1976).

14 This is indicated, for example, by the fact that the staff meeting on the computerisation of the new unified Form No.1 was attended by people from TsSU USSR and Republican TsSU's only (Soveshchanie... 1979). The restriction of computerisation to the higher levels of the TsSU system helps to explain the persistence of decentralised svodka (though this could well continue even with full computerisation).

15 The Krasnodar krai scheme defines 54 codes for the empty columns, representing nine income groups, each divided into six sub-groups by numbers of working family members and dependents. Descriptions of current monthly processing by punched-card machine are not given; there is presumably nothing of special interest involved in this.

16 For example: "In the collective farmer's budget, stocks at the start and end of each month of such purchased products as baked bread, macaroni items, margarine, sweets, biscuits, sausage items, jam, herring, salted fish and dried fish (twelve positions) are not taken into account, all purchases being taken as consumed. In the worker's and employee's budget, these stocks (except for sweets) are taken into account. Are stocks of these products really much greater in the families of workers and employees than in the families of collective farmers? And do their seasonal fluctuations influence the volume of consumption? Data show that these indicators can be omitted from workers' budgets without any loss".

17 We have no information on centralised processing in Republics other than the RSFSR.

18 Sabinin states that "it is not understood why" this situation exists.

CHAPTER C3

DEVELOPMENT OF THE DATA-PROCESSING PROGRAMME: TABULATIONS

1 Introduction

It is convenient to divide the programme for processing budget survey data into two main parts: tabulations of budget indicators for groups of budgets defined by one or more classification variables, and other operations, including more complex analyses involving the use of methods of mathematical statistics. The development of the tabulation programme, and of proposals to change it, is the subject of this chapter; the other operations are considered in the next chapter.

In Section 2 we survey the range of tabulation variables which have been used or envisaged, their role in the data-processing programme as a whole and their substantive significance. The distinction between tabulations which form part of the traditional standard programme of current processing and those which lie outside the standard programme is clarified.

Section 3 is devoted to the description of the standard programme of current processing and of the tabulations included in it. In Sections 4 and 5 we consider the two most important types of possible tabulations outside the standard programme - tabulations by per-capita family income in Section 4 and tabulations by variables associated with family size and composition in Section 5. Our conclusions are summarised in Section 6.

2 Survey of the range of possible tabulation variables

Two distinct terms correspond to "tabulation" in Soviet statistical terminology: svodka and gruppirovka. The two types of tabulation are

distinguished by their different roles within the predominant processing procedure of "decentralised summarisation", in which data are aggregated over successively broader categories of units of observation. These categories are determined by the way data-processing is organised, and include geographical categories corresponding to the statistical offices at oblast', Republican and All-Union levels. In the FBS, to take another example, budgets of workers and employees and budgets of collective farmers constitute distinct systems of categories, inasmuch as the data-processing (as well as the collecting) of workers' and employees' budgets is organised quite separately from that of collective farmers' budgets. Decentralised summarisation automatically produces tabulations in which the original units of observation are grouped in accordance with these categories. Such tabulations are "built into" the organisation of statistical work; they make up the "standard programme" of data-processing, and are referred to as "summarisations" (svodki).

The svodki produced in the processing of FBS data group family budgets by the following variables, in accordance with the organisation of the survey:

(a) "social group" - that is, workers, employees, collective farmers;

(b) within "workers", by branch of industry or by non-industrial branch of the national economy, and also by level of skill - that is, skilled, less skilled;

(c) within "employees", by occupational group;

(d) within "collective farmers", by productive orientation of the collective farm - that is, grain, livestock, technical crops etc;

(e) territorial units - that is, oblast' (krai, ASSR) or economic region of the RSFSR, Republic, USSR.

The breakdowns are shown more precisely in Table C3.1 and are described more fully in Section 3.

TABLE C3.1 - BREAKDOWNS PRODUCED BY THE STANDARD PROGRAMME OF CURRENT PROCESSING OF FBS DATA

Groups processed at oblast', Republic and USSR levels		"Small" groups processed at RSFSR or USSR level only (1)
Workers in industry	Collective farmers	
By level of skill: skilled/less skilled By branch of industry For USSR, Republics, oblasti OR for USSR, economic regions of RSFSR, other Republics OR for particular industrial centres	By productive orientation of collective farm: grain/ livestock/technical crops/ vegetable-potato/ garden-vineyard/citrus etc For USSR, Republics, oblasti OR for USSR, Republics, oblasti of the RSFSR and the Ukraine OR for USSR, economic regions, oblasti (2)	1. Primary school teachers 2. Middle school teachers 3. Doctors 4. Intermediate medical personnel 5. Engineering-technical personnel in industry 6. Employees in industry 7. Construction workers (3) 8. State farm workers (3) 9. Railway transport personnel 10. Old-age pensioners For USSR, Republics

Notes: (1) From 1963 on; see Chapter C2. See also note 5 to this chapter.

(2) An economic region is (i) a group of oblasti etc in the RSFSR or the Ukraine; or (ii) a medium-sized Republic (eg Kazakhstan); or (iii) a group of small Republics (eg the Baltic Republics).

(3) It is not clear whether these groups of workers are broken down by level of skill.

Sources: Parfenova (1964); DePauw (1965 pp 69-75); Yezhov (1965 pp 321-6)

Tabulations which are not built into the organisation of statistical work in this way fall outside the standard data-processing programme. Because decentralised summarisation entails the loss of data relating to the original units of observation in the course of aggregation, and does not produce these non-standard tabulations automatically, they must be produced from the initial non-aggregated data in specific exercises quite separate from the production of the standard tabulations. The non-standard tabulations are referred to as "groupings" (gruppirovki). Examples of gruppirovki of FBS data are tabulations by per-capita income and by type of family.

Svodki have traditionally dominated the output of the Soviet statistical system, largely because gruppirovka has been such an unwieldy and laborious process. Even though computerisation has so far in the main preserved decentralised summarisation as the basic framework of data processing, it has made it possible to produce a greater number of gruppirovki. This is considered an essential component of the aim of raising the analysability (analitichnost') of information. L.M.Volodarskii, Head of TsSU, reports that in the six years prior to 1982 there has been, as a result of computerisation, an increase of about 50 per cent in the ratio of the volume of data-processing (razrabotki) to the volume of statistical reporting (otchetnost'), and new gruppirovki must make up a substantial proportion of this increase (Ryauzov 1982). However, figures on the composition of statistical output given in a textbook on the Automated System of State Statistics (ASGS) demonstrate the very small relative weight of gruppirovki in the mid-1970s (Metodologicheskie... 1977). Thus, the volume of output information from the computer subsystem "Statistics of Agriculture"[1] at All-Union level breaks down as:

summarisations (svodnye raboty)	78%
groupings (gruppirovochnye raboty)	4.2%
arithmetical calculations	17.8%

Although the groupings do not account for a negligible amount of output in absolute terms - over 30 tabulations of collective farms and over 50 tabulations of State farms - summarisations nevertheless dominate groupings in the output by a ratio of almost 19:1 (p.141).

The importance of gruppirovki is heightened in the case of FBS data by the extremely limited relevance of some of the tabulation variables in the standard programme to substantive analysis of budgetary behaviour and by the very great relevance of other tabulation variables outside the standard programme (Table C3.2):

> The FBS and other surveys confirm the supposition that, within economic regions with fairly homogeneous economic and natural conditions, per-capita income and family composition in the main determine the level and structure of consumption of families of workers and employees. Branch does not exert a decisive influence (Zhutovskaya 1966).

According to Karapetyan (1980), branch breakdowns should be abandoned as superfluous except for a limited number of clear territorial-branch complexes (see Chapter B10). Nor, in the opinion of many critics, does the breakdown by "social group" have much value:

> The social breakdown has such hypothetical significance that it is of interest only for some secondary indicators (Karapetyan 1980).

The secondary indicators Karapetyan apparently has in mind here are those relating to sources of income. The structure of consumption is little influenced either by the division between "workers" and "employees", an increasingly arbitrary division as the number of mixed worker-employee families rises, or by the division between "workers and employees" and "collective farmers" as such. The latter division no longer corresponds closely to the much more relevant division into urban and rural residence because of the increasing number of "workers and employees" resident in rural areas (for example, those employed on State farms). The "social group"

TABLE C3.2

TABULATION VARIABLES USED AND NOT USED IN TsSU PROCESSING OF FBS DATA

Variables	Relevance of variables to economic analysis	Used or not used
Geographical	Relevant	Tabulations regularly produced as part of the standard programme of current processing (see Table C3.1)
"Social group" (workers, employees, collective farmers)	Of limited relevance as administrative definitions of "social group" are arbitrary; does not correspond to urban/rural division.	
Industrial branch (for workers)	Rarely of any interest	
Productive orientation of collective farm (for collective farmers)	Some relevance (eg affects private-plot activity)	
Skill level (for workers)	**May serve as extremely approximate proxy for level of family income**	
Per-capita total family income	Essential for economic analysis	Tabulations produced in 1961-8 and 1970 but not since
Family type (eg worker-dependent ratio, family size)	Essential for economic analysis	Tabulations never systematically produced
Urban/rural	Essential for economic analysis	"
Type of population point (1)	Tabulations proposed by Karapetyan and Rimashevskaya (1959) on grounds that these are the main variables influencing living conditions, employment status, income and structure of consumption	
Type of accommodation (2)		"
Sex of family head		
Presence/absence of private plot		

Notes: (1) Republic or oblast' centre / other town / workers' settlement / village

(2) State flat / cooperative flat / private house / hostel etc

breakdown should therefore be supplemented or replaced by an "urban-rural" breakdown (Levin and Yarkin 1976, Levin 1977, Milner and Gilinskaya 1981). Some writers further suggest refinement of the urban-rural division to distinguish among "types of population point" - for example: Republic or oblast' centre, other town, workers' settlement, village (Karapetyan and Rimashevskaya 1959).

Apart from "type of population point", additional tabulation variables commonly advocated fall into three groups: (a) those relating to family income; (b) those relating to family size and composition; and (c) those relating to family living conditions.

(a) Tabulation variables relating to family income

The main variables here are total family income and per-capita family income (Karapetyan 1980). For the analysis of data on incomes it has been suggested that tabulations are also needed by per-capita family wages, and by variables pertaining to sources of means of subsistence, such as the proportion of social grants and privileges in real family income (Kurs... 1982 pp.419-20). Another important variable affecting means of subsistence for workers and employees is the presence or absence of a private plot (Karapetyan and Rimashevskaya 1959, Karapetyan 1980).

Income is regarded as the most important factor influencing consumption (Chernyavskii 1981 p.256), and the single most important tabulation variable representing family income is generally considered to be per-capita total family income (Karapetyan, Rimshevskaya and Sidlyarenko 1967). Tabulations by per-capita income are needed to study the welfare of socio-economic groups enjoying different standards of living and the effects of State policy on their welfare, to analyse and forecast consumer demand (see Chapter D3), to construct current and projected "differentiated balances" of the income and consumption of the population (see Chapter D2), and to derive corrective

coefficients for the extrapolation of FBS data to the population as a whole (see Chapter B9). Soviet economists are particularly interested in the consumption pattern of the group with the highest incomes, which they usually regard as an approximation to "rational norms" and therefore a guide for long-term planning (Milner and Gilinskaya 1981).

The need for tabulations by per-capita income is linked by many Soviet scholars to the contemporary importance of a "differentiated approach" to the study and planning of living standards. Traditional data sources - statistical reporting on the production of and retail trade in consumer goods, wages funds, State allocations to social services, residential investment etc. - describe the standard of living of the population as a whole, as viewed "from above". These sources, as well as the standard programme of processing of FBS data, give only averaged (svodnye) indicators. Emphasis on these indicators was natural enough "in the historical period when the task before the country was to raise the real income of the population as a whole" (Balansy... 1969 p.5), or - to use an alternative interpretation of the past - "before the war, when policy was directed at the growth of heavy industry as a material base" (Karapetyan 1980 p.247). And averaged indicators retain a limited significance in making overall comparisons among territories and over time and in computations of the social product and national income. But in welfare policy "the question of providing enough for each person and family has now taken first place", as minimum-wage and other measures designed to help low-income families show (Balansy... 1969). As a result it is "theoretically incorrect and practically dangerous" to rely on averaged indicators alone, for the situation may improve on average at the same time as the situation of particular socio-economic groups deteriorates (Sistema... 1982 pp.256-7). The elimination of low living standards requires the differentiated study and planning of welfare by socio-economic group, supplementing the view "from above" with a view "from below" (Rimashevskaya

1968b). The differentiated approach will also clarify "the regularities of formation of income, consumption and demand, and the influence of different factors on them" (Balansy... 1969).

(b) Tabulation variables relating to family size and composition

Tabulation variables representing "type of family" include size of family (number of family members), number of working family members and number of children (Karapetyan 1980), and number of dependents (Matyukha 1973 p.135). Karapetyan and Rimashevskaya (1959) suggest that single-person households first be separated out, and families then be grouped into types defined by different combinations of numbers of working members and dependents. They advocate also tabulations by sex of family head, as the presence or absence of a man in the family is an important influence on its standard of living.

(c) Tabulation variables relating to family living conditions

Various economists suggest that FBS data be tabulated by "living conditions" (for example, Levin 1977). More specific variables which have been proposed are "type of accommodation" - State-owned flat, cooperative flat, private house, hostel etc.,(Karapetyan and Rimashevskaya 1959) and per-capita living space (Matyukha 1973 p.135).

As we see from Table C3.2, the only gruppirovki which have been incorporated into the regular data-processing programme are tabulations by per-capita income, and these were produced only in 1961-68 and 1970. It should be noted, however, that additional tabulations, while not forming part of the regular programme of TsSU USSR, are intermittently produced by statistical offices at oblast' and Republican level in order to provide data for special "analytical reports" on various topics (see Chapter C1). For example, the Tambov oblast' statistical administration is reported as

producing tabulations of collective farmers' budgets by number of days worked on the collective farm (Soveshchanie... 1953). Tabulations by per-capita income were produced by some local offices in the 1950s before being incorporated into the All-Union programme (Vsesoyuznye... 1954). Officials of TsSU USSR emphasise the importance of such additional local tabulations, but frequently criticise the inadequate scale and quality of the work; statistical offices tend to restrict their processing to the centrally set programme (Soveshchanie... 1953, Soveshchanie... 1964). Local FBS data are also sometimes tabulated by researchers from institutes outside TsSU; for example, Golub (1976) of the Central Economic-Mathematical Institute (TsEMI) constructed a differentiated balance of the incomes and consumption of the population of Donetsk oblast' (for workers and employees only) on the basis of his own per-capita-income tabulations for 1968.

Critics of the existing tabulation programme are not very clear or consistent on the question of whether those svodki which are of little interest should be abandoned in favour of new types of tabulation or whether they should be retained in addition to the new tabulations. Thus, Karapetyan (1980) writes of abandoning tabulations by branch, but proposes to retain tabulations by "social group" alongside urban-rural tabulations. Elsewhere he minimises the changes in the data-processing programme which should accompany computerisation: in taking new requirements of planning and management into account, there must be no break with past experience (p.239).

> The minimal output of the (computer) subsystem is not in doubt: it is determined by the existing practice of State statistics. The content of FBS output indicators is the result of many years' development... Users have become accustomed to this system of output data, which they use widely; and it is fully understood that they cannot be given less after automation than before it. (pp.245-6)

The inconsistency between this general principle and the recommendations made

by Karapetyan on specific questions suggests that the passage is meant to reassure conservatively minded officials and does not represent his real views. That Karapetyan should feel it necessary to resort to such subterfuge is an indication of the strength of resistance to change in the processing programme and perhaps also to the process of computerisation itself.

3 The standard programme of current processing of FBS data[2]

The summarisation (svodka) of FBS data is carried out by stages according to a general algorithm (Matyukha 1974)[3]. The various indicators (incomes by source, expenditures by type, acquisitions of food products, turnover of livestock and poultry, value and average prices of food products bought and sold etc.) are totalled over different categories of budgets, and then from the totals are calculated averages per 100 families and averages per 100 family members. Some svodki are produced monthly from the budget data for that month,[4] but most are produced quarterly. The quarterly svodki are compiled cumulatively over the course of the year; their data pertain to the first quarter of the year, the first two quarters, the first three quarters,and the whole year. This conformity with the logic of decentralised summarisation can hardly facilitate the analysis of seasonal patterns.

The data-processing is carried out at four levels: at the computer centres of the oblast'-level statistical administrations, at the computer centres which serve groups of oblasti (perhaps corresponding to RSFSR economic regions), at the computer centres of the Republican TsSU's and at the Main Computer Centre of TsSU USSR. At the oblast' level the data from individual family budgets are punched, input, checked and stored on magnetic tape. The quarterly summary totals (svodnye itogi) required for further processing are calculated, and sent on magnetic tape to the next level. At each level totals are summed from the level below, as necessary for producing

the planned tabulations, and the results sent on to the level above on magnetic tape, until All-Union level is reached (Siskov 1981)[5].

Let us briefly survey the tabulations produced (a) for workers in industry; (b) for workers outside industry (in construction, on State farms etc.) and for employees; and (c) for collective farmers.

(a) Tabulations produced for workers in industry

Some basic indicators of the budgets of workers in industry (pertaining to family composition, money incomes and expenditures, acquisition and consumption of food products) are tabulated monthly, with a geographical breakdown to oblast' level and with a breakdown by level of skill (skilled, less skilled, both) but without any breakdown by branch. Oblast', skill level and branch breakdowns cannot all be used simultaneously because this would yield unreliably small subsamples in the final cross-categories (Kats 1960).

The main bulk of tabulations of industrial workers' budgets are produced quarterly, covering the full range of budget indicators. Branch breakdowns are used in all, and a further breakdown by skill level in some, of the tabulations. Therefore, in order to maintain adequate subsample sizes, the geographical breakdowns used do not go as far as oblast' level but stop at the level of economic regions of the RSFSR together with other Republics without subdivision (though some tabulations cover the RSFSR only).

A few tabulations are produced only annually. These either pertain to such special topics as sources of acquisition of food products or have as their purpose the compilation of year-to-year growth series.

(b) Tabulations produced for workers not in industry and for employees

Each of the "small" groups listed in Table C3.1 - workers in different branches of the national economy outside industry, employees in different

occupational groups, and pensioners - are tabulated separately each quarter. As these groups are all represented by fairly small subsamples, all or most of the tabulations cover the USSR as a whole without any geographical breakdown[6]. Employees in industry are not broken down by branch.

(c) Tabulations produced for collective farmers

Tabulations of collective farmers' budgets are produced with a great variety of periodicities, to a large extent reflecting the seasonal cycles of different agricultural activities. Monthly, quarterly and twice-yearly tabulations seem about equally numerous. There are also some tabulations with other periodicities; for example, the number of livestock and poultry on private plots is tabulated five times a year (at the end of December, March, May, June and November).

The only non-geographical breakdown used is that by productive orientation of the collective farm, and even this appears only in a few of the twice-yearly tabulations (pertaining to composition of monetary income and expenditure, sale of agricultural products etc.). For this reason, the need to ensure adequate subsample sizes does not greatly constrain geographical breakdowns, which in most tabulations go down to oblast' level, at least as regards the RSFSR and the Ukraine. Economic region in some cases appears as an intermediate level in geographical breakdowns in addition to oblast' and Republic[7].

We do not attempt to compile complete lists of the budget indicators which have been calculated and tabulated at different times or to deal with any of the problems of definition involved. Table C3.3 gives a general idea of the range of "basic" indicators which are tabulated. The dietetic analysis (no.6 in the Table) is of particular interest, and is discussed further in the next chapter.

It appears that most of the tabulations present data in the form of

TABLE C3.3

BUDGET INDICATORS FOR WHICH QUARTERLY TABULATIONS WERE PRODUCED IN 1968

1 Composition of the family by sex, age and employment status

2 Provision of the family with living accommodation and objects of culture and everyday life*

3 Incomes of the family by sources: wages, labour payment on the collective farm, grants and privileges from social consumption funds, other incomes

4 Expenditures of the family on the satisfaction of material, cultural and everyday needs by types of need: food products, non-food products, services

5 Consumption of food products per family member by types of product

6 Basic nutritional substances** contained in the food products consumed and the calorific value of the daily diet

7 Acquisition by the family of food products by sources of acquisition: State and cooperative trade, the collective farm market, the private plot

8 Acquisition by the family of non-food industrial products in natural form by types

9 Sources of acquisition of non-food industrial products by types

10 Average prices of purchase of products

11 Stock of ready money remaining in the family (at the end of the quarter)

12 Payments into savings banks

13 Private plot: livestock by types, sown areas by crops, fruit and berry plantations by types

* That is, consumer durables

** Protein, carbohydrates, fats etc

Source: "System of basic indicators of State statistics describing the development of the economy and culture of the USSR", Section XV. "Statistics of the budgets of the population", Vsesoyuznoye... (1969 pp 558-9)

Note: This list is certainly not a complete list of all indicators tabulated. It does not include, for example, expenditures on specific products and product groups, or many indicators concerning collective farmers' private plots (productivity and turnover of livestock etc) which we know are tabulated (DePauw 1965). It is a list of what were considered "basic indicators" tabulated in 1968.

average per-family indicators, while separate quarterly tabulations present data for workers and employees of the USSR as a whole in the form of average per-capita indicators (according to the Work Plan for 1956 given by DePauw 1965).

4 Tabulations by per-capita family income

Some "experimental" tabulations of budget data relating to some areas by per-capita income were carried out "by TsSU USSR with the help of a number of (local) statistical administrations" as early as 1953-4 (Soveshchanie... 1953, Vsesoyuznye... 1954)[8]. In the few years leading up to 1961, tabulations by per-capita income were produced from primary FBS data by the Ukrainian Scientific Research Institute of Trade and Public Catering, as a basis of the analysis of consumption patterns made by I.I.Korzhenevskii in the late 1950s (Korzhenevskii 1962, Mochalov 1965), and by the Scientific Research Institute of Labour (Rimashevskaya 1965 p.55). TsSU officials recognised that it was "most urgent" that TsSU itself regularly produce these tabulations (Postnikov 1961), and TsSU began to do so in 1961 (Planovyi... 1981 p.183). Tabulations were then produced by TsSU every year until 1968 (Matyukha 1966, Bredov and Levin 1968, Planovyi... 1981).

However, the only year after 1968 in which per-capita tabulations have been produced was 1970 (Levin 1977, Chernyavskii 1981, Planovyi... 1981). There has been a single known exception to this: a tabulation of workers' and employees' wages by per-capita family income was used in working out a scheme for family allowances in 1974 (Matyukha 1973 pp.134-5). As we pointed out in Chapter C2, the absence of per-capita-income tabulations is an important example of the failure so far of computerisation to achieve its theoretical goal of raising the analysability of FBS data.

The non-production in recent years of per-capita-income tabulations is very difficult to explain, as their production has frequently been included

in accounts of plans for computerisation. For example, the Computer Centre of TsSU RSFSR was compiling, already in the early 1960s, a machine programme for the "Minsk-22" to produce average monthly indicators for the half-year and the year, tabulated by per-capita-income level and by family type (Soveshchanie... 1964). Lipkin and Mints (1970) confirm that "tabulation by per-capita income for all types of goods and services is envisaged in the operational programme for computer processing of budget data". It was reported yet again, at a meeting in May 1979, that a computer programme for producing tabulations by per-capita income and a number of other socio-economic variables was being developed, and was to be tried out experimentally in Lithuania, Latvia and Moldavia (Soveshchanie... 1979).

The contradiction between the apparent commitment of TsSU to producing per-capita-income tabulations and its real inaction is revealed by an examination of documents appended to the proceedings of the conference of statisticians in 1968 (Vsesoyuznoe... 1969). One of these is an account of "a system of statistical data for planning, checking plan fulfilment, and scientific research in the fields of economics, sociology and demography", prepared by a commission of TsSU USSR (p.457). TsSU had been ordered by the Central Committee in August 1967 to work out, together with Gosplan and the Academy of Sciences, such a "scientifically based system" of needed data. The commission appointed by TsSU to prepare this system of data interpreted its remit rather passively: it "examined the existing system... and noted its broadening in the light of contemporary tasks". Nevertheless, the section of the system dealing with "living standards of the population" does refer to the need for differentiated analysis of FBS data by per-capita-income and family-type groups (pp.470-1). In the "plan for conduct of sociological, economic and demographic research for the five-year period 1968-72", however, "the processing of data of workers' and collective farmers' budgets by level of per-capita income" is listed as a project to be carried out in 1968 only,

implying an intention to abandon the work from 1969 onwards (pp.475-8). As we know, the tabulations were not indeed produced in 1969, but they were produced in 1970 - a fact not announced in advance in the research plan for 1968-72. This suggests a degree of confusion and improvisation from year to year; some sort of internal conflict is also conceivable[9].

Several economists have complained about the continuing absence of per-capita-income tabulations in the 1970s and the early 1980s. Thus, Levin (1977) states that "a basic information source" has been lost and that it is essential to recover it. Chernyavskii (1981 pp.132-5) urges that a programme of per-capita-income tabulations for analysing the purchase of consumer durables "be carefully thought out with the participation of interested organisations".

In the summer of 1983 an order to the Department of Budget Statistics of TsSU was issued at a session of the directing Collegium of TsSU USSR, instructing it "to process and more fully analyse data of workers', employees' and collective farmers' family budgets in tabulations by per-capita total income, family composition and other socio-economic indicators" (V kollegii... 1983). This order suggests that the leadership of TsSU are themselves concerned at the long delay in producing the tabulations.

We now describe the per-capita-income tabulations which were produced by TsSU in the 1960s and the proposals made by critics for their improvement, under the heads (a) coverage and breakdown by "social groups"; (b) number of per-capita-income groups used and their boundaries; (c) periodicity of the tabulations; (d) nomenclatures of consumption and expenditure used; and (e) the choice between using "money income" and "total real income" in calculating per-capita income.

(a) Coverage and breakdown by "social groups"

"Workers and employees" were tabulated separately from "collective

farmers". Coverage of the collective farmer sample was complete, but coverage of the sample of workers and employees appears to have been incomplete and inconsistent[10]. Income and consumption indicators were tabulated for workers in industry but not for workers outside industry or for employees (Korovkin 1969); Korovkin comments that these tabulations should cover the whole sample of workers and employees. Expenditure indicators were tabulated for the whole sample of workers and employees taken together; it would be better, in the view of Davidovich and Nazarov (1968), to tabulate "workers" and "employees" separately.

(b) Number of per-capita-income groups used and their boundaries

Tabulations of "workers and employees" used eleven per-capita-income groups, and tabulations of "collective farmers" twelve groups (Bredov and Levin 1968, Levin 1969 p.150, Kosyachenko and Rutgaizer 1970)[11]. According to the textbook Ekonomicheskaya... (1976 pp.260-1), the boundaries dividing the groups in the tabulations of "workers and employees" were 300, 360, 420, 480, 600, 720, 900, 1200, 1500 and 1800 roubles per capita per year. We do not have the corresponding information for the tabulations of "collective farmers"[12].

Several economists urge that a larger number of per-capita-income groups be used, especially at the highest income ranges. They hold that this would help the study of consumption trends and the long-term planning of consumption, as the consumption pattern of the highly paid approaches "rational" consumption norms which the rest of the population will move towards in the future (Leifman 1963, Davidovich and Nazarov 1968, Korovkin 1969, Levin and Frenkel 1973). However, disaggregation into a larger number of groups at the high-income range presupposes a sample in which high-income families are much better represented than they are in the present sample (see Chapter B7).

(c) Periodicity of the tabulations

It is indicated in the "system of basic indicators of State statistics" given in Vsesoyuznoe... (1969 pp.558-9) that tabulations by per-capita income, like other tabulations, are produced every quarter. However, other sources state that tabulations by per-capita income are produced every six months - for data relating to the first half of every year, and for data relating to the whole year (Soveshchanie... 1964, Korovkin 1969). Korovkin considers that it would be expedient, for the purpose of planning trade with regard to seasonality, to produce tabulations by per-capita income for a limited set of indicators from data relating to individual months. Postnikov (1961), on the other hand, argues that the tabulations should be produced only yearly, as incomes data based on shorter periods are misleading: collective farmers receive payment from the collective farm mainly in the first and fourth quarters of the year[13].

(d) Nomenclatures of consumption and expenditure used

"Far from all budget indicators" were tabulated by per-capita income (Rimashevskaya 1968b). The consumption of food products was adequately covered, that of non-food products less fully covered on an extremely aggregated nomenclature, while expenditure on household goods and consumer durables was not tabulated at all (Frenkel and Lakhman 1966 p.99, Korovkin 1969, Levin and Frenkel 1973). According to Levin and Frenkel (1973), detailed data on the acquisition and consumption of all goods (quantity, price and source of acquisition) should be tabulated. Korovkin (1969) complains that tabulations of the prices at which collective farmer families acquire food, cloth, footwear and other goods are lacking.

(e) "Money income" or "total real income"

In the 1960s tabulations of data for workers and employees by per-capita

income were based on calculations of per-capita family money income, while tabulations of data for collective farmers were based on calculations of per-capita family total real income - that is, the sum of the monetary and natural components of per-capita family income. As many workers and employees also receive a part of their income in natural form from their private plots (and from such minor sources as gifts), the tabulations of workers and employees and the tabulations of collective farmers were not fully comparable. This impeded the differentiated study of consumption. In 1970, however, tabulations of workers and employees and tabulations of collective farmers were made comparable: tabulations based on money income, as well as tabulations based on total real income were produced for all social groups (Komarov and Chernyavskii 1973 pp.204-5).

5 Tabulations by variables associated with family size and composition

The sources do not give consistent information on whether tabulations by family type have ever formed part of the TsSU processing programme. Bredov (1966) states that budget data are tabulated twice a year by per-capita income and family type, while the "system of statistical data" prepared by the TsSU commission (mentioned in the last section) includes tabulations by family type ("by numbers of working members, dependents, children etc.") (Vsesoyuznoe... 1969 pp.470-1). On the other hand, Aganbegyan et al (1961 p.143), Davidovich and Nazarov (1968) and Korovkin (1969) all complain that tabulations by size or age-structure of family are not produced, and argue that it would be expedient to produce them. The TsSU Research Plan for 1968-72 makes no mention of tabulations by family type (Vsesoyuznoe... 1969 pp.475-8). As it does mention tabulations by per-capita income, one might expect that tabulations by family type would likewise have been mentioned in it if they had been planned. The meagre evidence does not on balance support the claims that tabulations by family type have been produced on any significant scale.

There have been a number of statements of intention to produce tabulations by family type - as in the case of tabulations by per-capita income, for the first half of every year and for the whole year (Soveshchanie... 1964, Matyukha 1973). It remains to be seen if and when these plans will be implemented.

As several writers point out, income and family composition influence the pattern of consumption jointly in an interactive way, so that conclusions drawn from tabulations by indicators of income alone or from tabulations by family type alone will be equally misleading. There is, for example, a tendency for families with high per-capita income to have fewer children than families with low per-capita income; a budgetary feature attributed to high income may in fact be largely due to a small proportion of children in the family. Complex cross-tabulations by various income and family-composition indicators taken jointly are therefore needed (Postnikov 1961, Matyukha 1973 p.135)[14]. Yezhov (1965 pp.323-6) sets out a series of schemas for such cross-tabulations, but does not make clear whether they specify tabulations actually produced by TsSU or merely illustrate what might be done. In view of the conservatism of TsSU and the difficulties that would have been entailed by production of the tabulations, it is likely that the schemas are illustrative in nature.

Tabulations by family-composition variables, and cross-tabulations by income and family-composition variables, have however been produced in some institutes outside TsSU. We shall refer briefly to some examples of such work.

In the early 1960s the Department of Living Standards of the Scientific Research Institute of Labour and the Summary-Economic Department of the State Committee on Labour and Wages modelled demand and consumption on the basis of FBS data for workers and employees. The primary data of 5000 budgets were obtained from TsSU, and processed at Machine-Calculating Stations under the

supervision of associates of the Scientific Research Institute of Labour. The computational programme was compiled at the Institute of Economics of the Armenian Academy of Sciencies, probably under the direction of A.Kh.Karapetyan, who organised the Laboratory of Economic-Statistical Research there from 1960.

The budgets were divided into groups by per-capita income and, within these groups, into subgroups by family composition. In order to ensure subsamples of adequate size, families were divided into no more than four categories: families without children, families in which children constituted up to one-third of family members, families in which children constituted between one-third and one-half of family members, and families in which children constituted more than one-half of family members. Expenditure and consumption data were cross-tabulated by per-capita income and family type, and the cross-tabulations were used to estimate coefficients of elasticity of consumption and to analyse the factors influencing consumption (Aganbegyan et al 1961, pp.141-4, Aganbegyan and Rimashevskaya 1961, Rimashevskaya 1965 p.55).

A similar analysis of the consumption of basic food products was carried out by the Scientific Research Institute of Labour in the 1970s, using the data of about 2000 budgets of workers and employees from five different areas (Nemchinova 1977)[15].

Finally, we mention the work of the Institute of Food of the USSR Academy of Medical Sciences on analysis of the patterns of food consumption of families of different size and age-sex composition, on the basis of FBS data. The methodology of this work is described by Raitsin (1967 pp.43-57).

6 Conclusions

Tabulations of FBS data are divided into two categories - the svodki that are generated within the standard programme of current data-processing, and

the gruppirovki which must be produced in separate exercises outside the process of decentralised summarisation. Svodki have traditionally predominated over gruppirovki, and computerisation has so far been carried out in such a way as to maintain both the distinction between the two types of tabulation and the domination of svodka. The value of the output of data processing is limited by the circumstance that svodka-tabulation variables ("social group", branch etc.) are in general of much less substantive importance than the neglected gruppirovka-tabulation variables (income, family composition etc.). The only gruppirovki which TsSU have ever regularly produced are the tabulations by per-capita income in 1961-8 and 1970. "The possibilities for using FBS data are severely constrained by the insufficient attention paid to gruppirovki" (Planovyi... 1981).

There are three basic ways by which this situation might be improved. In the immediate future, external pressure may induce TsSU to undertake the work needed to produce additional gruppirovki within the existing organisation of data processing. Secondly, a reconstruction of the survey on the territorial principle would have the advantage of making the svodka-tabulation variables more relevant: the branch breakdowns would be lost, and "social group" could easily be replaced as a tabulation variable by the more important urban-rural division. A definitive solution,however, depends on the replacement of decentralised summarisation as the basic mode of data processing by the use of data-banks containing budget indicators for individual families. This change is envisaged at a later stage of computerisation (Ananyeva 1976). The distinction between svodka and gruppirovka would then disappear. As in contemporary Western statistical computer systems, tabulations of any specification could be obtained from the data-bank at any time, at moderate cost and without the need for detailed advance planning.

Notes to Chapter C3

1 The textbook gives data only for the "Statistics of Agriculture" subsystem. As it takes this subsystem as an example for the purpose of explaining the structure of ASGS as a whole, the subsystem is probably a fairly typical one in its basic characteristics.

2 The information in the available literature is fragmentary, very partial and often unclear. The TsSU Work Plan for 1956 given by DePauw (1965 pp.69-75) appears to be a complete list of the tabulations produced at that time. Our account is based mainly on this source and on the less complete descriptions of the processing programme given by Kats (1960 pp.178-9) and Yezhov (1965 pp.321-6). Even briefer descriptions are given by Matyukha (1962, 1966, 1973 p.137, 1974), by Ananyeva, Ivanova and Khlopina (1980) and by Siskov (1981). Our account omits detail of little methodological interest.

3 According to Matyukha (1974), the general algorithm carries out "logical coordination (uvyazka)" as well as svodka of the data. He does not explain this term, which presumably refers to checks of internal consistency.

4 The 1956 Work Plan in DePauw (1965) and Yezhov (1965) give details of the monthly svodki, but more recent sources - Matyukha (1973, 1974), Ananyeva, Ivanova and Khlopina (1980) and Siskov (1981) - mention only quarterly svodki. It may therefore be the case that monthly svodki were abandoned at some time in the late 1960s or the early 1970s, conceivably in connection with computerisation. This is, however, highly conjectural, as none of the sources explicitly mentions such a change from past practice. As the more recent sources give quite brief accounts, they may well fail to discuss monthly svodki simply on account of their relative unimportance. We make the provisional, possibly incorrect, assumption that the change has not in fact occurred.

5 Matyukha (1973 p.137) and Ananyeva (1976) seem to imply that summary data on magnetic tapes are submitted directly from the computer centres serving the RSFSR regions to the Main Computer Centre of TsSU USSR, by-passing the computer centre of TsSU RSFSR. Siskov (1981), on the other hand, seems to imply that all the higher-level computer centres - that is, including the computer centre of TsSU RSFSR - play a part in the processing. The exact itinerary along which summary totals pass is not clearly specified in any of these sources.

6 The 1956 Work Plan mentions some tabulations of employees with Republican and oblast' breakdown, but Kats (1960 pp.178-9) states that employees' budgets are tabulated only for the USSR as a whole, and Yezhov (1965) confirms this for non-industrial workers as well as employees. We recall from Chapter C2 that there has been a tendency to process these "small" groups of budgets centrally at TsSU RSFSR without prior processing at lower levels. The sources on this topic do not explain how these groups are processed, if they are processed at all, in other Republics or at All-Union level. If groups of employees are tabulated only for the USSR as a whole, it might be conjectured that the processing at TsSU RSFSR produces such "All-Union" tabulations; otherwise one would expect processing to be centralised at TsSU USSR. This would imply that the survey covers employees (and perhaps the other small groups) only in the RSFSR.

According to the 1956 Work Plan, the tabulation of livestock and poultry on private plots, carried out twice a year, covers all workers and employees in the USSR - the only tabulation to combine the two social groups. This is presumably necessary because only a small proportion of the workers and employees in the survey possess livestock or poultry.

7 A few tabulations of collective farmers' budgets, such as those of "amounts and value of agricultural products sold, purchased and consumed", have no geographical breakdown. It is not clear why.

A few sources refer to a lack of regional breakdowns of FBS data. Thus, one textbook complains of an absence of regional breakdowns for unspecified "basic social groups and occupations" (Ekonomicheskaya... 1980 p.322), while Karapetyan (1980) argues that the introduction of a regional level between the levels of oblast' and of large Republic would help meet the needs of territorial planning. These comments are difficult to interpret in view of the fact that most sources on the processing programme refer to numerous regional breakdowns.

8 In Soveshchanie... (1953) there is also reference to an intention to tabulate workers' budgets by total family income and collective farmers' budgets by total family consumption in one or two oblast' statistical offices.

9 The inclusion of "processing by groups of families with different levels of per-capita income per year" in the "system of basic indicators" for 1968 (Vsesoyuznoe... 1969 pp.558-9) suggests that some importance was attributed to the tabulations, making their abandonment in 1969 all the more remarkable.

10 Some sources refer to the per-capita-income tabulations covering all workers, employees and collective farmers (Vsesoyuznoe... 1969 p.558, Komarov and Chernyavskii 1973), while others mention tabulations covering workers in industry and collective farmers only (Frenkel and Lakhman 1966 p.99). The fuller explanation given by Davidovich and Nazarov (1968) and by Korovkin (1969) resolves this apparent inconsistency.

11 Korovkin (1969 p.118), however, writes of nine groups for workers and employees and of ten groups for collective farmers. The discrepancy between Korovkin and the other sources is probably explained by reference to Davidovich and Nazarov (1968), who mention that nine and ten groups respectively are used in tabulations produced by research institutes studying the structure of demand - in particular, by the Scientific Research Institute of Trade and Public Catering (NIITOP) and by the All-Union Scientific Research Institute for study of the Conjuncture of Demand (VNIIKS). We assume that Korovkin is also referring to the work of these institutes and not to that of TsSU.

12 There is great inconsistency among different sources on the question of the group boundaries used in per-capita-income tabulations of workers and employees. Only Ekonomicheskaya... (1976) gives a breakdown into eleven groups. Matyukha (1973 p.146) gives a breakdown into twelve groups (boundaries at 600, 720, 840, ... 1800 rubles per capita per year). Ekonomicheskaya... (1983 p.382) gives a breakdown into eight groups (boundaries at 600, 900, 1200, 1500, 1800, 2100 and 2400 rubles per capita per year). Different breakdowns into six groups are given by Shvyrkov (1965) - boundaries at 300, 420, 600, 840 and 1200 rubles; by Ekonomicheskaya... (1970 p.283) - boundaries at 500, 600, 900, 1200 and 1500 rubles; and by Korzhenevskii (1971) - boundaries at 600, 900, 1200, 1500 and 2100 rubles. While Shvyrkov and Korzhenevskii appear to be referring to work done at non-TsSU institutes (though this is not made very clear), Matyukha (1973) and Ekonomicheskaya... (1970) appear to be referring to tabulations by TsSU. However, Davidovich and Nazarov (1968) argue that families with per-capita income over 1200 rubles per year should not all be placed in the same group, implying that this is what TsSU does - which would be compatible only with the breakdown given by Shvyrkov (1965).

The information available on the per-capita-income group boundaries is too incomplete and contradictory to permit resolution of these inconsistencies.

13 The obvious solution to this difficulty would be to classify families into per-capita-income groups on the basis of yearly income and then to tabulate data relating to shorter periods using those groups.

14 Postnikov (1961) makes in this connection the interesting suggestion that tabulations by per-capita income might be replaced by tabulations by per-yedok income, the yedok being the "adult-consumer equivalent" unit used in budget research in the 1920s. Thus children of different ages are counted as different fractions of a yedok in calculating the size of a family as a consumption unit. "It does not eliminate all deficiencies, but it gives better results than per-capita income." He reports that the Scientific Research Institute of Labour are carrying out calculations using the yedok on the basis of Soviet budget data from 1926-8.

15 The areas were: Moscow; Minsk and Minsk oblast'; Voroshilovgrad oblast'; Vladivostok and other towns of Primorskii krai; and Irkutsk.

CHAPTER C4

DEVELOPMENT OF THE DATA-PROCESSING PROGRAMME: OTHER ASPECTS

1 Introduction

This chapter deals with aspects of the TsSU data-processing programme not covered in Chapter C3, with the main emphasis on the application of methods of mathematical statistics[1]. As these aspects of the programme have been developed in the context of computerisation, our source of information on them is the accounts of the structure and contents of the existing or prospective ASGS computer subsystem "Budget Statistics".

After examining the relationships between the subsystem "Budget Statistics" and other computer subsystems and systems (Section 2), we consider the overall internal structure and content of the subsystem (Section 3).

It is convenient to divide data-processing tasks into two broad groups: those which do not involve the application of methods of mathematical statistics and those which do involve their application. The tabulations surveyed in the last chapter are the most important examples of tasks not involving use of mathematical-statistical methods; we briefly comment on another such task in Section 4. In Section 5 we survey those tasks involving use of mathematical-statistical methods the inclusion of which in the "Budget Statistics" subsystem is envisaged.

The use of mathematical-statistical methods has been impeded by obstacles, both of an intellectual or ideological nature and arising from difficulties of computational technique. The intellectual problems are discussed in Section 6. The technical problems presented by the application of mathematical-statistical methods within a data-processing system based on

decentralised summarisation are explained in Section 7, and a scheme which has been proposed for overcoming these problems ("modified decentralised summarisation") is assessed.

By way of conclusion, we review the scope of the TsSU data-processing programme taken as a whole and the prospects of its future development (Section 8).

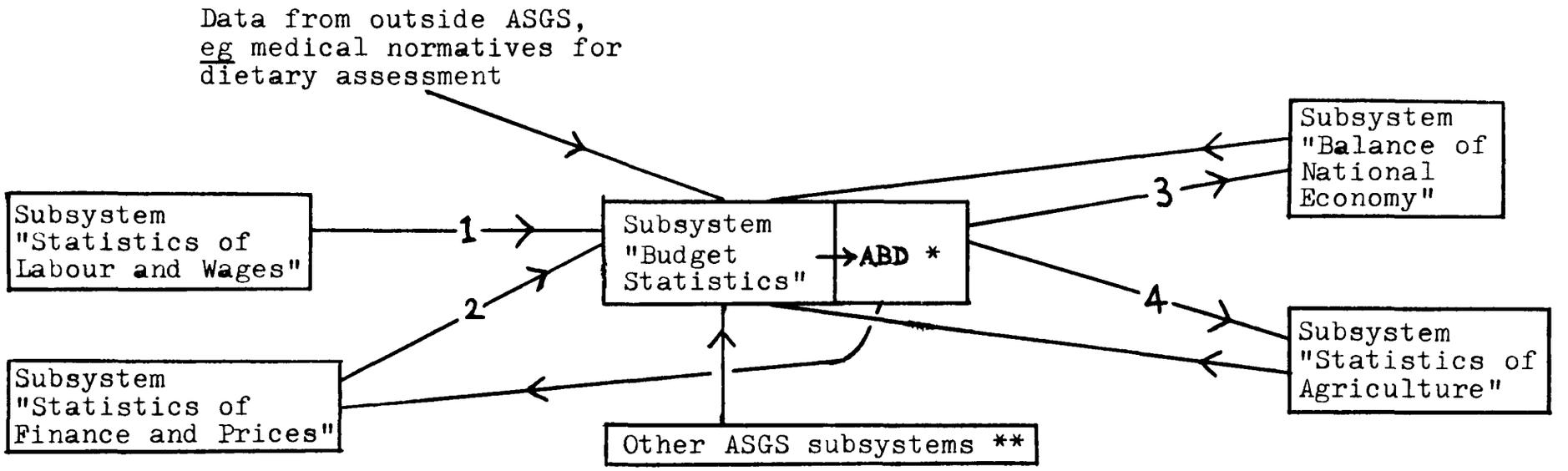
2 Relationships between the ASGS subsystem "Budget Statistics" and other ASGS subsystems and non-ASGS computer systems

The ASGS subsystem "Budget Statistics" is linked to the majority of the other ASGS subsystems, probably to eight of the thirteen other subsystems, from which it receives input data or to which it provides output data or both, as illustrated in Table C4.1[2]. There are also links between the subsystem and a number of computer systems serving bodies other than TsSU which use information from the FBS: the Automated System of Planning Calculations (ASPR) of Gosplan, the Automated System of Financial Calculations (ASFR) of the Ministry of Finance, and the computer systems of the Ministry of Agriculture, the Ministry of Trade and Gosbank (ASGS 1979 p.289).

The exchange of information between the "Budget Statistics" subsystem and the other subsystems and systems is to be carried out through Automated Data Banks (ABD's) at oblast', Republic and All-Union levels of ASGS. In these data banks, equipped with data-search facilities for the retrieval of specified information, are to be stored time-series data, data provided from other subsystems for later use in the "Budget Statistics" subsystem, and data output from the "Budget Statistics" subsystem which may later be needed by other subsystems and systems or needed to answer ad hoc enquiries from other organisations. The ABD's at oblast' and Republic levels are to contain additional indicators needed by local bodies. The ABD's at oblast' level, but not those at higher levels, are to store FBS indicators relating to

TABLE C4.1

SELECTED INFORMATION LINKS BETWEEN THE ASGS SUBSYSTEM "BUDGET STATISTICS" AND OTHER ASGS SUBSYSTEMS



Examples of content of data flows:

1 data for derivation of corrective coefficients

2 norms for valuation of free and subsidised social services, for use in calculating total real incomes

3 data on real incomes, for use in compiling the balance of money incomes and expenditures of the population

4 data on the private-plot economy and its output

* Automated Data Bank for the storage of information needed by other ASGS subsystems and by other computer systems (eg ASPR)

** "Statistics of Population, Health and Social Security", "Statistics of Residential Services", "Statistics of Industry", "Statistics of Trade"

Source: Adapted from Diagram 2 in Ananyeva and Barsukova (1981 p 33), with the use of additional information from Matyukha (1974) and ASGS (1979 pp 145-8)

individual families (Matyukha 1974; Ananyeva, Ivanova and Khlopina 1980).

The relations between the ASGS subsystem "Budget Statistics" and the corresponding subsystem "Standard of Living" of the Gosplan computer system ASPR are considered especially important. It is intended that the subsystem "Budget Statistics" provide the information needed for the functioning of a complex of economic-mathematical models to be incorporated into the ASPR subsystem. These models deal with trends in incomes, personal and social consumption and residential construction (Ananyeva, Ivanova and Khlopina 1980). M.A.Oganezov of TsEMI proposes that a report Differentiated Balance of Incomes and Consumption of the Population (see Chapter D3) be compiled by the ASGS subsystem[3], as the basis for a plan Differentiated Balance to be compiled by the ASPR subsystem (Planovyi... 1981 pp.167-77). However, none of this work seems to be very far advanced: Ananyeva and Barsukova (1981) refer only to the progress of methodological work by NII TsSU USSR[4] to determine the interaction of the "Budget Statistics" subsystem with other ASGS subsystems and "the possibility of its interaction with ASPR".

3 Structure and content of the "Budget Statistics" subsystem

The structure and content of the "Budget Statistics" subsystem is described by different sources in four different ways:

(a) Matyukha (1974) divides the "complex of tasks to be solved by the subsystem" into four blocks;

(b) Karapetyan (1980 pp.239-267) identifies six sequential stages of data processing;

(c) According to the textbook ASGS (1979 pp.288-9), the subsystem consists of ten task-complexes; and

(d) Ananyeva, Ivanova and Khlopina (1980) state that the subsystem contains four "complexes of electronic information-processing" (kompleksy elektronnoi obrabotki informatsii, or KEOI's), with more such complexes

planned for the future. The report of a staff meeting at TsSU USSR in May 1979 also discusses computerisation in terms of KEOI's, with six of them contemplated.

Before considering what conclusions can be drawn about the subsystem from these apparently conflicting accounts, let us take them one by one.

(a) The first block of the subsystem, according to Matyukha (1974), is to carry out "primary information processing" - that is, the logical coordination and summarisation (svodka) of budget indicators. This corresponds to what was called in the last chapter the "standard programme of current processing".

The second block is to calculate "synthetic indicators of the standard of living". This includes calculations of total real family incomes (money income plus money value of income in natural form plus value of free social services) as well as physiological assessment of the daily diet of families (calorific value; protein, fat and carbohydrate content) by social group and family type. The construction of per-capita-income distributions by social group, and the assessment of sample representativeness, also form part of this block.

The third block is to model the "processes of formation of family income and consumption". This involves the regression of consumption of different goods on per-capita income and family composition, as a basis for working out "plan budgets" for medium-term (five years) consumption planning. "Rational budgets" based on "scientific consumption norms" are to be worked out as a guide to long-term consumption planning.

The fourth block is to carry out "special processing" of data needed by other subsystems and computer systems.

(b) The six stages of processing proposed by Karapetyan (1980) are:

1. Primary processing to obtain monthly svodki and yearly indicators for individual budgets;

2. Calculation of total real family income;

3. The production of yearly svodki; tabulations by per-capita income and other variables; the construction of distributions of basic indicators and the calculation of their statistical characteristics;

4. The construction of per-capita-income distributions and the production of tabulations of family income formation (for example, size of first family wage by size of second family wage), using microcensus data;

5. Modelling the structure and trend of family incomes and consumption; and

6. The use of these models in balance calculations - in particular, for compiling report and plan differentiated balances of the income and consumption of the population (see Chapter D2).

Karapetyan (1980 p.263) suggests further analyses: physiological assessment of diet, calculation of sex-age norms of food consumption, analysis of the income elasticity of consumption, and analysis of the representativeness of sample data.

(c) The ten tasks (or complexes of tasks) listed in ASGS (1979) are shown in Table C4.2. The specification of the ten tasks may presuppose that primary data-processing has already been carried out. We may note the quite close correspondence between the ten tasks listed in ASGS and the twelve 'areas of study in the "information fund" of the subsystem' listed by Ananyeva, Ivanova and Khlopina (1980)[5].

Ananyeva and Barsukova (1981) give us some idea of the complicated relations among these tasks. A simplified version of their diagram of the links between the task "Statistical Study of Incomes" and six of the other

TABLE C4.2

ASGS TASKS ASSOCIATED WITH THE SUBSYSTEM "BUDGET STATISTICS"

Task no.(1)	Task
1410	1. Statistical study of family composition (size of family, composition by sex, age, social position and employment of family members)
1420	2. Statistical study of family incomes (level, rate of growth and structure by source for different social groups and types of family; income fund, total and per-capita of population, by source)
1430	3. Statistical study of level and structure of family expenditures
	4. Analysis of family purchases and consumption by source
1440	5. Statistical study of everyday and living conditions (living space, facilities, communal services, time spent on preparing food, dependence of living conditions on family structure etc)
	6. Statistical study of farming on private plots (livestock and poultry and their productivity, sown areas and crop yields, material outlays for private-plot farming and their sources)
	7. Statistical study of dependence of structure and trend of consumption expenditures on per-capita income, family composition and level and trend of average prices
1460	8. Economic-mathematical analysis (using methods of mathematical statistics) of change in the standard of living under the influence of different socio-economic factors
1470	9. Statistical study of the unsatisfied demand of the population for different goods; forecasts of changes in demand, taking into account possible changes in income levels, family composition and average prices
1480	10. Extrapolation of budget data to the population as a whole for different social groups, using distributions of families by per-capita income

(1) Task numbers 1410-1480 are the official codes, where known, as shown in Table C4.3. Numbers 1-10 are used in the list of ten "task complexes" of the subsystem "Budget Statistics" given in the textbook ASGS (1979 pp 288-9). The official codes for tasks 4, 6 and 7 are presumably in the ranges 1430-1440 (task 4) and 1440-1460 (tasks 6 and 7).

tasks is shown as Table C4.3. A considerable number of unidentified minor intermediate tasks prepare data from one task for use in the solution of another task.

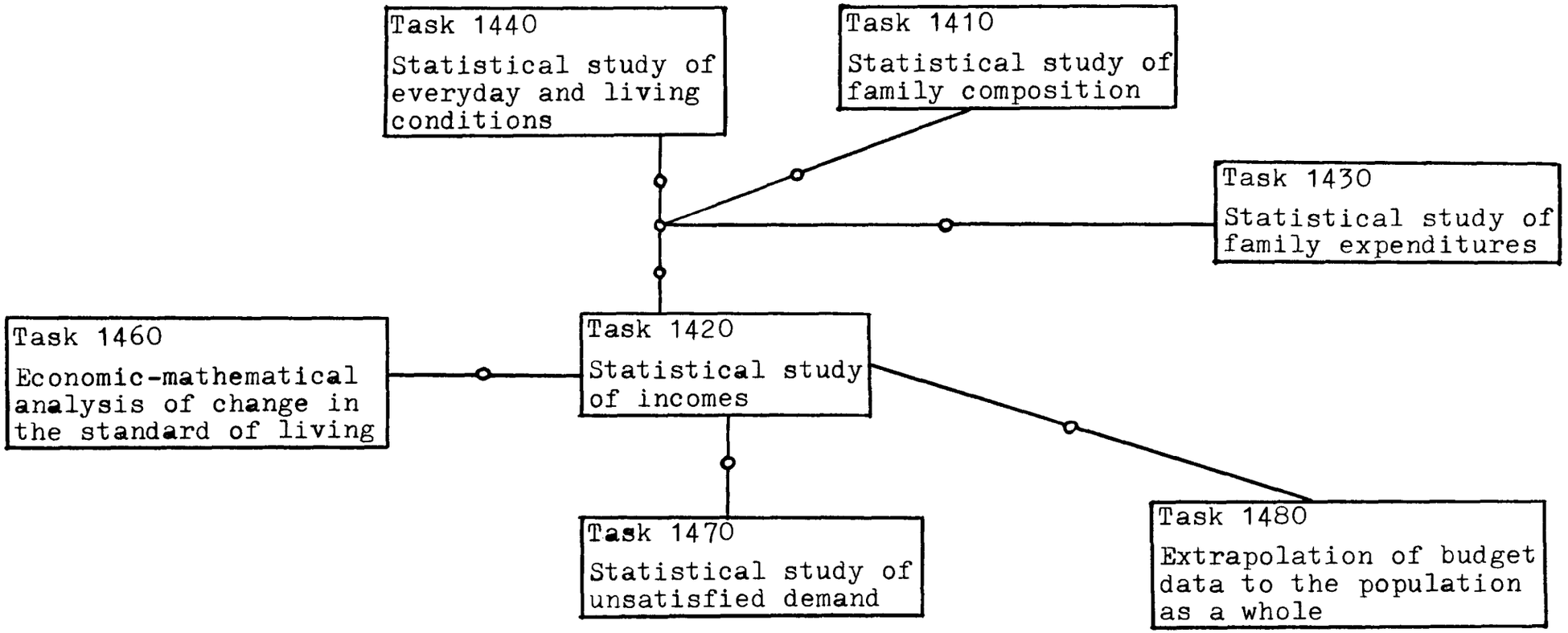
(d) Ananyeva, Ivanova and Khlopina (1980) list four KEOI's. The first deals with current data-processing (svodka), and the second produces tabulations by per-capita income and "a number of other socio-economic variables". The remaining two KEOI's process not FBS data but the data of other surveys conducted by the TsSU Budget Statistics Department - the microcensus and the time-budget survey respectively. The authors state that four additional KEOI's are to be worked out: (i) for the construction of income distributions and to extrapolate FBS data to the population as a whole; (ii) for the regression analysis of consumption and demand forecasting; (iii) for the calculation of optimal sample sizes; and (iv) to answer enquiries from various organisations.

At the staff meeting at TsSU USSR in May 1979 work was reported on the "industrial introduction" of the first KEOI, for current processing. It was stated that six KEOI's in all were envisaged - the four basic KEOI's mentioned above and two additional ones: (i) for the calculation of total real family income; and (ii) for carrying out tasks which are not part of the compulsory programme laid down by TsSU USSR (nyereglamentnye zadachi) by means of the Automated Data Banks. The latter function presumably includes the answering of ad-hoc queries from other bodies (Soveshchanie... 1979).

It will be clear from our survey of the four different accounts of the structure and content of the "Budget Statistics" subsystem that they cannot be convincingly reconciled with one another. It is scarcely conceivable that the subsystem could be organised simultaneously into "blocks", "stages", "tasks" and "KEOI's". We can, however, with some confidence regard two of the four accounts as irrelevant to the actual organisation of the subsystem.

TABLE C4.3

INFORMATION LINKS FOR THE SOLUTION OF ASGS TASK 1420, "STATISTICAL STUDY OF INCOMES"



• a task, or a set of tasks, within the ASGS subsystem "Budget Statistics"

Source: Diagram 1 in Ananyeva and Barsukova (1981 p 32), simplified

The account by Karapetyan (1980) presents his own proposals for a subsystem to be named "Standard of Living", proposals not necessarily followed by the designers of the actual "Budget Statistics" subsystem. The block structure described by Matyukha (1974) is not referred to in more recent sources, and probably dates from an early stage in the planning of the subsystem, now superseded. There remain the accounts in terms of "tasks" and in terms of "KEOI's", both drawn from apparently authoritative recent sources. We conjecture that the account in terms of KEOI's is the most reliable description of the way that the subsystem is being built up in practice, while the account in terms of tasks represents longer-term plans (or aspirations) to create a more sophisticated and integrated data-processing programme.

In Table C4.4 we show which analyses are mentioned in which of the main sources on plans for the subsystem. (Current processing is omitted because all sources state or imply that this will continue.) We see that two analyses - tabulations by per-capita income and other variables (A1) and the extrapolation of FBS data to the population as a whole (B3) - are mentioned by a majority of the sources, while all the sources refer to plans for the regression analysis of consumption expenditures (B7). On the whole, however, the discrepancies among the sources are striking. This can no doubt to some extent be attributed to the incompleteness of many of the sources or even to the unreliability of some of them. But it also seems likely that there has not in fact been any long-term programme, deliberately worked out and then implemented stage by stage. Behind the inconsistent sources there may lie hidden a story of improvisation, confusion, frequent revision of plans and conflict over priorities.

4 Analyses not involving the use of mathematical-statistical methods

The most important of the TsSU analyses of FBS data which do not involve the use of mathematical-statistical methods, the tabulations, have been

TABLE C4.4

NEW ANALYSES (OUTSIDE THE STANDARD PROGRAMME OF CURRENT PROCESSING OF FBS DATA) PLANNED OR CONTEMPLATED FOR INCLUSION IN THE ASGS SUBSYSTEM "BUDGET STATISTICS" ACCORDING TO VARIOUS SOURCES

Analyses mentioned [1]	Sources	(1) K 1980	(2) M 1973	(3) B 1964	(4) M 1974	(5) A 1976	(6) SKI 1978	(7) ASGS 1979	(8) AIKh 1980	(9) S 1981
A. Analyses not (or not necessarily) involving the application of mathematical-statistical methods										
1. Tabulations of expenditures by per-capita income, family composition etc [2]			x	x	x			x	x	( ) [3]
2. Provision for ad-hoc enquiries from various organisations									x	( ) [3]
3. Dietetic analysis of food consumption			x		x				x	( ) [3]
B. Analyses involving the application of mathematical-statistical methods										
1. Calculation of sampling errors									x	x
2. Determination of optimal sample size									x	
3. Construction of distributions by per-capita income and their use for extrapolation to the population				x	? [4]	x	x	x	x	x
4. Construction of empirical distributions of indicators						x [5]				
5. Calculation of important statistical characteristics of the sampling distributions of basic indicators						x	x			x

/cont'd

Table C4.4 (cont'd)

Analyses mentioned	Sources	(1) K 1980	(2) M 1973	(3) B 1964	(4) M 1974	(5) A 1976	(6) SKI 1978	(7) ASGS 1979	(8) AIKh 1980	(9) S 1981
B. Analyses involving the application of mathematical-statistical methods										
6. Modelling of the formation of family incomes		x			x	x	x			
7. Regression analysis of consumption expenditures (and of saving)		x	x	x	x	x	x	x	x	x
8. Forecasting of consumer demand on the basis of FBS data (with or without the use of data from other sources)			x		x			x	x	
9. Construction of time series		x				x				x
10. Analysis and forecasting of time series[6]						x				x

Table C4.4 - Sources

(1) Karapetyan (1980 pp 239-267)
(2) Matyukha (1973 pp 126-169)
(3) Report by Bredov in Soveshchanie ... (1964)
(4) Matyukha (1974)
(5) Ananyeva (1976)
(6) Siskov, Klimenko and Ivanov (1978 pp 17-23)
(7) ASGS (1979 pp 288-9); see Table C4.3
(8) Ananyeva, Ivanova and Khlopina (1980)
(9) Siskov (1981)

Notes on sources

Source (1) partially describes the preliminary design for the subsystem proposed by Karapetyan and his colleagues, probably in the early 1960s. The source is a posthumous collection of the writings of Karapetyan, and does not make clear when different sections were written.

Source (2) is a textbook account of "methods of processing and analysis of statistical data on the standard of living" recommended by the author, who was at that time head of the Budget Statistics Department of TsSU USSR.

The other sources, ordered by date of publication, are accounts by staff members of TsSU or of NII TsSU of planned or contemplated work on the subsystem.

Table C4.4 - Notes

1 Specialised analyses of little methodological interest, such as that of the use of public catering recommended by Matyukha (1973), have been omitted.

2 Lists of the tabulation variables used generally end with the words "and other socio-economic variables".

3 As the article by Siskov is on the subject of the application of mathematical-statistical methods, his failure to mention these analyses does not constitute evidence against their inclusion in plans for the subsystem.

4 Matyukha mentions "assessment of sample representativeness" (by comparison with other data sources; see Chapter B9) and states that this is "important for extrapolation to the population", without however explicitly including such extrapolation in the projected programme. Sources (3) and (5)-(9) refer both to "assessment of sample representativeness" and to "extrapolation to the population".

5 Ananyeva presumably refers not only to distributions by per-capita income, which are mentioned specifically by most of the sources, but also to distributions by other variables.

6 Ananyeva writes of "analysis of trends"; Siskov more clearly contemplates "analysis and forecasting of time series".

considered in Chapter C3[6]. There is scant information available about other analyses belonging to this category. For example,we have no account of the problems of retrieving and assembling FBS data required by other organisations (analysis A2 in Table C4.4). It is possible, however, to make a few comments regarding the dietetic analysis of food consumption (analysis A3 in Table C4.4).

Some sources mention that physiological assessments of the diet of families in the FBS are carried out. Thus Matyukha (1973 pp.64,138) refers to the production of "analytical tables" showing the calorific value and the protein, fat and carbohydrate content of daily diets by social group. Data on the physiological value and content of different foods are provided by medical-scientific research institutes such as the Institute of Diet of the USSR Academy of Medical Sciences. These institutes also establish "medical consumption norms" against which actual diets can be compared (Kurs... 1982 p.420).

Many sources, on the other hand, make no mention of dietetic analysis. Although I.Ya.Matyukha has called diet an urgent topic for analysis (Sukhoruchkina 1970), no KEOI devoted to dietetic analysis has been reported. The possibility cannot be excluded that dietetic analysis does not form part of the regular data-processing programme of TsSU but is only carried out as an occasional exercise. One such exercise was the dietetic calculations made by A.Pitelin at the Central Economic-Mathematical Institute on FBS data for 1958, differentiated by income level and proportion of children in the family (Raitsin 1967 pp.88-90; see Chapter C3, Section 5). Another was the analysis of the diets of 544 families of industrial workers in Moscow and Leningrad on the basis of FBS data for 1964 reported by Astrinskii (1968); where this analysis was conducted is not clear.

Figures pertaining to Soviet diets, such as average daily calorific intake, occasionally appear in Soviet literature, without indication of their

source. These figures are not necessarily taken from analyses of FBS data. They may be based on the special surveys of the diet of the population conducted by the Institute of Diet and other medical institutes (Astrinskii 1968).

5 Analyses involving use of mathematical-statistical methods

The analyses involving the use of mathematical-statistical methods listed in Table C4.4 fall naturally into two groups:

(i) analyses aimed at improving the general reliability and usability of output data - the calculation of sampling errors (B1), the determination of optimal sample size (B2), the construction of per-capita-income distributions and their use for extrapolating sample data to the population (B3), the construction of distributions of other indicators (B4),and the calculation of statistical characteristics of distributions (B5); and

(ii) analyses aimed at revealing the regularities, causative mechanisms and trends of budgetary behaviour, and at using the relationships revealed for the purpose of forecasting - modelling the formation of family incomes (B6)[7], the regression analysis of consumption (B7), demand forecasing (B8), and the construction, analysis and forecasting of time series (B9-10).[8]

(i) Analyses aimed at improving the general reliability and usability of output data

B1 and B2: Neither the calculation of sampling errors nor the associated determination of optimal sample size (given maximum permissible sampling error) are given much emphasis in the literature (see also Chapter B7). They are not, for example, mentioned in the textbook ASGS (1979) or in the report on computerisation by the Deputy Head of the Budget Statistics Department of TsSU USSR N.F.Belova (Soveshchanie... 1979). Ananyeva, Ivanova and Khlopina (1980) and R.T.Barsukova (Planovyi... 1981) just note that these calculations

will become possible in the future. The Deputy Director of NII TsSU USSR V.I.Siskov (1981) includes absolute and relative sampling errors among the statistical characteristics of distributions which are to be calculated (see B5 below).

B3: Distributions by per-capita income have been constructed on the basis of the data of past microcensuses (incomes surveys) (Starovskii 1971). It is proposed to create an analytical complex to construct such distributions (Siskov 1981) and to improve the methods used in the calculations (Planovyi... 1981). Most writers refer to the use of the per-capita-income distributions to derive corrective coefficients for extrapolating FBS data to the population, the problems of which have been discussed in Chapter B9. Siskov (1981) also suggests correcting average FBS indicators by ratio and regression methods with the use of auxiliary information. (He does not discuss how to apply these methods - for example, which auxiliary variables to use.)

B4: Only Ananyeva (1976) writes of the construction of empirical distributions on a range of indicators - that is, not only of per-capita-income distributions; but she does not specify the indicators to be covered.

B5: According to Siskov (1981), statistical characteristics are to be calculated for about eighty indicators of family composition, income and expenditure[9] by territory (oblast', Republic, USSR) and population group (workers and employees in industry, all workers and employees, collective farmers, all groups). Apart from arithmetic averages, three measures of dispersion are to be calculated (variance, standard deviation and coefficient of variation) as well as absolute and relative sampling errors.

(ii) Analyses aimed at revealing the regularities, causative mechanisms and trends of budgetary behaviour

B6: A number of sources refer to the "modelling of the formation of family incomes" as an analysis of some importance (for example, Matyukha

in Sukhoruchkina 1970), but quite what this means is seldom made clear. Aganbegyan and Rimashevskaya (1961) use the term "modelling of income formation" in connection with their procedure for deriving per-capita-income distributions from data on the various components of family income (wage of first worker, wage of second worker, social benefits etc.) and on family size and composition (see Chapter B9). When Karapetyan (1980) writes of modelling "the formation of urban and rural family incomes as a result of distributive and redistributive processes", he presumably has in mind a more substantial kind of analysis.

B7: The regression analysis of consumption expenditures is by far the most frequently discussed mathematical-statistical analysis of FBS data. Ananyeva, Ivanova and Khlopina (1980) list the following regression models as having been "worked out and experimentally tried":

(A) Models of the aggregated structure of consumption (food products / non-food products / services) -

1. Regression of per-capita food expenditure on per-capita income
2. Regression of per-capita food expenditure on family money income and value of food obtained from private plot
3. Regression of proportion of family expenditure devoted to food on per-capita income
4. Regression of expenditure on food plus services on per-capita income, size of family, proportion of family members who are children up to six years old, and proportion of family members who are women
5. Regression of expenditure on non-food products on per-capita income and size of family

(B) Models of the disaggregated structure of consumption - For the most important individual products, regression of the consumption of each product on family money income, size of family, number of adults in family and number of children in family.

Other sources refer to the use of independent variables representing

sources of income, the natural-climatic conditions of different regions (Matyukha 1974), and the level and trend of average prices of acquisition of products (ASGS 1979).

The methodology described by Matyukha (1973 pp.139-43), involving the calculation of sums, sums of squares and sums of products and the least-squares solution of a system of normal equations, is standard in character. The difficulties of computation in practice are discussed in Section 7[10].

B8: Demand forecasting as a possible component of the "Budget Statistics" ASGS subsystem is not clearly discussed in the literature. The general problems of demand forecasting using FBS data are considered in Chapter D3.

B9 and B10: We are likewise told very little about possible analysis and forecasting of time series. Siskov (1981) merely states that it is proposed to analyse and forecast time series stored in Automated Data Banks by means of mathematical-statistical methods.

6 Mathematical-statistical methods: intellectual problems

Siskov (1981), reviewing the position of mathematical-statistical methods within ASGS as a whole, is able to point only to a few scattered examples of their use: the forecasting of demographic time series in the "Statistics of Population" subsystem; the analysis of harvest yields, and the analysis of the efficiency of agriculture in Estonia, in the "Statistics of Agriculture" subsystem; and as a supplement to economic-mathematical methods such as input-output analysis. In general, he concludes, mathematical-statistical methods "are regarded only as auxiliary methods of analysis". The slow rate of progress in the introduction of mathematical-statistical analysis is not then a peculiarity of the processing of FBS data but a general problem: in most branches of statistics, in fact, plans are even less advanced than in

the FBS.

Two main issues must be considered in attempting to account for this situation. The first is the influence of intellectual attitudes unfavourable to the application of mathematical statistics which have been inherited from the Stalinist era and only partially overcome since that time. The second issue, to be dealt with in the next section, is the technical difficulty of mathematical-statistical analysis in the context of a data-processing system based on decentralised summarisation.

The use of mathematical-statistical methods in State statistics came under suspicion when the New Economic Policy was replaced by directive planning at the outset of the Stalinist period. The focus of mathematical statistics on chance fluctuations was regarded by an influential (though never completely dominant[11]) school of thought as at best irrelevant to and at worst subversive of a planned economy. The only proper function of statistics in socialist society was held to be large-scale economic accounting. 'It is necessary to finish with harmful anti-Marxist attempts to "mathematise" statistics...' (Gurevich 1938). For many years the use of mathematics in statistical analysis was attacked as "formalism", and on the whole only "simple methods of limited potential" were used (Vsesoyuznoe... 1969 pp.139-44).

After the death of Stalin, those who advocated wider use of mathematical-statistical methods were able gradually to strengthen their position. A methodological conference held by TsSU USSR in 1954 adopted a compromise resolution which did recognise a minimal role for mathematical statistics in socio-economic statistics. From about 1965 onwards there was great expansion in the amount of mathematical-statistical work done. This work, however, was mainly carried out elswhere than in TsSU[12]. It is striking that the series of conferences on the application of mathematical statistics to the social sciences which began in 1972 were organised by research institutes and by such

State bodies as Gosplan without any participation by TsSU.

The existence of continued resistance to the use of mathematical-statistical methods is made clear in the writings of the advocates of these methods. Bredov (1966) has to argue that the inclusion of mathematical-statistical methods in the programme of analysis of FBS data "is called for not by fashion, as some opponents of the programme have said, but by objective necessity"[13]. Articles still occasionally appear attacking the use of mathematical statistics on a theoretical level. The TsSU official M.Lipkin (1977), for example, rejects almost all application of mathematical statistics in economics, calling forth a criticism by A.Ya.Boyarskii (1980) of "these old errors, according to which a probabilistic treatment of phenomena contradicts the planned nature of the economy"[14].

Professor I.S.Paskhaver of the Kiev Institute of National Economy, speaking at the 1968 statisticians' conference about the problem of insufficient use of mathematical-statistical methods by practical State statisticians, draws special attention to the neglect of mathematical statistics in the training programmes for TsSU personnel:

> Very little is done to train statisticians in such methods. Textbooks of the general theory of statistics do not cover analysis of variance and other important methods. Even regression analysis, prominent in the textbooks of the 1920s and 1930s, is treated so schematically that the reader does not gain the taste and habit of using it... Our textbooks are more backward than those of fifty years ago, which unlike ours covered the organisation of sociological surveys (Vsesoyuznoe... 1969 pp.139-44).

Only in the last few years have more adequate textbooks of the general theory of statistics started to appear[15].

In order to demonstrate the effect on analytical work of the weak position of mathematical statistics in Soviet socio-economic statistics, let us consider Soviet approaches to the central problem of tracing the causative links among interacting variables. Although the production of various cross-tabulations

and logical thinking about their possible implications can provide a useful starting-point for causative analysis, it is in general necessary to proceed to the application of such mathematical-statistical methods as significance testing, analysis of variance and regression analysis, both because of the influence of chance variations on the data and because of the complexity of the underlying interactions among the variables. Otherwise, the neglect of the chance factor and of hidden confounding variables can easily lead to misleading conclusions.

However, it has become part of traditional Soviet statistical doctrine that "analytical tabulations (analiticheskie gruppirovki)" enable the analyst "to establish the connection among individual indicators of the socio-economic phenomenon under study". A recent textbook presents an example of such a tabulation which shows various average labour-productivity indicators for each of three groups of milk-processing factories in an oblast', corresponding to different ranges of the variable "volume of milk processed in 1979". A causative link between the tabulation variable and the tabulated variables is directly deduced from the tabulation: "It is obvious that increasing the size of enterprises... leads to an increase in labour productivity..." (Obshchaya... 1980 pp.98-100). There is no hint of the need to consider the possible existence of confounding variables, nor is there any mention of the advisability of applying tests of significance, although the groups are quite small, with only eight enterprises in the top size-band[16].

Professor Paskhaver cites one of the misconceptions that arise from reliance on the use of analytical tabulations. "It is a common view in the literature that the labour activity of able-bodied women collective farmers mainly depends on age and number of children." Tabulations showing that younger women work on average more days per year on the collective farm than older women, and women with fewer children more days than women with more

children, are regarded as sufficient proof of this contention. Paskhaver had one of his postgraduate students, E.V.Chekotovskii, carry out an analysis of variance of the days worked by 382 women collective farmers, using the FBS data for Kiev oblast' for 1966. Only 18 per cent of the total variance was found to be associated with age and number of children, while 70 per cent of the variance was associated with the occupation of the woman on the collective farm, clearly a much more important factor (Vsesoyuznoe... 1969 pp.140-2).

One can find discussions of analytical tabulation which recognise and attempt to deal with the problem of confounding variables, though still neglecting the role of the chance factor. Postnikov (1961) warns of the misleading conclusions which follow from tabulating FBS data by per-capita income without taking account of family composition. His attempt to work out more reliable methods is uninformed by mathematical-statistical concepts and relies on commonsense logic; in consequence, it is rather confused and inconclusive. His main recommendation, which is expounded theoretically by Zhidikhanova (1982), is that one must use not simple tabulations but multi-variable cross-tabulations which permit one to compare groups of units sufficiently homogeneous with respect to likely confounding variables.

However, as Shvyrkova and Shvyrkov (1966) point out, it is not always possible to form homogeneous groups; where it is possible, the groups will often be so tiny that their comparison cannot reveal any regularities. Many Soviet writers do in fact draw baseless conclusions from the comparison of tiny groups in complex cross-tabulations[17]. It must also be observed that the comparison of homogeneous groups can in any case give results known to be valid only for a particular set (or for a few particular sets) of values of the controlled variables.

Those Soviet analysts who understand mathematical statistics do not on

the whole urge that the method of analytical tabulations be completely abandoned, but explain why its results need to be assessed by mathematical-statistical methods like analysis of variance. This is demonstrated in the field of agriculture, for example, by Yuzbashev (1967). Zhidikhanova (1982) expresses the traditional prejudices against mathematical statistics when she accuses those who take the view that tabulations need to be supplemented by mathematical-statistical methods of "underestimating the significance of the method of gruppirovka"; they do this because they "make the error of exaggerating the stochastic elements in the development of social phenomena".

7 Mathematical-statistical methods: computational problems

A much greater volume of computation is required to analyse a given data-set by mathematical-statistical methods than to analyse it by descriptive methods alone. Before the advent of computers this severely restricted the use of such methods in practice. Computerisation has in the West been accompanied by greatly increased use of mathematical-statistical methods, and Soviet authors have often stated that this would be the case in the USSR as well (for example, Matyukha 1973 p.151). In the USSR, however, the exploitation of the hypothetical potential of computers for mathematical-statistical analysis is impeded by special problems which arise out of the traditional organisation of statistical data-processing as decentralised summarisation.

Data relating to individual units are lost at the very first stage of decentralised summarisation, and replaced by total or average values. Decentralised summarisation in its standard form is clearly incompatible with mathematical-statistical methods, for these are concerned with analysis of the variation among units, which is obscured in the process of averaging. There are two distinct ways of overcoming this problem:

(a) Mathematical-statistical analysis can be carried out independently of the system of decentralised summarisation, using data-sets relating to individual units stored in Automatic Data Banks (ABD's), as advocated by Ananyeva (1976). Or:

(b) More complex forms of decentralised summarisation can be developed in which, although data relating to individual units is still lost, the indicators of variability required for mathematical-statistical analysis are calculated and transmitted from level to level together with averages or totals. The main advocate of this "modified svodka" is the Deputy Director of NII TsSU USSR V.I.Siskov. The fullest general discussion of modified svodka is to be found in Metodologicheskie... (1977 pp.53-64); its application to the processing of FBS data is considered by Matyukha and Chernysheva (1975)[18] and by Siskov (1981).

As we have seen in Chapter C2, one of the main purposes of the envisaged transition to "integrated" computer systems based on ABD's is to facilitate the application of mathematical methods of analysis, including mathematical-statistical methods. However, as has been noted in Section 2 of this chapter in respect of the "Budget Statistics" subsystem of ASGS, only the ABD's at oblast' level are to store data on individual units, while those at Republic and USSR level are to store summary data. Mathematical-statistical analysis will therefore be facilitated only at oblast' level. In order to provide a basis for reliable conclusions it will be necessary to adopt the unwieldy procedure of repeating each analysis in every member of a representative and sufficiently large sample of oblasti (or in every oblast'). The results of any analyses conducted for only one or a few oblasti will have to be regarded as merely suggestive in character.

It is argued by Siskov and his colleagues that, though data on all units (enterprises, collective farms etc.) in the USSR could conceivably be

transferred to ABD's at All-Union level, this would be "inexpedient organisationally, technically and methodologically", and that it is for this reason that resort must be had to modified svodka (Metodologicheskie... 1977). The technical problems of creating All-Union ABD's based on individual data and of using them for mathematical-statistical analysis are no doubt formidable, given the very large number of units (whether building-sites, say, or families participating in the FBS) and the relatively less advanced state of Soviet computer technology. The obvious solution seems to be to create and use All-Union ABD's which store individual data on a manageable number of units constituting a representative All-Union sample of the population. In the case of the FBS, this would be a subsample. The apparent failure to consider this option is most probably accounted for by the continuing tendency of Soviet statisticians not to think readily in terms of sampling (see Chapter A4).

The central principle of modified svodka is the creation of an "organic link" between existing methods of statistical data-processing - svodka, gruppirovka[19] etc. - and mathematical-statistical methods of data-processing (Metodologicheskie... 1977). The programming of the schema of modified svodka is to be sufficiently flexible to allow for the application of either type of method or of both, as desired in any particular processing. The traditional methods, requiring the calculation of totals and means for each indicator but not of any other statistics, then represent either a special case of partial implementation of the schema or a necessary first stage in its full implementation.

Matyukha and Chernysheva (1975) give a simple illustration of the modified svodka of FBS data (Tables C4.5 and C4.6). In the exercise reported by them there are just two levels of data-processing - one representing regions served by different computer centres and one representing a Union Republic (presumably the RSFSR). Sums, sums of squares and sums of products

TABLE C4.5

TABULATION OF AUXILIARY QUANTITIES FOR REGRESSION ANALYSIS BY MEANS OF MODIFIED DECENTRALISED SUMMARISATION

Purpose: to estimate and test regression parameters a_0, a_1 and a_2 in the equations

$$\bar{x}_1 = a_0 + a_1 x_2$$

$$\bar{x}_1 = a_0 + a_1 x_3$$

and $$\bar{x}_1 = a_0 + a_1 x_2 + a_2 x_3 ,$$

where

x_1 = annual per-capita income of family

x_2 = size of family

and x_3 = wage of worker or employee selected for inclusion in the survey.

In this illustrative exercise, 418 budgets of workers' and employees' families from one Republic were divided into five groups, notionally corresponding to data-sets processed by five different computer centres.

Auxiliary quantities

Group	Σx_1 Σx_1^2	Σx_2 Σx_2^2	Σx_3 Σx_3^2	Σx_1x_2 Σx_2x_3 Σx_1x_3
I				
II				
III				
IV				
V				
Total				

Source: Matyukha and Chernysheva (1975)

TABLE C4.6

LIST OF STATISTICS WHICH MIGHT BE CALCULATED IN THE COURSE OF REGRESSION ANALYSIS BY MEANS OF MODIFIED DECENTRALISED SUMMARISATION

$\bar{x}$	mean
σ^2	variance
σ	standard deviation
$V = \frac{\sigma}{\bar{x}}$	coefficient of variation
μ	mean sampling error of $\bar{x}$
$\Delta = t\mu$	limit sampling error of $\bar{x}$ $(t = 2)$
a, b	lower bound, upper bound of 95% confidence interval
η %	relative sampling error of $\bar{x}$

For each regression line to be fitted (see Table C4.5):

η	coefficient of correlation
F_η	significance test of η
F_q	tabular value of F_η at q = 5%

OR

r	coefficient of pairwise correlation
t_r	significance test of r
t_q	tabular value of t_r at q = 5%
R	coefficient of multiple correlation
F_R	significance test of R
F_q	tabular value of F_R at q = 5%

W^2	test of linearity
W_q^2	tabular value of W^2 at q = 5%

a_0, a_1, a_2	regression parameters

Source: Illustrative exercise reported by Matyukha and Chernysheva (1975), as described in Table C4.5

of indicator values are calculated at the lower level and then transferred to the higher level for final summing. The final sums, sums of squares and sums of products are used to calculate a range of statistics needed for regression analysis of per-capita income (listed in Table C4.6).

A more complex procedure is described in very general terms in Metodologicheskie... (1977). Here data-processing is envisaged at all four levels of ASGS (raion or town, oblast', Republic, USSR). Moreover, the full range of statistics - variances and standard deviations, coefficients of variation, correlation coefficients, parameters of regression equations etc. - is calculated at each of the lower levels as well as at the highest level, and not just sums, sums of squares and sums of products. In contrast to the schema of Matyukha and Chernysheva (1975), in which processing at the lower levels serves only to generate intermediate quantities for mathematical-statistical analysis at the highest level, corresponding results of mathematical-statistical analysis are produced for all territories at every level. Specially designed algorithms for combining different statistical characteristics relating to a series of subpopulations into corresponding characteristics relating to the whole population are used at each level to obtain results for the next higher level[20].

A more detailed programme for modified svodka of FBS data is put forward by Siskov (1981). He proposes to regress various forms of expenditure on subsets of the following independent variables:

total real per-capita income
money per-capita family income
number of adults in family
family wages per working family member
percentage of total family expenditure spent on public catering
number of family members
number of working family members
number of children up to age 16 in family etc.

Sums and sums of squares of all the variables, dependent and independent, and sums of products of all possible pairs of dependent and independent variables, are to be calculated at regional and Republican computer centres and sent on to the Main Computer Centre of TsSU USSR for mathematical-statistical processing. Pairwise and multiple regression parameters are to be estimated by solving systems of normal equations at oblast', Republic and All-Union levels.

Apart from the very small-scale experimental calculations described by Matyukha and Chernysheva (1975), only a single real-life example of the application of modified svodka is reported (Metodologicheskie... 1977 pp.63-4). In the early 1970s[21], the programming of a regression analysis of "several thousand" family budgets ran into technical difficulties because the size of the data-set exceeded the capacity of the computer. The set of budgets was accordingly divided into "an arbitrary number of parts", none of which exceeded the capacity of the computer. Sums, sums of squares and sums of products were calculated separately for each part, and then final sums were produced and the regression analysis carried out.

It was found difficult, however, to obtain and store the sums of squares and products, containing a large number of digits, with the precision needed to avoid excessive accumulation of rounding errors[22]. This is still regarded as a problem awaiting solution in the more recent sources, although one would expect advancing computer technology to overcome the difficulty.

In assessing the significance of this trial, we should note that the schema used, with only two levels, was much simpler than those being proposed for adoption, and the amount of data processed much smaller than the amounts being contemplated (for example, several thousand budgets instead of several tens of thousands). Even so, the trial was not fully successful. The statement by Matyukha and Chernysheva (1975) that "the questions examined

have a fully determinate theoretical and practical solution" seems a little premature.

Even if modified svodka is a practicable procedure, it is certainly a very unwieldy and inefficient one, in view of the enormous quantity of intermediate results which it requires to be calculated, stored and transferred from one computer to another. It is also an inflexible procedure, in the sense that only those analyses can be undertaken which have been planned in advance. It would usually be impossible to carry out unplanned analyses, as the calculation of all the necessary intermediate quantities and statistical characteristics would not have been pre-programmed. There is a parallel here with the similar inflexibility of the tabulation methods at present in use (Chapter C3).

It is unclear whether the regression analyses and other mathematical-statistical analyses planned as part of the future "Budget Statistics" subsystem (Section 5) are to be carried out by means of modified svodka - and, if not, by which alternative method. A statistician interviewed by the author at the Leningrad Financial-Economic Institute in 1981 made the dismissive comment that such schemas are never used in practice.

8 The TsSU programme for processing FBS data: conclusions

The lack of clear, specific and consistent information makes it very difficult to assess the development of the TsSU programme for processing FBS data. There can be little doubt, however, that the central core of the programme remains, as it always has been, the cumulative monthly and quarterly svodka of budget data by territory and "social group" - that is, for workers (by branch of employment and/or level of skill), for employees (by occupational group) and for collective farmers (sometimes by productive orientation of collective farm).

It appears to be widely accepted that computerisation should make it

possible to expand this programme to include a range of more relevant tabulations (by per-capita income, type of family, urban/rural residence and other variables) as well as various mathematical-statistical analyses. These would both improve the reliability and usability of data (calculation of sampling errors, corrective coefficients etc.) and reveal the regularities and causative mechanisms underlying budgetary behaviour (regression analysis, time series analysis etc.). Many mutually contradictory proposals and plans for such new analyses have been published, but very little by way of actual achievement is yet evident. Even tabulations by per-capita income, which were already produced in the 1960s but abandoned in the 1970s, have not yet been restored.

Reference is often made to the need for analysis by mathematical-statistical methods, especially to the need for regression analysis of consumption as the basis for demand forecasting. There is evidence to the effect that the ideological attitudes which impeded the use of mathematical statistics in socio-economic statistics in the past have not yet been completely overcome among TsSU personnel. A more important obstacle, perhaps, is the technical difficulty of applying mathematical-statistical methods within a data-processing system still dominated by decentralised summarisation. The Automatic Data Banks currently planned will facilitate mathematical-statistical analysis, but only at oblast' level, while the practicability of the alternative procedure of modified svodka remains unproven. There seems no reason to expect rapid progress in the near future.

Notes to Chapter C4

1 It may be useful to enumerate here the types of analysis of FBS data not dealt with in this and the preceding chapter:

(a) Analyses carried out outside TsSU. Thus, demand forecasting on the basis of FBS data is discussed in this chapter only with regard to work planned for TsSU; demand forecasting in non-TsSU institutes is discussed in Chapter D3.

(b) Analyses carried out in TsSU but not forming part of the regular data-processing programme. These analyses are generally related to current policy concerns; examples are given in Chapter D1.

(c) Analyses carried out in or outside TsSU in which FBS data are used together with data from other sources, whether to compile planning balances (see Chapter D2) or to study a particular substantive problem area (see Chapter D1).

(d) Analyses mentioned in vague terms in the literature but without specific detail: for example, I.Ya.Matyukha refers to the need for such analyses as "relations between the private-plot and the collective-farm economies" and "the role of social consumption in the budgets of different population groups" (Sukhoruchkina 1970).

2 The list of ASGS subsystems linked to the subsystems "Budget Statistics" on which Table C4.1 is based is that given by the textbook ASGS (1979 pp.288-9). There is some inconsistency among the sources on the question of which subsystems are linked to the subsystem "Budget Statistics". Ananyeva and Barsukova (1981) list all the subsystems given in ASGS but mention in addition interchange of information with the subsystem "Statistics of Communications and Transport". Matyukha (1974) mentions links with the subsystems "Balance of National Economy", "Statistics of Labour", "Statistics of Trade", "Statistics of Culture" and "Statistics of Population". The inclusion of "Statistics of Culture" is unconfirmed by later sources and may be an error.

3 Oganezov, following Karapetyan (1980 pp.239-267), refers not to a "Budget Statistics" subsystem, as do all other sources, but to a "Standard of Living" subsystem of ASGS. It is possible that the use of this term signifies a stronger commitment to close interaction between the ASGS subsystem and the ASPR "Standard of Living" subsystem.

4 It appears that NII TsSU USSR plays a key role in the design of the "Budget Statistics" subsystem. Matyukha (1974) reports that "at present NII TsSU USSR and the Budget Statistics Department of TsSU USSR are working on the technical specification" of the subsystem. The authors of the main sources on the subsystem work at NII TsSU USSR. (One might have expected this role to have been played by the computer systems institute VGPTI TsSU USSR).

5 Tasks 1,2,3,5,6 and 10 in the ASGS list exactly correspond to six of the areas of study given by Ananyeva, Ivanova and Khlopina (1980). Task 4 appears to correspond to four areas of study (consumption of food products, turnover and prices of food products, consumption of non-food products, and consumption of services). Tasks 7, 8 and 9 correspond to the area of study concerned with consumption modelling and demand forecasting. (The distinction between tasks 7 and 8 as described is not clear.) One area of study - savings - does not seem to be covered by any of the ten tasks.

6 Mathematical-statistical methods could in principle be used in connection with the production of cross-tabulations: the tabulations could be accompanied by statistical tests of association. There is no evidence that the TsSU tabulation programme provides such a facility.

7 Inasmuch as "modelling the formation of family incomes" (analysis B6) may amount to no more than a means of deriving per-capita-income distributions from FBS data, it could be argued that it should be included in the first group of analyses (B1-B5) or even counted as an analysis not involving the use of mathematical-statistical methods.

8 It might be noted here that the use of quite a few mathematical-statistical methods is not even contemplated in the future TsSU programme. Some additional methods involving very intensive computations are occasionally applied to small sets of budget data (from the FBS or from independent small-scale local budget surveys) by non-TsSU institutes. See, for example, the work of the Central Economic-Mathematical Institute (Tipologiya... 1978) and of the Institute of Sociological Investigations (Ovsyannikov 1982) to create typologies of classes of family budgets characterised by relatively distinct consumption patterns by means of cluster analysis.

9 The indicators are to include: number of family members, number of working family members, number of children in family up to seven years old, number of children in family between seven and sixteen, number of children in family over sixteen, number of adults in family; family wage, family money income, amount received by family as social payments and grants, total family real income; expenditure on food products (and expenditures on individual food products), expenditure on public catering, expenditure on non-food products (and expenditures on individual types of non-food product), and expenditure on services.

10 Lipkin and Mints (1970), arguing that "mathematical-statistical methods should be introduced gradually, by stages", propose an algorithm for regressing consumption on per-capita income which uses the corresponding tabulations by per-capita income as a starting point. They suggest that, as a first step towards regression analysis, the tabulations be produced together with calculations of basic statistical characteristics for each income group (intra-group variance and standard deviation etc.). This would give "very valuable information for experimental calculations

on the application of regression and correlation analysis". There is no indication that any other authors have taken interest in this proposal.

11 The conflict between the advocates and the opponents of the use of mathematical-statistical methods in socio-economic statistics has been a long and complex one. Here we restrict ourselves to a highly simplified account of the historical background of present-day difficulties.

12 An impressive exception is the work carried out by the Administration of Agricultural Statistics of TsSU RSFSR and the Computer Centre of TsSU RSFSR under the leadership of A.I.Manellya in 1970-1. They correlated the time series for 1947-69 of the yields of five different crops, and constructed regions of synchronic harvest fluctuation by cluster-analysing the correlation coefficients for pairs of oblasti. Practical recommendations were made on the basis of the analysis: for example, the regions defined should be subjected to different planning cycles (Manellya 1973, Manellya and Terekhina 1974).

13 To take another example: "It would be incorrect to think that a scientific comparative analysis of living standards in different regions and cities... can be fully carried out using traditional methods of analysis. To study such a complex process... mathematical-statistical methods need to be more widely used" (Guntulis and Martishos 1972).

14 Boyarskii's statement that the old errors "have long been overcome" is not to be interpreted too literally. It is of interest to note that Boyarskii's critique appears not in the same journal as the original article by Lipkin, the TsSU organ Vestnik statistiki, but in the Vestnik Moskovskogo Universiteta published by Moscow University.

15 For example, the textbook Obshchaya teoriya statistiki (M,1980) by G.S.Kildishev, V.Ye.Ovsiyenko, P.M.Rabinovich and T.V.Ryabushkin has a good coverage both of traditional Soviet methods and of basic mathematical-statistical methods.

16 As noted in the last footnote, this textbook is an improvement over earlier ones. It does contain a chapter on the study of relationships among variables by mathematical-statistical methods. However, because the traditional methods are presented uncritically, the reasons for using mathematical-statistical methods are inadequately explained. Intellectual and political obstacles to the improvement of statistical training therefore persist.

17 As an extreme but not significantly atypical example of this malpractice, let us take an analysis of budget data by Mints (1976 pp.171-2). He argues that not only the size but also the structure of income is a significant influence on consumption pattern, as regular and irregular incomes tend to be used for different purposes. To study the influence of structure of income on structure of consumption, he divides a set of 60 budgets of Moscow workers' families for 1958 first into seven family types, then groups the budgets of each type by per-capita income (number of bands not given) and by proportion of irregular incomes in total income (less than 5 per cent, 5-10 per cent, over 10 per cent). He discusses on the basis of comparisons of the resulting subgroups how expenditure on different products (furniture etc.) varies with size and structure of income within each family type. The failure of the calculations to reveal the expected dependencies he attributes to the fact that free social services and the degree of regularity of receipts were not taken into account, giving no indication of regarding the use of subgroups mostly containing one or two budgets each as a problem.

18 The works written by Matyukha alone suggest that he lacks the understanding of mathematical statistics needed to write this article, the real author of which is presumably Chernysheva. Matyukha is no doubt cited as first co-author in recognition of his position as head of the Budget Statistics Department of TsSU USSR.

19 According to the account in Metodologicheskie... (1977), the modified svodka which should replace traditional svodka is to be "based on the organic inclusion in the process of svodka of gruppirovka and of mathematical-statistical methods". Modified svodka is therefore seen as a solution to the problems of mathematical-statistical analysis. But the method of tabulation envisaged is not explained.

20 For formulas see Siskov (1974), in which rules for combining coefficients of variation and correlation are derived, and Metodologicheskie... (1977 pp.57-61).

It is pointed out in Metodologicheskie... (1977) that "the principles of combination and division of statistical populations" can be implemented horizontally (at one level) as well as vertically (by transfer of data from a lower to a higher level). Thus results can be obtained for any desired set of oblasti, Republics etc., taken together.

21 According to Metodologicheskie... (1977), the exercise was conducted "several years ago".

22 The need for high precision is enhanced by the fact that many of the algorithms for calculating statistical characteristics involve subtractions of A from B, where A and B tend to be very large numbers very close to one another in magnitude. Moreover, (B-A) often occurs as a quotient.

There is considerable inconclusive discussion in Metodologicheskie... (1977) about whether it is preferable, from the point of view of precision and volume of data flow, to transfer totals or averages from level to level. In fact, the basic problem remains the same whichever of these options is chosen, though the use of averages increases the number of calculations made and therewith the accumulated rounding error.

CHAPTER C5

PRODUCT NOMENCLATURES USED IN THE COLLECTION AND PROCESSING OF CONSUMPTION DATA

1 Introduction

Questions of the coverage and level of disaggregation of FBS data, as collected and as processed, impinge on many central issues of survey organisation: the burden of data collection, the efficiency with which data are used, the suitability of data for planning purposes, and the extent to which the survey is adapted to changing conditions. These questions can be raised regarding all parts of the survey programme - the breakdown of family income by source, or of the labour outlays of collective farmers. However, we shall consider only the product nomenclature of goods and services acquired by purchase (thereby excluding also those acquired by other means than purchase, in particular foodstuffs received as payment for work by collective farmers or produced by families on private plots for their own consumption). This is because the literature available on other parts of the survey programme does not suffice for a proper discussion. The data on expenditures are the most important data produced by the survey, inasmuch as there exist other major sources of income and time data (income surveys, time budget surveys etc.) but the FBS is the only large-scale source of expenditure data. No doubt the problems posed by the parts of the programme which we neglect have much in common with the problems considered in this chapter.

In Section 2 we present and comment upon the product nomenclature of expenditures used in the survey forms, and discuss its level of disaggregation and its division into food products, non-food products and

services. In Section 3 we consider the aggregation undergone by this nomenclature in the course of data processing by TsSU, and in Section 4 we discuss the independent processing of survey data by institutes outside TsSU. In Sections 5 and 6 we deal with the relation between the survey nomenclature and those used in retail trade statistics and in production statistics respectively. We conclude in Section 7 with a general discussion of the problems of determining the product nomenclature.

2 The product nomenclature on Form No.1

The product nomenclatures of the data collected from workers and employees and from collective farmers in 1963, as reproduced by DePauw (1965), are shown in Tables C5.1 and C5.2 respectively. Breakdowns of the numbers of items in these nomenclatures into food products, non-food products and services are given in Table C5.3. Table C5.4 compares the ratio of numbers of food and non-food products in the nomenclatures of the survey and of the statistical reports returned by retail trade establishments, for 1969 and 1976.

From the numbers of items in the food-products nomenclatures and from the parts of them shown in Tables C5.1 and C5.2, we can see that they are very finely disaggregated. Soviet economists are satisfied that the level of disaggregation of food products is at least adequate (Frenkel' and Lakhman 1966); Rimashevskaya considers the nomenclature unnecessarily fine (Shenfield 1982b).

Matters are far more problematic as regards non-food products and services. First of all, it is difficult for us to gain a clear idea of the precise meaning of such categories as "items of domestic use", "cultural products", "everyday services" and so on. We might be inclined to assume that Soviet economists, familiar with such terms, and Soviet interviewers, relying on detailed instructions, do not share our difficulty and can

TABLE C5.1

PRODUCT NOMENCLATURE OF FORM No.1 "BUDGET OF WORKER AND EMPLOYEE" FOR FOOD AND NON-FOOD PRODUCTS AND FOR SERVICES

FOOD PRODUCTS

158 Wheat flour
159 Rye and other flour

160 Wheat bread from flour of ungraded quality
161 Wheat bread from flour of graded quality
162 Rye and other bread

163 Rice

164 Groats (buckwheat, millet, semolina, pearl barley, oatmeal, barley and others)

165 Legumes

166-214 Other food products (not listed by DePauw)

PUBLIC DINING

215 Public dining at cafeteria, snack-bars, restaurants and cafés

218 Utilisation of child-care establishments (nursery schools, crèches and milk kitchens)*

221 Meals eaten during temporary absence from home; expenses for a party at the club

MANUFACTURED NON-FOOD PRODUCTS

72 Cotton cloth
73 Woollen cloth
74 Silk cloth (without staple fibre)
75 Staple cloth
76 Linen and other cloth

77 Cotton cloth piece goods (i.e. kerchiefs, tablecloths, towels, sheets etc.)
78 Woollen cloth piece goods
79 Silk cloth piece goods
80 Linen and other cloth piece goods

* As in Table C5.2, utilisation of child-care establishments is grouped with public dining, presumably because payment is primarily for food provided to the children at these establishments.

TABLE C5.1 (cont'd)

81 Cotton clothing (i.e. finished apparel, excluding headwear, underwear, knitted wear, stockings, socks and footwear - shirts, trousers, suits, dresses, skirts, coats etc.)
82 Woollen clothing
83 Silk clothing
84 Fur clothing and fur pelts
85 Other clothing (PVC,leather etc.)

87 Headwear (except fur)
88 Underwear (except knitted)
89 Knitted wear (except stockings and socks)
90 Stockings and socks

91 Haberdashery (thread and needles, buttons, combs, ribbons, razors etc.)

92 Leather footwear (boots, shoes, galoshes, slippers, sandals)
93 Rubber footwear
94 Felt footwear
95 Other footwear (canvas, prunella, tarpaulin etc.)

97 Educational products (newspapers, magazines, books, school materials, writing materials)*

98 Musical instruments*

99 Radio and television sets*

101 Watches
102 Clocks

103 Sports equipment, photographic equipment, games (chess sets etc.); toys,children's bicycles etc)*

105 Motor cars, motorcycles, bicycles

106 Furniture and household items (wardrobes, bookcases, sideboards, couches, cheval glass, writing tables etc.)**
107 Other furniture (beds, tables, benches etc.)**

108 Household utensils (dishes, pots, pans, glasses, sewing-machines, polishes, cleaning fluids etc.)

109 Everyday electrical appliances (irons, hotplates, electric ranges, electric adding-machines, sewing machines etc.)

111 Household soap
112 Toilet soap
113 Other hygiene and cosmetic products (perfume, eau-de-cologne, powder, toothbrushes, bast sponges etc.)

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* Lines 97, 98, 99 and 103 together are known as "cultural products".

** We hypothesise that 107 is basic furniture, and 106 non-basic, perhaps including also carpets, rugs, curtains etc.

TABLE C5.1 (cont'd)

114 Drugs, medical supplies and other items for medical treatment

116 Cigarettes, makhorka, tobacco

117 Fuel and illuminating materials: firewood
118 " " " : hard coal
119 " " " : kerosene
120 " " " : other (peat, briquettes etc.)

121 Building materials for capital and current repair (of residential accommodation) and for new construction

WOODEN FRAMEWORK, HOUSES, LIVESTOCK ETC.

122 Wood framing; houses

123 Livestock and poultry

124 Feed, seeds, seedlings, agricultural implements etc.(for use on private plots)

125 Other products

SERVICES

96 Sewing and mending of clothes and footwear (including dry cleaning and dyeing of clothes)

104 Repair of recreational equipment

110 Repair of furniture, household utensils and electrical appliances; making of furniture from materials supplied by the family

126 Payment for boarding school

127 Cultural-educational services (theatre, cinema, circus etc.)

128 Use of sanatoria, rest homes, Pioneer camps, forestry schools

131 Medical treatment

132 Baths, laundry, hairdressing etc.

134 Transport

135 Post, telegrammes, telephone

136 Rent
139 Heating
140 Other residential services (gas, electricity, water etc.)

141 Payment for labour for capital and current repair (of residential accommodation) and for new construction

146 Insurance

147 Services relating to the private plot (protection of vegetable garden or orchard, medical treatment of livestock etc.)

148 Other services (sawing and chopping of firewood, wages for domestic servants etc.)

TABLE C5.2

PRODUCT NOMENCLATURE OF FORM NO.1 "BUDGET OF COLLECTIVE FARMER" FOR FOOD AND NON-FOOD PRODUCTS AND FOR SERVICES

FOOD PRODUCTS

The acquisition of food products is covered in the forms for collective farmers' budgets in four places:

(a) Table 11 of Form No.1 on "product turnover" covers the acquisition by purchase or as payment for work on the collective farm of non-manufactured food products;

(b) Table 9 of Form No.1 on "turnover of livestock and animal products" covers the acquisition of animal food products from animals kept on the private plot;

(c) Table 13 of Form No.1 covers the purchase of manufactured food products; and

(d) Form No.3 covers the consumption of food in public dining, schools and child-care establishments. (The corresponding expenditures are covered in Forms Nos. 6 and 7, but these are not reproduced by DePauw.)

(a) Non-manufactured food products

39 Rye
40 Wheat
41 Maize
42 Polygonum millet, Hungarian millet, green bristlegrass
43 Legumes (peas, beans, haricot beans, lentils and other)

45-118 Not listed by DePauw: "a broad range of agricultural, forestry and fishing products". It seems these include some non-food goods, such as wool, peat and straw.

(b) Non-manufactured animal food products

The animals covered and the products derived from them are:

1	Cows and buffaloes	meat, fat, offal, milk
2	Heifers	meat, fat, offal
3	Heifers older than one year	meat, fat, offal
4	Bulls and bullocks older than one year	meat, fat, offal
5	Calves under one year (small heifers, bulls and bullocks)	meat, fat, offal

6	Adult sheep older than one year	meat, fat, offal, milk, wool
7	including breeding ewes and shearlings	-
8	Lambs under one year	meat, fat, offal, wool
9	Adult goats older than one year	meat, fat, offal, milk, wool
10	including breeding does	-
11	Kids under one year	meat, fat, offal, wool
17	Adult pigs older than 9 months	meat, fat, offal
18	including breeding sows	-
19	Gilts from 4 to 9 months	meat, fat, offal
20	Piglets under 4 months	
21	Adult and young fowl (hens, roosters, geese, ducks and others)	meat, fat, hen eggs, other eggs
22	Rabbits	meat
23	Bee colonies	honey
24	Horses	meat, fat, offal
25	Donkeys	
26	Other livestock	

(c) Manufactured food products

154 Baked bread, bread and flour products - rye and other
155 " " " " " - wheat

156 Macaroni products

157 Margarine and margarine-type products

158 Sweets, chocolate, khalva etc.
159 Biscuits, cakes, pastry etc.

160 Unprocessed tea and coffee

161 Sausage products and smoked meats
162 Canned meats, canned meat and vegetables

163 Herring, all kinds except fresh
164 Other fish - salted, dried, smoked and cured
165 Canned fish

166 Other canned products

167 Vodka, liqueur and other spirits
168 Grape and other fruit and berry wines
169 Beer

170 Other manufactured food products (salt, ice-cream, dry kissel, baking soda, yeast, mustard, packaged tomatoes etc.)

(d) Public dining, schools and child-care

1 Baked rye and other bread
2 Wheat bread

3 Corn grain

4 Legumes

5-58 Other food products (not listed by DePauw)

NON-FOOD PRODUCTS

173-196	Cloth, cloth piece goods, clothing and footwear	Identical with 72-95 in Table C5.1
197	Material for sewing and mending footwear	
198-203	Cultural and recreational products	Identical with 97-103 in Table C5.1
204	Motor cars, motorcycles, bicycles (including repairs)	
205	Furniture (beds, tables, chairs, sideboards, cupboards, chests of drawers, rugs, feather beds, trunks etc.)	
207	Items of domestic use (sewing-machines, lamp-shades, candelabras, oil-stoves, pails, tubs etc.)	
208	Household electrical appliances (stoves, coffee-pots, irons, electric adding-machines, electric lamps etc.)	
209-213	Soap, toiletries, drugs, tobacco	Identical with 111-116 in Table C5.1
214	Kerosene	
215	Hard coal	
216	Other types of fuel and illuminating materials	
217	Building materials (sawn wood, plywood, bricks, nails, wallpaper etc.)	
218	Agricultural and handicraft implements and materials	

219 Feed: oil-seed, malt residuum, mixed feed (except oilcake), molasses and other

220 Other manufactured products (matches, boxes for mailing etc.)

226 Purchase of buildings

Purchase of animals (21 types as listed under FOOD PRODUCTS (b))

4 types of wool (see FOOD PRODUCTS (b))

SERVICES (INCLUDING PUBLIC DINING)

222 Sewing and mending of clothes and footwear

223 Repair and manufacture of furniture and household items; repair of electrical appliances

224 Repair of recreational goods

225 Repair and erection of buildings (not including cost of the construction materials)

227 Public dining while living at home (not including meals of children at pre-school institutions)

228 Meals during temporary absence from home; expenses for a party at the club

229 Utilisation of child-care establishments

230 Cultural-educational services (theatre, cinema, circus etc.)

231 Payment for boarding school

232 Use of sanatoria and rest homes

233 Medical treatment

234 Baths, laundry, hairdressing etc.

235 Personal transport

236 Post, telegrammes, telephone

238 Rent and residential services

239 Other (non-production) services

240 Payment for shepherds and guards

241 Transport necessary for marketing and production

242 Other production services (processing of products, repair of agricultural and handicraft implements etc.)

249 Insurance

TABLES C5.1 and C5.2 - SOURCES AND NOTES

Table C5.1 and C5.2 are drawn from the incomplete reproductions by DePauw (1965) of survey forms for 1963 taken from TsSU staff instructions, dated 1962:

we1: Form No.1 "Budget of Worker and Employee" (pp.53-61);
k1 : Form No.1 "Budget of Collective Farmer" (pp.31-44); and
k3 : Form No.3 "public dining facilities used by collective farmers and their children at the collective farm, at school and at child-care establishments" (p.45).

Unfortunately the original Soviet source used by DePauw has not been available to us.

We have extracted information for Table C5.1 from Sections III, IV and V of we1 (pp.56-59). Section III covers purchase of manufactured non-food products and of "wooden framework, houses, livestock, poultry etc." Section IV covers "non-commodity expenditures", which include both services (the only items with which we concern ourselves) and expenditures which do not correspond to acquisition of goods and services (e.g. taxes, loans) or are really turnover items (e.g. savings bank deposits). Section V covers purchase of food goods and expenses on public dining.

We have extracted information for Table C5.2 from Tables 9, 13, 14 and 15 of k1 (pp.35-36, 39-43) and from k3 (p.45). Table 9 covers the turnover of livestock and animal products, which includes the purchase of animals and the consumption of products from them. Table 13 covers purchase of manufactured food products, Table 14 that of manufactured non-food products, and Table 15 covers other expenditures, of which again we are concerned only with those on services. k3 covers the consumption of food goods in public dining.

Almost all item lines for purchases in we1 and k1 are divided into two or three sub-lines for purchases from different sources. In we1 there are two sub-lines: for purchase in State or cooperative*trade, and for purchase from private citizens (including purchase on the collective-farm market). In k1 there are up to three sub-lines: for purchase in State or cooperative trade, for purchase from the collective farm, and for purchase from private citizens. A sub-line is omitted where the item cannot be purchased from the corresponding source - for example, manufactured non-food goods from the collective farm or a stay in a sanatorium from a private citizen.

Gaps in line numbers are explained by our omission of:

a. sub-total lines;
b. lines showing the division of expenditure items into components paid for in different ways (e.g. the part of the cost of a stay in a sanatorium paid by the family and the part subsidised by a member's workplace);
c. expenditure items which do not correspond to the acquisition of goods or services (e.g. taxes, loans, reimbursement for damage to collective farm property); and
d. turnover items (e.g. deposits into savings banks).

We have omitted a certain amount of detailed information given by DePauw.

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* A mainly rural trade network, in effect part of State trade.

TABLE C5.3

NUMBERS OF ITEMS IN THE PRODUCT NOMENCLATURE OF FBS FORM NO. 1 (1963 VERSION)

	Numbers of items in the product nomenclature of	
	Form No. 1 "Budget of Worker and Employee"	Form No. 1 "Budget of Collective Farmer"
FOOD PRODUCTS:		
i. non-manufactured non-animal		< 57 ± 2
ii. non-manufactured animal		54
iii. manufactured		17
All food products	53 ± 1	
NON-FOOD PRODUCTS	47	> 61
ALL PRODUCTS (except animals)	100 ± 1	
SERVICES (including public dining)	20	20
ALL PRODUCTS AND SERVICES (except animals)	120 ± 1	
Animals	1	21
ALL PRODUCTS AND SERVICES (including animals)	121 ± 1	

Source: Tables C5.1 and C5.2

TABLE C5.3 - NOTES

The Table is based on calculations of the numbers of items in Tables C5.1 and C5.2. We must exclude the sub-total lines on Form No.1 from the count, but for the parts of the Form omitted by DePauw we can only estimate their number approximately on the assumption that they occur about as frequently as in other parts of the Form. This explains the ranges of uncertainty in the Table.

Calculation of the first column, for budgets of workers and employees, presents no difficulty. Comparison with Table C5.4 shows that the figures agree well with those given by Levin (1969).

The data for budgets of collective farmers present more complications. The classification of items follows Table C5.2. Food category (d) is omitted on the assumption that all the items it contains are covered by categories (a), (b) and (c). Category (a), 67 items in all, covers three types of non-manufactured products in proportions unknown thanks to the incompleteness of DePauw's listings:

i. non-animal food products;
ii. animal food products; and
iii. non-food agricultural products.

As the nomenclature of animal foods in (b) is finer than that in (a)ii., the full nomenclature of food products consists of (a)i., (b) and (c). But we cannot obtain it because we cannot determine the number of items in (a)i..

DePauw (p.25) does tell us a little about (a)iii: it includes fibres, hides, sheepskins and wool for the making of clothing and footwear for family use, firewood, brushwood, peat and straw for heating purposes, wood for household needs, and straw and hay for animal litter. If these 10 goods are removed from (a) we have 57 items left. We also add them to the 51 manufactured non-food products* (corresponding closely to the 47 in the workers' and employees' budget) to give 61.

As these 10 items may not exhaust (a)iii., and as an overlap remains between (a)ii. and (b), (a)i. must be rather less than 57 items and "non-food products" rather more than 61.

Our inability to determine the exact size of the nomenclature in collective farmers' budgets does not prevent us from concluding that, as regards both food and non-food products, it is considerably larger than that of workers' and employees' budgets as a consequence of the more complex economy of the rural household.

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* including the four types of animal wool listed under (b) in Table C5.2

TABLE C5.4

COMPARISON OF NUMBERS OF ITEMS IN THE PRODUCT NOMENCLATURES OF RETAIL TRADE STATISTICS AND OF FBS FORM NO. 1 ("BUDGET OF WORKER AND EMPLOYEE")

	Product nomenclature of retail trade statistics		Product nomenclature of FBS Form No. 1 ("Budget of Worker and Employee")	
	according to Levin (1969)	according to Levin and Yarkin (1976)	according to Levin (1969)	according to Levin and Yarkin (1976)
Number of food products	32	35	52	56
Number of non-food products	40	56	47	61
Total number of food and non-food products	72	91	99	117
Ratio of number of non-food products to number of food products	1·25	1·60	0·90	1·09
Ratio of number of food products to total number of food and non-food products	0·44	0·38	0·53	0·48

Source: First three lines taken from Levin (1969) and from Levin and Yarkin (1976); last two lines calculated from the first three lines

confidently allocate different products to the right category. However, the fact that "sewing machines" are cited on Form No.1 (Table C5.1) as examples both of "household utensils" (line 108) and of "everyday electrical appliances" (line 109) makes this assumption a doubtful one.

It is striking how cloth, cloth piece goods, clothing and footwear are classified only by type of material, so that (for example) a cotton sheet comes under the same item as a cotton kerchief but a different item from a linen sheet.

One often comes across pleas that the product nomenclatures for workers and employees and for collective farmers be made fully consistent with one another (Bredov and Levin 1971, Levin and Yarkin 1976). This was finally achieved with the adoption of the unified Form No.1 "Budget of a Family" for all budgets in 1979. In fact, comparison of Tables C5.1 and C5.2 shows that even in 1963 differences in nomenclature for non-food products and services were not very significant. The differences that do exist are easily explained by differences between urban and rural conditions. Thus, workers and employees have two lines for furniture, one (apparently) for less essential furniture (line 106) and one for more essential furniture (line 107), while collective farmers - whose furniture presumably tends to be less varied - have only one line (line 205). Workers and employees pay for the service of "sewing and mending of clothing and footwear" (line 96), while collective farmers, in addition to the corresponding line 222, may also buy "material for sewing and mending shoes" for themselves (line 197). The critics must be less concerned with such minor points than with the much more substantial differences in the tabulations produced from the collected data (see Section 3).

The main criticism of the nomenclature of non-food products and services, however, is that "some items are so broad as to be economically meaningless, and should be disaggregated" (Rimashevskaya 1964). The most

frequently given example of this is the treatment of residential and everyday services, to which we return in Section 4. A number of other examples are obvious from Tables C5.1 and C5.2: the classification of clothes only by type of material, so that coats cannot be distinguished from dresses, suits, shirts or trousers (Table C5.1, lines 81-85); the lumping together of adults' recreational goods with children's toys (line 103), of cars with bicycles (line 105) and so on. As a result, the information which could be used to study various important issues is lost in the process of completing Form No.1.

The nomenclature for non-food products seems to have remained unchanged during the 1960s, at 47 items (Table C5.3 for 1963, Table C5.4 for 1969), but to have been appreciably refined in the early 1970s (61 items in 1976 - see Table C5.4). It is likely that this revision was in response to the criticism of the survey by economists, as expressed by several contributors to the conference on the study of consumer demand held by the market research institute VNIIKS in 1969 (Organizatsiya... 1971).

Comparison of the nomenclatures used in the statistical reports of retail trade establishments and in the survey of workers' and employees' budgets (Table C5.4) shows that the finer detail of the FBS nomenclature is overwhelmingly due to a greater disaggregation of food products. In the FBS food products and non-food products occupy about the same number of items, while in trade statistics non-food products predominate. With the passage of time, both sources give greater prominence to non-food products, but the gap between the two remains.

What is involved here is the adaptation of statistical classifications to changing conditions. The pattern of consumption has been changing in the USSR since Stalin's time, as the range of non-food products available to the mass consumer has diversified. The organisers of the FBS appear more resistant to change than those responsible for trade statistics.

An example of a new phenomenon which necessitates changes in the design of Form No.1 is the post-Stalin growth of residential cooperatives through which people can now buy their own flats instead of renting (Kosyachenko and Rutgaizer 1970). Thus, payments made to cooperatives towards flat purchase need to be distinguished from payments made to them for services provided to blocks of cooperative flats. It is not clear whether this problem has now been sorted out.

Perhaps the most serious archaism in the design of the product nomenclature of the FBS is its inadequate treatment of domestic consumer durables (washing-machines, refrigerators etc.). "The data on consumer durables are especially inadequate" (Frenkel and Lakhman 1966). Like sewing machines, these presumably come under "household utensils" and/or "everyday electrical appliances". Rimashevskaya (1968b) actually states that their purchase is omitted, but we understand this as referring to ommission from the data-processing programme: in view of the importance attached to the principle of balancing income and expenditure in compiling budgets, it is unlikely that purchases of consumer durables should not be recorded somewhere. A research report co-edited by Rimashevskaya (Tipologiya... 1978) complains of "the absence of... detailed description of industrial goods acquired, especially of consumer durables", but does not claim that they are omitted from the records altogether. Chernyavskii (1981 pp.132-5) proposes the adoption of a programme of analysis of the purchase of consumer durables, to be based on FBS data and to be worked out jointly by TsSU and outside scholars. By implication the data are collected but not analysed.

It is often stated that there is no source of reliable information on the stock of consumer durables actually in use, which is needed as well as purchase data in order (for example) to forecast demand: calculations

based on sales figures and putative periods of functioning are hypothetical (Levin 1969). The presence in households of consumer durables, their qualitative state (measured by percentage depreciation), as well as their acquisition, should be recorded in the FBS or in a special separate survey, argue Lakhman and Frenkel (1971) and Baranova and Levin (1978 pp.128-36).

Such special surveys do, however, exist; as the critics must surely be aware of their existence, they presumably regard them as of little value. Matyukha (1966) mentions, as one of three "directions for improving the budget survey", the organisation of supplementary surveys on questions of interest not included in the programme of the main survey. TsSU RSFSR conducted surveys of household inventories of consumer durables in 1958, 1962 and 1965 (Parfenova and Rumyantsev 1967, Rumyantsev 1968). In 1967 the survey was extended from the RSFSR to the USSR as a whole, and in 1972 and 1975 to collective farmers; previously it had been restricted to workers and employees (Baltsevich 1980)[1]. Since the 1970's, information on the presence of consumer durables has also had a place in the large-scale three-yearly "sample survey of family composition, incomes and living conditions of workers and employees in the non-agricultural branches of the national economy", or microcensus (Vorontsova 1975)[2]. Data are also collected in various surveys conducted by research institutes outside TsSU[3].

3 The product nomenclature used in TsSU tabulations

We have no clear and comprehensive source of information on the product nomenclature used in the tabulations produced by TsSU from FBS data on consumption. Karapetyan (1980 pp.241-2) complains that:

> data processing is restricted to the compilation of ... tables for particular sections or groups of indicators. As a result we obtain a disparate picture of different aspects of consumption. For welfare planning we need a single system of interrelated and balanced indicators...

But in order to assess the restrictions of the processing programme, we are forced to rely on two methods, both with serious shortcomings and giving somewhat discrepant results.

(a) In Chapter C3 we considered the information on the routine processing programme given in Yezhov (1965 pp.321-6). He introduces his list of tabulations with the preamble:

> Oblast' statistical administrations obtain a mass of valuable information, in particular:

and the specifications which follow include lists of the consumption items which are tabulated for different groups of budgets, separated by commas. The wording gives the impression that Yezhov is presenting merely a selection of the most important tabulations produced. However, as this is a systematic textbook presentation, we may suspect that we have a complete account of all tabulations routinely carried out at the time (which does not exclude the possibility of additional tabulations as occasional exercises).

On this uncertain assumption we may determine the product nomenclature implicit[4] in Yezhov (Table C5.5), and compare it with the nomenclature of the data as collected (Tables C5.1 and C5.2). Both nomenclatures refer to about the same date - Yezhov's to 1964 or thereabouts, that from DePauw to 1963. In this way we can assess how rationally and efficiently the data collected are used.

The shortcomings of this "Yezhov method" are: (1) it is uncertain that

the complete programme of tabulations can be reliably ascertained thus, and (2) it throws no light on any improvements made since 1965.

(b) We may assemble the specific complaints about the nomenclature of the processing programme made by Soviet critics of the FBS. Unfortunately these are not numerous enough to generate a full picture, nor have any of them been published in the last decade: we have brief comments in only seven articles appearing between 1964 and 1971. On the other hand, we feel more confident that we have interpreted them aright than we are in respect of Yezhov.

(a) The "Yezhov method"

Let us first compare the nomenclature for workers in Table C5.5 with that for workers and employees[5] in Table C5.1. A few items appear in the same form in both nomenclatures: groats, utilisation of child-care establishments, leather footwear, and cultural-educational services (theatre etc.). Other items in Table C5.5 correspond to groups of several items on Form No.1, which have been aggregated in the course of processing. The two types of flour and the three types of bread, the pointlessness of distinguishing which in data collection has been remarked by Rimashevskaya (Shenfield 1982b), are subsumed under "flour" and "bread" tout court. The five types of clothing are aggregated, as are the three types of non-leather footwear, the various types of "cultural products" and the different "residential services". But very many of the items on which data are collected appear nowhere in the tabulations[6]. Of the 78 items as collected for which deductions can be made about processing, no fewer than 46 do not appear in the tabulations; a further 28 items are aggregated into 10 broader items; and only four are preserved in their original form.

When we turn to compare the nomenclatures for collective farmers from

Tables C5.2 and C5.5, the pattern is similar but accentuated. Only "macaroni products" and "leather footwear" are known to be retained in the tabulations as collected. Table 9 of Form No.1 details the acquisition of meat and of offal from seventeen different kinds of animal (Table C5.2); data processing reduces this to just "meat". All industrial goods save cloth and footwear are aggregated, and in the field of services we have only "cultural and everyday services". In all, of 75 collected items for which deductions can be made about processing, 73 are aggregated into just 10 categories.

Finally, breakdowns by source of acquisition are provided for five basic food products in workers' budgets and for non-food products (taken as a whole) in collective farmers' budgets. The five foods - meat, milk, eggs, potatoes and vegetables - are probably those for which town dwellers rely most on the collective farm market to supplement State shops as a source of supply. Nevertheless, by far the larger part of the data collected on source of acquisition of products appears not to be used.

The programme which we derive from Yezhov is then remarkably restricted, especially by contrast with the extensive data collected. Much of the effort expended on the completion of the detailed survey forms, it seems, serves no useful end. How does this conclusion compare with the miscellaneous comments of Soviet critics on the subject?

(b) The comments of Soviet critics

We shall review the comments of Soviet economists on the processing by TsSU of FBS data on (i) clothing and footwear; (ii) "cultural, everyday and household products"; (iii) services; (iv) prices; and (v) source of acquisition. We shall discuss what sort of overall picture emerges and what sort of processing programme these economists seem to be advocating.

(i) Clothing and footwear

Levin (1969) and Lakhman and Frenkel (1971) are satisfied with the processing of workers' and employees' budgets but not with the coarser nomenclature used in tabulations of collective farmers' budgets, which "summarise data on money expenditures in an extremely aggregated form". Thus, for workers and employees, knitted products constitute one item and stockings and socks another, while for collective farmers both are merged in a single item. For workers and employees footwear is divided into leather, plastic and felt, while for collective farmers only leather footwear is taken into account. In tabulations of budgets of collective farmers, cloth, clothing, headwear and cultural products are all represented by a single item.

These points accord ill with our information from Yezhov. From Table C5.5 it seems that data on knitted products, stockings and socks are not processed at all, that of the types of footwear only leather is taken separately for either workers or collective farmers, but that cloth is tabulated separately for collective farmers.

(ii) "Cultural, everyday and household products"

Tabulations for workers and employees "lack data on expenditures on products of cultural-everyday and household use" (Korovkin 1969 p.118). We saw under (i) that tabulations for collective farmers aggregate cultural products with cloth and clothing; they also provide no data on the acquisition of durable goods. Levin (1969) mentions that no information can be obtained on beds, sewing-machines or haberdashery.

The first point, if understood literally, contradicts Yezhov's nomenclature for workers' budgets, which does contain the items "furniture and household items" and "cultural products". It may well be that Korovkin

TABLE C5.5(a)

THE PRODUCT NOMENCLATURE USED BY TsSU FOR FBS TABULATIONS IN 1965

Product nomenclature used for tabulations of workers' budgets	Product nomenclature used for tabulations of collective farmers' budgets
1. - 17. Basic food products listed in Table C5.5(b)	1. - 17. Basic food products listed in Table C5.5(b)
18. Public dining	18. Cloth
19. Use of childcare establishments	19. Leather footwear
20. Woollen and silk cloth	20. Other footwear
21. Other cloth	21. Other industrial products
22. Clothing	22. Agricultural products
23. Leather footwear	23. Livestock, poultry and bees (1)
24. Other footwear	24. Cultural and everyday services
25. Furniture and household items	
26. Cultural products	
27. Theatre, cinema and other cultural-educational services	
28. Rent and residential services	
Total: 17 food products	Total: 17 food products
7 non-food products	6 non-food products
24 products	23 products
4 services	1 service
28 products and services	24 products and services
Analysis of the sources of acquisition of five food products: meat, milk, eggs, potatoes, vegetables	Analysis of the sources of acquisition of non-food products taken as a whole

Source: Table C3.1, based on Yezhov (1965 pp 321-6)

Note: (1) The list of products given by Yezhov includes "livestock, poultry and bees"; this may mean that "livestock" is tabulated separately from "poultry and bees".

TABLE C5.5(b)
THE PRODUCT NOMENCLATURE USED BY TsSU FOR FBS TABULATIONS IN 1965: BASIC FOOD PRODUCTS

1. Flour
2. Bread
3. Groats
4. Macaroni products
5. Potatoes
6. Vegetables and melons
7. Fruit and berries
8. Milk
9. Milk products
10. Vegetable oils
11. Animal fats
12. Eggs
13. Meat
14. Meat products
15. Fish
16. Fish products
17. Sugar and confectionery products

does not mean to imply that there are no data at all on these products, but only that the data are inadequate.

(iii) Services

Rimashevskaya (1964) mentions, as a processing category in need of disaggregation, "residential-everyday services", comprising:

1. installation, repair and registration of radios;
2. sewing and mending of clothing and footwear;
3. hire of household goods;
4. baths, laundry, hairdressing; and
5. rent, fuel, residential services, residential repairs etc.

This is far from consistent with Yezhov: there we have point 5 ("rent and residential services") as a separate item for workers, with the other points not covered at all, while for collective farmers we have a broader category, "cultural and everyday services"[7].

Perhaps the programme for processing data on services was elaborated in the late 1960's, for Kosyachenko and Rutgaizer (1970) - in their study of the use of budget survey data to forecast demand for paid services - state that in the processing of workers' and employees' budgets the types of paid services corresponding to the nomenclature of the "balance of money incomes and expenditures of the population" are distinguished. The only exception to this is that expenditures on rail, water and air transport are aggregated, as are expenditures on motor-car and urban electric transport. Evidently this balance, which is used as a planning tool, is constructed on quite a fine nomenclature. The authors are less happy with the processing of collective farmers' budgets, which distinguishes only total expenditure on paid services and, within this, expenditure on "cinema, theatre and other spectacles". This is much further removed from Yezhov than is Rimashevskaya's

account of the matter: transport, for example, nowhere figures in Table C5.5.

(iv) Prices

Yezhov makes no mention of the output of price data. However, Frenkel and Lakhman (1966 p.97) state that "in recent years" the average prices of food and some non-food products purchased by workers in State shops and on the collective-farm market respectively have been tabulated. Tabulations of collective farmer budgets, on the other hand, give no price data (Korovkin 1969 p.118).

(v) Source of acquisition

At least here there is agreement between Yezhov and the economists (Levin 1969, Lakhman and Frenkel 1971). Breakdowns of food purchases by source of acquisition - State shops or private trade - are produced for workers and employees but not for collective farmers. With the introduction of guaranteed money payment of collective farmers and the consequent monetarisation of their consumption, argue Lakhman and Frenkel (1971), the waste of these data becomes less excusable: it is important for planning to study the change in structure of demand as the money incomes of collective farmers grow. We do not know whether TsSU have since taken the point.

Both methods we have used to assess the processing programme lead to the following conclusions: that much valuable information is lost through use of nomenclatures considerably coarser than those on the survey forms; and that the situation is worse in the processing of collective farmers' budgets than in the processing of workers' and employees' budgets, and

worse for non-food products and services than for food products. Once we get down to details, however, there are so many discrepancies between one source and another that we are forced to recognise that the patchy and unclear literature available does not suffice to give us a reliable detailed picture. On the other hand, there are enough points of agreement to deter us from rejecting any source as completely untrustworthy. We may nevertheless speculate that the less extreme pattern of aggregation suggested by the comments of the Soviet critics is more plausible than that inferred on the "Yezhov method".

Given that "many important indicators needed to analyse and plan consumption and trade are absent from processed data" (Korovkin 1969), how fine a nomenclature do the critics consider necessary for the processing programme? Mints (1968) refers simply to the need for data on a "detailed nomenclature" of consumed products. Levin and Frenkel (1973) urge that tabulations should show in detail, by income group, the acquisition and consumption of "all products": the quantities, prices and sources of acquisition (the latter being especially important in the case of consumer durables). One might assume that by "all products" he means "all products identified on Form No.1". This may, however, be to understate the degree of disaggregation that the critics are demanding. Although personal transport constitutes only one item on Form No.1, Kosyachenko and Rutgaizer (1970) want processing to distinguish among rail, water, air, motor-car and urban electric transport. Levin (1969) wants to distinguish between thread and other haberdashery, and between tea and other non-alcoholic drinks: the first distinction at least[8] is not made on Form No.1. These authors thereby go beyond the demand that the data at present collected be effectively used to an attempt to impose further burdens on the interviewers and budget economists. This seems to be because they wish to be able to use FBS data for detailed studies of consumer demand in specialised areas

of consumption (see Section 4) - a demand which it is perhaps unreasonable to make of a general-purpose budget survey.

4 Independent processing of FBS data by institutes outside TsSU

From the 1960s onwards, institutes specialising in social welfare, aware of the failure of TsSU to produce output data adequate to their research needs, began to undertake independent processing of the data of the TsSU budget survey (Korovkin 1969)[9], as well as conducting their own small-scale budget surveys. TsSU would provide the institutes with survey forms or even the original family records, which they would then work on using their own methodology. Because of the limited resources of the institutes, such studies are usually local in scope, using budgets from the home town, oblast' or small Republic of the institute[10]. Insofar as they make use of family records, they are also restricted to the analysis of budgets for a single preceding year, because after a year of being stored these records are destroyed (Gribov 1968a); this of course prevents any analysis of trends over a series of years. Korovkin argues that this arrangement of independent processing is harmful: it "delays research, uses the time of researchers in an irrational manner, and disperses State resources". In order to come to our own judgement, we shall focus on two case studies of research projects based on independent processing of survey data.

The two case studies represent different aspects of the study of consumer demand. The study of the consumption of everyday services conducted at the Moscow Technological Institute (Gribov 1968a, 1968b) is a detailed examination of the factors influencing consumer demand for various very specific services. The study of consumption patterns conducted at the Central Economic-Mathematical Institute (TsEMI) under the supervision of Aivazyan and Rimashevskaya (Tipologiya... 1978), on the other hand, is an

attempt to construct typologies of consumers and of consumption items over the whole range of goods and services using multivariate mathematical-statistical methods of cluster analysis.

In his study of everyday services, Gribov first considered using Form No.1 as the starting-point for his independent processing. Form No.1 "Budget of Worker and Employee" contains five items which are regarded as belonging to "everyday services":

1. sewing and mending of clothing and footwear;
2. repair of cultural products;
3. repair of furniture, household goods and electrical appliances;
4. baths, laundry and hairdressing; and
5. wages paid for capital and current residential repairs and new construction.

Form No.1 also shows amounts paid to State service enterprises and to private persons respectively for these services.

These data, complains Gribov, are neither disaggregated enough nor comprehensive enough for his purposes. Some services are not covered, while points 1, 3, 4 and 5 are really groups of services. Thus, point 1 groups four distinct services: sewing of clothing, sewing of footwear, mending of clothing and mending of footwear; dry cleaning and dyeing are also subsumed under this item. In order to study the factors influencing consumption in regions with different climatic, national and other peculiarities, each service must be studied separately. The nomenclature - presumably all-encompassing in scope - which he recommends for use is that of Form I-byt; this consists, in fact, of four forms on which enterprises providing everyday services make their statistical reports to TsSU (Posobie... 1980, pp.389-395).

Gribov accordingly took recourse to the auxiliary family records, in which expenditures are recorded in detail sufficient to identify each

type of service. Data were laboriously extracted on "expenditures on a number of basic industrial services in 1965 from the budget records of 456 families of Moscow workers and employees with three or four family members". The data were used to study the influence of income, family size and family composition on consumption.

From the tables in Gribov (1968a), it appears that Gribov managed in this way to assemble data on "all (everyday) services" taken together, and on only five specific services: four components of item 1 (above) - sewing of clothing, mending of clothing, mending of footwear, and dry cleaning and dyeing, and one of the components of item 3 - repair of everyday electrical appliances. The labour involved must have been colossal; to limit it he had to leave a majority of everyday services out of the study - and to break his own principles by merging two services together (dry cleaning and dyeing). His demand that each service listed on Form I-byt constitute a separate item in the collection and processing of FBS data by TsSU is understandable in this light.

But what Gribov demands in one area of services could with equal justification be demanded by other researchers in all other segments of the entire range of goods and services. Comprehensive nomenclatures would impose wholly impracticable burdens on both interviewers and data processors. Korovkin (1969) argues that computerisation should make it possible to incorporate into the TsSU programme "the processing of all indicators needed for research". Even passing over the faith in the infinite capacity of computers, this is to overlook the work required to prepare the data input. While recognising the need to improve the use-value of the TsSU processing programme, and the need to organise matters so that special exercises like Gribov's can be carried out as efficiently as possible, the idea that such exercises can be made redundant by providing in advance for the routine generation of all the data that any researcher might conceivably

want is a typical example of absolutist Soviet self-delusion. Independent data-processing by outside institutes is not inherently inefficient, though its advantages need in each instance to be weighed against those of an independent special-purpose survey (as advocated, for example, by Ignatovich 1975).

The data base of the TsEMI study comprised the annual Control Notebooks of 524 family budgets from two (unidentified) towns. The contents of these Notebooks were considered broadly sufficient for the purposes of the research, though more detailed information on the acquisition of industrial goods would have been welcome, as would have been data on the ages of family members, which - it was suspected - might possibly have affected the typology of consumers had age been among the data collected in the FBS. Information was transferred from the unwieldy Control Notebook on to forms specially designed to be more compact. In the computer analysis 125 variables were used, of which 100 were consumption items. These variables were selected as those "most informative", thought by the researchers most likely to highlight essential patterns. Restriction of the number of variables, it is held, involves no loss to analytical power and can only bring a gain in clarity by shutting out "surplus noise". One might only wish that some analysis of correlations among a broader set of variables had supplemented the intuitive judgements of the investigators in selecting the variables used.

In this study of global consumption patterns, it was sufficient to rely on the survey forms, of which the Control Notebook is a condensation. The nomenclature of Form No.1 was obviously regarded as sufficiently fine, and no attempt was made to go back to the primary family records. The work was carried out independently of the TsSU processing programme not primarily because TsSU product nomenclatures were unsuitable, but because cluster analysis is too sophisticated a technique to form part of TsSU's

routine processing work. Although many of the 100 consumption variables used may not have appeared in TsSU tabulations, there is no technical reason at this level of product disaggregation why they could not so appear.

Thus if an investigation requires product disaggregation finer than it is practicable to provide for in routine processing of FBS data, a special data-processing exercise is inevitable. If such disaggregation is not needed, independent analysis may still be necessary where it is desired to use techniques other than those routinely employed.

5 Product nomenclatures of the FBS and of trade statistics

We see from Table C5.4 that the nomenclatures of the survey of workers' and employees' budgets and of the statistical reports of trade establishments are of roughly the same order of disaggregation, with the former somewhat finer than the latter: 117 items as against 91 in 1976. However, it seems that the two nomenclatures do not correspond at all closely: they "speak in different languages" (Rimashevskaya 1971). There are repeated proposals that the FBS nomenclature be brought into line with the nomenclature used on Form 3-torg, the form on which trade establishments make statistical reports of deliveries, stocks and sales (Levin 1969, Korovkin 1969)[11]. It is a matter for speculation why it is always proposed to bring the FBS nomenclature into line with the trade statistics nomenclature rather than vice versa: the latter may be considered superior, but more crucially it may be assumed that the far-flung trade network cannot be expected to adapt itself to such a relatively unimportant institution as the budget survey.

Korovkin (1969) gives examples of what this adaptation would involve for the product nomenclature of FBS tabulations. The category "products in domestic use" used in the processing of workers' budgets corresponds to three items in Form 3-torg: "metal kitchenware and other metal products", "glass, china or porcelain kitchenware" and "sewing machines". Similarly,

"furniture" in the former corresponds to four items in the latter: "furniture", "metal beds", "carpet items" and "other items of household furnishing". The category "cultural products" in the processing of collective farmers' budgets corresponds to four items in trade statistics: "sports products", "musical products", "toys" and "other cultural products". Thus the aim of bringing the survey data into correspondence with trade statistics is consistent with other motives for disaggregating survey categories, but imposes a detailed scheme which may differ from what might be chosen as optimal from the point of view of meaningful analysis.

Why do economists consider it so important that the nomenclatures used by the two data sources be at least comparable? Comparability would facilitate the combined use of the two in research and planning: at present researchers and planners can use both sources jointly only by resorting to "supplementary hypothetical calculations which lack the necessary accuracy" (Korovkin 1969). Combined use, in turn, is considered indispensable because neither source on its own is thought adequate for research or planning. Trade statistics are supposed reasonably reliable but cannot be used to analyse consumption by social or income groups; FBS data can be differentiated by social or income groups but are known to be highly unreliable, mainly on account of their unrepresentativeness. By means of collation with trade data, however, it is possible to derive corrective coefficients the application of which is believed to make FBS data usable. Thus the pressure to adapt the FBS product nomenclature ultimately derives from the poor design of the FBS sample[12].

We may note that the trade statistics nomenclature, which is used as a standard for assessing the FBS nomenclature, gradually becomes finer and more extensive over time as the range of products it must cover diversifies (Section 2). The proposals of Soviet economists for further refinement of the trade statistics nomenclature are set out in Table C5.6. The narrower categories are considered necessary to bring statistics and planning closer into touch with the very detailed nomenclatures used by trade organisations

TABLE C5.6

PROPOSALS MADE BY SOVIET ECONOMISTS FOR DISAGGREGATING THE PRODUCT NOMENCLATURE OF RETAIL TRADE STATISTICS

Type of product	Proposals made	References
Food products	Replace "meat and meat products" by "pork", "mutton", "beef", "meatballs", "minced meat" etc	Levin and Yarkin (1976)
	Replace "milk products" by "milk", "kefir", "sour milk", "cream", "cottage cheese", "smetana", "cheese" etc	Levin and Yarkin (1976)
Clothing	Replace "clothing" by "coats", "suits", "dresses", "jackets", "trousers" etc, broken down by men's/ women's/children's clothing and by type of material	Levin and Yarkin (1976)
	As above, but broken down also by summer wear / winter wear / inter-season wear	Levin (1969)
	Separate out "woollen shawls" from "woollen products"	Korovkin (1969 pp 125-6)
	Separate out "other knitted items" (gloves, mittens, scarfs, mufflers etc) from "knitted products"	Korovkin (1969 pp 125-6)
Furniture	Replace "furniture" by "tables", "chairs", "armchairs", "cupboards", "sideboards", "couches", "beds", "suites" etc	Levin and Yarkin (1976)
Other non-food products	Separate out "motor cars" from "other non-food products"	Korovkin (1969 pp 125-6)

in formulating their orders to industry:

> Broad product groups such as clothing are represented (in trade statistics) by only one line. But trade orders to industry distinguish about 200 types of clothing. There is no question of introducing all 200 into the reporting of sales, but a certain amount of disaggregation will help us to forecast seasonal fluctuations and to take account of changes in the sex-age composition of the population - for example, we should distinguish among men's, women's and children's clothing, and among winter, summer and inter-season wear (Levin 1969).

Levin argues that knitted products, electrical products and so on should be similarly disaggregated. Such disaggregated accounts are now kept in a special sample of trade enterprises (Shenfield 1982a, p.19). It is generally recognised, however, that the possibilities of disaggregation in the trade network as a whole are limited by the need to avoid excessively complicating record-keeping in a branch of the national economy which handles a larger volume of accounting data than any other branch as it is (Davidovich et al 1972, p.169). So the linked pressures for the elaboration of the product nomenclatures of both trade statistics and the FBS come up against similar constraints on the scale of data collection and processing[13].

6 Product nomenclatures of the FBS and of production planning

In Section 5 we considered the problem of comparability between the nomenclatures of the FBS and of trade data. However, some economists (for example, Levin and Yarkin 1976) argue not only that these two nomenclatures need to be brought into line, but also that - in order to facilitate the planning of production for the satisfaction of demand as forecast - the unified nomenclature must then be made compatible, if not identical, with the nomenclature used in planning the output of industrial branches.

The problem is expounded with admirable force and clarity by Dudkin (1968) in a lecture delivered at a conference at TsEMI in 1966 on consumption

modelling (Opyt... 1968, pp.264-274). The title of the lecture is "the experience of calculations of an optimal balance of the national economy using demand functions, and the requirements they impose on consumption statistics". In 1964-5 Dudkin elaborated a static model of an optimal material balance for the plan up to 1970, presumably at TsEMI (his institutional affiliation is unclear); he refers also to similar work carried out at the same time in the Main Computer Centre of Gosplan USSR. He is clearly a person with practical planning experience and so aware of facts which, he complains, scholars tend to neglect. On the evidence of the other lectures delivered at this conference his complaint is fully justified.

At the same time as the "objective technological and production data" available to mathematical economists become more precise, argues Dudkin, they "have to rely in their optimising calculations on increasingly subjective assessments of final consumption. To construct models of optimal long-term planning, it is necessary above all to work out demand functions on a product nomenclature which groups together products produced on the same equipment." Even theoretical, let alone practical, research on these demand functions remains inadequate. In the absence of guidelines on future demand expressed in usable form, "practical planning calculations of detailed final consumption by planning agencies" rely on "extremely hypothetical and subjective" demand forecasts. The production and investment plans which result turn out seriously discrepant with the pattern of demand. If such misleading subjective assessments are to be avoided, demand functions for families of different types on a detailed and appropriate nomenclature must be constructed: there is no third way.

The system of classification of products used in production planning varies with the planning technique. At one point Dudkin refers to the nomenclature in which the material balances are compiled by the planning agencies. Elsewhere he is concerned with the nomenclatures used in input-output

models such as the sixteen-branch model for 1970 worked out at Gosplan in 1964-5. This confusion is not crucial, as the problem turns on the opposed principles of classification which divide the nomenclatures of both material balances and input-output tables on the one hand from those of both the FBS and trade statistics on the other. For while the former must be organised on lines relating to production - so as to coincide with administrative boundaries (branch, sub-branch, enterprise etc.) in the case of material balances, or so as to clarify the interconnections of productive processes in the case of input-output tables - it is equally unavoidable that the latter be organised on lines relating to trade and consumption[14].

Let us suppose that an attempt is made to derive demand functions from FBS data. "Correspondence (between the survey nomenclature and the production nomenclature) is unattainable even for the broadest product groupings, so sound planning calculations are impossible." For example, the survey category of "cultural products" covers products of several different industrial branches (engineering and metalworking, wood-processing and paper, glass etc.), and it is impossible to obtain separate functions for the products produced in each branch. The total demand for cultural products could be divided up among the branches involved "proportionally to base-year figures", but the results would not be reliable enough for practical use.

The situation is similar if trade statistics are used (Levin and Yarkin 1976). Thus, the goods in the product category "electrical products" include refrigerators, electric lamps, electric irons, electric floor-polishers, washing-machines and so on made in a number of different industrial branches.

Dudkin reports the methods used in the input-output forecasting study conducted at Gosplan which we have mentioned. The demand function relating demand for "food products", as defined in the FBS, to income had to be taken as the demand function for the output of the food-processing industry. A function for "all non-food products" had to be taken as the demand function

for the output of light industry as a whole[15]. It was necessary to do without demand functions for the products of the remaining branches in the model altogether. Such gross methods are "suitable only for experimental research, not for practical calculations of the optimal plan".

The statistical base, concludes Dudkin, must be reconstructed. He urges that the FBS nomenclature be "re-examined" by TsSU "in order to provide for correspondence or comparability with the nomenclature used in natural-measure input-output tables". That he has limited hopes for what can be achieved in this direction is revealed by his proposal that TsSU also organise a supplementary one-off survey of population expenditures using a detailed production-oriented nomenclature agreed with the corresponding industrial branch ministries. Sixteen years later there is still no sign of any such survey, and its methodology would certainly present a formidable challenge.

Thus the problem of product nomenclatures raises one apparently insuperable barrier to the effective use of the FBS as a tool for planning production and consumption[16].

7 Concluding discussion

We have seen that the product nomenclatures used in the collection, and especially in the processing, of FBS data suffer from serious gaps and excessive aggregation from the point of view of researchers and planners. However, we have also seen that researchers and planners tend to make unrealistically far-reaching demands on the FBS. Even with rationalisation of the survey programmes - for which there is no doubt ample room - and with expansion (within plausible limits) and improved training of the labour force working on the survey (substantial enough as it is), we cannot conceive of the FBS providing data of the quantity and quality considered necessary by its critics for the analysis and effective planning of consumption.

Rimashevskaya (1968b, 1971) has herself pointed out the impossibility of conceding all the demands made on the survey:

> The programme of observation contains 2-3000 questions and proposals are being made all the time to add to it because there is no answer to such and such a question. (This) would make the survey even more unwieldy and inefficient. How many thousands of questions can the budget form contain?

Therefore, if newly arising requirements are to be met, she continues, the programme must not be added to but changed, and indicators which are no longer of great value must be dropped. Greater reliance could be made on one-off supplementary enquiries (Karapetyan, Rimashevskaya and Sidlyarenko 1967). But there is resistance to the dropping of questions. Matyukha, replying as Head of OBS TsSU USSR to critics of the survey at the 1969 conference on the study of consumer demand (Organizatsiya... 1971), rejects the idea that more room could be made for consumption data by collecting less information in other areas:

> Some comrades say that it is necessary to deal more specifically with consumer demand in the budget survey, to broaden significantly the range of goods in the survey programmes, throwing out income and other questions. One may not of course pose the matter thus (Matyukha 1971).

Matyukha tries to meet his critics by suggesting that the data in which they are interested be gathered in a separate survey (of the same poor sample):

> It is not excluded that the sample also be surveyed on a special programme adapted more closely to the task of studying consumer demand. It's worth the staff of VNIIKS (the market research institute) and of the TsSU Department of Budget Statistics thinking about that. I think that such programmes must be worked out next year.

This is another mooted special-purpose survey of which we hear no more. In any case, the basic problems could scarcely be overcome by multiplying the number of surveys. This is true in particular of the problem of

determining product nomenclatures.

A competently and efficiently designed budget survey, using a product nomenclature representing some sort of compromise among the contradictory needs of different survey users, could provide a great deal of reasonably reliable and relevant information for purposes both of academic research and of general macro-planning. Supplementary surveys on a smaller scale could serve various specialised interests, such as detailed market research, as could projects for the supplementary processing and analysis of the data of the main survey. The Soviet budget survey in its present form is far from reaching even these standards, modest by comparison with the ideal standards required by the professed aim of providing (in the areas it covers) an adequate data base on which planners working within the existing system of detailed directive micro-economic planning could guarantee the exact satisfaction of future consumer demand.

Notes to Chapter C5

1 In 1967 the survey covered six goods: radios, TVs, refrigerators, washing-machines, vacuum-cleaners and sewing-machines. In 1972 six more were added: loudspeakers, cars, motorcycles, bicycles and mopeds, cameras and watches. In 1975 tape-recorders were added, radios, loudspeakers and watches dropped. The data were processed by per-capita income groups, for workers and employees and for collective farmers separately, by Republic and for the USSR as a whole. But "the information, representative of the USSR and of each Republic as a whole, is not fully representative of the rural population of some Republics", inconsistently admits Baltsevich (1980).

2 See Chapter B9. The microcensus covered 240,000 families in 1958, when it was conducted for the first time, and 310,000 families in 1975. Data on consumer durables did not figure in the survey programme in the early years (Zhutovskaya 1966), but the Deputy Head of OBS TsSU USSR reports them as part of the plans for the 1975 survey, and not under the heading of "new data", the implication being that this was not the first time they were to be collected (Vorontsova 1975). Like the FBS, the microcensus is organised on the branch principle, harming the representativeness of its data, and it at first excluded the rural population.

3 Thus information on consumer durables was collected in the surveys conducted by various institutes using the "method of momentary observations" (see Chapter B11). The Armenian survey of 1962-3 recorded the presence of 21 types of consumer durable, what durables had been acquired in the previous two years and places of purchase (to assess the degree to which local shops were meeting the demand) (Balansy... 1969 Chapter 2). The market research institute VNIIKS conducted a survey of the periods of functioning of consumer durables in 1977 (Myasin and Frenkel 1981).

4 Some items in Table C5.5 - those starting with the word "other" - are not specifically listed by Yezhov. An analyst with access to the tabulations could,however, derive data on them by subtraction. For example, data on "other footwear" could be derived from the tabulations on "footwear" and on "leather footwear". The nomenclature given in the Table is thus in part implicit.

5 Yezhov provides no information on tabulations of employees' budgets. Korovkin (1969) reveals that consumption data are processed for workers in industry but not for workers outside industry or for employees.

6 Cloth piece goods, headwear, underwear, knitwear, stockings and socks, haberdashery, watches, clocks, sports equipment etc., cars etc., household utensils, electrical appliances, soap, toiletries, drugs etc., tobacco, fuels, building materials, sanatoria etc., medical treatment, baths etc., transport, post etc., various repairs items, insurance.

7 The year in which Rimashevskaya writes this is very close to the year in which the Forms reproduced by DePauw were in use (1963). The lack of correspondence between her points and the items on Form No.1 is therefore rather worrying: only points 2 and 4 clearly correspond to items in the nomenclatures of Form No.1; point 5 is an aggregate of several items; and points 1 and 3 cannot be found there at all. Perhaps these are not meant to be items on Form No.1, but are categories used in independent processing of family records.

8 As we do not have a full list of the food items on Form No.1, we do not know for certain whether tea is distinguished from other non-alcoholic drinks on it. It would be surprising if it were not, in view of the large total number of food items.

9 The institutes the involvement of which Korovkin mentions are: the institute of labour research NII-truda, the trade institute NIITOP, its equivalent in the Ukraine UkrNIITOP, and the economics institute of the State Planning Commission NIEI Gosplan.

10 For example, the studies of income distribution in Rimashevskaya (1965) are based only on the processing of the budgets for the Armenian Republic (Shenfield 1982b). Strictly speaking, limited resources does not fully explain the fact that the studies are nearly always local in character. They limit the amount of data that an institute can process, but the data could be drawn from across the USSR. Instead of analysing all budgets (or a large proportion of budgets) from one area, a narrow cross-section of budgets - say, of families with many children - could be taken from the country as a whole. The deciding circumstance may be that it is simpler and easier for an institute to obtain the cooperation of a statistical office in its own locality than to gain the approval of TsSU USSR for its project (point made by Professor Yu.V.Arutyunyan in conversation with the writer; see Shenfield 1981).

11 In speaking of the product nomenclature of retail trade, we refer to that used to record turnover; there are discrepancies between the nomenclatures for turnover and for stocks (Korovkin 1969).

12 For fuller discussion of the combined use of FBS data and trade statistics see Chapters B9 and D3.

13 Not all of the pressures are for disaggregating the product nomenclature of trade statistics. Korovkin (1969) argues that in some product areas aggregation is desirable: "Many data needed for analysis and planning are absent while many reports are overburdened with superfluous detail which is almost never used." But most of the commentators neglect this point, and press for the disaggregation rather than the rationalisation of nomenclatures.

14 The distinction between the nomenclatures of material balances and of input-output tables, on the production side, is that only the former - in order to play their role in the iterative planning process - have to be consistent with the administrative structure of the economy. It is very far from true that each branch produces products of a similar type (whether from a production or from a consumption point of view) or that products of any one type are produced in only one branch. Defence industry, for example, produces many consumer durables. In input-output tables an effort is made to construct "pure" branches free from such quirks. The discrepancy between such branches and the really existing administrative branches is one of the difficulties facing the use of input-output analysis in operative planning.

On the consumption side, the nomenclature of trade statistics is presumably much influenced by the administrative structure of the trade network (types of wholesale depots and shops etc.). The nomenclature of the FBS is obviously not constrained by factors of this kind, but is limited by what it is practical to demand of interviewers or data processors. Without special training, for example, it would not be practical to require them to determine the branch of industry in which particular products had been produced. A theoretically ideal nomenclature from the point of view of analysis of consumption patterns, analogous to the "pure" input-output nomenclature on the production side, would group together goods and services purchases of which tended to be (positively or negatively) correlated. Studies like the one by TsEMI discussed in Section 4 could serve as a basis for such a nomenclature. To a large extent it would reflect the substitutability and complementarity of products in demand.

15 It seems that calculations using FBS data by the economist V.V.Shvyrkov were relied upon.

16 It is of interest in this context to note that systems of models proposed for consumption planning occasionally include an input-output model of production and distribution (Aganbegyan 1960, Mints 1976 p.171) but that there is scant sign of practical work to connect input-output models with demand forecasting models (see Chapter D3).

PART D

THE USE MADE OF FBS DATA

CHAPTER D1

SURVEY OF THE USE MADE OF FBS DATA

1 Introduction

In this chapter we begin our examination of the uses to which FBS data are put in the USSR. We introduce a classification of the actual and potential uses of FBS data in Section 2. In Sections 3-6 we briefly consider four fields in which FBS data may be used: welfare policy, retail price policy and the construction of retail price indices, the investigation of socio-demographic problems, and study of the contribution of private plot husbandry to agriculture. Two further fields in which FBS data are used are discussed at greater length in Chapters D2 and D3: the compilation of statistical and planning balances, and the analysis and forecasting of consumer demand. Chapter D4 is concerned with an example of a field in which FBS data could be, but are not, used: study of the consumption of alcoholic drink. In Chapter D5 Part D is concluded with a general assessment of the use made of FBS data and a discussion of the interaction between the organisation of the survey and the demands made upon it by actual and potential data users.

2 Classification of the actual and potential uses of FBS data

Our classification of the actual and potential uses of FBS data is shown in Table D1.1. The data are used in economic and planning calculations of various kinds, in the retrospective and prospective assessment of the impact of welfare and price policies on the standard of living of different population groups, in demand forecasting and in the investigation of social problems of concern to policy-makers, such as the use of labour resources

TABLE D1.1

CLASSIFICATION OF THE USES MADE OF FBS DATA

A. ACTUAL USES MADE OF FBS DATA

1. The "traditional study" of living standards by TsSU (1)
2. General planning calculations
   (a) calculations of national income, the real incomes of the population etc
   (b) compilation of statistical and planning balances (see Chapter D2)
      - balance of the money incomes and expenditures of the population in extended form (2)
      - differentiated balance of the money incomes and expenditures of the population (3)
      - balances of the production and disposal of agricultural products
      - balance of labour resources (4)
3. Retrospective and prospective analysis of the effect of welfare measures (changes in minimum wages, pensions and other social payments etc) on the standard of living of different groups of the population (see Section 3 of this chapter)
4. Retrospective and prospective analysis of the effect of price changes on the standard of living of different groups of the population (see Section 4 of this chapter)
5. Investigation of socio-demographic problems of concern to policy-makers (unused labour resources, factors influencing the birth rate etc) (see Section 5 of this chapter)
6. Analysis of the private-plot economy (see Section 6 of this chapter)
7. Analysis and forecasting of consumer demand (see Chapter D3) (3)

B. SOME OF THE USES WHICH COULD BE MADE OF FBS DATA

1. Construction of retail price indices (see Section 4 of this chapter)
2. Analysis of the consumption of alcoholic drink (see Chapter D4)

Sources: Matyukha (1966, 1974), Vsesoyuznoe... (1969 pp 24-5), Sukhoruchkina (1970), Posobie... (1980 p 369)

TABLE D1.1 (cont'd)

Notes:

(1) In the words of T V Migai: "the traditional study of the course of fulfilment of Party-Government decisions concerning the standard of living" (Sukhoruchkina 1970) - that is, the standard programme of tabulations (see Chapter C3)

(2) This balance is used to plan monetary circulation. The balance in extended form covers transactions between population groups (workers and employees, collective farmers) as well as transactions between the population and the State.

(3) This work is carried out primarily in research institutes outside TsSU, but may be introduced into the TsSU programme in the future.

(4) The use of FBS data in the compilation of this balance is mentioned by some sources, but further information is lacking.

and influences on the birth rate. Soviet sources mention that FBS data are used in macro-economic calculations of the national income (for example, Posobie... 1980, p.369) but without giving any details of such use. This is probably an indirect use of FBS data: the data are used in the compilation of statistical balances of incomes and expenditures of the population (see Chapter D2), and these balances are presumably made use of in macro-economic calculations.

Only a few of the many potential uses of FBS data are indicated in Table D1.1. One contrast between Soviet and Western practice should be noted: FBS data are not used in the construction of retail price indices, although this is one of the main uses to which budget survey data are put in Western countries.

3 The use of FBS data in the field of welfare policy

FBS data are used by TsSU to assess the impact that State welfare measures have had on family budgets. Thus, at a meeting of TsSU personnel in 1970, I.Ya.Matyukha stated that "it is important to analyse the changes in incomes and consumption that have arisen from the implementation of the decisions of the Twenty-Third Party Congress - the rise in the minimum wage, the rise in the wage-rates of machine operators, the reduction of taxes for those earning not more than eighty rubles per month, the introduction of guaranteed incomes on collective farms, the expansion of social services etc" (Sukhoruchkina 1970). V.N.Starovskii added at the same meeting that the "economic and social results" of the rise in the wages of workers on State farms and of the introduction of social insurance for collective farmers must be studied. We lack the information needed to assess the methods used in analyses of this kind.

As well as retrospective analyses of the effects of policy decisions already taken, TsSU also uses FBS data to estimate the effects of possible future policy changes. The most important known instance of this was the use

of tabulations of FBS data in designing the scheme for family allowances for families with up to fifty rubles per-capita income per month which was introduced in 1974 (Matyukha 1973 p.134). This was possibly the most significan use that has been made of the FBS in framing Soviet policies. Recently, with the extension of the FBS sample to cover old-age pensioners, FBS data have been used "to carry out tasks associated with the improvement of pension provision" (Ekonomicheskaya... 1983, p.377). A.Kh.Karapetyan discusses the use of FBS data to compare the effectiveness of different methods of raising the real incomes of the population - increases in the minimum wage, increases in social benefits, price cuts etc. (Metodologicheskie... 1959, pp.80-85). Again, very little information is available on the methods used in these calculations.

The FBS is an essential data source for calculations pertaining to welfare policy because, unlike other sources of data on social expenditures (pensions, grants, education, health-care etc.), it permits breakdowns by socio-economic group. For this reason Drits (1968, pp.315-6) urges that the coverage of social services in the FBS programme be extended, that the representativeness of the FBS sample be improved, and that the FBS be supplemented by a periodic survey (every three or four years) of the social services received by families.

To the extent that analyses based on FBS data do actually serve as a guide to policy decisions in the welfare field, one would expect the success of policies in achieving their purposes to be limited by the unreliability of FBS data. There is in the literature one hint that this is so. Karapetyan (1980, p.253) reports that the calculations of the resources needed for the introduction of family allowances in the 1950s exposed the lack of representativeness of the FBS, and that this led to the decision to conduct the first microcensus (incomes survey) in 1958.

That biases in the FBS can give rise to serious misjudgements of social

conditions is indicated by an editorial footnote of N.M.Rimashevskaya in Karapetyan (1980, p.81). Rimashevskaya comments that in the 1950s

> ...there existed a generally accepted point of view according to which the main cause of poverty was families with many children. This point of view was to a significant extent based on the results of TsSU's analysis of income statistics. But neither the FBS nor the September wages survey covered the population as a whole, especially those excluded from production by disability. Later research and special surveys showed that poverty was caused both by large families and by the relatively low level of provision for the disabled[1].

The point of view criticised must have been a persistent one, for the research to which Rimashevskaya refers is quite recent in origin:

> Special research into the material situation of the disabled, especially in family breakdown, has not been carried out in our country. Until recently the information which would have made such an analysis possible has been lacking. It was obtained relatively recently thanks to a special survey, conducted in several towns (Taganrog, Kostroma, Tallin), of the situation of (old-age and other) pensioners and of its effect on other population groups (degree of family support, effect on family incomes etc.).
>
> ...This research has again demonstrated the erroneousness of the idea that large families is the only or main reason for the existence of low-income families. Inadequate provision for people unable to work as a result of disability or old age is a factor of no less importance (Rabkina and Rimashevskaya 1978, pp.27-29).

In conversation with this writer, Rimashevskaya commented that adequate records of the number of disabled people have always been available but that it had been assumed, before the special surveys were conducted, that a higher proportion of the disabled were members of households containing wage-earners than is in fact the case (Shenfield 1982b). It is reasonable to conjecture that the exclusion of households consisting of pensioners and the disabled from the FBS has both reflected official neglect of the problems of these social groups in the USSR and contributed to such neglect.

4 The use of FBS data in the field of retail price policy and their non-use in the construction of retail price indices

Soviet researchers have used FBS data to analyse the effect of retail price changes on the consumption pattern of different income groups. For example, L.I.Sadunashvili (1962) carried out such an analysis on expenditure data relating to four different per-capita-income groups of workers in the USSR[2].

It is sometimes observed that price coefficients of elasticity of demand, calculated on the basis of FBS data, may be used to determine "correct price ratios" (Mints 1968). One also comes across explicit claims that FBS data are used "to set new prices and tariffs for consumer goods and services" (Ekonomicheskaya... 1983, p.377)[3]. However, we have found no evidence to substantiate this claim.

Sarkisyan (1972, pp.45-7) argues that the effect of price changes on different social and regional population groups could be monitored by constructing a retail price index weighted by the average consumption structure of each such group. Unlike the price indices at present calculated by TsSU, which are based on official price statistics, such indices would be based on FBS data. Sarkisyan points out that family budget data are used in the construction of price indices both in capitalist countries and in other socialist countries, and that they were used for this purpose in the 1920s in the USSR. He reports that the Department of the Standard of Living of the Scientific Research Institute of Labour has worked out a methodology for constructing FBS-based indices and has made experimental calculations. It is not clear why TsSU has ignored such recommendations to bring the USSR into line with international practice.

5 The use of FBS data in the investigation of socio-demographic problems

FBS data are occasionally used to investigate socio-demographic problems

of concern to Soviet policy-makers. Thus, Head of the Budget Statistics Department of the Ukrainian TsSU T.V.Migai reports a study by the Ukrainian TsSU,on the basis of FBS data, of non-employed persons and of the factors impeding their entry into employment (Sukhoruchkina 1970). We have no information on the methodology of this analysis.

Study of the influence of socio-economic factors on the reproduction of the population is mentioned as one of the possible uses of FBS data, in combination with the data of other surveys, in Kurs... (1982,p.420). However, the sociological studies of the determinants of the birth rate which we have examined are based solely on specially designed sample surveys and make no reference to the FBS (Rodzinskaya 1981, Siks 1983). Whether this was because the researchers regarded the FBS as a valueless data source for their purposes or because they were unable to gain access to FBS data is not known.

6 The use of FBS data in the study of the contribution of private plot husbandry to agriculture

Most agricultural statistics compiled by TsSU are derived from the statistical reporting of collective and State farms, subsidiary State agricultural enterprises and agricultural procurement organisations. These reports, however, cover only the social sector of the agricultural economy. Information on the private plot sector must be obtained from various other sources - from the FBS, from the survey of collective farm markets, from the annual census of private livestock and poultry, and from occasional surveys on time budgets and other topics. Among these sources it is the FBS which plays the most important role: most types of data on the private-plot economy can be obtained, if they can be obtained at all, only from the FBS.

Thus, the FBS is the only source of data on the output of different agricultural products from private plot husbandry (Sergeyev 1983,pp.165-6,

236); the determination of such output is, according to the then Head of TsSU V.N.Starovskii, one of the main uses of FBS data (Vsesoyuznoe... 1969, pp.24-5). The FBS is likewise relied upon for data on the outlay of feed in private plot husbandry (Sergeyev 1983, pp.243-4, Ryabushkin and Skvortsova 1982)[4]. Although data on the numbers of privately owned livestock by type are given by regular censuses of privately owned livestock as well as by the FBS, only the FBS gives data on the quantities of animal products yielded by these livestock - eggs, milk, wool, honey etc. (Sergeyev 1983, p.236). It is only from FBS data that losses of agricultural products, feed and privately owned livestock in the course of private plot husbandry can be estimated (Ryabushkin and Skvortsova 1982). Data of this kind are used by TsSU in the compilation of balances of the production and disposal of agricultural products (see Chapter D2).

Biases in the FBS sample of collective farmer households such as the exclusion of households sharing a cow with another household and of households without able-bodied members (see Chapter B4) have an especially deleterious effect on the representativeness of data on private plot husbandry. It is the inadequate representativeness of FBS data on privately owned livestock that makes the conduct of complete censuses of privately owned livestock necessary. This is confirmed by a speech of V.N.Starovskii to a meeting of TsSU personnel, whom he urges to "pay attention to the representativeness of the collective farmer sample on the indicator of privately owned livestock", commenting that

> If we can obtain undoubtedly representative data on (privately owned livestock), this will enable us in future to discontinue the complete censuses of (privately owned livestock) (Sukhoruchkina 1970)[5].

Apart from the problem of representativeness, the very detailed primary data on private plot husbandry collected in the FBS (including, for example, data on the use of working time by collective farmers) are known to be of

unreliable quality (see Chapter B5). This may be the reason why normative methods appear usually to be used to assess gross and net family incomes derived from private plot husbandry in preference to using direct FBS data[6].

Another deficiency of the FBS as a source of data on private plot husbandry is that it covers not the whole of the private plot economy but only the private plot husbandry of collective farmer families, collecting no data on the private plot husbandry of the many families of workers and employees who have private plots. Thus, norms based on the average output of agricultural products from the private plots of collective farmers are used to estimate the output from the private plots of workers and employees living in rural areas (Sergeyev 1983, pp.165-6). We are informed that in setting these norms "differences in the agricultural technology" used on the private plots of collective farmers and on those of workers and employees are taken into account, but we are not told how this is done. In the absence of data on the private plot husbandry of workers and employees, the adjustment is presumably made by "expert assessment"[7].

The special problems entailed by the use of FBS data on private plot husbandry in regions with a pattern of agriculture different from that typical of the RSFSR, the Ukraine and Belorussia are discussed by a Senior Economist in the Georgian TsSU, M.Morozov (Morozov 1961). He complains that the standard programme of collection and processing of FBS data, imposed on all the Republic TsSU's by TsSU USSR, adequately covers only indicators of field-crop cultivation, livestock-rearing and vegetable-growing. Natural and economic conditions in Georgia, however, are extremely varied, with no fewer than thirteen agricultural zones and sub-zones characterised by different agricultural specialisations (grain-livestock, mountain-livestock, vineyard, subtropical crops etc.). The leading branches of production in the private plot sector are horticulture and viniculture, accounting for over 40 per cent

of gross output. The data given by the FBS on private plot husbandry in Georgia - and, we must assume, in other Republics with a "deviant" pattern of agriculture as well - are therefore highly inadequate.

Thus, collective farmer budgets contain no data on the areas under tea-leaf, noble laurel, tung-tree, mulberry and other citrus fruits, or on the yields of these crops. These data have to be derived indirectly from other sources of information. Up to at least 1960, the areas of citrus-fruit plantations were estimated using the 1952 levels as a starting-point and making allowance for the maturation since then of some young plantations. Estimates of yields were based on reporting of procurements, to which were added "expert assessments" of quantities of products consumed by the producing households and sold by them on the collective farm markets. These indirect estimates were known to be insufficiently reliable[8].

Notes to Chapter D1

1 The word "poverty" is used here for convenience, although the corresponding Russian word bednost' never appears in Soviet discussions of conditions in the USSR. Instead the term maloobespechennost', or "low level of material provision", is used, which presumably lacks the undesirable ideological overtones of bednost'.

2 The data used by Sadunashvili were taken from Korzhenevskii (1959, p.21).

Leifman (1962) complains that the analysis of the dependence of consumption on prices is distorted by the practice in the FBS of valuing products acquired by collective farmers from their private plots and from collective farms in natura at State retail prices. When retail prices change, it appears that the structure of expenditure has changed, even though the pattern of consumption may have remained as before.

3 See also Karapetyan and Rimashevskaya (1959).

4 FBS records show, for each type of livestock (cows, other horned livestock etc.), the total number of days feeding in the month and the corresponding outlay of feed (Sergeyev 1983, pp.243-4).

5 As the rules according to which the selection of collective farmer households for the sample is conducted guarantee bias by excluding certain categories of household from the survey, it is difficult to understand why Starovskii imagines that data representativeness can be achieved simply by "paying more attention" to carrying out the standard representativeness checks (see Chapter B6). Either he is not aware of the rules or he does not grasp their significance.

6 However, Karapetyan (1980, p.255) seems to attribute the resort to normative methods to the complexity of calculations using FBS data: "We lack reliable practical means of determining gross and net family incomes derived from private plot husbandry; too much scrupulous accounting and calculation would be needed". He tells us that the norms used are "taken from indicators of agricultural enterprises operating in similar natural-climatic and production conditions". The differences between the methods used in State or collective agricultural enterprises and those used in private plot husbandry must make the norms highly misleading. TsSU does, however, undertake occasional special studies of private plot husbandry on the basis of FBS data, in which incomes derived from private plot husbandry are presumably directly estimated. For example, TsSU Estonia planned in 1970 to make a study of the role played by private plots in the income and consumption of collective farmer households (speech by E.N.Veyersalu, Sukhoruchkina 1970).

7 It appears from Sergeyev (1983) that data on the private plot husbandry of collective farmers but not on that of workers and employees are collected even now that the formerly separate budget Forms No.1 for workers and employees and for collective farmers have been unified. It is not clear how this is to be explained; the information given by Sergeyev is conceivably out of date.

8 Until the late 1950s such tasks as the compilation of balances of agricultural products and calculations of the productivity of agricultural labour had been carried out only at the level of the USSR as a whole. Morozov therefore put forward his complaints soon after the Georgian TsSU had begun to do such work, encountering the difficulties he describes. There has been no indication of any response by TsSU USSR to the complaints.

Morozov notes that other sources of data on private plot husbandry, created by TsSU USSR to supplement the FBS, similarly failed to take account of the special features of the agriculture of such Republics as Georgia. In 1959 quarterly sample surveys of 0.7 per cent of the collective farmer households in Georgia were instituted, which collected data on private livestock and their productivity, areas under and yields from crops, fruit trees and so on. But these sample surveys also provided no data on the output of silk, tea-leaf, noble laurel, tung-fruit or hay.

Morozov urges also that the collective farmer sample for Georgia be somewhat increased from its existing level of 0.14 per cent (about the same level of representation of collective farmer households as for the USSR as a whole) to permit more adequate coverage of all the agricultural zones and sub-zones.

CHAPTER D2

THE USE OF FBS DATA IN THE COMPILATION OF STATISTICAL AND PLANNING BALANCES

1 Introduction

TsSU compiles a variety of statistical balances (of the production and disposal of different products, of the income and expenditure of the population etc.) for past periods. These frequently serve as the basis for the compilation of corresponding planning balances for future periods by the planning bodies. There are also statistical and planning balances compiled by other bodies (the trade balances of the Ministry of Trade, the cash balance of the State Bank etc.). Finally, research institutes have devised such additional balances as the "differentiated balance" of incomes and expenditures of the population which have not as yet been introduced into statistical and planning practice.

In this chapter we assess the use made of FBS data in the compilation of these balances. The range of balances in the compilation of which FBS data may be used, and their functions, are reviewed in Section 2. The role played by FBS data in the compilation of balances of money incomes and expenditures of the population is assessed in Section 3. In Sections 4 and 5 we examine more closely two aspects of the compilation of these balances - the assessment of trade on collective farm markets ("collective farm trade") and the assessment of the migration of money from one territory to another, respectively. Section 6 is devoted to the proposals for a differentiated balance of money incomes and expenditures of the population. In Section 7 we consider the role of FBS data in the compilation of balances of the production and disposal of agricultural products. Some general conclusions

about the use of FBS data in this field of planning work are drawn in Section 8[1].

2 The range of balances in the compilation of which FBS data may be used

Balances of many different kinds are compiled by TsSU, Gosplan and other bodies[2]. The FBS is not a relevant data source for the compilation of certain kinds of balance, such as the material balances used to coordinate the planning of production and the "inter-branch balance" (input-output table). It is claimed by Shvyrkov (1965, pp.14-15, 1966, pp.162-6) that FBS data are used:

(a) by TsSU and by Gosplan to compile report and plan balances respectively of the money incomes and expenditures of the population;

(b) by TsSU to compile balances of the production and disposal of various agricultural products;

(c) by the USSR Ministry of Trade to compile the trade balance (torgovoi balans); and

(d) by the State Bank (Gosbank USSR) to compile the cash balance (kassovyi balans).

The balance of the money incomes and expenditures of the population is "the most general form of consumer budget of the population, used to balance the effective demand of the population against the supply of goods and services" (Sayenko 1983). It can be compiled in "reduced form" - that is, without distinguishing between different groups of the population - and in "extended form" - that is, for workers and employees and for collective farmers separately. A typical format of the balance in its extended form is shown in Table D2.1. The FBS is one of the few sources of data on transactions between different groups of the population, and therefore plays

TABLE D2.1

BASIC FORMAT OF THE BALANCE OF MONEY INCOMES AND EXPENDITURES OF THE POPULATION (EXTENDED FORM)

MONEY INCOMES	population as a whole	workers and employees	collective farmers	MONEY EXPENDITURES	population as a whole	workers and employees	collective farmers
I. Receipts from State and cooperative enterprises and establishments, including: - wages - labour payments by collective farms (1) - receipts from sale of products (2) - pensions and grants - receipts from the financial system (3) - other receipts (4)				I. Payments to State and cooperative enterprises and establishments: - purchase of goods (7) - payment for services (8) - payments to the financial system (9)			
II. Receipts from the sale of goods and services to the population (5)				II. Payments for goods and services purchased from the population (5)			
III. Total money incomes of the population Excess of expenditures over incomes (6)				III. Total money expenditures and savings of the population Excess of incomes over expenditures (6)			
Balance				Balance			

TABLE D2.1 (cont'd)

Sources: Margolin (1957 pp 82-3), Statistika finansov (1974 p 70), Sergeyev (1983 p 495)

Notes: (1) Subdivided into payments to collective farmers for labour-days, payments to hired workers, payments to members of fishery collectives etc

(2) That is, agricultural products; subdivided into compulsory deliveries and contractual sales, procurements, sales additional to procurements, sales (to organisations and establishments) on the collective farm market, sales of livestock to collective and State farms etc

(3) Subdivided into interest on savings, interest on State loans, insurance receipts, State loans for private residential construction etc

(4) Subdivided into bonuses and other forms of labour payment, travelling expenses, income from sales to commission shops and procurement organisations etc

(5) Or "receipts from the exchange of goods and services among population groups"; subdivided into receipts from the sale of agricultural products and receipts from the sale of other goods and services to the population. Similarly for payments.

(6) Sergeyev gives an alternative format for constructing the balance: III. is the last line on the incomes side, and the "excess" line on the expenditures side reads "change in the stock of ready cash in the hands of the population (increase +, decrease -)".

(7) Subdivided into purchase of goods in State and cooperative trade, payment of charges to commission shops, purchases from collective farms etc; includes public dining

(8) Subdivided into rent and payment for residential services, payment for everyday services, payments to childcare establishments, payment for stays in sanatoria and rest homes, payments for cinema, theatre and other entertainments, payment for rail, water and air transport, payment for motor-car services and local transport, payment for communications services, and payment for other services

(9) Subdivided into taxes, insurance payments, repayments of loans from the State, payments to social and cooperative organisations (the Party, housing cooperatives etc), increase of deposits held in savings banks, purchase of State loans etc

a very important role in the compilation of the extended balance (Sections 3-5). Proposals for a differentiated balance of the money incomes and expenditures of the population, elaborated to distinguish between different income groups and possibly between different types of family, contemplate even greater reliance on FBS data (Section 6).

The use of FBS data is essential to the compilation of balances of the production and disposal of agricultural products (Section 7) because the FBS is one of the few sources of data on the private plot economy (see Chapter D1).

The role played by FBS data in the compilation of the trade balance and of the cash balance is less clear. The trade balance is compiled by the Ministry of Trade in order to reconcile the plan for the supply of commodities to the trade network with the purchasing capacity of the population, estimated on the basis of the plan balance of the money incomes and expenditures of the population compiled by Gosplan (Ginzburg 1962, Shvyrkov 1966). The balance of money incomes and expenditures of the population is also one of the sources used by Gosbank in the compilation of the cash balance (Ginzburg 1962). It is doubtful, however, whether the entries in the balance of money incomes and expenditures of the population used in the compilation of the trade balance and of the cash balance are based to any extent on FBS data. Textbooks on the administration and planning of trade make little if any reference to the FBS (see Chapter D3). Nor is the FBS mentioned in accounts of the compilation of the cash balance to be found in textbooks on financial statistics such as Statistika finansov (1974,p.79)[3].

3 The use of FBS data in the compilation of balances of the money incomes and expenditures of the population

Annual report balances of the money incomes and expenditures of the

population are compiled for the USSR, Union Republics and oblast'-level territories by TsSU USSR, Republican TsSU's and oblast'-level statistical administrations respectively. Annual plan balances are compiled for the USSR, Union Republics and oblast'-level territories by Gosplan USSR, Republican Gosplans and oblast'-level planning commissions respectively, with the participation of the Ministry of Finance and Gosbank. Methodological instructions for the compilation of the balances are issued by TsSU, Gosplan, the Ministry of Finance and Gosbank. Accounts of the methodology used are given by Margolin (1957, 1960) and Ginzburg (1962).

Up to 1959 the balances were compiled only for the USSR as a whole. Republican balances, the need for which had been recognised by Gosplan at a meeting in 1957 (Soveshchanie... 1957), were introduced in 1960 (Shvyrkov 1966, pp.162-3). It is not clear when balances began to be compiled at oblast' level. Oblast'-level balances had certainly become standard practice by the 1970s[4]. There is even an isolated reference to the compilation of balances in some raiony (Zhilov 1974).

We have noted the distinction between balances in reduced form, which cover only the monetary flows between the population taken as a whole and State and cooperative enterprises and establishments (parts I and III of Table D2.1), and balances in extended form, which trace the monetary flows between each of the two population groups (families of workers and employees, families of collective farmers) taken separately and State and cooperative enterprises and establishments, and also the monetary flows between the two population groups (part II of Table D2.1). Up to at least 1961 the balance was compiled in extended form only for the USSR as a whole (Ginzburg 1962). In the late 1950s and early 1960s there was considerable discussion among economists concerning whether the balances should be compiled in extended form at Republic and oblast' levels. A scholarly conference held at the Ukrainian Scientific Research Institute of Trade (UNIIT) in 1961

recommended that this should be done (Opredelenie... 1962,p.275). It appears that in 1962 or 1963 the balances at Republic level began to be compiled in extended form[5]. Balances at oblast' level, however, were still compiled in reduced form only as late as the mid-1970s (Zhilov 1974, Fridman 1976). The pressure for balances all to be compiled in extended form has therefore been only very partially successful[6].

The advocates of balances in extended form have stressed the need for planners to have at their disposal a fuller picture of the patterns of monetary circulation in the economy, and to be in a position to take into account the very different structures of income and consumption of the population groups (Ginzburg 1962)[7]. Opponents of the demand for balances in extended form have not disputed the desirability of such balances, but have argued that the data available do not permit them to be reliably compiled: it is necessary to make a number of assumptions even in compiling balances in reduced form, and in compiling balances in extended form the number of assumptions inevitably increases beyond tolerable limits (Sapelnikov, Shnirlin and Levin 1959).

The data required for the compilation of balances in reduced form relate exclusively to transactions between the population as a whole and State and cooperative enterprises and establishments. These data can be derived from the complete statistical reporting of enterprises and establishments, either from report data collected by TsSU, such as retail trade statistics, or from report data collected by other institutions (the data of the State insurance agency Gosstrakh on insurance payments, the data of savings banks on deposits and interest payments etc.). The use of such data sources can involve certain problems: for example, in estimating the consumption expenditure of the population on the basis of trade statistics allowance must be made for "petty wholesale" (melkii opt) - that is, sales made through retail trade outlets to enterprises, organisations

and establishments - and the data available on petty wholesale are rather poor[8]. Such problems notwithstanding, statistical reporting is preferred as a data source over the FBS and other surveys where it exists.

In compiling balances in extended form, it is no longer possible to rely on statistical reporting alone. Transactions among the population, and in particular trade on the collective farm market, are not covered by statistical reporting, so that resort must be had to the data of surveys like the FBS and the survey of collective farm markets. It may also be necessary to use FBS data in order to allocate incomes and expenditures of the population between the population groups (Sergeyev 1983, p.501).

Collective farm trade is dealt with in Section 4. Here we briefly consider three problems in the compilation of the balance of monetary incomes and expenditures of the population in extended form which are discussed in the literature and which relate to the use of FBS data: (i) the estimation of wage income accruing to families of collective farmers from family members who are workers and employees; (ii) the allocation of social expenditures by the State between the two population groups; and (iii) the estimation of change in the money holdings in the hands of the population.

(i) The estimation of wage income accruing to families of collective farmers from family members who are workers and employees

Margolin (1957) states that "the data source for wage income earned by members of families of collective farmers is the FBS". However, Ginzburg (1962) describes a method which relies much less heavily on the use of FBS data. The number of members of families of collective farmers who are workers and employees and who are living with their families is estimated on the basis of the annual reports of collective farms or on the basis of the population reports of village Soviets, and checked against data from the last population census. This estimated number is multiplied by the

average wage of workers and employees in rural areas, taken from labour statistics. To the result is added wages sent or brought to the families by family members who are workers and employees and who are not living with their families. Only this component is estimated on the basis of FBS data.

(ii) The allocation of social expenditures by the State between the two population groups

Drits (1968, pp. 315-6) states that "in a number of cases the FBS is the only data source for allocating social expenditures (on pensions, grants, schools, hospitals etc.) among social groups", but that the FBS must be improved to make these data more complete and reliable. However, social expenditures are allocated between the population groups by extremely approximate methods which avoid the use of FBS data. The total sum paid as pensions and grants from the social security budget is allocated between the population groups in the same proportion as wage income. The occasional social payments made by trade unions are allocated in the same way. Grants paid to single mothers and to mothers of many children are allocated between the population groups "according to the data of financial bodies" (Ginzburg 1962).

(iii) The estimation of change in the money holdings in the hands of the population

Although change in the money holdings in the hands of the population is obtained from the balance of monetary incomes and expenditures as a residual (see Table D2.1), an effort is made to estimate it independently on the basis of FBS data. However, Margolin (1957) recognises that this may lead to an underestimation of the growth of money holdings as a result of biases in the FBS. Therefore "it is expedient to correct these data by means of expert assessment" - a rather arbitrary procedure.

The methodology used in the compilation of the monetary balance of

incomes and expenditures of the population in extended form is clearly designed to minimise the use made of FBS data. Indirect and extremely approximate methods of estimation, relying on arbitrary assumptions but making use of data sources other than the FBS, are chosen in preference to the direct derivation of the needed indicators from a survey known to be highly unreliable.

4 The assessment of trade on collective farm markets

The complications of assessing trade on collective farm markets is one of the main reasons that TsSU has resisted pressure to compile balances at Republic and oblast' level in extended form (Ginzburg 1962). Some minor components of collective farm trade are covered by statistical reporting, such as the commission trade conducted by consumer cooperatives, but the great bulk of collective farm trade conducted by collective farmers is covered only by two sample surveys. The FBS provides data on the income of collective farmers derived from their sales on collective farm markets, and on the expenditures of workers and employees on products purchased on collective farm markets. There is also a survey of the sales of agricultural products on the collective farm markets in the larger towns (referred to below as the collective farm market survey; see Chapter A4).

A variety of methods have been proposed for determining the volume of trade on the collective farm market. Margolin (1960) recommends extrapolation of average data from the survey of collective farmers' budgets to the total number of collective farmer households in a territory. Ginzburg (1962) suggests that FBS data be used to assess collective farm trade conducted in the rural areas ("intra-rural trade"), for which no other data source exists, but data from the collective farm market survey to assess collective farm trade conducted in the towns ("extra-rural trade"). Fridman (1976, pp.63-4) states that FBS data are used where possible, but in

territories where the FBS is not conducted resort is had to data from the collective farm market survey. A common view is that more than one method should be tried, but it is not clear how the final estimate should then be determined: "Only comparison of the results of calculations based on different data sources gives the most reliable turnover data" (Margolin 1957)[9].

The differences of view among Soviet authors regarding the best method of assessing collective farm trade can be largely attributed to their uncertainty as to which of the two surveys is least unreliable as a data source. Both surveys are generally regarded as highly unreliable.

The method described by Fridman (1976) for territories for which FBS data are not available demonstrates the problem involved by reliance on data from the survey of collective farm markets. Market sales in the oblast' centre, where per-capita sales are higher than elsewhere in the oblast', are separated out from market sales in other towns in the oblast' covered by the survey. Sales in the "other towns" are then grossed up by a factor equal to the ratio of the total urban population of the oblast' outside the oblast' centre to the population of the "other towns" covered. Sales in the oblast' centre are added to the result, and a correction is made for sales of products brought in from other oblasti (Section 5). However, this method is based on the assumption that sales per capita population in the towns covered by the survey (excluding the oblast' centre) are approximately equal to sales per capita population in the towns not covered by the survey. As only the larger towns are selected for the survey of collective farm markets, this is a very doubtful assumption[10].

5 The assessment of the inter-territorial migration of money

We have so far assumed that the structure of the balance of incomes and expenditures of the population is the same at all geographical levels.

In fact the structure shown in Table D2.1 is adequate only to the balance for the USSR as a whole. At lower levels account must be taken of the "migration of money" from one territory (Republic, oblast' etc.) to another (Sistema... 1982,p.278). Money does not circulate in a closed cycle within each territory but is carried across territorial boundaries as a result of several phenomena, of which the main ones are holiday and business travel, migratory labour (with the migrants sending or bringing part of their income to their families resident in other areas), shopping trips to centres in other territories, and the sale of agricultural products on collective farm markets outside the territory of residence of the seller. We shall not consider here how the inter-territorial migration of money can be incorporated into the structure of the balance, nor shall we attempt a full account of the many methods which have been proposed for estimating the migration of money, but restrict our comments to the role played by FBS data in these methods.

Methods of estimating the migration of money can be divided into two broad categories: cumulative and residual. In cumulative methods each component of the migration of money - collective farm trade, holiday travel, migratory labour etc. - is estimated separately and the components summed. In residual methods the total migration of money is obtained directly as the difference between two quantities. An account of both types of methods is given in Organizatsiya... (1981,pp.86-93).

Cumulative estimation involves the combined use of a great variety of data sources. The migration of money in collective-farm trade is estimated on the basis of data from the FBS and the survey of collective farm markets. However, in view of the unreliability of some of the data sources and the difficulty of excluding omissions and double-counting from the calculation, cumulative estimation is recommended as a supplement to rather than as a replacement of residual estimation (Organizatsiya... 1981).

One method of residual estimation is illustrated in Table D2.2: the net sum of money put into, or taken out of, circulation by the financial system in a given territory in the course of a year is compared with the change in the stock of money in the hands of the population of that territory during the same period, as estimated from FBS data. An alternative method involves comparison of the sum spent by the population of a territory in State and cooperative trade, irrespective of place of purchase, estimated by extrapolating FBS data, with the turnover of State and cooperative trade in the territory, net of petty wholesale (Organizatsiya... 1981, Voronov 1981, p.77)[11].

The residual estimation of the migration of money in general involves the comparison of data relating to the transactions of trade or financial establishments in a given territory, given by statistical reporting of those establishments, with corresponding data relating to the population of that territory, which are available only from the FBS. The use of FBS data in estimating the migration of money is therefore unavoidable, although their unreliability is recognised. The ratio of "organised savings" (payments into savings-bank accounts etc.) to cash in hand is "always higher" for the FBS sample than for the population as a whole, and "it frequently happens that the velocity of circulation (of money) calculated from FBS data diverges significantly from the velocity of circulation calculated on the basis of banking information on cash turnover". It is necessary "to make substantial corrections to FBS indicators, significantly reducing the value of calculations based on the FBS" (Organizatsiya... 1981).

Kaganov (1964) informs us that the Ukraine Gosplan proposed that the programme of the FBS in the Ukraine be changed to collect separate data on purchases made outside the oblast' of residence, enabling estimation of the inter-territorial migration of money directly from FBS data. The proposal was rejected by TsSU USSR. It is not clear that this change would, in the

TABLE D2.2

TABLE RECOMMENDED FOR THE ESTIMATION OF INTER-TERRITORIAL MIGRATION OF MONEY (1)

Year	Money put into (taken out of) circulation, corrected for change in the money holdings of enterprises, establishments and organisations	Change in the money holdings in the hands of the population, calculated on the basis of FBS data	Migration of money (col. 3) - (col. 2)
(col. 1)	(col. 2)	(col. 3)	(col. 4)
1964	+ 2000	+ 2200	+ 200
1965	- 1000	- 900	+ 100
1966	+ 1500	+ 1400	- 100
1967	- 500	- 700	- 200

Source: Statistika finansov (1974 p 92); figures hypothetical, units not specified

Note: (1) In 1964, 2000 units are put into circulation but money holdings in the hands of the population increase by 2200 units, so 200 units are brought in from other territories.

In 1965, 1000 units are taken out of circulation but money holdings in the hands of the population decrease by only 900 units, so 100 units are brought in from other territories.

In 1966, 1500 units are put into circulation but money holdings in the hands of the population increase by only 1400 units, so 100 units are taken out to other territories.

In 1967, 500 units are taken out of circulation but money holdings in the hands of the population decrease by 700 units, so 200 units are taken out to other territories.

absence of improvement in the representativeness of the FBS, have made possible more reliable estimates[12].

6 Proposals for a differentiated balance of money incomes and expenditures of the population

The idea of compiling a differentiated balance of money incomes and expenditures of the population was first advanced by Professor I.Yu.Pisarev in 1958 (Shvyrkov 1966). The first detailed schema for such a balance, proposed by A.Kh.Karapetyan (Aganbegyan et al 1961, pp.151-3), is shown in Table D2.3. A large number of indicators of family composition, incomes and expenditures are set out in the balance for each of several per-capita-income groups[13]. Separate balances are compiled for each of the two population groups (workers and employees, collective farmers) and for each territory. In some variants of the differentiated balance, types of family as well as income groups are distinguished; for example, Shvyrkov (1966, pp.160-6) divides the population into three groups by size and composition of family, subdividing each of these groups into a number of per-capita-income groups. Two basic types of differentiated balance have been envisaged: the "report differentiated balance", compiled from statistics relating to a past period, and the "plan differentiated balance", based on forecast data for a future period. The advocates of the differentiated balance argue that its annual compilation would facilitate assessments of the economic effect of welfare measures on different income groups and provide "a base for forecasting, planning and regulating consumption" (Rimashevskaya 1962, 1971). Its introduction into statistical and planning practice was recommended by the scholarly conference at UNIIT in 1961 (Opredelenie... 1962, pp.272-3).

The first experimental differentiated balances were compiled for workers and employees for the years 1958 and 1965 at the Scientific Research Institute of Labour (NII-truda) in 1960. "Unfortunately these balances drew

TABLE D2.3

FORMAT OF THE PROPOSED DIFFERENTIATED BALANCE OF THE INCOMES AND EXPENDITURES OF THE POPULATION

Lines of the balance correspond to "groups of families by level of per-capita income (in rubles)". Columns are as follows:

1. number of families in the group
2. number of family members in the group
3. number of family members in the group working
4. number of family members in the group who are pensioners
5. number of family members in the group holding grants
6. number of family members in the group who are men
7. number of family members in the group who are women
8. number of family members in the group who are children up to one year of age
9. number of family members in the group who are children between one and three years of age
10. number of family members in the group who are children between four and seven years of age
11. number of family members in the group who are children between eight and fifteen years of age
12. total income of families in the group
13. total money wages of families in the group
14. - including money wages of first employed persons in the families
15. pensions received by families in the group
16. grants received by families in the group
17. other payments from social funds received by families in the group
18. value of unpaid social services received by families in the group
19. total expenditure on consumption by families in the group
20. expenditure on food products by families in the group
21. expenditure on products for personal use (clothing, footwear etc) by families in the group
22. expenditure on consumer durables by families in the group
23. expenditure on services by families in the group (1)
24. savings made by families in the group

Source: Aganbegyan et al (1961 pp 151-4); in chapter written by A Kh Karapetyan

Note: (1) Karapetyan writes that it is expedient to subdivide services by type: education, health-care, culture etc.

no special response from practical planners", who at that time were paying more attention to the rational consumption budget (Balansy... 1969). In 1964 NII-truda compiled variants of a plan differentiated balance for 1970. Work on differentiated balances both for workers and employees and for collective farmers, conducted in the Scientific Research Economic Institute (NIEI) of Gosplan, is reported by Kosyachenko and Rutgaizer (1970)[14]. A great deal of work on the methodology of the plan differentiated balance has been carried out at the Central Economic-Mathematical Institute (TsEMI) (Planovyi... 1981). Most of these balances have been compiled only for the USSR as a whole, although Golub (1976) compiled a report differentiated balance for the workers and employees of Donetsk oblast' (Ukraine), mainly relying on the schemas developed at TsEMI.

None of the proposals for differentiated balances, however, has been adopted by TsSU or Gosplan. There appears to be an intention to include a plan differentiated balance in the system of computerised planning calculations at some time in the future (Avtomatizirovannaya... 1980, p.202).

All possible schemas for differentiated balances rely on the use of FBS data, as the FBS is the only source of data on incomes and expenditures differentiated by social group, per-capita-income group and type of family. The inadequacy of FBS data has always been the main argument advanced against the compilation of differentiated balances. In response to the proposal for the regular compilation of differentiated balances put forward by Korzhenevskii (1959), Sapelnikov, Shnirlin and Levin (1959) argue that the necessary data for such balances are lacking. Kosyachenko and Rutgaizer (1970) claim that, while it is useful to compile the balances for the USSR as a whole, FBS data are not sufficiently representative to justify their compilation at lower levels. It would obviously be impossible to compile differentiated balances for territories where the FBS is not conducted. Moreover, as M.G.Frenkel points out, it has not been possible to compile differentiated balances at any level since 1971, when TsSU ceased producing

tabulations of FBS data by per-capita income (Planovyi... 1981, p.183; see Chapter C3).

As Golub (1976) observes, "the inadequate provision of information" is "one of the essential reasons why... the idea of the differentiated balance as an instrument of welfare analysis and planning has still to reach the stage of practical recommendations". "Without the improvement of statistical information, the plan differentiated balance will not find its way beyond the boundaries of scientific research institutes" (Planovyi... 1981, p.183).

7 The use of FBS data in the compilation of balances of the production and disposal of agricultural products

Balances of the production and disposal of agricultural products are compiled by TsSU as a means of assembling, checking and analysing data on the movement of different agricultural products from their production to their final use. Balances of acquisition and disposal are compiled separately for State farms, collective farms, collective farmer households and other households with private plots (Statistika... 1982, pp.219-228)[15]. Different sources of acquisition are distinguished in the balances, as are different uses (personal consumption, sale on the collective farm market, wastage etc.). Balances are compiled in natural terms for all basic products - grain and grain products, sunflower, potatoes, vegetables, melons, fruit and berries, grapes etc; beef, mutton and lamb, pork, poultry etc; milk, eggs, wool. Balances are compiled in value terms at current prices for all basic products, and at comparable prices for some basic products[16].

Until the late 1950s balances of agricultural products were compiled only for the USSR as a whole. It appears that balances at Republic level began to be compiled in 1958 or 1959[17]. Balances at oblast' level are still not compiled (as of 1982).

The data sources used in the compilation of the balances are the annual statistical reports of collective and State farms, the statistical reports of procurement organisations, the survey of collective farm markets and the FBS (Statistika... 1973, p.200, Statistika... 1982).

FBS data are used for a number of purposes in this work. As noted in Chapter D1, the FBS is the sole source of data on the output of collective farmers' private plots, although Levin and Frenkel (1973) complain that "fuller and more precise" data are needed on this topic. FBS data are used to estimate average sales and purchases per family on the collective farm market (Margolin 1960, pp.143-4). Coefficients derived from the FBS are used to divide up the total quantity of products acquired by collective farmers by end-use - personal consumption, storage loss, sale on the collective farm market etc.(Statistika... 1973, pp.198-200). An example of such a calculation is set out in Table D2.4.

We see from Table D2.4 that FBS data are not used to estimate the total acquisition of grain and grain products by collective farmers, which can be derived from other sources, but only to divide up the total by end-use. That is, resort is had to using FBS data only when no alternative data source is available.

8 Conclusions

FBS data play quite an important role in the compilation of balances of the money incomes and expenditures of the population and of balances of the production and disposal of agricultural products. This is because in a number of areas, such as the output of collective farmers' private plots and consumption by social group, the FBS is the only available data source. Where some choice among possible data sources exists, the FBS is usually avoided in view of the known unreliability of its data. Collective farm trade is an exception to this tendency; here there is no clear preference

TABLE D2.4

ILLUSTRATION OF THE USE OF FBS DATA IN THE COMPILATION OF BALANCES OF AGRICULTURAL PRODUCTION

Data from the annual statistical reports of all the collective farms in an unidentified Union Republic:

Grain and grain products supplied to collective farmers by collective farms	110 200 000 centners
Grain and grain products received by collective farmers from the harvest	27 250 000 centners
Total grain and grain products acquired by collective farmers	137 450 000 centners

Data from the survey of collective farmers' budgets in the Republic:

Total grain and grain products acquired per 100 households	85 340 kg. = 853 centners
Personal consumption of grain and grain products per 100 households	50 732 kg. = 507 centners

Coefficient of extrapolation from the survey of collective farmers' budgets to the population of collective farmer households in the Republic as a whole

$$= \frac{137\ 450\ 000}{853} = 161\ 137\ .$$

Personal consumption of grain and grain products by all collective farmer households in the Republic

= 507 x 161 137 = 81 348 000 centners.

Grain and grain products acquired by collective farmers and used for purposes other than personal consumption

= 137 450 000 - 81 348 000 = 56 102 000 centners.

Source: Statistika selskogo khozyaistva (1973 pp 198-200)

between two data sources, the FBS and the survey of collective farm markets, both known to be highly unreliable.

The deficiencies of FBS data, especially at oblast' level, seem to be the main factor preventing a number of developments in this area of statistical and planning work considered desirable by Soviet economists: the compilation of balances of money incomes and expenditures of the population in extended form at oblast' level, the introduction of differentiated balances of money incomes and expenditures of the population, and probably the introduction of balances of agricultural products at oblast' level. It follows that the inadequate organisation of the FBS has a considerable deleterious effect on statistics and planning in such fields as monetary circulation and agriculture.

Notes to Chapter D2

1 Although we are concerned here only with contemporary planning practice, it may be of interest to note that in the early 1920s S.G.Strumilin used budget data "to determine the size of wages funds and to solve methodological problems of the compilation of the balance of the national economy and of other planning calculations" (Mints 1976,p.170).

The account in this chapter is not intended to cover the many aspects of the compilation of balances which are unrelated to the question of the use of FBS data.

2 See Balansy... (1969,p.5) for a list of balances compiled by TsSU.

3 According to Ekonomicheskaya... (1983,p.377), FBS data are used in the compilation of the balance of labour resources, but we have found no information confirming this statement.

4 Sources for the 1960s are inconsistent: Ginzburg (1962) refers to oblast'-level balances, but Leifman (1962), Kaganov (1964) and Levin (1969) refer only to balances for the USSR and Republics. Sources for the 1970s do all refer to oblast'-level balances (Maier, Rutgaizer and Ivensen 1971, Zhilov 1974, Fridman 1976, Golub 1976). It is possible that the introduction of the balances in different territories took place over a period of several years.

5 Kaganov (1964) reports that balances at Republic level "began relatively recently" to be compiled in extended form. As this was not yet the practice in 1961, the change must have taken place in 1962 or 1963.

6 "This question has been raised many times at meetings of planning personnel and at scholarly conferences... (and) noted in a number of journal articles and textbooks" (Ginzburg 1962). Economists continued to press the need for balances in extended form at oblast' level in the 1970s (Levin and Frenkel 1973, Fridman 1976).

7 The main concern is in effect with the differences between the urban and the rural population, with the division of the population into "workers and employees" and "collective farmers" usually being accepted as a substitute for the urban-rural division. Levin and Frenkel (1973) do, however, argue specifically for the compilation of separate urban and rural balances.

8 See Chapter D3 for further discussion of the difficulties of studying consumption on the basis of trade statistics.

9 In compiling the balances of production and disposal of agricultural products (Section 7), TsSU obtains sales on the collective farm market as a residual item. As the balances of agricultural products also rely on data from the FBS and the survey of collective farm markets, this does not amount to a basically different method.

10 Ginzburg (1962) urges TsSU to conduct an additional, more complete, sample survey of collective farm trade every two or three years in order to improve the compilation of the balance of monetary incomes and expenditures of the population.

11 In a third residual method, mentioned in Organizatsiya... (1981), the sum of old currency removed from circulation in a territory in the currency reform of 1961 is compared with the sum put into circulation there between the currency reforms of 1947 and of 1961. This makes it possible to identify any territory down to raion level as a net importer or exporter of money. This method was of value for only a few years after 1961.

12 Kaganov (1964) also proposes that the FBS programme cover cash in hand at mid-month as well as at the beginning and end of the month. He argues that additional tabulations of FBS data, by periodicity of incomes and expenditures, by total family income (rather than only by per-capita income), by number of family members with independent incomes and (in the case of collective farmers' budgets) by proportion of income obtained from the collective farms are required for the analysis of monetary circulation.

13 An even wider range of indicators, including household property and the use of non-working time, is proposed for the balance by Rimashevskaya (1971).

14 The balance compiled by NIEI is evaluated highly by Sidlyarenko (1975) for covering all components of real income - income from private plot production and from free social services as well as wages.

15 Balances are compiled also for subsidiary and other State agricultural enterprises (apart from State farms) and for mixed State-collective enterprises. Overall balances are compiled for "all State enterprises" and for "all categories of enterprise and household".

16 These are all report balances. Gosplan compiles plan balances, but not for all the products; this involves the use of approximate expert judgements (Levin 1969).

17 At a meeting in 1957 it was stated that "Republic Gosplans have not as a rule compiled balances of basic food products (bread products, meat products etc.); they must now do so..." (Soveshchanie... 1957). There is reference to the compilation of Republic-level meat and milk balances in Vsesoyuznoe... (1959, pp.23-4). Morozov (1961) reports that Republic TsSU's have recently begun to compile balances of agricultural products.

CHAPTER D3

THE USE OF FBS DATA FOR FORECASTING CONSUMER DEMAND

1 Introduction

In this chapter we consider the problems associated with the choice among different data sources for the analysis and forecasting of consumer demand in the USSR in order to assess and account for the role played by the FBS in this field. We do not attempt to discuss the methods used in demand forecasting except insofar as they depend on the nature of the data. Soviet authors recognise that this aspect of the matter is a crucial one: "The effectiveness (of demand forecasting) is determined above all by the content and quality of the input information. However subtle and complex the mathematical-statistical apparatus, it cannot correct or improve the input data, or extract more information from them than they contain" (Lakhman and Frenkel 1967).

In Section 2 we briefly review the development of Soviet practice in the selection of data sources for demand forecasting. In Sections 3-5 we consider the advantages and disadvantages of the three main approaches: reliance on FBS data (Section 3), reliance on trade statistics and other forms of statistical reporting (Section 4),and the combined use of FBS data and trade statistics (Section 5). Those problems with data which are common to all these three approaches are discussed in Section 6. In Section 7 we comment on the relationship between data problems and the use of normative methods of demand forecasting. In Section 8 we review the various reasons for the restricted role played by the FBS in demand forecasting and consider their relative importance. Conclusions are summarised in Section 9.

2 The development of Soviet practice in the selection of data sources for demand forecasting

Work on demand forecasting, using budget survey data, was conducted in the 1920s (Bazarov 1927, Davidovich et al 1972,p.45). The field was completely neglected during the Stalinist period. From 1957 onwards work was revived in several research institutes belonging to the All-Union and Republican Ministries of Trade, Gosplan and the Academy of Sciences, although not in TsSU itself[1].

Levin (1977) divides methods of demand forecasting into three categories: (a) "expert assessment" by people experienced in supplying the trade network; (b) methods based on the determination of "rational consumption norms"; and (c) methods based on the regression modelling of demand. We do not here consider expert assessment, although it may perform at least as well as other methods under Soviet conditions, because it does not involve formalised procedures of data processing. We shall return to normative methods in Section 7. Our main concern is with regression methods, which may be subdivided according to the data sources used[2].

Baranova and Levin (1978) conveniently classify data sources used for demand forecasting into basic, supplementary and auxiliary sources. The two basic sources are the Family Budget Survey and trade statistics[3]; regression methods are accordingly of three basic types - those that rely on the FBS, those that rely on trade statistics, and those that combine the use of both. Supplementary sources are those which provide data on important general factors influencing demand - statistics of income, population, retail prices, trade on collective farm markets etc. Additional independent variables taken from such supplementary sources, such as degree of urbanisation of the population or retail price indices, are often inserted in regression models belonging to any of the three basic types. Auxiliary sources provide data on specific factors influencing demand in particular cases: for example,

the rate of residential construction affects demand for furniture, and the availability of electricity supply affects demand for electrical goods. Independent variables taken from auxiliary sources may also be inserted in models where appropriate.

The research into demand forecasting conducted in the late 1950s and early 1960s was based on the use of FBS data. The main centres of this work are shown in Table D3.1. The system of models developed in the Scientific Research Institute of Labour under the leadership of I.Yu.Pisarev and A.Kh.Karapetyan is shown in Table D3.2. In the mid-1960s the Scientific Research Institute of Trade and Social Catering and the Ukrainian Scientific Research Institute of Trade and Social Catering of the Ministry of Trade issued recommendations for the use of FBS data in medium-term (3-5 years) demand forecasting by Republican trade organisations. When the All-Union Scientific Research Institute for Study of the Conjuncture of Demand (VNIIKS) was created in 1966, the work was transferred there. However, although the Ministry of Trade institutes compiled forecasts by basic product group for 1964-5 and for 1966-70, their methods were not put into practice by the trade organisations themselves, as had been intended (Davidovich and Nazarov 1968, Korovkin 1968).

The modelling work based on FBS data came under immediate and severe attack from economists not involved in it. An early article by I.I. Korzhenevskii (1959) of the Ukrainian Scientific Research Institute of Trade and Social Catering, arguing the need to use FBS data, drew a detailed criticism from Sapelnikov, Shnirlin and Levin(1959), who accused Korzhenevskii of "exaggerating the significance (of FBS data) in planning the structure of demand" but advanced no counter-proposals of their own. The main point made by these and other critics was that any calculations based on the FBS were "very hypothetical in view of the far from perfect data collected by TsSU" (Mochalov 1965), and that "these models can become a real instrument

TABLE D3.1

MAIN CENTRES OF RESEARCH WORK ON DEMAND FORECASTING USING FBS DATA

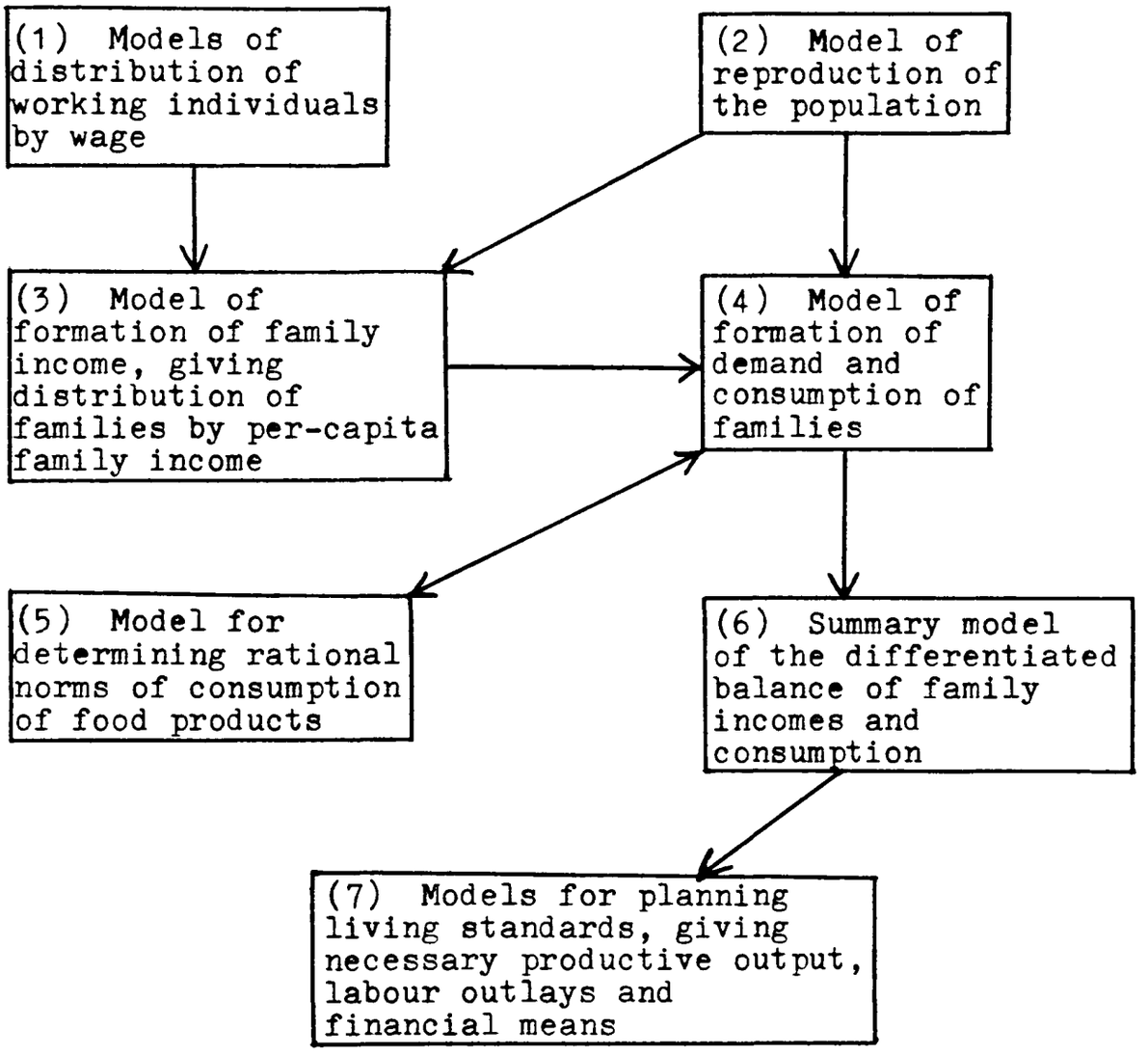
Centres	Type of work	References
Department of Living Standards, Scientific Research Institute of Labour (NII-truda)	General methodology of forecasting (see Table D2.2)	Aganbegyan et al (1961)
Scientific Research Institute of Trade and Social Catering (NIITOP)	General methodology of forecasting	Korzhenevskii (1959); Davidovich and Nazarov (1968)
Ukrainian Scientific Research Institute of Trade and Social Catering (UkrNIITOP)		
All-Union Scientific Research Institute for Study of the Conjuncture of Demand (VNIIKS)[1]		
Plekhanov Moscow Institute of National Economy	Seasonal fluctuation of workers' expenditures on food products	Shvyrkov (1962); Shvyrkov and Shvyrkova (1973)[2]
Laboratory of Economic-Mathematical Research of the Academy of Sciences	Construction of an objective function of consumption	Volkonskii (1963)
Institute of the Economy and Organisation of Industrial Production (IEOPP), Siberian Division of the Academy of Sciences	Dependence of expenditures on income	Leifman (1963)
Central Economic-Mathematical Institute (TsEMI), Academy of Sciences	Dependence of food consumption of collective farmers on money income	Levkova and Tikhova (1968)

[1] Since the foundation of VNIIKS in 1966

[2] See also Mints (1976 pp 174-182).

TABLE D3.2

A SYSTEM OF MODELS FOR PLANNING LIVING STANDARDS



⟶ transfer of the results of calculations from one model for use as input to another model

Source: The system of models proposed in Aganbegyan et al (1961 p 171) for planning the living standards of workers' and employees' families in 1970

Note: Mints (1976 p 171) proposes a similar system of models, with an additional model included to take account of seasonal fluctuations in consumption.

of planning ... retail trade only if the FBS is improved" (Davidovich and Chertikhina 1967)[4]. The advocates of FBS-based methods regretted that "the use of budget statistics (for demand forecasting) is greatly hindered by the view that FBS data are not and cannot be representative enough for the more or less precise estimation of the structure of incomes and expenditures of the whole population" (Lakhman and Frenkel 1967). Recognising the deficiencies of the FBS, they insisted that FBS data, suitably corrected, could be used even in their existing state.

Alternative models of demand forecasting using retail sales data from trade statistics were first suggested by L.S.Kuchayev of the Plekhanov Moscow Institute of National Economy (Kuchayev 1966). The methodology was further elaborated by V.V.Shvyrkov (Korovkin 1966). The approach of Kuchayev and Shvyrkov was supported by Gosplan, which began its own work in 1964 on forecasting demand for each of seventy products and product groups for 1966-70 on the basis of sales data for 1948-65[5]. Demand forecasts for 1968-70 using trade statistics were carried out in VNIIKS from its creation in 1966 (Bredov and Levin 1968).

Supporters of the Gosplan project claimed that it was giving good results and argued that it was time to set production plans in line with the forecasts (Korovkin 1968). However, an examination of the figures given by Chernysh (1968) for Belorussia casts doubt on this favourable assessment[6]. Lakhman and Frenkel (1967), criticising the Gosplan methodology and holding that the basic input information must be FBS data, judge the results obtained as unsatisfactory for many important goods: "The calculations must be regarded as no more than experimental".

As the shortcomings of methods based on either FBS data or trade statistics alone become more obvious, more attention began to be paid to ways of combining use of both sources (Lipkin and Mints 1970). A recommended methodology of this type for the use of trade organisations at Republican

and oblast' levels was published by the Laboratory of Economic-Mathematical Research of the Siberian Division of the Academy of Sciences together with the Novosibirsk Institute of Soviet Cooperative Trade of Tsentrosoyuz[7] (Korovkin 1968). Like the recommended methodology for FBS-based forecasting, this was not applied in practice.

Recommendations for a "Methodology of Short and Medium-Term Forecasting of Effective Demand (on the Basis of Budget and Trade Statistics)" were also produced by the Laboratory of Problems of Commodity Turnover of the Central Economic-Mathematical Institute (Volkova and Komarova 1976). Several different variants of modelling using the two sources together have now been proposed (Section 5). None of them appears to be very widely applied in practice.

The current situation is described by Solovyev and Druker (1981) of the Central Mathematical-Economic Institute:

> Demand modelling is usually based on time series of trade statistics, with FBS data used as illustrations. Our own research is no exception.

There is abundant evidence supporting this contention. Most general works on consumption ignore the FBS completely and rely mainly on trade statistics, with some reference to other types of data such as rational consumption norms; some recent examples are the books by Chernyavskii (1981), Sarkisyan (1982) and Orlov (1983). Those works which do make some use of FBS data (for example, Sarkisyan 1983) typically do no more than cite a few percentage figures to illustrate the change that has occurred in the broad structure of consumer expenditure. Textbooks on the planning and administration of retail trade either make no mention of the FBS (Pyatakova and Lysenkov 1981, Voronova 1981) or assign it a minimal supplementary role (Stolmov 1972, Arkhipova and Bayev 1977, p.125). The market research institute of the Ministry of Trade (VNIIKS) and that of Tsentrosoyuz (VNIIEKT) appear to use

trade statistics only: the account of market research by the Head of the Russian Division of VNIIKS Yu.Tvildiani (1977) does not refer to the use of budget data. The great majority of published studies of the demand for particular goods and services use trade statistics only, as will be seen from the fairly representative selection of such studies listed in Table D3.3[8].

3 Advantages and disadvantages of reliance on FBS data[9]

The main advantage of the FBS as a source of data for forecasting demand is that it brings together in one place a wide range of relevant and comparable indicators. Many of these indicators are not available elsewhere (for example, most of the indicators on the private plot economy). Many other indicators have, in the absence of FBS data, to be estimated unreliably from disparate and non-comparable sources (for example, indicators of the incomes of the population).

The range of budget indicators available from the FBS is more complete than the range available from trade statistics and other sources (Section 4) in the following significant respects:

(a) The FBS covers the consumption not only of goods but of all paid services, and also provides some information on the consumption of free social services;

(b) Consumption is covered not only by value indicators but also by some natural indicators;

(c) The direct acquisition of food products from private-plot production and from collective farms (as payment in kind) is covered[10];

(d) Data are collected on prices of purchase;

(e) In principle all components of family income are covered, including income from sales on the collective farm market and from social welfare payments;

TABLE D3.3

SOME PUBLISHED STUDIES OF DEMAND FOR SPECIFIC GOODS AND SERVICES

Source	Type of good or service	Geographical scope of study	Source of data used (1)
Gribov (1968a,b)	Everyday services	Moscow	FBS and trade stats
Soldatkin (1968)	Clocks/watches	USSR	Trade stats
Kosyachenko and Rutgaizer (1970)	Paid services	USSR	FBS
Fedorets (1971)	Shavers etc	Sverdlovsk wholesale depot	Trade stats
Potapovskii (1971)	Electrical goods	USSR	Trade stats
Davidovich and Yastrubinetskaya (1972)	Cosmetics and toiletries	Leningrad	Trade stats
Beletskii and Rumyantsev (1972)	Television sets etc	Moscow	Trade stats
Anisimova (1977)	Goods sent to consumers by parcel post	USSR	Trade stats
Feldman and Kuznetsova (1979)	Vegetable fats and oils	RSFSR	Trade stats
Kondrateva and Lopushenskii (1980)	Toys	Moldavian SSR	Trade stats
Martynov and Solovyev (1981)	Radio and electrical goods	USSR	Trade stats (2)
Gabidzashvili (1981)	Tea	USSR	Trade stats
Yukhimenko, Puzynin and Povolotskaya (1983)	Everyday services	USSR	Trade stats

Notes:

(1) FBS - Family Budget Survey
Trade stats - Trade statistics

(2) The authors state that in future work FBS data need to be used.

(f) The FBS collects data not only on family income and consumption expenditure but also on other elements of the budget - compulsory payments and voluntary deductions from wages, taxes and savings;

(g) The FBS collects information on living space and on residential facilities.

The fuller range of indicators available makes it possible to use more appropriate independent variables in regression equations. It is only on the basis of FBS data that one can construct such regression variables as the ratio of monetary to natural income (Frenkel and Lakhman 1966, pp.99-101)[11].

To take another important example, models based on trade statistics have to rely on official retail price indices which cover only State and cooperative trade and are not calculated in such a way as to reflect the real movement of prices, taking into account changes in product mix and quality. Models based on FBS data, on the other hand, can include the average prices at which families purchase food and some non-food products in State, cooperative and collective-farm market trade. These average prices are not subject to the same biases. Unfortunately the data made available on them are very limited and insufficiently disaggregated (Bredov and Levin 1971, Levin and Frenkel 1973, Levin and Yarkin 1976).

The most important distinction between trade statistics and FBS data from the point of view of demand modelling is, however, that trade statistics can be broken down only by points of sale while FBS data can be broken down into socio-economic groups of consumers by level of per-capita income, age-sex family composition or other variables. Only by such breakdowns can a forecast take into account projected changes in the structure of the population, such as changes in the income distribution, as different socio-economic groups tend to have different structures of consumption. This is the crucial reason adduced for the necessity of using FBS data by such authors as Davidovich and

Nazarov (1968), Bredov, Davidovich and Ultanbayev (1971) and Levin (1977). Lakhman and Frenkel (1967) point out that the changes in the level and structure of demand which resulted from the rise in rural money incomes in 1965-6 could not have been forecast on the basis of trade statistics alone.

However, the deficiencies of the FBS limit the extent to which this advantage can be exploited in practice. Unless researchers reprocess primary FBS data in accordance with their needs, they are constrained in their analyses by the nature of the tabulations made available by TsSU. We have seen in Chapter C3 how reluctant TsSU has been to produce the necessary tabulations by per-capita income and other variables.

Thus,FBS per-capita-income tabulations, even when they have been available, have made it possible to fix only 6-10 points on regression graphs of consumption against per-capita income. Moreover, these points have been concentrated close together in the middle range of the per-capita-income continuum, yielding excessively broad confidence zones in the upper and lower ranges. This problem persists even if primary data are reprocessed to give a larger number of points because of the under-representation of high and low income groups in the FBS sample (Leifman 1962, 1963).

The most serious disadvantage of the FBS as a data source is the poor quality and unrepresentativeness of its data. All authors recognise that this is so; the only disagreement concerns whether it is feasible adequately to correct the data (Section 2). It is commonly argued that FBS data can be used to study demand only at the level of the USSR as a whole and in those Republics well represented in the sample: at <u>oblast'</u> level and below, and in poorly represented Republics, data - where they exist at all - are too unrepresentative to be usable (Arkhipova and Bayev 1977, p.125)[12].

Although the FBS collects data on the consumption of the full range of goods and services, the nomenclature used in the tabulations produced by TsSU is too aggregated and incomplete for the detailed study of demand for

particular groups of goods or services (Chapter C5). For example, everyday services are merged into broad heterogeneous groups (Gribov 1968b). But as this is a problem which affects both FBS data and trade statistics in different ways, it does not systematically determine the desirability of either data source over the other.

A frequent criticism of models based on FBS data is that they are static in nature - that is, they express the relationship between demand and its factors in a single base period only. For a long-term forecast this is inadequate, as changing influences on demand like technical progress and the size of stocks of consumer goods possessed by the population are neglected (Baranova and Levin 1978). This criticism is fully justified only when directed at specific models rather than at the general principle of relying on FBS data, for dynamic models based on time series of FBS indicators are quite feasible. Davidovich et al (1972,p.4) refer to work on dynamic modelling at the Scientific Research Institute of Trade and Social Catering, and Levin (1977) considers a variety of possible approaches. But it is argued by Shvyrkov (1968) and by Davidovich et al (1972,p.97) that sufficiently precise least-squares estimation of parameters for dynamic models was not possible because the available time series of FBS indicators by per-capita income were too short, beginning in 1961 and stopping again in 1968. By contrast, very long continuous time series of trade statistics have been and are available.

4 Advantages and disadvantages of reliance on trade statistics and other forms of statistical reporting 13

The main advantage of basing the study of demand on trade statistics is the high quality of their data by comparison with the FBS. Sufficiently reliable and precise figures, broken down by Republican, oblast'-level and raion and town trade organisations, are available for a long run of years[12].

Although the quality of trade statistics is much higher than that of FBS data, one still finds quite a few complaints about them. For example. according to Bredov, Davidovich and Ultanbayev (1971), "the accounting system for sales of goods by detailed mix is still far from perfect"[15].

As has been noted, trade statistics lacks many indicators needed for a full study of demand: payments for some services, compulsory payments and voluntary deductions from wages, taxes and savings (Mayer, Rutgaizer and Ivensen 1971); consumption of free social services (Rimashevskaya 1971); and natural acquisitions from private plots and collective farms (Levkova and Tikhova 1968). Available data on trade on the collective farm market are highly unreliable as a result of the deficient design of the survey which collects them (see Chapter A4). Some researchers, however, succeed in partially overcoming these gaps by combining the use of trade statistics in their models with data taken from other branches of statistics - in particular, from demographic statistics and from the balance of money incomes and expenditures of the population. An example is the work of V.Mayer, V.Rutgaizer and T.Ivensen (1971) at the Scientific Research Economic Institute of Gosplan USSR[16].

It is more difficult to compensate for the failure of trade statistics to take into account the socio-economic structure of the population. Independent variables can be inserted into the model to represent global population characteristics like proportion of the population urban, proportion of the population less than sixteen years old, proportion of old-age pensioners in the population (Mayer, Rutgaizer and Ivensen 1971), or even the degree of income differentiation of the population (Grebnev and Rybchenko 1969). The assumption of a linear relationship between such variables and demand can rarely be justified, and the real impact of socio-economic factors can scarcely be adequately represented in this way.

Mention should be made of two further problems involved in the use of

trade statistics: the need to correct for petty wholesale (melkii opt), and the effect on the statistics of "inter-territorial migration of money".

No distinction is made in trade statistics between sales direct to the population and petty wholesale - the purchase of goods in State and cooperative trade by organisations, establishments and enterprises for such purposes as catering, repairs and office supply. Petty wholesale accounts for about 5 per cent of total retail turnover, but for some goods the proportion is much higher (Levin and Yarkin 1976)[17]. Corrections must therefore be applied to trade statistics to make allowance for petty wholesale when studying consumer demand proper, but this can only be done on the basis of occasional sample surveys of petty-wholesale sales carried out by TsSU. Thus, Frenkel and Lakhman (1966, p.105) used in their calculations data from the survey conducted in 1961.

The term "inter-territorial migration of money" is used to refer to the fact that the population of a given territory spend part of their incomes outside that territory - on holiday and business trips, on shopping expeditions to urban centres with better supplied shops and so on. For example, the population of Tula oblast' spent 7-8 per cent of their total expenditure outside the boundaries of the oblast' in 1958-65; and in a number of oblasti and Republics the proportion was significantly higher than this (Lakhman and Frenkel 1967). The sales made in the shops of a territory, as shown in trade statistics, may thus be either greater or smaller than the purchases made by the inhabitants of the territory, depending on whether the net migration of money is into or out of the territory. Allowance should be made for migration of money in territorial demand modelling, because forecasting aims to discover how to satisfy future demand on its home territory. Lakhman and Frenkel (1967) cite the difficulty of making this allowance as an argument against basing forecasts on trade statistics. Korovkin (1968) replies that "migration of money can be left out of the model" as a less essential factor

in the determination of demand, on the doubtful and irrelevant grounds that it is "in most cases stable over time".

5 The combined use of FBS data and trade statistics[18]

It is useful to classify the methods which have been proposed for combining the use of FBS data and trade statistics in demand forecasting according to the relative roles played by the two sources. Some methods use data from one source to improve or correct a forecast primarily based on the other source, while other methods assign more symmetric roles to the two sources.

One method of the first type, the idea for which is attributed to A.I.Grebnev by Bredov and Levin (1971), involves inserting into a trade-statistics model an additional independent variable taken from the FBS to represent income differentiation. This approach was tried at the Computer Centre of the Ukrainian Gosplan (Grebnev and Rybchenko 1969). However, it is difficult to define an adequate variable. If, for example, the ratio of the sizes of the two extreme groups in the per-capita-income distribution from the FBS is used, as suggested by Baranova and Levin (1978), changes in the middle range of the income distribution will have no effect on the forecast. The role here given to the FBS is not sufficient to offset the deficiencies of trade statistics.

The method of constructing a forecast based on FBS data and correcting it by means of coefficients derived from trade statistics is advocated by several authors in a number of variants. Coefficients may be used simply to correct the input data from the FBS (as discussed in Chapter B9) and the forecast made from the corrected input data, or a forecast may be made from uncorrected FBS data and then corrected by means of coefficients extrapolated into the future[19]. This approach was used by VNIIKS to forecast demand for 1971-5 (Davidovich 1969)[20]. It is probably the best reasonably straightforward

way of compensating for the most severe specific deficiencies of the two data sources (though it cannot of course compensate for the deficiencies common to both sources).

Some authors propose carrying out separate forecasts based on each of the sources simultaneously and then systematically using each forecast to "correct" the other until a convergent final forecast is obtained. An example of a system of models of this type, devised by Davidovich (1972), is shown in Table D3.4[21]. It is not clear whether the quality of results would justify such unwieldy procedures. The question of how best to combine FBS data with trade statistics to forecast demand appears to remain open[22].

6 Data problems common to all three approaches

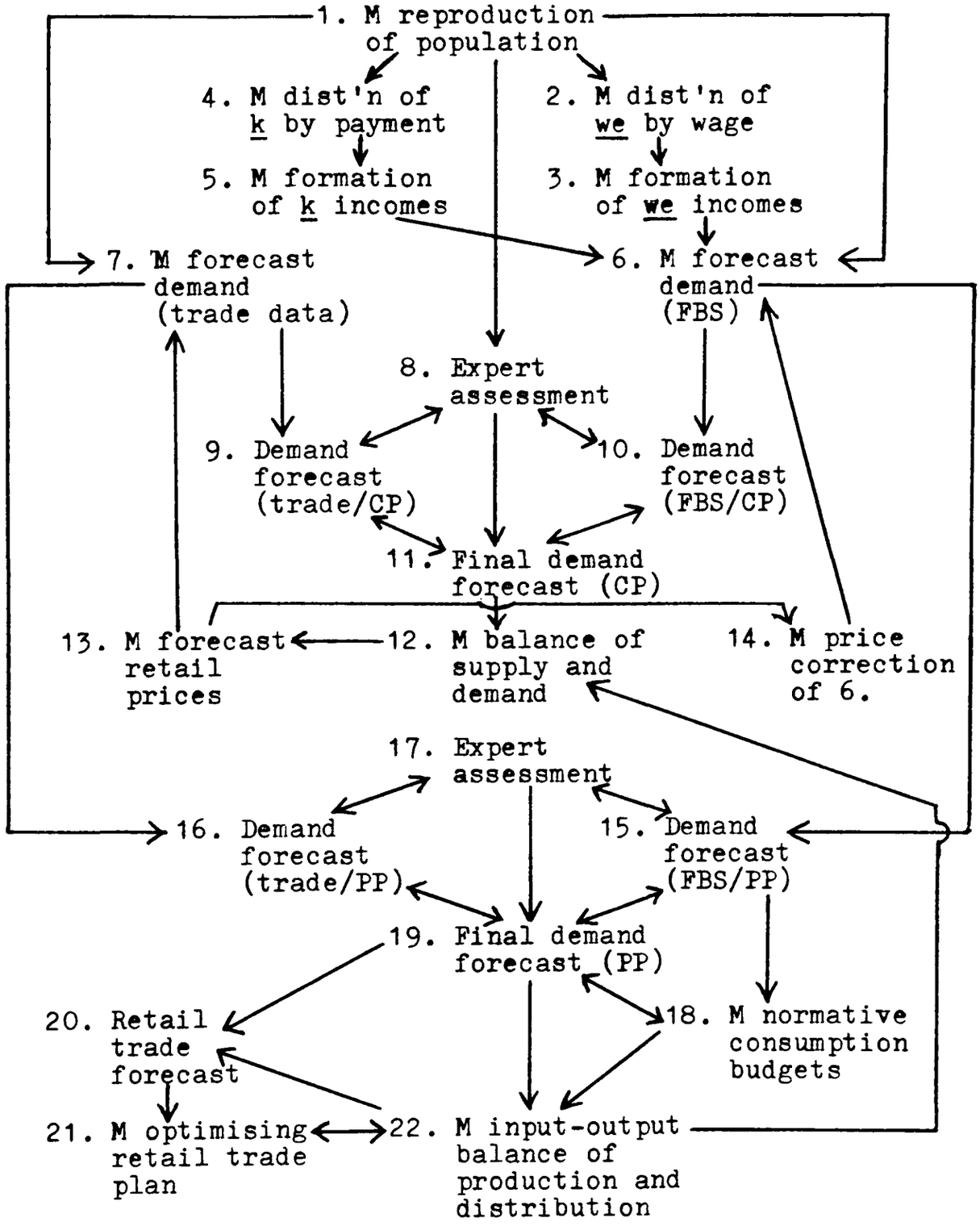
The problem of demand forecasting is not solved by finding the best method of combining the advantages of FBS data and of trade statistics, because there are a number of severe data problems which affect both sources more or less equally. We have seen, for example, the difficulty of taking proper account of the price factor whichever source is used: FBS data on average prices of purchase are inadequate while the price indices of trade statistics are misleading. We consider here four other problems in this category.

(i) From the discussion in Chapter C5 it will be clear that the product nomenclatures used in the FBS and in trade statistics have some limitations in common. For example, neither nomenclature is compatible with the nomenclature of the input-output table, so that demand forecasts cannot be readily linked to the planning of production (Dudkin 1968).

(ii) Neither the FBS nor trade statistics makes a clear distinction between the urban and the rural population, so that demand cannot be forecast separately for each of these two sectors. In the FBS the main division is

TABLE D3.4

A SYSTEM OF MODELS FOR FORECASTING DEMAND AND PLANNING RETAIL TRADE



Source: Davidovich (1972)

Table D3.4

Code

1. Model of the reproduction of the population
2. Model of the distribution of workers and employees by wage
3. Model of the formation of the incomes of workers' and employees' families
4. Model of the distribution of collective farmers by labour payment
5. Model of the formation of the incomes of collective farmers' families
6. Model for forecasting demand using FBS data
7. Model for forecasting demand using data from retail trade statistics
8. Expert assessment of future demand
9. Forecast of demand on the basis of data from retail trade statistics, in comparable prices
10. Forecast of demand on the basis of FBS data, in comparable prices
11. Combination of partial forecasts into a final forecast of demand, in comparable prices
12. Model of the balance of demand and supply
13. Model for forecasting the level and interrelations of retail prices
14. Model for correcting the forecast of demand based on FBS data by taking the level and interrelations of planned retail prices into account
15. Forecast of demand on the basis of FBS data, in prevailing prices
16. Forecast of demand on the basis of data from retail trade statistics, in prevailing prices
17. Expert assessment of future demand
18. Model of normative consumption budgets
19. Combination of partial forecasts into a final forecast of demand, in prevailing prices
20. Forecast of volume and structure of retail trade turnover
21. Model for optimising the plan of retail trade turnover
22. Model of the inter-branch balance (input-output model) of production and distribution of output

between workers and employees, many of whom live in rural areas (on State farms etc.), and collective farmers. In trade statistics the main division is that between the system of State trade and the system of cooperative trade. Cooperative trade is primarily rural but also accounts for about 25 per cent of urban retail turnover. On the other hand, about a quarter of the total expenditure of the rural population is spent in towns, mainly in State trade (Levin and Yarkin 1976).

(iii) When forecasting demand for some goods, in particular for consumer durables, it is necessary to take as one of the influencing factors the size of the stock of the goods already in the possession of the population. Some economists complain that there is no reliable source of information on this (for example, Levin 1969); presumably they regard the occasional surveys of consumer durables conducted by TsSU on the FBS sample network as unreliable[23]. They suggest either that a special regular survey be instituted or that the information needed be collected by the FBS (Levin 1969, Baranova and Levin 1978, pp.128-36).

(iv) A substantial proportion of potential consumer demand in the USSR remains unsatisfied[24]. Under these circumstances data on actual purchases, whether derived from the FBS or from trade statistics, are inevitably misleading as indicators of the underlying demand, and one cannot reliably forecast demand on their basis.

Lakhman and Frenkel (1967) effectively make this point in their criticism of the trade-statistics model developed by V.V.Shvyrkov:

> (The forecasts of Shvyrkov) transfer into the future existing supply-demand imbalances... Were planning bodies to be guided by the results of calculations using Shvyrkov's methodology, light industry would be disoriented and would develop in the wrong directions.

If the degree of satisfaction of the demand for a given good has been falling in the recent past, a forecast which identifies sales with demand will

probably recommend that the supply of the good be restricted even further. Lakhman and Frenkel observe that knitwear was sold in 1966 at a level 9 per cent over Shvyrkov's demand forecast, but that this still left 3-4 per cent of demand unsatisfied; the forecast implausibly predicted a fall in demand for knitwear in 1967[25].

It also follows that the success of a demand forecast cannot be judged by comparing it with actual sales after the forecast period has elapsed. If part of real demand is unsatisfied, coincidence of sales with forecast demand shows that the forecast was too low.

Although Lakhman and Frenkel write as though the problem of unsatisfied demand is specific to forecasting on the basis of trade statistics, it applies no less to the use of expenditure data taken from the FBS. Demand forecasting cannot be effective unless some sufficiently reliable method is found for assessing and making allowance for unsatisfied demand.

It is, however, very difficult and perhaps impossible to arrive at such a method. It appears to be a common practice to regard the proportion of trade orders fulfilled as an indicator of the degree of satisfaction of demand[26], but it is doubtful whether Soviet trade orders themselves adequately reflect demand. A number of economists advocate that unsatisfied demand be "recorded" in trade statistics or in the FBS or in both on the basis of what consumers say they would like to purchase but cannot obtain in the shops (Lakhman and Frenkel 1967, Levin and Yarkin 1976). Such an exercise, apart from being extremely burdensome, assumes that people can readily and reliably state how they would behave under the hypothetical conditions of adequate supplies. The most realistic suggestion may remain that of Aganbegyan et al (1961, pp.147-8): "orienting" assessments of unsatisfied demand in poorly supplied areas should be derived by comparing the consumption of their populations with that of the population of areas in which demand is satisfied to the greatest extent (Moscow, Leningrad etc.), making allowance for

differences in income distributions.

7 The use of normative methods of demand forecasting

Long-term Soviet demand forecasts are often oriented towards the attainment of "rational" patterns of consumption by the population. Rational budgets are constructed predominantly on the basis of "scientific" consumption norms worked out by various research institutes. These norms determine the diet, clothing, accommodation and so on needed to satisfy the physiological requirements of living in different climatic regions. A secondary role in the construction of rational budgets is typically played by FBS data: the current consumption of high-income families is taken as a desirable long-term goal for the whole population where there does not appear to be any "scientific" way of setting consumption norms[27].

There are various reasons why many Soviet researchers prefer to use normative methods in demand forecasting, including reasons of an ideological nature. Here we wish only to note that one prominent reason for the preference is the desire to avoid the use of the inadequate data sources on which descriptive statistical methods of demand forecasting have to be based. Thus Kuznetsova (1978) argues that the shortcomings of the statistical approach do not allow it to be used for long-term forecasting and that therefore the normative approach must be used instead. Yet the main shortcomings she cites are inherent not in the statistical approach as such, but rather in the reliance of the statistical approach on data sources which do not effectively reflect demand - the unrepresentativeness of the FBS sample, the insufficient expression of consumer needs in existing consumption patterns etc.

8 Reasons for the restricted role of the FBS in demand forecasting

The most obvious reason for the limited use of FBS data in demand forecasting is the poor quality of the data available as a result of all the

deficiencies in data collection and processing. Were this the only factor at work, however, one might still expect a rather greater use of FBS data, at least in combination with data from trade statistics and other sources. There is indeed evidence of other obstacles to the wider use of FBS data. We shall consider three such obstacles. First, some researchers appear to prefer to model demand on the basis of trade statistics for reasons extraneous to an objective assessment of the relative effectiveness of alternative methods. Second, there are other researchers who would, it seems, like to use FBS data but are unable to gain access to them. Lastly, we shall suggest that institutional interests have developed around methods based on trade statistics, and that these interests obstruct the application of alternative methods.

Why a researcher prefers one approach to a problem over another is rarely completely clear. Each researcher explains his own preference by reference to objective considerations, but may attribute more subjective motives, such as fascination with mathematical technique for its own sake, to his rivals. Frenkel and Lakhman (1966, pp.102-3) accuse unidentified colleagues of preferring to take refuge from the problems of handling real data in purely theoretical work[28]:

> In many works of our economists and mathematicians on forecasting, the analytical side predominates. Relying mainly on hypothetical data and examples, they avoid a number of important problems of applying their methods and conclusions in planning practice.

Mints (1968, p.17), discussing why the role of the FBS in demand forecasting is "sometimes underestimated", suggests that mathematical statisticians may be loath to forgo the opportunity of applying sophisticated techniques of time-series analysis to trade statistics. He cites in this connection an observation made by the Polish economist Z.Pawlowsky (1961):

> It is interesting to note that researchers with a certain training in the field of mathematical statistics prefer to use time-series data, while those who are not very strong in mathematics use family budgets.

However, this explanation cannot be relevant in the very many cases of demand forecasting using trade statistics where only fairly simple mathematical techniques are applied - for example, with regard to the work of the market research units in trade organisation.

Occasionally a preference for the use of trade statistics over that of FBS data is justified by theoretical opposition to reliance on sample surveys as such. This attitude is expressed by those statisticians who remain under the influence of the prejudice against sampling which prevailed in the Stalinist period, such as Professor P.P.Maslov, who argues that the indicator of retail-trade turnover per capita has the decisive advantage over the indicator of per-capita income that it is contained in statistical reporting (by complete enumeration), "while per-capita income can be obtained only on the basis of sample data" (Maslov 1962, p.196).

It often happens that Soviet scholars base their research on budget data, but that instead of using Soviet data they use foreign data[29]. In many of these instances, one would have thought it more apposite to apply the techniques under discussion to Soviet data, and it may be conjectured that the researchers have not been able to gain access to FBS data. In other cases, researchers analyse the data collected in specially organised local budget surveys (for example, Rimashevskaya and Ovsyannikov 1981). As similar analyses could in principle have been just as well carried out on FBS data of a less local character, one again suspects that FBS data were not used mainly because access to them could not be obtained.

Open references to the problem of obtaining access to FBS data have been found only in publications about the demand forecasting work of trade organisations and institutes. Kuznetsov (1965) complains that "retail and

wholesale organisations have to make orders to industry without disposing of information on consumption budgets". Belyakov and Kurak (1967) explain that

> at present (FBS data) are processed only... for TsSU, Gosplan and other official establishments, and are not submitted for the use of industrial and trade enterprises and organisations. FBS data should be at the service of the bodies which plan trade.

In 1966 the market-research institute VNIIKS was set up under the Ministry of Trade. According to A.Struyev (1964), Chairman of the State Committee on Trade of the Council of Ministers, the intention in setting up this institute was that it should "analyse the data of current trade, trade stocks and family budgets". However, the difficulty that VNIIKS met with in trying to obtain FBS data from TsSU is shown by the comments of the Director of the Kazakhstan Branch of VNIIKS K.A.Beisembetov (1976):

> A positive decision is essential in the question of the submission by TsSU of FBS data to the branches of VNIIKS and TsNILS. If such expensive surveys are to be conducted, then the information from them must reach those who are investigating problems of consumption and demand. The excuse that the FBS is not sufficiently representative must be set aside in view of the doubtfulness of achieving representativeness in the near future.

It appears then that if trade organisations do not use FBS data, this is not the result of their own judgement concerning the suitability of such data but simply reflects the fact that they are not in a position to obtain the data. By contrast, "statistics of sales are available to trade organisations at any level" (Lokshin 1968). Trade organisations presumably obtain sales data not from TsSU but from the departmental statistics collected by the Ministry of Trade and Tsentrosoyuz themselves.

It is likely that the difficulty of obtaining data from TsSU is a function of the status of the institution seeking the data within the power structure. The requests of central State bodies like Gosplan are satisfied

automatically. Trade organisations enjoy very low status in the Soviet system, and find it correspondingly difficult to obtain access to data. Research institutes under the Academy of Sciences occupy an intermediate status: probably their staff sometimes succeed in obtaining data and sometimes do not.

We recall that, although Gosplan has access to TsSU data, it chose to base its own large-scale demand forecasting work in the 1960s wholly on trade statistics. Our hypothesis is that this choice by such a high-status body led to the creation of a powerful institutional interest in the promotion and justification of the trade-statistics approach, and that this impeded the development of other approaches. The information needed conclusively to confirm or to refute hypotheses of this kind is not available, but we shall argue for its plausibility on the basis of an examination of the positions taken up by G.N.Korovkin, a Gosplan economist closely associated with the demand forecasting work at Gosplan.

Reporting on the progress of the work at Gosplan, Korovkin (1966) does not merely explain the generally recognised advantages of trade statistics over FBS data but even presents the disadvantages of trade statistics as if they were advantages. Thus, one of the advantages of using trade statistics is allegedly that this does away with the need to make calculations of the income distribution of the population. Korovkin presents the use of FBS data not only as impracticable under existing circumstances but also as unnecessary in principle. In so doing he makes reference to the authoritative judgement on the matter of Professor Maslov, though one doubts whether he really shares Maslov's archaic point of view.

In 1969 VNIIKS organised a conference on the organisation of market research (Organizatsiya... 1971). At this conference TsSU came under considerable pressure to improve the FBS in order to facilitate the use of

its data for market research. This pressure was resisted both by the Head of the TsSU Budget Statistics Department I.Ya.Matyukha and by Korovkin. Matyukha took up a rather defensive position, admitting that "we must of course seek out possibilities of using budget statistics to study consumer demand" but insisting that

> we cannot agree with those who would like budget statistics to become only a source of information on consumer demand. To pose the problem in this way means to vitiate the task (of the FBS) of studying living standards.

The nature of this supposed conflict between the requirements of the study of consumer demand and those of the study of living standards was not clarified. Matyukha suggested that the solution to the conflict might be the introduction of a new survey, specially devoted to the study of demand. (Nothing more seems to have been heard of this suggestion.)

Korovkin spoke in a much less conciliatory tone:

> Comrade Matyukha has spoken of the limited possibilities of organising budget surveys in accordance with the needs of scientific research and demand forecasting. He recalled yet again the necessity more actively to use trade statistics. But not everyone understands this.

The published text of Matyukha's speech to the conference does not, however, contain any reference to the necessity of using trade statistics, being wholly concerned with defending the FBS. For Korovkin exclusive reliance on trade statistics in demand forecasting is not an unfortunate necessity pending improvement of the FBS but an established practice to be protected by warding off such an improvement. The conservatism of TsSU is a useful means to exploit for the purpose of undermining the critics and rivals of Gosplan.

9 Conclusions

The FBS has various advantages over alternative sources of data for demand forecasting, the most important of which is that only the use of FBS data makes it possible to take into account the effect of the

socio-economic differentiation of the population on demand. In view of the poor quality of FBS data, however, the most effective methods of demand forecasting combine the use of FBS data with that of trade statistics and other information. The potential even of these methods is limited by data problems which affect the FBS and trade statistics alike - in particular, by the extreme difficulty of making proper allowance for unsatisfied demand.

FBS data are not widely used in demand forecasting work. This is partly explained by the generally recognised deficiencies of FBS data, which lead many researchers to place more emphasis on modelling with trade statistics and on normative methods of long-term demand forecasting. A number of other factors also militate against the use of FBS data - certain attitudes which exist among some researchers, the difficulty which many researchers have in gaining access to FBS data (especially those working in trade organisations and institutes), and the emergence of powerful institutional interests (as in Gosplan) committed to methods of forecasting demand on the basis of trade statistics.

Notes to Chapter D3

1 Maslov (1967, p.154) complains of the "lack of initiative" shown by TsSU in this respect: "TsSU considers itself the monopoly body for statistical work and fights against Departmental amateurishness, but for some reason it leaves the study of consumer demand to the trade organisations."

For a discussion of the organisation of market research in the USSR, see Hill, Shenfield and Park (1982).

2 They may also of course be subdivided according to the mathematical technique used, but this is not our main focus of interest here. Models using FBS data usually analyse structural dependencies at a single time period, although there is no technical necessity for this to be so (see Section 3). Models using trade statistics are based on the analysis and correlation of time series of sales and other variables (total money incomes of the population, retail price indices etc.).

3 We use "trade statistics" broadly to include statistical reporting in the field of services to the population; in Soviet sources the term is often used narrowly to refer to the sales of goods only.

4 "Many specialists quite justifiably remark that, for the successful introduction of these models into planning practice, it is necessary above all to improve budget statistics" (Grebnev and Rybchenko 1969).

5 The work was carried out under the leadership of Ya. A. Oblomskii in the Department for the Introduction of Economic-Mathematical Methods into Planning of the National Economy, the Department of Commodity Turnover and the Main Computer Centre of Gosplan USSR, in the corresponding departments and the computer centre of the Ukrainian Gosplan, and in the Scientific Research Institute of the Belorussian Gosplan. The work is described by Shvyrkov (1968), Mints (1968) and Bredov and Levin (1968); for the Ukrainian work see Grebnev and Rybchenko (1969), and for the Belorussian work see Chernysh (1968). The Scientific Research Economic Institute of Gosplan USSR also had some connection with the work, suggesting amendments to the methodology (Korovkin 1968).

6 Chernysh reports that actual sales in 1966 in Belorussia turned out to be within 3-4 per cent of forecast sales, but this discrepancy is an extremely large one relative to the actual increase in sales over the forecast period (in the range 3-10 per cent for most product groups). This is without taking account of the fact that actual sales are a poor indicator of real demand under conditions of partially unsatisfied demand.

7 Soviet internal public trade is organised in two separate administrative systems: the predominantly urban system under the All-Union and Republican Ministries of Trade ("State trade"), and the mainly rural system of consumer cooperatives under Tsentrosoyuz, the Central Union of Consumer Cooperatives ("cooperative trade"). Each system has its own market research institute (VNIIKS and VNIIEKT respectively).

8 It appears that those few studies that use FBS data are carried out in academic institutes, for which access to TsSU data is easier than it is for the market-research institutes (see Section 8). For example, V.D.Gribov carried out his study of demand for everyday services at the Moscow Technological Institute. The uneven coverage of services by trade statistics is a reason for preferring to use FBS data in this area.

9 For discussion of methods of modelling demand on the basis of FBS data see Leifman (1962, 1963), Bredov (1966), Mints (1968) and Matyukha (1973, pp.144-6).

10 Leifman (1962) complains that the practice of valuing these acquisitions at State retail prices distorts comparisons of the consumption of families with different degrees of dependence on them and comparisons of the consumption of workers' and of collective farmers' families. He suggests valuation at procurement prices.

11 The unreliability of FBS data sometimes prevents these theoretical advantages from being realised in practice. Thus, in the modelling carried out at the Ukrainian Scientific Research Institute of Trade, total consumption expenditure was taken as a proxy for income, on the grounds that "incomes are recorded less reliably in family budgets than expenditures" (Leifman 1962). As a result savings were ignored, as in most models based on trade statistics.

12 Also, Davidovich et al (1972, p.50) point out that "in some Republics, not to mention krai and oblasti, the sample is so small that it is hardly possible to calculate coefficients of elasticity on its basis".

13 For a discussion of modelling demand on the basis of trade statistics see Shvyrkov (1966).

14 Trade statistics are "very representative and reliable" (Korovkin 1968), "very direct and representative, sufficiently precise" (Davidovich et al 1972, p.4).

15 Again, Gribov (1968b) writes of the "confusion caused by yearly changes in instructions" for the statistical reporting of everyday services.

16 Another example is the work at the Computer Centre of the Ukrainian Gosplan described by Grebnev and Rybchenko (1969).

17 Levin and Yarkin give the following figures for proportions of petty-wholesale sales, taken from a special survey:

fats	15.4%	electrical goods	17.7%
milk products	14.2%	wood materials	34.2%
flour	11.7%	building materials	17.7%
cereals and beans	12.8%	office goods	17.8%

18 For discussions of general demand forecasting models combining the use of FBS data and trade statistics see Frenkel and Lakhman (1966), Levin and Frenkel (1973) and Davidovich et al (1972). The best survey of alternative approaches is that of Baranova and Levin (1978). For applications to the forecasting of demand for specific product groups see Volkova and Komarova (1976) and Lomovatskii (1980,pp.137-144), concerned with clothing and knitwear and with fish respectively.

19 A number of methods have been suggested for extrapolating coefficients into the future, including averaging and the fitting of trends by regression (Frenkel and Lakhman 1966, Baranova and Levin 1978).

20 According to Davidovich (1969), the results of the forecast for 1971-5 were "very satisfactory",although it is not clear how this could already be known in 1969.

21 Davidovich rather optimistically states that his system of models "has been worked out in principle and after experimental verification can be introduced into planning practice".

22 "Various methods are possible in principle. It is possible to choose the best, from the point of view of the precision of forecast results, only by experimental calculations" (Baranova and Levin 1978).

23 The surveys carried out in 1958, 1962 and 1965 are described by Rumyantsev (1967, 1968).

24 For example, unsatisfied demand for cars, radios, equipment for private plots and building materials constitutes about 20 per cent of sales according to an estimate by VNIIKS, while VNIIEKT estimates that unsatisfied demand in rural areas amounted to 12-15 per cent of total demand in 1976-80 (Orlov 1983). The basis for these estimates is unclear.

25 Davidovich and Yastrubinetskaya (1972) give similar examples. Between 1965 and 1969 sales of eau-de-cologne fell because production was reduced and trade orders left unfulfilled. In 1970 industry responded to the trade orders and increased production, and sales exceeded those forecast by 17 per cent.

26 Thus, Kondratyeva and Lopushanskii (1980) of VNIIEKT report that cooperative trade is supplied with toys to the extent of 80-84 per cent of orders.

27 According to Krylov and Kirichenko (1962), 75 per cent of expenditure on goods and more than one-third of other expenditure in the rational budget is calculated on the basis of scientific norms.

For a very useful account of Soviet rational consumption norms and their role, see Weitzman (1974).

28 An example of a Soviet work relying purely on hypothetical data and examples to illustrate a theoretical argument is the work of Maslov (1961) on coefficients of elasticity. The alternative explanation for this tendency - that is, that purely analytical writers have not been able to gain access to real data - cannot, however, be excluded.

29 For example: Konyus (1963) and Volkonskii (1963) discuss demand functions on the basis of Japanese budget data for 1931-7. Valtukh (1980) uses data from twenty countries, not including the USSR and with American data predominating, to explore the role of the objective consumption function. Valtukh and Ryzhenkov (1980) use utility functions to analyse the structure of consumption on the basis of Austrian data.

CHAPTER D4

THE FBS AS A SOURCE OF DATA ON THE CONSUMPTION OF ALCOHOLIC DRINK

Alcoholism is a pressing social, economic and health problem in the USSR. One might expect discussions of this problem to draw on the FBS as a valuable source of data on alcohol consumption. Although retail trade statistics provide a basis for estimating total expenditure on alcoholic drink by the population, it is only budget survey data which make it possible to analyse consumption by social and income group, family types and so on[1].

However, when we examine Soviet works on alcoholism, we find that they make no use of budget survey data[2]. Some such works (for example, Entin 1979) adduce no data at all on the scale of alcohol consumption. Others refer to the inadequate retail-trade data published by TsSU (for example, Belitskaya and Anisimov 1971, and Kondrashenko and Skugarevskii 1983)[3]. Data are often cited from occasional local surveys of the problem conducted by researchers. Thus, the authors of the book Alkogolizm... (1966) carried out a sample survey of the sales of alcoholic drink in Dmitrovskii raion of Moscow oblast' in 1960; not only Segal (1967) but the more recent commentators Strumilin and Sonin (1974) still rely on these results. The study of alcoholism by Kondrashenko and Skugarevskii (1983), to take another example, refers to a sample survey of alcohol consumption by workers in a large industrial enterprise conducted by Lisitsin and Kopyt (1978).

One possible explanation for the failure of writers on alcoholism to make use of FBS data is their lack of access to FBS data. It is quite likely that they find it at least as difficult as do market researchers (Chapter D3) to obtain data from TsSU. However, some data from the FBS are published

on the basis of which rough estimates of alcohol consumption can be made - usually indirectly (see Table D4.1 for examples)[4]. If these data are not used, this is presumably because they are known to be unreliable.

Although sales of alcoholic drink have for many years been aggregated with sales of non-alcoholic drink and of other minor food products in published retail-trade statistics, it is possible to derive estimates of alcohol sales from them by making appropriate adjustments. This is what Krasikov (1981, pp.165-9) does in a samizdat essay: he concludes that alcoholic drink accounted for about 15 per cent of all sales in State and cooperative shops in 1972. We have carried out a similar exercise on data for 1968, giving the same result. Local Soviet surveys of retail sales have yielded results consistent with these estimates: thus, it was found that alcoholic drink in 1960 accounted for 15.2 per cent of retail turnover in Moscow oblast' (Dmitrovskii raion) and for 16.6 per cent in Perm oblast' (Segal 1967, p.268). Finally, the retrospective budget survey among emigrés reported by Treml (1982) also gives similar results.

Moreover, we must make some allowance when estimating total alcohol consumption for alcohol acquired from sources apart from the State and cooperative shops. Strumilin and Sonin (1974) consider that illegal home-brew (samogon) probably accounts for at least one-half of total consumption of vodka. Other alcoholic drinks are also home-brewed, such as the wine made in large quantities in Georgia and Moldavia. Many people regularly take alcohol from their workplaces (Treml 1982), and managers sometimes distribute industrial spirits to their workers as necessary unofficial supplementary payment[5]. Alcoholic drink must then account on average for at least 20 per cent of total family consumption.

This suggests the extent to which budget surveys, which estimate this proportion at about 6 per cent, underestimate alcohol consumption. The discrepancy may be attributed in part to biases in sample design, and in part to deliberate underreporting by families of their real alcohol consumption.

TABLE D4.1

ESTIMATES OF PROPORTION OF FAMILY EXPENDITURE ON ALCOHOLIC DRINK BASED ON FBS DATA

(a)

	families of workers and employees	families of workers in industry
1970	7·1 %	6·8 %
1975	6·8 %	6·8 %
1981	6·4 %	6·3 %

Source: Narodnoye khozyaistvo SSSR 1922-1982 - yubileinyi statisticheskii yezhegodnik, M 1982, p 422; the figures are those given for "other expenditures", of which alcoholic drink is by far the largest component for families of workers and employees.

(b) Krasikov (1981 pp 165-9) obtains an estimate of about 15% for 1972 on the basis of retail trade statistics. According to Korovkin (1969), FBS data give estimates of expenditure on alcoholic drink of about 40% of estimates based on trade statistics. Therefore FBS data for the period around 1970 must have given an estimate of about 15 x 0·4 = 6 % .

(c) Aleksandrova (1967) presents an average annual budget compiled from FBS data for a group of four-person families of workers employed at the Nosenko factory in the town of Nikolayev (Nikolayev oblast', Ukraine) for 1966-7. The proportion of expenditure on alcoholic drink is 2·8 % .

It is not obvious how most of the biases in the FBS sample are likely to affect data on alcoholic drink. In the absence of breakdowns of alcohol consumption by income group, it is difficult to judge whether the over-representation in the sample of middle-income groups and the exclusion of families with the highest and lowest incomes result in any substantial net bias. Nor is the effect of the under-representation of sparsely populated areas clear: incomes may on average be lower there, but alcoholic drink may occupy an even more prominent position in consumption there than in the central areas, inasmuch as many products are not available for sale in outlying places while alcohol can be bought anywhere (Krasikov 1981).

However, one bias in the FBS sample almost certainly leads to under-estimation of alcohol consumption - that associated with the "guinea-pig effect" discussed in Chapter B5. Those families who are sufficiently disciplined in their habits, and sufficiently ready to conform to official demands, to participate in the survey for prolonged periods are also likely to consume less alcoholic drink on average than the population as a whole. The participating families who are made the subjects of newspaper articles are always presented as living in an exemplary way.

Deliberate under-reporting of expenditure on alcoholic drink, motivated by the desire to make a good impression on the interviewer, is a well-attested phenomenon in Western budget surveys. Respondents may be even more embarrassed about their alcohol consumption in the USSR in view of the official campaigns against alcoholism[6]. The problem appears to be exacerbated by lack of confidence in the confidentiality of information provided (Barbashov 1968). In one textbook we are told of a respondent who admitted to the interviewer that his records of vodka purchases had been incorrect, explaining that it would be very unpleasant for him, as the "best producer" in his factory, if people found out about his secret drinking (Uchebnoe...

1958, p.195).

The information provided is also often distorted as a result of relationships within the family. In many families the wife takes responsibility for family purchases while the husband keeps a separate personal budget (zanachka) secret from her by concealing part of his income (bonuses etc.):

> Then Tamara (the narrator's wife - SDS) did some very closely figured accounts and informed me how much money I should have to provide for the family, and how much I could squander on my trollop. It's a good thing she doesn't know about my bonuses, and the odd fees I get (Zinoviev 1981, p.99).

Speeches at meetings of survey participants demonstrate that the keeping of budget records tends to be undertaken (or at least supervised) by the wife. Although interviewers are advised to collect information from individual family members in secrecy from the rest of the family on request (Uchebnoe... 1958, p.195), the zanachka must often be left out of account. As a large porportion of alcohol consumption is financed out of the żanachka, this contributes to the under-reporting of expenditure on alcohol (Shenfield 1982b).

A remarkable official reluctance to recognise the implausibility of the low figures for alcohol consumption given by the FBS is revealed in a pair of articles published in Izvestiya (Aleksandrova 1967, 1968). Alongside a feature about a family participating in the survey there appeared a supposedly typical annual budget of family income and expenditure, compiled by staff of the Nikolayev oblast' (Ukraine) statistical administration on the basis of FBS data for a group of four-person families of workers employed at the Nosenko factory in the town of Nikolayev in 1966-7. This budget showed an average total expenditure of 3268 rubles, of which only 93 rubles, or 2.8 per cent, were spent on alcoholic drink. In the follow-up article we are told of a letter received by Izvestiya from a worker, A.Bogdanov of the town of Safonova in Smolensk oblast', disputing the veracity of this figure:

> We are the same sort of family as appears in your calculations: four persons. I earn 120-140 rubles a month, my wife 70, father 200 and mother 120 - total 510. And one-third of our wages goes on vodka. In statistics we need reality, not thought-up examples... This is the collective opinion of our youth.

The Izvestiya journalist, after checking whether the author of this letter really existed, replied that she had full confidence in the "real calculations" on which the published budget was based[7]. The average figure of 2.8 per cent, she argued, proved that there were only a few heavy drinkers and many people who did not drink at all. "Your case is less common than you think; not everyone drinks so much." The article proceeds to discuss the link between alcoholism and murder.

We can conclude that the FBS provides no information of any value on the consumption of alcoholic drink by different population groups. The problem of alcoholism must be studied by other means[8].

Notes to Chapter D4

1 Even analysis of consumption by territory on the basis of retail trade statistics can only be very approximate in view of the many purchases made in a given locality by people resident elsewhere.

2 The same is true of English-language works on alcoholism in the USSR. The statistical study of alcohol in the USSR by Treml (1982) cites the results of some Soviet budget studies (not the FBS itself; see pp.75-81), but in view of the evident understatement of alcohol consumption in them and the "almost complete absence of Soviet statistics on alcohol expenditure by income groups" he relies on the results of a budget survey conducted among emigrés.

3 These generally give only percentage increases over time without base figures.

4 Some data from budget surveys other than the FBS are also available. These give proportions of family expenditure on alcoholic drink of the same order of magnitude as the FBS. Thus, the average proportion given by a survey of budgets of workers' families in several oblasti of Siberia in 1946-57 was 3.4 per cent (Alekseyev and Bukin 1980). A more recent survey of budgets of 863 families living in a town in Western Siberia gave proportions for different groups of families, classified by "consumer types", varying between 3.4 per cent and 10.4 per cent (Rimashevskaya and Ovsyannikov 1981).

5 Remark made by Aron Katsenelinboigen. Treml (1982,p.76) also draws attention to costs related to alcohol consumption: premiums paid to middlemen for alcohol purchased from them during restricted hours or in restricted areas; expenses of medical treatment for alcoholism, sobering-up-station charges and fines levied for drunkenness.

6 Official attitudes to alcohol consumption are perhaps reflected in the model family budgets used for long-term normative demand planning. The minimal subsistence budget for a family of four presented by Sarkisyan and Kuznetsova (1967, p.66) allows for 2.7 per cent of family income to be spent on "tobacco, matches, wine and vodka" (that is, about 2 per cent on alcoholic drink). The more generous "rational budget" (p.166) provides for the expenditure of 3.3 per cent of family income on alcoholic drink.

7 The statistician Yakhot (1969) cites Bogdanov's letter as an illustration of the fallacy of drawing general conclusions on the basis of a single case. However, the calculations of the Nikolayev oblast' statistical administration must also be based on an extremely small number of budgets, as the survey at the Nosenko factory presumably covers a standard cluster of 20-25 workers, of which account is taken only of those in four-person families.

8 Strumilin and Sonin (1974) call on TsSU to organise a large-scale sample survey of the socio-economic consequences of alcoholism, but there is no indication that the appeal has been heeded.

CHAPTER D5

ASSESSMENT OF THE USE MADE OF FBS DATA

1 Introduction

In this chapter we attempt an overall assessment of the use made of FBS data in Soviet statistical practice and of the problems raised by the usability of FBS data. The evidence of the use or non-use of FBS data in various fields presented in Chapters D1-D4 provides a basis for this assessment.

The extent of the use of FBS data is assessed in Section 2. The main problems involved in using FBS data are summarised in Section 3. In Section 4 the relationship between TsSU and the actual and potential users of FBS data outside TsSU is examined, and the influence that non-TsSU data users are able to exert on the organisation of the survey is considered. We sum up our conclusions in Section 5.

2 The extent of the use of FBS data

The lists of uses of FBS data which one finds in Soviet textbooks (see Table D1.1), and statements in Soviet sources to the effect that "budget statistics are used to a greater and greater extent for analytical purposes to solve practical problems in planning the production of consumer goods, socio-cultural measures etc." (Karapetyan and Rimashevskaya 1959), give one the impression that FBS data are extensively used for the most varied purposes. Other statements in Soviet sources affirm by contrast that

> FBS data in their existing form are unsuitable for solving planning-economic tasks. The gap between the information required and that obtainable widens from year to year (Korovkin 1969, p.118).

According to Karapetyan (1980):

> The unanimous view of participants at a number of scholarly seminars and conferences has been that FBS data cannot fully satisfy academic and planning needs.

Available reports of the proceedings of such seminars and conferences, such as that of the conference on the study of consumer demand held at VNIIKS in 1969 (Organizatsiya... 1971), on the whole support this contention. It is also of relevance to note in this context the criticism of the book by I.Ya. Matyukha (1973) on statistics of the standard of living made by another TsSU official reviewing it:

> Too much space is devoted to the FBS and to recommendations on how to use its results. While we recognise the value of FBS data, their significance should not be overestimated, as they play a limited role in mass calculations (Sidlyarenko 1975).

Our own survey of the uses made of FBS data suggests that the lists of uses cited in statistics textbooks may exaggerate the real extent of use of FBS data. Many of the uses of FBS data in economic calculations (of national income etc.) are marginal or indirect. There is not a great deal of evidence for the effective use of FBS data in the analysis of policy options in the field of social welfare (Chapter D1 Section 3), and no clear evidence of their use in the determination of pricing policy (Chapter D1 Section 4). The role played by FBS data in the analysis of socio-demographic problems is a fairly minor one (Chapter D1 Section 5). They play a secondary role in the analysis and forecasting of consumer demand (Chapter D3).

There are also various purposes for which FBS data could conceivably be used but for which they are in reality not used. In contrast to most

other countries, budget data are not used in the USSR in the construction of retail price indices (Chapter D1 Section 4). They are not used, for example, for the study of the consumption of alcoholic drink (Chapter D4).

Nevertheless, we have found that FBS data do play an important role in a few specific areas. The FBS is the main data source for the analysis of private plot husbandry (Chapter D1 Section 6). It is a fairly important data source for the compilation of certain statistical and planning balances - in particular, for the compilation of the balance of the money incomes and expenditures of the population in extended form and for that of balances of the production and disposal of agricultural products (Chapter D2). Here the FBS provides data unavailable from other more reliable sources - for example,data on transactions among private citizens (on the collective farm market etc.). In general, the use of other sources is preferred to the use of the FBS wherever there is a choice, so that FBS data are resorted to only when there is no alternative. There is an exception to this rule where the alternative data source is the survey of collective farm markets, the data of which are regarded as approximately as unreliable as FBS data.

3 The main problems involved in using FBS data

The tendency to avoid relying on the use of FBS data arises above all from general awareness that FBS data are unrepresentative of the population as a whole or otherwise unreliable. The deficiencies of the forms in which TsSU produces tabulations of FBS data - the gaps in the range of tabulations produced, insufficient disaggregation of the product nomenclature, irrelevant tabulation variables and so on - also serve to discourage wider use of FBS data. There is also a problem for many potential users of FBS data outside TsSU of gaining access to the data; market research organisations find it particularly difficult to obtain the data (Chapter D3)[1]. However, we have seen that even bodies which have access to FBS data, including TsSU itself,

avoid their use where this is possible and try to restrict their work programmes in order to minimise their reliance on FBS data. It is for this reason that TsSU has resisted demands to compile more balances at oblast' level (balance of money incomes and expenditures of the populatio in extended form, balances of agricultural products) (Chapter D2)[2].

The use of FBS data at oblast' level entails special difficulties. The survey is not conducted at all in many oblast'-level territories, and the samples in those territories where it is conducted are often regarded as "insignificant" in size or as unrepresentative of the territory as a whole. As a result, statistical and planning calculations are even more constrained by the inadequacy of the FBS at oblast' level than they are a Republic and USSR levels (see Chapter D2). A common argument for improvi the FBS sample is that "local bodies are in extreme need of correct indic of the standard of living" (Kolpakov 1968)[3].

Awareness of the unreliability of FBS data leads to great stress on need to combine the use of FBS data with the use of data from other sourc when the use of FBS data cannot be avoided altogether[4]. Indeed, some supplementary data sources, such as the complete census of privately owne livestock (Chapter D1 Section 6), owe their very existence to the deficie of the FBS, as they would not be needed if FBS data could be relied upon[5]

A common practice is the combined use of FBS data and of statistical reporting data pertaining to the same phenomenon. Thus, FBS data on mone holdings in the hands of the population are used together with the report data of financial institutions in the analysis of monetary circulation (Chapter D1 Section 5). Similarly, FBS data on family expenditures are u together with the report data of retail trade outlets in the analysis and forecasting of consumer demand (Chapter D3). The main advantage of the FBS over report data for these analyses is that only FBS data can be obta

in socio-economic breakdowns (by per-capita income, social group, family type etc.), while the main advantage of report data is their greater representativeness and reliability. The combined use of the two data sources makes it possible, with some difficulty, to compensate at least partly for the deficiencies of each of the data sources taken separately.

4 The relationship between TsSU and data users outside TsSU

Pressure on TsSU to correct perceived deficiencies in the organisation of the FBS is exerted by actual and potential users of FBS data in various ways. Articles by users seeking to exert such pressure - mainly research economists, but also Gosplan officials such as Kaganov (1964) - constitute one of the main sources of the information on which the present thesis is based. Efforts to influence the conduct of the FBS are also made by users participating in scholarly and Governmental meetings and conferences. For example, at an interdepartmental meeting[6] held by Gosplan on problems of planning the food supply,

> the methodology of calculating per-capita consumption which should be used in compiling current and long-term plans was discussed. In connection with the discussion of these questions, a number of proposals were made for improving the FBS (Soveshchanie... 1957).

Conferences may even agree on the formal presentation of detailed recommendations for improving the FBS as well as other data sources. Thus, the published recommendations of the conference on market research held by the Ukrainian Scientific Research Institute of Trade in Kiev in 1961 state that "research into consumption and demand requires the improvement of consumption statistics", and that "the conference requests TsSU USSR" to broaden its programme of tabulations of FBS data, to produce tabulations by per-capita income, to make the sample more representative and to cover social services more thoroughly (Opredelenie... 1962,pp.274-5).

Moreover, users of FBS data have pressed for the establishment of regular contacts between users and TsSU officials responsible for the conduct of the FBS.

> An important role in eliminating shortcomings (of the FBS) must be played by the establishment of business contacts between the TsSU Budget Statistics Departments and the departments and institutes which widely use FBS data for practical purposes (Aleshina 1959).

At a conference at the Central Economic-Mathematical Institute in 1966, L.Ye.Mints argued that it was necessary to hold "regular (every two or three years) special meetings between TsSU and representatives of Ministries, Gosplans and scientific establishments to exchange experience on the study of consumption and to improve the FBS and other branches of statistics" (Mints 1968).

There is no evidence of such regular links between TsSU and users of FBS data having been set up. I.Ya.Matyukha reported in 1970 that "some Republic TsSU's have strengthened their links with scientific research establishments, which obtain data to study the planning of consumer goods production etc" (Sukhoruchkina 1970). Apart from the fact that other Republic TsSU's had presumably <u>not</u> strengthened their links with scientific research establishments, there is no indication that the links in question were intended to assist data users in pressing for changes in the organisation of the survey[7].

The attitude of TsSU officials towards data users seems to depend on the status of the user. Concern is expressed for the needs of users in State planning and administrative bodies, however slow the response of TsSU to these needs may be. Thus, the Deputy Head of TsSU USSR V.S.Kudinov stated at a meeting of TsSU personnel that

> the use of the data by State and planning bodies makes it necessary to improve the information and to raise the regional representativeness of the sample (Sukhoruchkina 1970).

The Head of TsSU USSR V.N.Starovskii had similarly cited in 1957 the interest taken by Government and Gosplan officials in the use of FBS data on the output of meat and milk in the private plot economy as a reason for improving the representativeness of the sample (Vsesoyuznoe... 1959, pp.23-4 ; see Chapter B8). One finds no such expressions of concern for the needs of less influential data users in, for example, scientific research establishments.

5 Conclusions

FBS data are not very widely used in Soviet statistical practice, but they play an important role in fields where more reliable data sources are lacking, such as private plot husbandry and collective farm trade. Mainly as a consequence of widespread awareness of the deficiencies of the FBS, the use of FBS data is avoided wherever possible. This has a serious restrictive effect on planning work, especially at oblast' level. Where the use of FBS data cannot be avoided, it is common practice to try to compensate for their deficiencies by using them in combination with data from more reliable sources.

Data users outside TsSU attempt in various ways to influence the conduct of the FBS. Their efforts to establish regular links with the TsSU Budget Statistics Department have not been successful. TsSU officials do nevertheless express concern for the needs of data users in State and planning bodies, though not for those of data users in scientific research establishments.

Notes to Chapter D5

1 The access problem may not be a completely independent factor, inasmuch as TsSU sometimes cites the unrepresentativeness of FBS data as its reason for not making them available (see Chapter D3).

2 In Chapter D3 some further, probably less important, impediments to the use of FBS data, such as dogmatic prejudice against sample surveys as such and preference for mathematical models which happen not to require the use of FBS data, were discussed.

3 Kolpakov was a lecturer at a seminar on "concrete sociological research" held at the Academy of Social Sciences of the Central Committee in June 1966.

Kozlov et al (1965, p.231) state that, in view of difficulties in planning and other work in oblasti where the FBS is not conducted, TsSU USSR has begun to conduct one-off budget surveys on a reduced programme which cover all the territories of the USSR. It is unclear what surveys are here being referred to. If the reference is to the survey of incomes, family composition and living conditions (microcensus), then we must remark that a survey with such a limited programme and conducted so infrequently falls far short of solving the problem.

4 The new Head of the Budget Statistics Department of TsSU USSR, D.I.Dumnov, has emphasised the necessity of "complex use" of statistical reporting data and FBS data in the economic analyses carried out by statistical offices (Soveshchanie...1979).

5 One might argue that the improvement of the FBS would make the survey of collective farm markets superfluous as well.

6 This meeting was attended by representatives of Gosplan USSR, Gosekonomkomissiya USSR, TsSU USSR, Republic Gosplans, the USSR Ministry of Trade, the USSR Ministry of the Food Industry, the USSR Ministry of the Meat and Milk Products Industry, the USSR Ministry of the Bread Products Industry, Tsentrosoyuz (the administration of the consumer cooperatives), the Institute of Diet of the Academy of Medical Sciences and a number of other scientific research institutes.

7 Chernyavskii (1981, pp.132-5), discussing hypothetically how the average frequency of purchase of consumer durables could be calculated on the basis of FBS data, comments that "the programme of these calculations and their results must be carefully thought out with the participation of interested organisations". This implies at least that he does not automatically assume that there would be effective consultation between TsSU and the data users.

PART E

CONCLUSIONS: THE FAMILY BUDGET SURVEY AS A CASE-STUDY OF METHODOLOGICAL INERTIA

1 Introduction

The most striking characteristic of the conduct of the Family Budget Survey which emerges from our study is its methodological inertia. Those taking a professional interest in the FBS, whether as academic economists and statisticians or as practical planners and market researchers, have pressed the Central Statistical Administration repeatedly throughout the entire post-Stalin period to make the changes in the conduct of the FBS necessary to turn it into a source of reliable, representative and relevant data. A brief review of the current situation (Section 2) will confirm that their pressure has not induced TsSU to reform the organisation of the FBS in any fundamental way, but at best has led to improvements of secondary importance (some of which have even proved temporary). The purpose of this concluding chapter is to enquire into the circumstances which may explain this remarkable inclination and ability of TsSU to resist change in its working methods.

In Sections 3 and 4 we draw attention to two pertinent aspects of the political climate prevailing in Soviet statistics, which have so far been considered only obliquely: the mutual isolation of TsSU and the academic community, and the attitude taken by TsSU towards outside criticism of its work, respectively.

In Sections 5-7 we compare the methodological inertia in the conduct of the FBS with three analogous phenomena drawn from other fields of Soviet life: the impediments to technological innovation in Soviet industry (Section 5), the former ideological deformation of Soviet science (Section 6), and the limits encountered by economists and ecologists seeking to reform Soviet environmental policy (Section 7). Both the parallels between each of these phenomena and the inertia in the methodology of the FBS, and the points of contrast between them, are explored. On the basis of these comparisons, we argue that the most important factor impeding the

reconstruction of the FBS on a sounder basis is the continuing inability of mathematical statisticians to achieve sufficiently high status in the political system of Soviet statistics.

The thesis is concluded in Section 8 with some remarks on the possible implications of our case-study of methodological inertia for the understanding of the nature of the Soviet social system.

2 Methodological inertia in the conduct of the FBS

In this Section we review the main ways in which the conduct of the FBS has changed,and the main ways in which it has not changed, since it was constituted in its present form in 1951-2.

The coverage of the sample by social group, territory, branch and occupation has undergone certain changes (Chapters B2-B4). Coverage has been extended to new groups of the population such as workers in rail transport, in construction and on State farms and (in recent years) old-age pensioners. However, many groups remain excluded - important branches of the economy such as the food industry and trade, unskilled workers, employees of the State administration, the Armed Forces, collective farmers who share a cow with neighbours, the disabled and so on. Territorial coverage remains very incomplete and uneven: sparsely populated regions are scarcely covered, and the sample (especially that of workers and employees) is not even representative of the whole of those territories which are covered.

None of the much-criticised basic principles underlying the sample design has been abandoned. The use of long periods of participation continues to generate biases in the structure of the sample (by family income and composition, age etc.), while TsSU continues to look with favour on the resulting "guinea-pig effect" (Chapter B5). The inadequate system of standard representativeness checks has not been revised; sampling errors are still not calculated (Chapter B6). Corrective coefficients are, as

before, applied by TsSU only to data on collective farmers (Chapter B9). Above all, there is no sign of any replacement of the branch by the territorial principle (Chapter B10).

Even very simple steps which could appreciably reduce sample bias have not been taken. For example, the decision has not been taken to eliminate the "multi-worker bias" by excluding from the sample workers and employees who are not the main earners in their families (Chapter B1). The practice of starting systematic selection in the middle of the first interval, which gives rise to the "tail-cutting bias", has not been modified (Chapter B1).

The data-processing programme still largely retains its traditional form, dominated by the process of decentralised summarisation and by the production of tabulations by the irrelevant variables of "social group" and branch (Chapter C3). Contrary to expectations expressed by a number of writers, the painfully slow mechanisation and then computerisation of data-processing (Chapter C2) has not been accompanied by any basic change in the nature of the analyses carried out. The one important reform of the data-processing programme introduced in the 1960s, the production of tabulations by per-capita family income, was rescinded in the 1970s and has not yet been re-introduced (Chapter C3). Tabulations by other socio-economic variables, such as those relating to family size and composition, have never been regularly produced. Product nomenclatures used in the tabulations remain incomplete and inappropriately aggregated (Chapter C5).

The budget survey forms remain loaded with a very large number of indicators, many of which are not processed or used, the consequent burden on interviewers and participants leading to the collection of data of poor quality (Chapter C1). Of the many changes in form design advocated by critics of the survey, the only substantial one eventually introduced

was the unification of the two variants of Form No.1 (for workers and employees, and for collective farmers) in the late 1970s[1].

There has in short been extremely little real change in the methodology of the FBS in the last thirty years.

3 The political climate of Soviet statistics: the mutual isolation of TsSU and the academic community

In this study we have come across a number of manifestations of the tendency towards the mutual isolation of TsSU and the academic community. Thus, TsSU takes little or no interest in applying methods of sample design and data analysis developed in scientific research institutes: the use of corrective coefficients (Chapter B9), of sample designs on the territorial principle (Chapter B10), of the method of momentary observations (Chapter B11) or of mathematical-statistical models (Chapter C4). Rimashevskaya (1971) contrasts the prevailing situation, in which researchers work out models of family income and consumption and obtain results which "are then somehow taken into consideration" by statistical and planning bodies, with the ideal situation, in which these bodies themselves adopt for regular use the models worked out for them in scientific establishments[2]. Other aspects which we have noted of the isolation of outside researchers from TsSU are their difficulties in gaining access to FBS data (Chapter C3) and the absence of regular channels through which they could influence the conduct of the FBS (Chapter D5).

Another circumstance contributing to the mutual isolation of TsSU and the academic community is the extreme rarity of individuals who move from academic posts to TsSU (or vice versa) in mid-career. The top positions in TsSU are always (so far as we are aware) filled by internal promotion; one does not find the practice, common in some countries, of appointing prominent scholars to supervise State statistics. A means of

promoting methodological innovation, the potential effectiveness of which is suggested by the role played by Professor Tore Dalenius in Swedish State statistics (Lyberg 1983), is thereby ruled out. TsSU appears to be more exclusive in this respect than other State bodies. It is surely of significance, for example, that it was Gosplan and not TsSU which appointed A.Kh.Karapetyan in the 1960s to found and direct one of their computer centres[3], even though his research work had been in the field of statistics in general and in that of the methodology of the FBS in particular (see Chapters B9 and B11)[4].

It might be thought that the scientific research institute attached to TsSU (NII TsSU) would serve to bridge the gap between TsSU and the academic community. The work of NII TsSU on schemas for the reconstruction of the FBS sample on the territorial principle (Chapter B10) and on the method of momentary observations (Chapter B11) demonstrates effective contact between NII TsSU and researchers in institutes not attached to TsSU. However, the work of NII TsSU appears to have had as little influence on the practice of TsSU itself as has the work carried out elsewhere. In other words, using the criterion of real patterns of influence rather than that of formal subordination, NII TsSU forms part not of TsSU but of the academic community[5].

4 The political climate of Soviet statistics: the attitude of TsSU towards criticism of its work

One of the key features that distinguishes the post-Stalinist from the Stalinist political system in the USSR is the enormously enhanced legitimacy accorded to expert criticism of existing practices in a wide range of fields, provided that the criticism takes account of political sensitivities and confines itself to technical and organisational matters. Within these parameters, criticism of the work of ministries and other

State bodies may be quite sharp and gain publicity in the general as well as the technical press. State bodies are expected to respond to and take account of criticism directed at their work. Even though criticism can by no means be counted upon to guarantee significant improvements, it generates pressure that makes improvement more likely. The first precondition of change is an awareness among those who could bring it about of the existence, importance and general nature of a problem. In the absence of open criticism, such awareness will not extend beyond a narrow circle of specialists, incapable of gaining the support and understanding needed to improve the situation.

When one considers the political climate of Soviet statistics, one realises how incomplete and uneven the process of destalinisation has been in the USSR. TsSU officials are on the whole inclined to ignore outside criticism of their work and even to deny the legitimacy of such criticism. Speaking at an international professional forum, a seminar held in 1977 by the Conference of European Statisticians of the United Nations Economic Commission for Europe, the Head of TsSU RSFSR A.P.Dryuchin alluded contemptuously to criticism directed at the work of TsSU by other Soviet organisations:

> The activity of Soviet State statistical bodies is highly appreciated (in the USSR) since it makes an important contribution to the management of the Soviet Union. It goes without saying that no efforts are wasted in proving the adequacy of data collected by the Central Statistical Administration of the USSR... or in "defending" them against any allegations by other organisations (Druchin 1978).

It is extremely rarely that the TsSU journal Vestnik statistiki contains substantial criticism of methodology used by TsSU. Reports published in it of departmental and scholarly meetings on statistical questions may reveal that some sort of criticism has been voiced, but the substance of the criticism is typically not made very clear.

The large number of sources critical of the conduct of the FBS cited in this thesis may have created the impression that TsSU has faced sustained and coherent criticism from all concerned quarters at least in this area. This impression would be an exaggerated one. Almost all of these sources are only tangentially concerned with the FBS, devoting to it at best a few paragraphs and at worst a sentence or two. The authors are mainly economists or planners oriented towards one or another substantive problem rather than towards statistical methodology as such, but who make some comments on the FBS and other possible data sources in the course of their discussion.

By way of exception, there are just two critical sources centrally concerned with the methodology of the FBS. The kandidat dissertation of V.P.Safronova, a member of the staff of NII TsSU, is a competent mathematical-statistical survey and critique of the practice of survey sampling in Soviet State statistics (Safronova 1968). It contains a substantial section on the FBS. The referat of the dissertation, a summary issued in a very small number of copies,has no doubt been consulted by a few interested specialists, but the work has remained unpublished and its influence must have been minimal.

The other exceptional source is a review of the book on the FBS by the Head of the Budget Statistics Department of TsSU USSR I.Ya.Matyukha (1965) which appeared in Vestnik statistiki under the names of A.Kh.Karapetyan, N.M.Rimashevskaya and A.Sidlyarenko (1967). Karapetyan and Rimashevskaya are, we recall, prominent scholarly critics of the FBS; Sidlyarenko was at this time Head of the Budget Statistics Department of TsSU RSFSR. The review, the publication of which in the TsSU journal was rather remarkable, contained substantial criticism of the conduct of the FBS and of Matyukha for his apologetic approach to the subject:

> The author does not dwell on the controversial questions of (FBS) methodology... The situation... is pictured as though there were no debatable problems of any kind... In reality this is far from so... The author of a special monograph on budget statistics should, in our opinion, have thoroughly discussed (criticisms of the FBS raised at scholarly conferences) and given convincing answers to the questions that arise...

The reviewers also commented that "it is a pity that almost all the examples (in the book) are based on hypothetical figures, which deprives them of perceptual value". The publication of this review suggests that TsSU is under some pressure to change its attitude towards criticism[6].

It is possible to detect a certain variation among TsSU officials in their attitudes towards criticism. Thus Sidlyarenko, as we have seen, is prepared to associate himself with criticisms of the stance taken by Matyukha[7]. Another relatively flexible TsSU official is the present Head of the Budget Statistics Department of TsSU RSFSR A.I.Parfenova, who is on record as opposing the organisation of the FBS on the branch principle at a TsSU staff meeting (Sukhoruchkina 1970)[8]. One cannot therefore exclude the possibility that TsSU may gradually become more open to criticism.

One of the factors impeding progress in this direction is the exclusion of any open criticism of TsSU methodology from the textbooks used to train statisticians. This must be a political constraint imposed on the authors of textbooks, for criticism is excluded even from textbooks written by authors known from their other writings to understand the deficiencies of TsSU practice. As an example we may take the textbook on the general theory of statistics written by a collective of statisticians at the Moscow Economic-Statistical Institute headed by G.S.Kildishev (Kildishev et al 1980). Kildishev and his colleagues have made great efforts to educate Soviet statisticians (and other specialists) in mathematical statistics. Only a perceptive reader would realise that the section in their textbook on the FBS (pp.383-8), while on the surface

approving of the TsSU methodology, is designed to make the reader aware of its deficiencies[9].

5 First analogy: impediments to technological innovation in Soviet industry

In considering the methodological inertia in the conduct of the FBS, one is struck by apparent parallels with the difficulties encountered by the process of technological innovation in Soviet industry (see, for example, Berliner 1976 and Amann et al 1977). One might conceive of the conduct of the FBS as a special kind of productive activity, in which a near-monopoly producer (TsSU) employs a particular technology (understood as comprising sampling, interviewing and data-analytical methodology as well as data-processing equipment) to produce a final product (statistical information) for consumers (policy-makers, planners and researchers). The failure of TsSU significantly to adapt its technology (methodology) in order to produce a product more in line with the requirements of the consumers (data-users) could then be viewed as a special instance of the poor performance of the USSR in the field of technical innovation. This analogy has in fact been implied by Rimashevskaya (1971), who refers to the adoption of statistical models by statistical and planning bodies for regular use as a kind of "industrial innovation". In doing so she is evidently comparing the relationship between TsSU and statistical researchers in research institutes with the similarly difficult relationship between industrial enterprises and technologists in industrial research institutes.

We must here distinguish between innovation in data-processing equipment and innovation in statistical methodology as such. We have seen that the slow and uneven pace of the introduction of more advanced types of computational machinery into TsSU use has constrained improvement in the methods of data processing and analysis (Chapters C2-C4). As in other

industries such as steel smelting, the production of synthetic fibres and electric power transmission[10], outdated types of equipment continue to be produced and installed even long after the new types have come into wide use. The problem of innovation in the branch of industry producing data-processing equipment therefore has an indirect impact on the problem of innovation in the statistical methodology of TsSU. The link between the two problems should not, however, be exaggerated, inasmuch as TsSU does not fully exploit the potential of the data-processing technology available to it at any given time.

Investigators have identified the later stages of the "research-production cycle" as the location of the main bottleneck in the process of technological innovation in Soviet industry. Research and the experimental development of prototypes and pilot plants present much less severe problems than first commercial introduction of new equipment and its subsequent diffusion throughout industry. The resistance of established enterprises to innovation makes it necessary to incorporate new technology disproportionately in new enterprises (Berliner 1976 pp.504-5, Amann et al 1977 p.36). We have seen that the situation with regard to the methodology of the FBS is quite similar. Thus, researchers in scientific institutes have been able to devise schemas for reconstruction of the sample on the territorial principle (Chapter B10) and to develop the new method of momentary observations (Chapter B11). They have even acquired the resources needed to conduct some experimental surveys using the new methods (Chapter B11). But there has been no progress to the next stage of introduction of the methods into regular use by TsSU. Resort has not in this case been had to the incorporation of the new "technology" (methodology) in new "enterprises" (statistical agencies).

The analogy between methodological inertia in the conduct of the FBS and the slow rate of technological innovation in industry is therefore an

attractive one. Nevertheless, we would argue that it has its limitations, especially when we turn to the problem of explaining the reasons for the inertia.

Thus, industrial managers prefer to avoid the practical difficulties and temporary disruption entailed by substantial changes in established procedures. Clearly this is also an important factor in the reluctance of TsSU officials to reconstruct the FBS sample on new principles or radically to reorganise data processing. In the words of Rimashevskaya quoted in Chapter B10: "TsSU is used to working within a rigid system which change would disrupt" (Shenfield 1982b). However, we have seen that TsSU not only fails to undertake major transformations of its procedures, but does not even make changes in its methodology which would significantly improve the data produced at negligible cost in disruption and inconvenience (Section 2). The inertia in the methodology of the FBS has been much more extreme than the inertia in industrial technology: innovation in industry may be very slow, but it does occur,and once it has occurred it is not usually reversed, as was the introduction of per-capita-income tabulations into the FBS data-processing programme[11].

Much Soviet and Western discussion of the problems of innovation in Soviet industry centres on the adequacy of the system of economic incentives for managers (for example, Berliner 1976). Attempts are made to provide special incentives for innovation which can counteract the disincentives arising from the jeopardy into which innovation may put quantitative plan fulfilment. One might then by analogy attribute the methodological inertia of TsSU to the fact that TsSU officials are not subject to economic incentives.

Inasmuch as nobody has yet devised an incentives scheme suitable for State statisticians, this argument seems a rather hypothetical one.

Moreover, the lack of economic incentives for statisticians does not prevent rapid methodological innovation in some State statistical systems. In all countries State statistical offices are funded from the State budget, and their staff receive fixed salaries. The striking variations in the innovative behaviour of State statisticians among countries and even among offices within an individual country must be explained in terms of other factors.

Similarly, the failure of Soviet industrial managers to adapt their operations to the changing requirements of consumers is often attributed to their advantageous position as "sellers in a sellers' market" under conditions of shortage and the inability of enterprises to choose their suppliers. No doubt this is an extremely important circumstance. However, all State statistical offices are monopoly suppliers of State statistics, and the users of their data can rarely choose to go elsewhere if they are not satisfied[12]. Again, there are great variations in the ability of data users in different countries to influence the production of State statistics, and these variations must be explained in terms of non-economic factors[13].

6 Second analogy: the ideological deformation of Soviet science

One of the shortcomings of the analogy between statistical and industrial innovation is the implication that in both cases we are concerned simply with the rate of progress along a given path of development. While this may be an acceptable approximation with regard to the development of industrial technology, it is a misleading metaphor to apply to the development of Soviet statistical methodology[14]. As we have seen in Chapters A3 and A4, Soviet statistical practice has not followed a linear progression since 1917. The role of mathematical statistics and of probabilistic sampling theory in socio-economic statistics, which had seemed secure in the 1920s, was almost completely undermined in the Stalin

period. What we have examined in this thesis is not so much real technical progress, however slow, as a mostly unsuccessful attempt, in a particular area of statistical practice, to bring about a recovery from the consequences of Stalinism.

One therefore thinks of viewing the development of statistical methodology in the USSR in the light of the ideological deformations suffered by other Soviet sciences in the Stalin period. The best-known and most serious instance of this phenomenon is undoubtedly the domination of Soviet biology under both Stalin and Khrushchev by the unscientific dogmas of T.D.Lysenko (Medvedev 1969, Joravsky 1970). Less far-reaching examples in physics, chemistry and other fields are discussed in Loren Graham's study of science and philosophy in the Soviet Union (Graham 1973).

There are in fact many points of contact and similarities between the ideological deformation of statistics and that of the physical sciences. A recurrent theme of Stalinist dogma in all these fields was hostility to probabilistic methods and interpretations, whether in socio-economic statistics, genetics, quantum physics or organic chemistry[15]. At the notorious 1948 session of the Lenin Academy of Agricultural Sciences which condemned genetics, Lysenko proclaimed that "science is the enemy of chance"[16]. It was as a statistician that V.S.Nemchinov spoke in defence of genetics at this session. The ideological rehabilitation of the concepts of probability has assisted the recovery of all these sciences.

It should be stressed that ideological discourse as such does not necessarily impede scientific development. We may recall the role played by religion in Newton's thought. Graham argues that Marxist "dialectical materialism", flexibly interpreted by Soviet philosophers, does not hinder and may even constructively contribute to scientific thinking. Be this as it may, Soviet science appears not to have been seriously impeded in the 1920s by the vigorous ideological debates about science then in progress

(Joravsky 1961). The harm done to science by ideology in the Stalin period was the result of attempts to impose particular dogmatic readings of Marxist-Leninist ideology compulsorily on the scientific community.

This general point is confirmed in the case of statistics by the fact that those who have affirmed the practical significance of probability theory and mathematical statistics for socio-economic statistics, as well as those who have denied it, have been able to argue their positions in terms of Marxist-Leninist ideology. We may cite in this connection the work of B.I.Karpenko, who emphasises "the dialectical understanding... of determinism and indeterminism, of stochastics and probability, of statistical regularity and chance..., their unity and interrelations in various branches of contemporary knowledge" (Karpenko 1979 p.5).

We must also make a distinction between general allegiance to a flexible philosophical approach, which need not be unduly restrictive, and the fetishisation of whatever Marx, Engels or Lenin may have had to say on this or that subject. Soviet scholars are generally obliged to take cognizance of those "statements" (vyskazyvaniya) of the "founders" which relate to their field[17]. Fortunate are those studying subjects in which Lenin took no particular interest. Unfortunately for contemporary Soviet statistical practice, Lenin had much to say about socio-economic statistics[18]. That Lenin is still taken seriously by TsSU officials is suggested by a speech of I.Ya.Matyukha at a meeting of TsSU staff in 1970. "Without studying how Lenin used budget survey data," he observes, "the improvement of the economic-statistical analysis of FBS data is unthinkable". The quality of the analytical reports submitted by Republic TsSU's is to be raised by staff training and by organising study of the works of Lenin (Sukhoruchkina 1970).

A comparison of the Stalinist suppression of the use of mathematical statistics in socio-economic statistics with the suppression by Lysenko of

genetics in biology reveals a number of differences as well as some similarities. Neither the suppression of applied mathematical statistics nor its subsequent recovery has been as complete as the suppression and the recovery of genetics. The opponents of the application of mathematical statistics in socio-economic statistics cannot, like the Lysenkoites, be dismissed as charlatans or ignoramuses; their position is strengthened by the fact that they do have experience and expertise in practical statistical work, even though they do not understand and therefore disparage the relevance of mathematical statistics. The involvement of top political leaders in the controversy over the role of mathematical statistics is not in evidence, in contrast to their close involvement in the biological controversies. It may be conjectured that, while Stalin, Khrushchev and Brezhnev were aware of the practical significance for agriculture of the biological issues, they failed to grasp the import of what must have seemed a rather obscure statistical controversy and therefore took up no position in it. This would help account for the circumstance that neither side in the statistical controversy has ever achieved complete victory over the other.

The overall importance of the ideological factor in explaining current TsSU practice is difficult to gauge. Our analysis of the sample design of the FBS suggests that TsSU officials lack a clear commitment to any of the competing schools of statistical theorists (Chapter B12). To the extent that TsSU practice is influenced by archaic ideas, this appears nowadays to be more the result of bureaucratic inertia than the result of the direct influence of such ideas on the officials involved. The ideological deformation of Soviet statistical thought was certainly, by contributing to the neglect of the application of mathematical statistics and sampling theory in socio-economic statistics, a central genetic factor in the emergence of the present situation. It may nevertheless be official

routine rather than ideology which has become the main impediment to the reform of the methodology used by TsSU.

7 Third analogy: limits to the reform of Soviet environmental policy

We have suggested that bureaucratic inertia has replaced ideological dogma as the crucial impediment to the application of mathematical-statistical theory in Soviet State statistics. Why, however, have Soviet mathematical statisticians - for example, those at present on the staff of NII TsSU - not been able to acquire the status and influence needed to overcome the inertia of TsSU and thus to bring their expertise effectively to bear on the conduct of State statistics?

It is useful, in attempting to answer this question, to compare the situation of the mathematical statisticians with that of other professional groups who, starting out in the Stalin period from a similarly powerless position, have been more successful in acquiring influence over the activity of State bodies. An analysis of the experience of some such relatively successful professional groups is provided by Thane Gustafson (1981) in his study of changing Soviet practice in the management of land and water resources.

Gustafson shows how economists concerned with the assessment of the capital effectiveness of alternative power generation schemes and agricultural development programmes, and ecologists concerned with the assessment of their environmental consequences, have been able to attract a significant measure of official attention and support. Official awareness of the issues raised by these specialists has been enhanced.

The specialists themselves now "occupy well-established institutional bases and have regular channels of access to decision-makers" (p.69); "in several instances their participation (in policy debate) has been vigorous and seemingly influential" (p.83).

On the other hand:

> ... advisers... have lacked the independent leverage to force a new idea into official currency unless at least a part of the leadership had already been made receptive to it by policy needs (p.83).

The actual impact on policy of "the specialists and would-be advisers"

> ... depends totally on changes in official receptiveness, giving (them) occasional opportunities but frequent frustrations (p.69).

These limits to the influence of specialists are consistent with the concentration of effective power in the Soviet system in the hands of the Party apparatus. What is of interest from our comparative perspective is the modest but real influence which specialists in water and land management have nevertheless acquired.

It is clear from Gustafson's account that specialists in water and land management owe their status and influence to the fact that the analytical techniques espoused by them represented a response to urgent policy needs, the practical value of which could be perceived by at least a part of the leadership. The potential practical value of mathematical statistics and sampling theory, by contrast, though also very great in reality, can be much less easily perceived by political leaders - assuming that anyone even considers it worthwhile to try to draw their attention to an issue of such conceptual difficulty[19]. One of the very few remedies available in the Soviet system for bureaucratic inertia, intervention on the side of would-be innovators from the top leadership, is probably ruled out in a field as specialised as mathematical-statistical methodology.

One of the obstacles to proper recognition of the practical importance of mathematical statistics may be its position as a methodological rather than a substantive discipline. It is a relatively simple matter to perceive the need for special disciplines which directly study the economy or the environment. The role of mathematical statistics is an indirect one: it

functions in an auxiliary capacity within a wide range of substantive disciplines. Its overall importance is not therefore immediately obvious.

This circumstance must also make it difficult for mathematical statisticians to mobilise support from influential members of better established disciplines, in the way that the geneticists obtained the effective support of prominent physicists against Lysenko. Although mathematical statistics is potentially a matter of concern to members of several disciplines (economics, sociology, demography, agronomy, ecology etc.), within any one discipline it is only a small minority of the methodologically most conscious scholars who give it a high priority in their work. For example, although the demographer Volkov has been very active in his attempts to improve sampling practice (see Chapter B10), other demographers have shown indifference to or a complete lack of understanding of the problem (see the comments on sampling made by Urlanis, cited in Chapter B2)[20]. Support for mathematical statistics therefore tends to be broad-based but very diffuse, especially in view of the rigidity of inter-disciplinary boundaries in the USSR. There is no way within the Soviet system for such diffuse support to take on a politically effective form.

There is another crucial distinction between the field of water and land management and that of mathematical statistics. The problems of water and land management had formerly been simply neglected; once the necessity of overcoming this neglect had been officially recognised, recognition of the appropriate specialists naturally followed. The situation with regard to mathematical statistics is more complicated. To the extent that it is perceived not as a conceptually distinct discipline with its own contribution to make but as a specialised part of "statistics in general", it will be regarded as falling within the province of the established specialists on "statistics in general" - that is, the staff of

the Central Statistical Administration. As "statistics in general" has never been neglected, there will not appear to be any serious problem of past neglect to overcome. This would account for the apparent inability of the mathematical statisticians to deal with the political leadership at all, their access to the leaders being blocked by TsSU. All they can do is to try to influence TsSU itself.

We therefore need a more differentiated model of political relationships in analysing the position of the mathematical statisticians than the simple model found adequate by Gustafson in analysing the position of resource management specialists. Gustafson basically distinguishes only between specialists on the one hand and political leaders and officials, taken together, on the other (Table E.1). The problem faced by the specialists is then that of acquiring influence over the leaders and officials.

In our alternative model (Table E.2), we make a distinction between "political leaders" and "officials". By "political leaders" we mean those occupants of the top levels of the political hierarchy who take responsibility not, or not only, for policy in specialised fields but for the functioning of the Soviet system as a whole. This group very roughly corresponds to the membership of the Central Committee. The "officials", by contrast, constitute the very much larger group of those whose competence is restricted to specialised fields - for example, senior TsSU officials. The "officials" are also therefore, in a certain sense, "specialists", and certainly regard themselves as such, even though the quality of their expertise is disputed by groups of subordinate specialists excluded from important "official" positions[21]. The main conflict is not that between "specialists" and "leaders/officials", but that between rival groups of "official" and "non-official" specialists for influence over the leaders.

The central focus of this conflict, we conjecture, is competition for "official" positions in administrative hierarchies disposing of

effective power in the field concerned. It is conceivable that a group of subordinate specialists could partly or wholly supplant a group of dominant specialists from their official positions (see Table E.2). There is no water-tight division between "officials" and "specialists" in the USSR. Indeed, there is a tradition of staffing certain administrative hierarchies from the appropriate profession, as exemplified by the appointment of doctors to senior positions in the Ministry of Health[22].

Although it was our study of the situation in the field of State statistics which prompted us to suggest this three-level model of the political relationships of policy innovation, we hypothesise on the basis of these general considerations that it may also be found applicable to the situation in other fields.

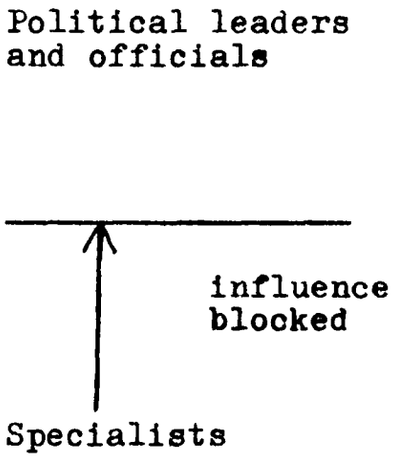
8 The Family Budget Survey, the Central Statistical Administration and the Soviet social system

Our comparison of the methodological inertia in the conduct of the FBS with analogous phenomena in other fields of Soviet life has been rather inconclusive. Although there are certain parallels and points of contact between the problem of reform of the FBS and the problems of technological innovation in Soviet industry, of ideological deformation of Soviet science, and of the reform of Soviet policy in directly substantive fields like the management of land and water resources, none of these problems has proven fully comparable with that of the FBS. Ideological factors have lost their former importance as obstacles to change, yet official routine continues on as before. Mechanisms of change operative (however inadequately) in other fields, such as incentives schemes and top-level intervention, do not seem feasible in the field of statistical methodology. One might be inclined to attribute the fact that inertia is greater in statistics than in industry, science or substantive policy to this circumstance.

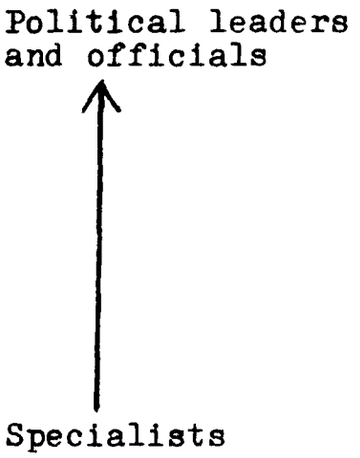
TABLE E.1

THE MODEL OF POLITICAL RELATIONSHIPS IMPLICIT IN GUSTAFSON'S ACCOUNT OF POLICY INNOVATION

(a)



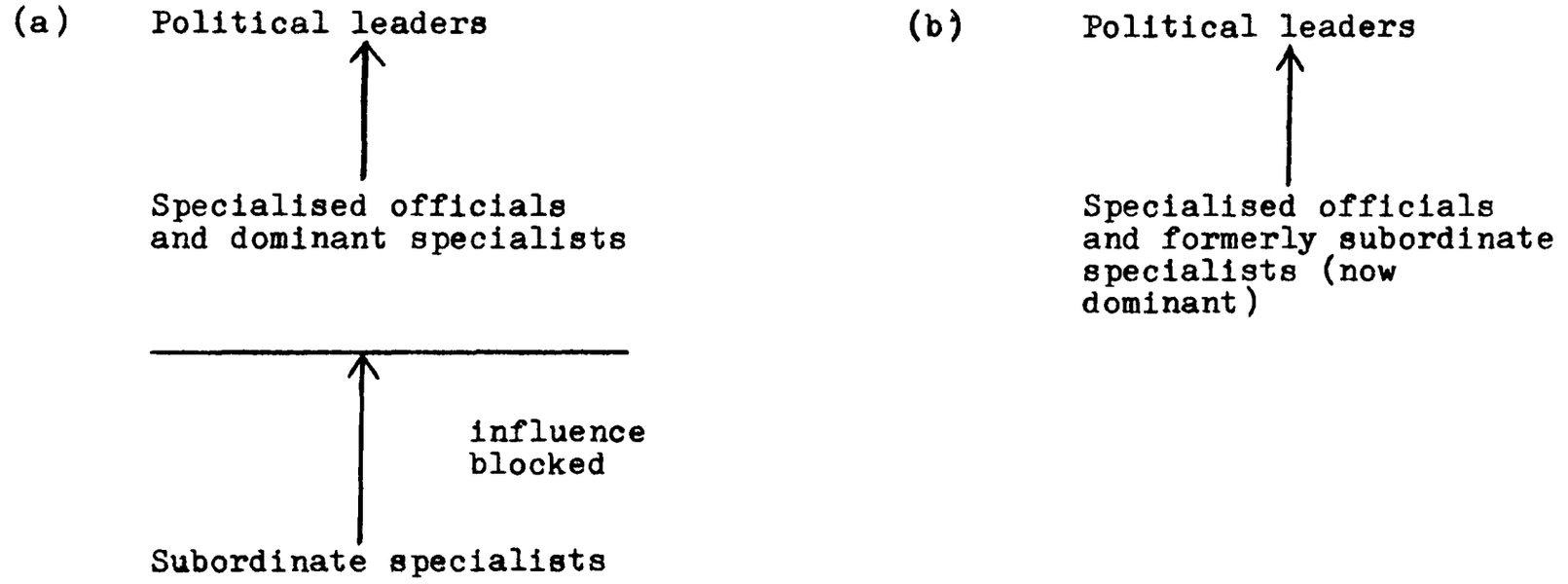
(b)



Source: Gustafson (1981 pp 69, 83)

TABLE E.2

AN ALTERNATIVE MODEL OF THE POLITICAL RELATIONSHIPS OF POLICY INNOVATION



This would hardly be a very useful conclusion. Neither incentives nor top-level intervention can be expected to play a decisive role in statistical work. If one considers the work of different statistical offices in Western countries, one finds no clear link between formal institutional arrangements and openness to methodological innovation[23]. The crucial factor, in our experience, is the professional atmosphere among statisticians, and in particular the presence or absence of fruitful collaborative relations between practically-oriented academic mathematical statisticians and theoretically-oriented State statisticians. As an example of such relations, we may cite the part played by Professor Tore Dalenius in Swedish State statistics:

> During the 1940s (Professor Dalenius) held positions in various Swedish government agencies and private firms, and he also spent a couple of years studying statistics in the United States. In 1950 he joined the Swedish National Board of Health and Welfare and in 1952 he moved to the National Central Bureau of Statistics (now Statistics Sweden). In 1956 he left in order to finish his Ph.D. thesis, "Sampling in Sweden"...
>
> Since 1956 he has been a faculty member of the Department of Statistics, Stockholm University, during the last 20 years as Professor of Statistics with a special concern for official statistics production. As a consequence a community of interest grew up between him and Statistics Sweden...
>
> In the early 1950s he organised a course in sampling for the professional staff... This and other initiatives were fundamental elements in the work to introduce sampling methodology at Statistics Sweden. He founded the Research Institute that today performs many regular and ad-hoc surveys of individuals and households... His contacts with Statistics Sweden have been intense and extensive. The saying is that everybody at Statistics Sweden has a Tore Dalenius file.
>
> However, the communications have not always been accompanied by marks of courtesy. Tore Dalenius has not only been interested in what Statistics Sweden actually has been working on, but also in things he thinks Statistics Sweden <u>should</u> have done. Thus, he has functioned as a constant goad, sometimes irritating but always rewarding (Lyberg 1983).

The contrast with Soviet State statistics could not be more dramatic. One could scarcely conceive, on the evidence of the present study, of a Soviet statistician moving so easily between academic and State work, exerting such a powerful influence in both spheres simultaneously. On the contrary, the Soviet scholarly community and TsSU seem almost hermetically sealed off from one another (Section 3). And the hostility of TsSU towards criticism of its work coming from outside specialists (Section 4) stands at the opposite pole to the attitude taken by Statistics Sweden.

And so we return to the nature of the Central Statistical Administration as an institution - hidebound, self-perpetuating, virtually impervious to outside influences. As we argued in Chapter B10 with reference to the problem of reorganising the FBS sample on the territorial principle, change would appear to require top-level intervention to interrupt the autonomous self-reproduction of TsSU in its present form. For example, the monopoly of TsSU over State statistical work might be broken, and new institutions created under more innovative leadership. Somewhat more plausibly innovative individuals (from NII TsSU perhaps) might be appointed to senior positions in TsSU[24]. This is what Rimashevskaya, on her visit to Birmingham in 1982, said she expected to happen:

> Everything depends on the decision-makers. They should be replaced, and I think that they will be replaced - if not within five years, then within ten (Shenfield 1982b).

But not knowing the basis on which Rimashevskaya makes her prediction, we are perhaps entitled to remain sceptical.

In conclusion we should like to comment on the significance that the case-study of the Family Budget Survey appears to us to have for the assessment of alternative conceptions of the Soviet political system. We have shown that the Central Statistical Administration enjoys considerable autonomy within its sphere of responsibility, and that it is able to pay

very little heed to outside criticism - even to criticism coming from a body as important as Gosplan. This is hardly compatible with the model of an effectively unified totalitarian society. But neither is the rigidity of TsSU, its unwillingness to engage in any real debate with its critics, compatible with Western conceptions of "pluralism". Qualifying the concept of "pluralism" by the use of terms like "limited pluralism" or "constrained pluralism", though of course a useful precaution against confusion with Western pluralism, does not contribute to the positive characterisation of the Soviet system. It is the corporatist view of Soviet society which seems best to fit the findings of this study. The Central Statistical Administration emerges neither as an obedient tool of an all-powerful centre nor as a participant in the give-and-take of a relatively open and dynamic society, but as the closed, inward-looking corporation par excellence, deeply entrenched in its positions within a frozen bureaucratic structure[25].

Notes to Part E

1 Even this example illustrates the slow pace of change. It was reported that a unified Form No.1 had been worked out several years before a unified form was actually adopted in practice (Matyukha 1974, Soveshchanie... 1979).

2 Rimashevskaya, it is true, attributes the prevailing situation not to a lack of desire on the part of statistical and planning bodies to use the models worked out by research institutes, but to the inadequacy of the information base. However, if TsSU really wished to use such models, it could take the steps needed to improve the information base.

3 The Computer Centre of the Armenian Gosplan (Aganbegyan 1980). For biographical information on Karapetyan, see Chapter B11.

4 Tensions between TsSU officials and outside scholars in another field, that of population forecasting, are discussed in Shenfield (1983a).

A graphic demonstration of the mutual isolation of TsSU and the research institutes was provided by N.M.Rimashevskaya on her visit to Birmingham in 1982. She picked up a list of this writer's references on the FBS and went through the names one by one. The names of all the scholars cited were known to her, and many of them were personal acquaintances of hers. With the single exception of I.Ya.Matyukha, whom she had met when he was Head of the TsSU Budget Statistics Department, none of the names of the TsSU officials cited were known to her. She had never heard of D.Dumnov, who had been transferred from the TsSU Department of Agricultural Statistics to replace Matyukha as Head of the Budget Statistics Department. Although she had been closely involved in work on the methodology of the FBS at the Scientific Research Institute of Labour and then at the Central Economics-Mathematical Institute (see, for example, Chapter B9), she claimed to have no detailed knowledge of the organisation of the FBS except for the little she had picked up from her contacts with Matyukha (Shenfield 1982b).

5 The Collegium of TsSU USSR recently criticised "shortcomings" in the work of NII TsSU and instructed them "to concentrate (their) efforts... on the solution of the most urgent problems of State statistics" (V kollegii... 1984a). It is conceivable that this may be intended as a sign for NII TsSU to concern itself less with working out proposals for radical changes in the methodology of TsSU, and more with immediate problems arising within the existing framework.

6 The tone of most of the review is quite a mild one, and the overall assessment of the book is positive: "It clarifies sufficiently fully and systematically questions of the organisation of the statistics of consumer budgets in the USSR".

Surprisingly enough, Rimashevskaya (in conversation with this writer) defended Matyukha, stating that in fact he understood the

deficiencies of the FBS quite well. In response to the objection that one would never guess this from his published writings, she remarked that "Matyukha is such an official person that his writings are no guide to his views". One is not surprised at such complete dissociation between the public and the private face in the USSR where political matters (in the narrow sense) are concerned, but one would no longer expect to encounter it in most technical fields.

7 In his review of a later book by Matyukha (1973) on the statistics of the standard of living, Sidlyarenko (1975) again criticises Matyukha's uncritical approach: "The author should not only have examined the system of statistical indicators, but also have criticised it, exposed its shortcomings and made proposals for its improvement".

8 Curiously enough, Parfenova, in opposing the branch principle, does not advocate the territorial principle but argues instead that "selection should be based on family types".

9 Thus, long periods of participation in the survey are first justified as a means of making it possible "to study trends in the data for a comparable group of families" (an argument often advanced by TsSU, specious precisely because a static sample does not remain comparable over time). Later in the text it is stated that long periods of participation "are considered most expedient in view of the organisational peculiarities of the FBS", hinting that the practice does not really have an analytical motivation. Reference is then made to the tendency of the sample to age and to diverge from the structure of the population, but the question of whether there is any way in which this could be avoided is not discussed. The reader may gain the impression that the TsSU methodology is imperfect but that it is the best available in the circumstances.

For an example of the work of the statisticians at MESI on applied mathematical statistics, see Venetskii and Kildishev (1975).

10 In the steel industry, production by traditional methods continued to increase in the USSR even after the introduction of oxygen smelting and continuous casting. A similar pattern is found in the production of synthetic fibres. In the installation of high-voltage electric power transmission lines, the USSR was ahead of the USA, the UK and the FRG in the late 1950s but had fallen behind by 1970 (Amann et al 1977 pp.52-4).

11 The reversal of technological innovation in industry does sometimes occur. For example, numerically controlled machine-tools have on occasion, after some attempt to use them properly, been used as manually operated machines with the programming controls ignored.

12 In some fields - market research, opinion polling etc. - there is some "competition" in Western countries between State statistical offices and private statistical agencies. Even here, however, the competition is attenuated by a tendency for State and private agencies to collect different kinds of data. Thus, State budget surveys collect broad background information on family expenditures, which firms may choose to supplement by commissioning market research focussed more specifically on the types of product they aim to sell (and the substitutes and complements of those products). The statistical data provided by the State are mostly public goods, those provided by private organisations mostly private goods.

13 This line of argument makes us suspect that both Soviet and Western discussions of innovation in Soviet industry tend (for different reasons) to over-emphasise the role played by economic factors at the expense of the role played by political, cultural and other non-economic factors such as the degree of public exposure of shortcomings, official attitudes to criticism and the status of various professional groups. One recalls in this context V. Dudintsev's famous novel Not by bread alone (Dudintsev 1957).

14 Amann et al (1977 pp.31-3) point out that the metaphor is somewhat misleading even as applied to industrial development. Definition of "advanced technology" as the pattern prevailing in the USA may lead the researcher to neglect indigenous Soviet technology not widely diffused in the West. For example, some Soviet man-made fibres (such as "Enant"/Nylon-7) have good technical characteristics but are not produced in large quantities in the West. The method of momentary observations can likewise be considered an indigenous Soviet contribution to the methodology of budget surveys (Chapter B11).

15 We refer to dogmatic "anti-idealist" objections to the theory of resonance, which interprets the bonding patterns of some organic ring compounds in probabilistic terms (Graham 1973).

16 For further discussion see Shenfield (1982a), where we argue, contrary to general assumption, that even certain branches of pure mathematics (probability theory in particular) have undergone ideological deformation in the USSR.

17 See, for example, the comments on the role played by vyskazyvaniya in Soviet historical scholarship of Alexander Yanov (1981 pp.71-2). Yanov entitles the chapter containing these comments 'The serf historians: in bondage to "statements"'.

18 See, for example, Razvitie... (1971), a book devoted to "the development of the theory and methodology of statistics in the works of V.I.Lenin". Lenin does not seem to have been aware of the emergence of mathematical statistics.

19 We do not mean to imply that the assessment of capital effectiveness or of environmental impact entails no technical complexities. But in these areas the specialist with a knack for popular exposition is presumably able to explain to the non-specialist Party official at least the basic nature and purpose of the techniques he is proposing. It is doubtful whether the same is true with regard to sampling theory.

20 Moreover, those who use mathematical statistics in the natural (as against social) sciences or in quality control may have no professional reason to concern themselves with its use in socio-economic statistics.

21 Thus officials working in TsSU or Gosplan consider themselves not merely "officials" (rabotniki) but also "statisticians" and "planning specialists". One finds the same phenomenon in the West. Thus, administrative civil servants in Britain tend to reject with indignation accusations that they are "amateurs" and demands that the civil service be "professionalised"; they consider that they are professionals.

22 However, many Soviet specialists are very reluctant to become officials.

23 For example, there is no obvious link between innovation and whether or not statistical work is concentrated in a single office. We do not mean to deny that certain institutional arrangements have great potential for promoting contact between practitioners and theoreticians. Special methodological units in State statistics offices may, as in the Netherlands, effectively mediate between State and academic statisticians and facilitate methodological change. They are not, however, indispensible means of achieving this goal, and do not always function effectively.

24 It would be necessary to infringe on the general practice within TsSU of promoting Deputy Heads to Heads and so on. Thus Volodarskii has succeeded Starovskii as Head of TsSU USSR.

25 It is tempting to think of each corporation as a "sub-totalitarianism", and of the Soviet system as a balanced coalition of "sub-totalitarianisms".

REFERENCES

Abbreviations used for names of journals

EiOPP	Ekonomika i organizatsiya promyshlennogo proizvodstva ("Economics and organisation of industrial production", published by the Institute of the Economics and Organisation of Industrial Production, Novosibirsk)
EiMM	Ekonomika i matematicheskie metody ("Economics and mathematical methods", published by the Central Economics-Mathematical Institute, Moscow)
JASA	Journal of the American Statistical Association
JRSS	Journal of the Royal Statistical Society
PKh	Planovoe khozyaistvo ("Planned economy", published by Gosplan USSR
SI	Sotsiologicheskie issledovaniya ("Sociological research", published by the Institute of Sociological Research, Moscow)
ST	Sovetskaya torgovlya ("Soviet trade", published by the USSR Ministry of Trade)
SZ	Sovetskoe zdravookhranenie ("Soviet health-care", published by the USSR Ministry of Health)
UZS	Uchenye zapiski po statistike ("Scholarly notes on statistics")
VE	Voprosy ekonomiki ("Questions of economics", published by the Institute of Economics, Moscow)
VMU	Vestnik Moskovskogo Universiteta ("Courier of Moscow University")
VS	Vestnik statistiki ("Statistical courier", published by the USSR Central Statistical Administration)

Abdulin R G, Denezhnye dokhody i platezhesposobnyi spros selskokhozyaistvennogo naseleniya, p 139 in Organizatsiya... (1971)

Aganbegyan A G, Doklad na nauchnom sovete NII-truda "Ispolzovanie matematicheskikh modelei i elektronnykh vychislitelnykh mashin dlya perspektivnykh raschetov po zarabotnoi plate, dokhodam i potrebleniyu rabochikh i sluzhashchikh" (Rukopisnyi fond NII-truda), M 1960

Aganbegyan A G, introduction to Karapetyan (1980)

Aganbegyan A G et al, Primenenie matematiki i elektronnoi tekhniki v planirovanii, M 1961

Aganbegyan A G and Rimashevskaya N M, Ispolzovanie matematicheskikh modelei i EVM v planovo-ekonomicheskikh raschetakh po zarabotnoi plate, dokhodam i potrebleniyu trudyashchikhsya, PKh 1961,4,15

Aivazyan S A, Venetskii I and Mkhitaryan V, Vsesoyuznaya nauchno-tekhnicheskaya konferentsiya "primenenie mnogomernogo statisticheskogo analiza v ekonomike i otsenke kachestva produktsii", VS 1978,3,73

Akinshina N K, K voprosu primeneniya vyborochnogo nablyudeniya v statistike proizvoditelnosti truda v pervye gody sovetskoi vlasti (1918-1929 gg), p 254 in Vyborochnoe... (1966)

Aleksandrova N, Godovoi byudzhet, Izvestiya 3.12.1967, pp 1-2

Aleksandrova N, Dva stakana do gibeli, Izvestiya 2.3.1968, p 5

Alekseyev V V and Bukin S S, Rost blagosostoyaniya rabochikh Sibiri v usloviyakh stroitelstva razvitogo sotsializma, M 1980, pp 66-81

Aleshina F Yu, K voprosu o metodologii raschetov nauchno obosnovannykh norm lichnogo potrebleniya, p 154 in Voprosy truda... (1959)

Aleshina F Yu, Izmenenie urovnya zhizni rabochikh semei, p 348 in Sotsiologiya v SSSR, t. 2, M 1965

Alirzayev A G, Opredelenie struktury migratsii tovarov s pomoshchyu differentsirovannogo balansa dokhodov i potrebleniya, p 112 in Dokhody... (1976)

Alkogolizm - put' k prestupleniyu, M 1966

Altunina L, Sobranie rabochikh, sluzhashchikh i kolkhoznikov, vedushchikh byudzhetnye zapisi, VS 1974,10,72

Amalrik A, Involuntary journey to Siberia, Collins and Harvill Press 1970

Amann R, Cooper J M and Davies R W (eds.), The technological level of Soviet industry, Yale UP 1977

Ananyeva S P, Organizatsiya statistiki byudzhetov naseleniya SSSR i vozmozhnosti polucheniya na yeye osnove dannykh o rozhdayemosti, Voprosy statistiki i ucheta Vyp. 8, M 1964, p 30

Ananyeva S P, Organizatsiya obsledovanii semeinykh byudzhetov v stranakh-chlenakh SEV, UZS t. 11, 1966, p 159

Ananyeva S P, Metodologicheskie osnovy funktsionalnoi podsistemy ASGS "Statistika byudzhetov", p 102 in Statistika i elektronno-vychislitelnaya tekhnika v ekonomike, Vyp. 9 - Metodologicheskie problemy postroyeniya funktsionalnykh podsistem ASGS, M 1976

Ananyeva S P and Barsukova R T, O sisteme pokazatelei semeinykh byudzhetov v ASGS, UZS t. 42, M 1981, p 26

Ananyeva S P and Ivanova T A, Matematiko-statisticheskoe izuchenie dokhodov naseleniya po dannym byudzhetnykh obsledovanii, p 50 in Voprosy urovnya... III (1972)

Ananyeva S P, Ivanova T A and Khlopina O, Funktsionalnaya podsistema ASGS "Statistika byudzhetov", VS 1980,1,30

Andreichenko I, Povyshat' effektivnost' vyborochnykh metodov v sotsiologicheskikh issledovaniyakh, VS 1975,1,26

Anisimova Zh M, Statisticheskii analiz i prognozirovanie pokupatelskogo sprosa, Bukhgalterskii uchet, finansy, kredit i statistika Vyp. 8, M 1977, p 144

Antropova V G and Melnikova Z M, Vliyanie nekotorykh sotsialno-bytovykh faktorov na zabolevayemost' rabochikh, Zdravookhranenie Rossiiskoi Federatsii 1981,2,21 (For English-language account see Ryan M, Some social influences on workers' morbidity, British Medical Journal Vol. 283, 22.8.1981, p 546

Arkhipov B S, Sotsiologicheskie issledovaniya v rabote oblastnogo komiteta partii, SI 1974,1,110

Arkhipova L V and Bayev N F, Rynkovedenie, M 1977, pp 124-5

Armstrong A G and Lecomber J R C, Statistics for medium-term economic planning, JRSS A (131) 1968, Part 1, p 45

Arutyunyan Yu V, Sotsialnaya struktura selskogo naseleniya SSSR, M 1971

Arutyunyan Yu V, Sotsiologicheskie ocherki o sovetskoi Estonii, Tallinn 1979

Astrinskii D A, Shkala potrebitelskikh yedinits raskhodov na pitanie, p 340 in Opyt... (1968)

Avtomatizirovannaya sistema gosudarstvennoi statistiki (eds. S I Volkova and A N Romanova), M 1979

Avtomatizirovannaya sistema planovykh raschetov (ed. N P Lebedinskii), M 1980

Babayev L, Sobranie po statistike semeinykh byudzhetov v Lvovskoi oblasti, VS 1967,4,92

Babayev L, Oblastnoe sobranie predstavitelei semei, vedushchikh zapisi lichnykh byudzhetov, VS 1972,6,75

Baklanov G I, Adamov V Ye and Ustinov A N, Statistika promyshlennosti, M 1970

Balan V, Ob izuchenii vnutrismennykh poter' rabochego vremeni v stroitelstve metodom momentnykh nablyudenii, VS 1972,3,56

Balansy dokhodov i potrebleniya naseleniya (eds. A Kh Karapetyan and N M Rimashevskaya), M 1969

Baltsevich L A, Strukturnye zakonomernosti potrebleniya blag dlitelnogo polzovaniya, p 255 in Teoreticheskie... (1980)

Baranova I Ya and Levin A I, Modelirovanie i prognozirovanie sprosa naseleniya, M 1978

Barbashov I S et al, Statistika otdelnykh otraslei narodnogo khozyaistva, M 1968

Bartol K M, Soviet computer centres: network or tangle? Soviet Studies, April 1972, Vol. 23 No. 4, p 608

Bauman M V, Avtoreferat: Nekotorye problemy teorii i praktiki momentnykh nablyudenii, M 1970

Bazarov V A, Ispolzovanie byudzhetnykh dannykh dlya postroyeniya struktury gorodskogo sprosa v perspektive generalnogo plana, PKh 1927,5,73

Beisembetov K A, Osnovnye napravleniya izucheniya i prognozirovaniya pokupatelskogo sprosa, p 36 in Problemy izucheniya i prognozirovaniya sprosa v soyuznykh respublikakh, Dushanbe 1976

Belitskaya Ye Ya and Anisimov R P, Koeffitsient otnositelnoi intensivnosti, p 133 in Voprosy sanitarnoi i meditsinskoi statistiki, M 1971

Belyaevskii I K, Statistika kolkhoznoi torgovli, M 1962

Belyakov A and Kurak S, Kon'yunkturnaya informatsiya, ST 1967,4,27

Berliner J S, The innovation decision in Soviet industry, MIT Press 1976

Berzkaln O Ya, Iz opyta vyborochnogo obsledovaniya, VS 1960,11,61

Berzkaln O Ya, Voprosy podgotovki iskhodnoi informatsii o dokhodakh i potreblenii naseleniya, p 166 in Dokhody... (1968)a

Berzkaln O Ya, Ob otbore kolkhozov dlya obsledovaniya v nikh byudzhetov semei kolkhoznikov s primeneniem EVM, p 252 in Opyt... (1968)b

Berzkaln O Ya, Vyborochnoe obsledovanie - istochnik informatsii dlya opredeleniya vzaimosvyazei mezhdu dokhodom i potrebleniem naseleniya, p 43 in Dokhody... (1968)c; and p 43 in Voprosy urovnya... III (1972)

Bigata G, Principaux résultats de l'enquête permanente de 1971 sur les conditions de vie des ménages, No. 82 des Collections de l'INSEE, série M no. 2, February 1973

Blank G Ya, Ekonomika sovetskoi kooperativnoi torgovli, M 1968

Boyarskii A Ya, Matematika i statistika segodnya, VMU Seriya 6 Ekonomika 1980,1,28

Boyarskii A Ya and Venetskii I, Ob organizatsii postoyannoi vyborochnoi seti naseleniya, VS 1978,10,57

Brainin Ye, Komissiya sodeistviya uspeshnomu provedeniyu byudzhetnogo obsledovaniya, VS 1964,11,85

Bredov V M, Ob ispolzovanii dannykh statistiki semeinykh byudzhetov v narodnokhozyaistvennykh raschetakh, UZS t. 11, 1966, p 150

Bredov V M, Davidovich B Ya and Ultanbayev R R, Metody kratkosrochnogo i srednesrochnogo prognozirovaniya platezhesposobnogo sprosa, p 58 in Organizatsiya... (1971)

Bredov V M and Levin A I, K voprosu o metodologii prognozirovaniya struktury platezhesposobnogo sprosa, p 120 in Opyt... (1968)

Bredov V M and Levin A I, Prognozirovanie sprosa naseleniya, VE 1968,7,55

Bredov V M and Levin A I, O sovershenstvovanii metodov prognozirovaniya sprosa naseleniya, VE 1971,4,82

Casley D J and Lury D A, Data collection in developing countries, Clarendon Press 1981

Chernyavskii U G, Potrebnosti, tovarooborot, potreblenie materialnykh blag, M 1981

Chernyavskii Ya M, Puti uluchsheniya ispolzovaniya rabochego vremeni, M 1972

Chernysh A I, Prognoz potrebitelskogo sprosa v BSSR, p 76 in Opyt... (1968)

Chomaryan E A, Metody i pokazateli sotsialno-demograficheskoi kharakteristiki sovetskikh semei, in Primenenie... (1962)

Cole J P, A geography of the USSR, Butterworth 1970

Darbinyan M M, Kommercheskaya rabota i izuchenie sprosa v torgovle, M 1971

Dashkevich A, Kaler B and Khanin L, Vazhnyi istochnik informatsii, ST 1978,10,34

Davidovich B, Metody srednesrochnogo prognozirovaniya sprosa, ST 1969,12,17

Davidovich B and Chertikhina E, Matematiko-statisticheskie metody v prognozirovanii sprosa, Ekonomicheskie nauki 1967,10,71

Davidovich B Ya, Lakhman I L, Nazarov R S and Frenkel M G, Metody prognozirovaniya sprosa, M 1972

Davidovich B and Nazarov R, Prognozirovanie platezhesposobnogo sprosa i statistika, ST 1968,6,23

Davidovich B and Yastrubinetskaya P, Prognoz mikrosprosa na parfyumerno-kosmeticheskie tovary, ST 1972,3,22

Davidson H D, Hains R and Newberry T L, Error of estimation in systematic activity sampling, Journal of Industrial Engineering 1960,4,290

Davydov M B, Comparative mechanisation of agriculture in the USSR and other countries, p 210 in Samizdat Register II (ed. R Medvedev), Merlin Press 1981

Dedyulya A, Oblastnye sobraniya predstavitelei semei, vedushchikh zapisi semeinykh byudzhetov, VS 1970,12,82

Dedyulya A, Oblastnoe sobranie predstavitelei semei, uchityvayushchikh lichnye byudzhety, VS 1972,12,74

Department of Employment (UK), The Family Expenditure Survey: report for 1978, 1979

DePauw J W, The Soviet statistical system: the continuous sample budget survey, Foreign Demographic Analysis Division of the US Bureau of the Census 1965

De Vet B, The 1974/75 workers' budget enquiry, Department of Labour, Income and Consumption of the Netherlands Central Statistical Office (undated)

Deville J-C and Malinvaud E, Data analysis in official socio-economic statistics, JRSS A (146) 1983, Part 4, p 335

Dmitriyeva R, Tekushchii uchet naseleniya, VS 1980,4,54

Dmitriyeva R, Boyarskii A and Volkov A, Zadachi statistiki naseleniya i demograficheskikh issledovanii v desyatoi pyatiletke, VS 1976,11,3

Dmitriyeva R and Volkov A, Zadachi statistiki naseleniya i demograficheskikh issledovanii, VS 1983,2,7

Dokhody i pokupatelskii spros naseleniya, M 1968

Dokhody i potreblenie naseleniya, M 1976

Dokhody naseleniya Belorusskoi SSR (voprosy teorii i praktiki) (ed. Ye I Landin), Minsk 1980

Dolganina T K, Momentnye nablyudeniya v izuchenii pokupatelskogo sprosa, p 78 in Primenenie... (1962)

Dolgushevskii F G and Khristich A G, Selskokhozyaistvennaya statistika s osnovami ekonomicheskoi statistiki, M 1976

Doroganich F D, Materialnoe blagosostoyanie trudyashchikhsya Moldavskoi SSR (1946-1958 gg), Kishinev 1974

Drits V I, Voprosy ucheta obshchestvennykh fondov potrebleniya v BSSR, p 308 in Opyt... (1968)

Druchin A P, The environment in which statistical offices will operate in ten years' time II, Statistical Services in Ten Years' Time (ed. J W Duncan), Pergamon Press 1978

Dudintsev V, Nye khlebom yedinym, Izdat. TsOPE, Munich 1957

Dudkin L M, Sravnitelnyi analiz kriteriev v statisticheskikh modelyakh optimalnogo materialnogo balansa narodnogo khozyaistva, p 41 in Ekonomiko-matematicheskie... III (1966)

Dudkin L M, Opyt raschetov optimalnogo balansa narodnogo khozyaistva s funktsiyami sprosa i trebovaniya k statistike potrebleniya, p 264 in Opyt... (1968)

Dumnov D, Pisarenko E and Te Yu, Razvitie leninskikh idei v statistike byudzhetov naseleniya, VS 1981,4,16

Dumnov D and Riik K, Mezhdunarodnoe soveshchanie po voprosam metodologii obsledovanii domashnikh khozyaistv, VS 1978,12,73

Dunham V S, In Stalin's time: middle-class values in Soviet fiction, Cambridge UP 1976

Edwards A, Some aspects of market research in the Soviet Union, p 45 in Report of the American Marketing Delegation to the Soviet Union, Summer 1960, sponsored by the Harvard Graduate School of Business Administration (mimeo), Harvard Graduate School of Business Administration 1960

Ekonomicheskaya statistika (eds. Ye N Freimundt et al), M 1970, pp 278-84

Ekonomicheskaya statistika, M 1976, pp 260-1

Ekonomicheskaya statistika (eds. A Ya Boyarskii and Ye G Yasin), M 1980, p 322

Ekonomicheskaya statistika, M 1983

Ekonomiko-matematicheskie metody, Vyp. I: Narodno-khozyaistvennye modeli, teoreticheskie voprosy potrebleniya (eds. V S Nemchinov et al), M 1963

Ekonomiko-matematicheskie metody, Vyp. III: Ekonomiko-matematicheskie modeli narodnogo khozyaistva (eds. A L Vainshtein, L V Kantorovich, A A Konyus and L Ye Mints), M 1966

Elias A, Soviet practice in the classification of economic activity, International Population Reports Series P-95 no. 57, Foreign Manpower Research Office of the US Bureau of the Census 1961

Entin G M, Lechenie alkogolizma i organizatsiya narkologicheskoi pomoshchi, M 1979

Euler M, Die Einkommens- und Verbrauchsstichprobe 1973, Wirtschaft und Statistik 1972,7,375

Fedorets V, Opyt optovoi bazy, ST 1971,3,41

Fedotov I, Momentno-vyborochnoe nablyudenie, VS 1966,3,31

Filippov N, Luchshe pomogat' statistikam po byudzhetam, VS 1961,7,78

Filippova N A, Stepen' tochnosti srednikh raskhodov v rabochikh byudzhetakh, in Voprosy narodnogo khozyaistva SSSR, M 1962

Frenkel M G and Lakhman I L, Ekonomiko-matematicheskie metody opredeleniya struktury platezhesposobnogo sprosa naseleniya, UZS t. 11, M 1966, p 97

Fridman A M, Ekonomika i planirovanie sovetskoi kooperativnoi torgovli, M 1972

Fridman A M, Ekonomika sovetskoi kooperativnoi torgovli, M 1976

Fuller E, The Poti experiment, Radio Liberty Research Bulletin RL 118/83 (15.3.83)

Gabidzashvili V S, Ekonomiko-statisticheskie metody prognozirovaniya proizvodstva i potrebleniya chaya v SSSR, Tbilisi 1981

Gini C, The application of the sampling method to the materials of the last Italian population census, lecture at the 17th Session of the International Statistical Institute, Bulletin of the International Statistical Institute 23 Liv. 2, p 198, 1928 (in French); VS 1929,3-4,151 (in Russian)

Ginzburg S I, Metody ischisleniya balansa denezhnykh dokhodov i raskhodov po sotsialnym gruppam naseleniya, p 58 in Opredelenie... (1962)

Gladkaya I I et al, Statistika sovetskoi kooperativnoi torgovli, M 1974

Glaude M, A decade of methodological investigations on family expenditure surveys in France, paper presented to the International Meeting on Analysis of Sample Survey Data and Sequential Analysis at the Hebrew University of Jerusalem in June 1982

Glushkov V M and Kanygin Yu M, Informatsionnye resursy upravleniya, Naukovedenie i informatika Vyp. 21, 1980, p 3

Goldman M I, Soviet marketing - distribution in a controlled economy, The Free Press of Glencoe/ Collier-Macmillan 1963, pp 54-5

Goldman M I, Consumption statistics, p 321 in Treml and Hardt (1972)

Golovach A V, Metody rascheta inoraionnogo sprosa na tovary, p 72 in Voprosy ekonomiki i organizatsii torgovli Vyp. IV, Kiev 1963

Golub L A, Voprosy postroyeniya otchetnogo differentsirovannogo balansa dokhodov i potrebleniya naseleniya oblasti, p 118 in Dokhody... (1976)

Graham L R, Science and philosophy in the Soviet Union, Allen Lane 1973

Grankov V P, Vyborochnoe nablyudenie, M 1955 (2nd edn. 1963)

Grebnev A and Rybchenko I, Ekonomiko-matematicheskie metody v planirovanii tovarooborota, PKh 1969,2,25

Gribov V D, Issledovanie potrebleniya bytovykh uslug po byudzhetnym dannym, Sbornik trudov Moskovskogo tekhnologicheskogo instituta, M 1968a

Gribov V D, Opyt planovogo rascheta sprosa na bytovye uslugi po dannym sploshnoi otchetnosti, p 101 in Opyt... (1968)b

Guntulis A and Martishos S, Nekotorye metody sravneniya urovnya zhizni naseleniya po gorodam, raionam i soyuznym respublikam, p 23 in Voprosy... III (1972)

Gurevich S, Za bolshevistskuyu teoriyu statistiki, PKh 1938,4,70

Gustafson T, Reform in Soviet politics - lessons of recent policies on land and water, Cambridge UP 1981

Hanson P, The consumer in the Soviet economy, Macmillan 1968

Hill M R, Shenfield S and Park J D, Market research in the Soviet Union, Journal of the Market Research Society 24, 2, 1982, p 152

Hough J F, Soviet leadership in transition, The Brookings Institution 1980

Hough J F and Fainsod M, How the Soviet Union is governed, Harvard UP 1979

Ignatovich V, V Leningradskom Dome Uchenykh, VS 1975,8,85

Ilyenkova S, Vyborochnyi metod v issledovanii ekstensivnogo ispolzovaniya oborudovaniya v legkoi promyshlennosti, VS 1966,10,25

Inshutina G S, O vozmozhnosti primeneniya mnogotselevoi vyborki v sotsialnoi statistike, Trudy MESI, M 1972

Inshutina G S, Avtoreferat: Primenenie mnogotselevykh vyborochnykh obsledovanii v sotsialnoi statistike, M 1975

Instruktsiya po obsledovaniyu byudzhetov rabochikh i sluzhashchikh, Otdel Byudzhetnoi Statistiki TsSU SSSR, M 1960

International Labour Organisation, Methods of compiling cost of living index numbers, Studies and Reports Series N no. 6, Geneva 1925

International Labour Organisation, Methods of conducting family budget enquiries, Studies and Reports Series N no. 9, Geneva 1926

Ivanov N and Zavyalov V, Etapy sozdaniya tekhnicheskoi bazy ASGS, VS 1978,6,48

Iz opyta organizatsii obshchegorodskikh sobranii semei rabochikh i sluzhashchikh, vedushchikh byudzhetnye zapisi, VS 1955,2,95

Izuchenie sprosa na tovary narodnogo potrebleniya - spravochnik (ed. N D Vinogradskii), Kiev 1976

Joravsky D, Soviet Marxism and natural science 1917-1932, RKP 1961

Joravsky D, The Lysenko affair, Harvard University Russian Research Center Studies no. 61, Cambridge Mass. 1970

Kabo Ye O, Byudzhety rabochikh, UZS t. 13, M 1967, p 194

Kabo Ye O, Monograficheskii metod v statisticheskikh issledovaniyakh, p 60 in Ocherki po istorii statistiki SSSR, M 1972

Kaganov G, Ispolzovanie dannykh byudzhetnykh obsledovanii dlya planirovaniya denezhnogo obrashcheniya, PKh 1964,6,39

Kalinichenko I, Iz opyta raboty statistikov po byudzhetam Kirgizskoi SSR, VS 1963,6,74

Kanygin Yu M, ASU: opyt i perspektivy (beseda s Ak. V M Glushkovym), Naukovedenie i informatika Vyp. 20, M 1979, p 3

Karapetyan A Kh, Metodologicheskie voprosy postroyeniya differentsirovannogo balansa dokhodov i potrebleniya naseleniya, in Primenenie... (1961)

Karapetyan A Kh, Voprosy organizatsii byudzhetnykh obsledovanii sem'i metodom momentnykh nablyudenii, p 58 in Primenenie... (1962)

Karapetyan A Kh, Voprosy postroyeniya differentsirovannogo balansa dokhodov i potrebleniya trudyashchikhsya, p 31 in Statisticheskie... (1964)a

Karapetyan A Kh, Ekonomiko-statisticheskie modeli v funktsii struktury, p 69 in Statisticheskie... (1964)b

Karapetyan A Kh, K metodike otbora semei pri organizatsii vyborochnykh obsledovanii, in Soveshchanie... (1970)

Karapetyan A Kh (posthumous), Dokhody i potreblenie naseleniya SSSR, M 1980

Karapetyan A Kh and Rimashevskaya N M, Voprosy povysheniya reprezentativnosti byudzhetnykh obsledovanii, p 215 in Voprosy... (1959)

Karapetyan A Kh and Rimashevskaya N M, Metod momentnykh nablyudenii v izuchenii potrebitelskikh byudzhetov semei rabochikh i sluzhashchikh, Sotsialisticheskii trud 1967,8,126

Karapetyan A, Rimashevskaya N and Sidlyarenko A, I Ya Matyukha "Statistika byudzhetov naseleniya", VS 1967,8,72

Karpenko B I, Razvitie idei i kategorii matematicheskoi statistiki, M 1979

Kaser M, Soviet statistics of wages and prices, Soviet Studies 1955,7,31

Kats Ya D, Ocherki statistiki truda, M 1960, pp 167-85

Katsenelinboigen A, Soviet economic thought and political power in the USSR, Pergamon Press 1980

Kazun U A, Ocherk razvitiya byudzhetnoi statistiki zarubezhnykh sotsialisticheskikh stran, UZS t. 28, M 1976, p 223

Kemsley W F F, Interviewer variability in expenditure surveys, JRSS A (128) 1965, part 1, p 118

Kemsley W F F, Redesigning the Family Expenditure Survey, Statistical News, May 1968, p 10

Kemsley W F F, The Family Expenditure Survey: Handbook on the Sample, Fieldwork and Coding Procedures, HMSO 1969

Kemsley W F F, The Family Expenditure Survey: a study of differential response based on a comparison of the 1971 sample with the census, Statistical News, November 1975, p 16

Kenkmann P O, O vozmozhnostyakh primeneniya vyborochnogo metoda v sotsiologii, p 175 in Trudy po sotsiologii I, Tartuskii Gosudarstvennyi Universitet 1968

Khoroshun P, Razrabotka materialov obsledovaniya byudzhetov kolkhoznikov na schetno-perforatsionnykh mashinakh, VS 1965,11,75

Khristovoi A, Sobranie, posvyashchennoe statistike semeinykh byudzhetov, VS 1967,2,84

Kildishev G S and Ilyenkova S, O reprezentativnosti momentnogo nablyudeniya, VS 1970,7,31

Kildishev G S, Ovsiyenko V Ye, Rabinovich P M and Ryabushkin T V, Obshchaya teoriya statistiki, M 1980

Kiseleva G P, p 299 in Vsesoyuznoe... (1969)

Kish L, Survey sampling, John Wiley and Sons 1965

Klebanov B, Oblastnoe sobranie predstavitelei semei, vedushchikh zapisi svoikh byudzhetov, VS 1968,11,83

Klimenok I, Sobranie obsleduyemykh semei, VS 1974,11,71

Klyuchenskii I, Iz praktiki provedeniya proverok raboty statistikov po byudzhetam rabochikh i sluzhashchikh, VS 1955,5,68

Kochetov I V, Metody vyborochnykh obsledovanii v statistike perevozok gruzov na zheleznodorozhnom transporte, p 238 in Vyborochnoe... (1966)

Kolpakov B T, Vyborochnye obsledovaniya TsSU RSFSR i ikh ispolzovanie v sotsialnykh issledovaniyakh, p 59 in Problemy... (1968)

Komarov V E and Chernyavskii U G, Dokhody i potreblenie naseleniya SSSR, M 1973, p 204

Kondrashenko V T and Skugarevskii A F, Alkogolizm, Minsk 1983

Kondratyeva S and Lopushenskii A, Igrushki: obespechennost', perspektivy razvitiya torgovli, Sovetskaya potrebitelskaya kooperatsiya 1980,7,46

Konovalov A, V tesnom kontakte s obsleduyemymi semyami, VS 1965,5,65

Konyus A A, Teoreticheskii indeks tsen potrebleniya i yego primenenie v planirovanii platezhesposobnogo sprosa, in Ekonomiko-... I (1963)

Kordos I, Experimental study of family budgets using the rotational method, Przeglad Statystyczny 1971,3-4,227

Korovkin G N, K voprosu o metodakh planirovaniya narodnogo potrebleniya, UZS t. 11, M 1966, p 245

Korovkin G N, Ekonomicheskaya otsenka novykh metodov planirovaniya struktury platezhesposobnogo sprosa, p 21 in Opyt... (1968)

Korovkin G N, Narodnoe potreblenie i torgovlya, M 1969, pp 113-4

Korovkin G N, Neskolko polemicheskikh voprosov, p 241 in Organizatsiya... (1971)

Korzhenevskii I I, Opredelenie sprosa naseleniya na otdelnye tovary, ST 1959,3

Korzhenevskii I I, Osnovnye zakonomernosti razvitiya sprosa v SSSR i metody yego izucheniya, p 16 in Opredelenie... (1962)

Korzhenevskii I I, Osnovnye zakonomernosti razvitiya sprosa v SSSR, M 1971

Kozlov T I, Ovsiyenko V Ye and Smirnskii V I, Kurs obshchei teorii statistiki, M 1965, pp 230-1

Krakovskii A, Vazhnyi rezerv uvelicheniya proizvodstva (nekotorye itogi obsledovanii ispolzovaniya oborudovaniya), VS 1965,10,11

Krapivina M S, Primenenie vyborochnogo metoda pri obsledovanii byudzhetov semei rabochikh i sluzhashchikh v 1918-1951 gg, p 33 in Vyborochnoe... (1966)

Krasnoshchekov N, Soveshchanie rabotnikov byudzhetnoi statistiki, VS 1962,10,74

Krasnoshchekov N, V kollegii TsSU SSSR, VS 1964,1,78

Krastin' O P and Berzkaln O Ya, K voprosu o ratsionalnom planirovanii registratsii dokhodov i raskhodov naseleniya, p 34 in Voprosy... III (1972)

Krevnevich V V, Vliyanie nauchno-tekhnicheskogo progressa na izmenenie struktury rabochego klassa SSSR, M 1971, pp 133-6

Krutikov F A, Volkova N V, Barta V and Berova Ya, Problemy izucheniya i prognozirovaniya sprosa pri sotsializme, Moscow and Prague 1981

Krylov P N, O metodakh planirovaniya rosta narodnogo potrebleniya, in Soveshchanie... (1970)

Krylov P N and Kirichenko N Ya, Ispolzovanie ratsionalnogo byudzheta v planirovanii roznichnogo tovarooborota, p 91 in Opredelenie... (1962)

Krylov V N, Vyborochnyi metod v statistike, M 1957, pp 74-82

Kryushin V N, Surin N M and Uskov N F, Tekhnicheskie sredstva obrabotki informatsii, M 1976

Kuchayev L S, Blagosostoyanie i veshchestvennyi spros, p 63 in Statisticheskoe... (1966)

Kurs ekonomicheskoi statistiki (ed. A I Petrov), 3rd edn. M 1961, pp 392-5; 5th edn. M 1975, p 433

Kurs sotsialno-ekonomicheskoi statistiki (ed. M G Nazarov), M 1982

Kuzmenkova L, O statistike semeinykh byudzhetov v Kharkovskoi oblasti, VS 1973,4,75

Kuznetsov N, Kak my izuchayem spros, ST 1965,9,23

Kuznetsova N P, Normativnyi metod planirovaniya i prognozirovaniya urovnya zhizni naseleniya, p 136 in Voprosy oplaty truda i urovnya zhizni naseleniya, M 1978

Lakhman I and Frenkel M, Aktualnye problemy prognozirovaniya sprosa, Sovetskaya potrebitelskaya kooperatsiya 1967,12,31

Lakhman I L and Frenkel M G, Ob informatsionnoi baze prognozirovaniya sprosa, p 196 in Organizatsiya... (1971)

Lazarsfeld P F, Notes on the history of quantification in sociology, Isis 52, 1961, p 277

Leifman L Ya, Pokazateli elastichnosti potrebleniya i ikh ispolzovanie pri opredelenii potrebnosti v tovarakh, p 186 in Opredelenie... (1962)

Leifman L Ya, Matematicheskoe issledovanie zavisimosti potrebleniya otdelnykh tovarov ot dokhoda, p 292 in Ekonomiko-... I (1963)

Levin A I, Sotsialno-ekonomicheskie problemy razvitiya sprosa naseleniya v SSSR, M 1969

Levin A I, Sotsialisticheskii vnutrennyi rynok, M 1973, pp 232-3, 254-8

Levin A, Problemy prognozirovaniya sprosa naseleniya, PKh 1977,6,90

Levin A I and Frenkel M G, O nekotorykh metodakh prognozirovaniya sprosa, EiMM 1973,6,1084

Levin A I and Yarkin A P, Platezhesposobnyi spros naseleniya, M 1976

Levin A I and Yarkin A P, Tovarnoe obrashchenie: problemy prognozirovaniya i upravleniya, M 1980

Levin B M, Sotsialno-ekonomicheskie potrebnosti: zakonomernosti formirovaniya i razvitiya, M 1974, pp 196-9

Levkova L A, Primenenie metoda glavnykh komponent v izuchenii raskhodov naseleniya, p 83 in Dokhody... (1976)

Lipkin M, K voprosu o granitsakh primenimosti metodov korrelyatsii i regressii v ekonomicheskikh issledovaniyakh, VS 1977,7,31

Lipkin M and Mints L, Ob izuchenii sprosa naseleniya na tovary narodnogo potrebleniya po dannym byudzhetnoi statistiki, VS 1970,8,35

Lisitsin Yu P and Kopyt N Ya, Alkogolizm, M 1978

Lomovatskii G I, Matematicheskie metody i modeli v ekonomicheskikh issledovaniyakh na primere rybnoi promyshlennosti, M 1980

Lukasheva R I, in Soveshchanie... (1964)

Lutokhina E A, Oplata truda ITR, M 1966

Lyberg L, Preface, Statistical Review (published by Statistics Sweden, Stockholm) 1983,5,5

Maier V, Rutgaizer V and Ivensen T, Modelirovanie struktury potrebitelskikh raskhodov naseleniya, PKh 1971,10,49

Manellya A I, Postroyenie raionov sinkhronnykh kolebanii urozhainosti zernovykh kultur putyem korrelyatsii vremennykh ryadov, UZS t. 22-3, M 1973, p 274

Manellya A I and Terekhina A Yu, Statisticheskii analiz tipov dinamiki urozhainosti selskokhozyaistvennykh kultur, UZS t. 26, M 1974, p 150

Mansimov Ch A, Izmenenie v zhiznennom uklade semei Lenkoranskogo raiona, SI 1981,3,102

Margolin N, Metodika sostavleniya balansa denezhnykh dokhodov i raskhodov naseleniya, PKh 1957,7,81

Martynov A V and Solovyev Yu P, Modelirovanie sprosa na tovary kulturno-bytovogo naznacheniya, EiMM 1981,3,540

Maunder W F, Sir Arthur Lyon Bowley 1869-1957, in Studies in the history of statistics and probability, Vol. II (eds. Sir M Kendall and R L Plackett), Griffin 1977

Masherov P M, Sovetskaya Belorussiya 6.12.1978 p 4

Mashinnaya obrabotka ekonomicheskoi informatsii (ed. V I Rybin), M 1978

Maslov P P, Nekotorye puti ispolzovaniya koeffitsienta elastichnosti potrebleniya, in Primenenie matematiki v ekonomicheskikh issledovaniyakh t. 2 (ed. V S Nemchinov), M 1961

Maslov P P, Ekonomicheskie modeli v planirovanii tovarooborota, p 196 in Opredelenie... (1962)

Maslov P P, Sotsiologiya i statistika, M 1967

Maslov P P, Izmerenie potrebitelskogo sprosa, M 1971, pp 35-6

Maslov P P, Romanovskaya K P and Simchera V M, Problemy izmereniya byudzheta vremeni sovetskoi sem'i, SI 1978,1,170

Matthews M, Class and society in Soviet Russia, Penguin 1972

Matthews M, Privilege in the Soviet Union - a study of elite life-styles under communism, George Allen and Unwin 1978

Matveyev M T, Itogi i nekotorye problemy vnedreniya elektronnykh sistem sbora i obrabotki informatsii v narodnom khozyaistve USSR v desyatoi pyatiletke, Mekhanizatsiya i avtomatizatsiya upravleniya, Kiev 1979,1,1

Matyukha I Ya, Iz opyta primeneniya vyborochnogo metoda pri izuchenii zhiznennogo urovnya naseleniya, VS 1960,9,14

Matyukha I Ya, O statistike potrebitelskikh byudzhetov, p 95 in Metodologicheskie... (1962)

Matyukha I Ya, Soveshchanie rabochei gruppy statistikov stran-chlenov SEV, VS 1963,3,79

Matyukha I Ya, Vyborochnyi metod v sovremennoi statistike byudzhetov naseleniya, p 77 in Vyborochnoe... (1966)

Matyukha I Ya, Statistika byudzhetov naseleniya, M 1967

Matyukha I Ya, Byudzhetnye obsledovaniya naseleniya, p 245 in Organizatsiya... (1971)

Matyukha I Ya, Statistika zhiznennogo urovnya naseleniya, M 1973

Matyukha I Ya, Vyborochnye obsledovaniya semeinykh byudzhetov kak funktsionalnaya podsistema ASGS, VS 1974,1,22

Matyukha I Ya, O plane statisticheskikh i metodologicheskikh rabot TsSU SSSR na 1984 g, VS 1984,1,3

Matyukha I and Chernysheva T, Vnedrenie matematiko-statisticheskikh metodov v issledovanie zhiznennogo urovnya naseleniya, VS 1975,1,15

Matyukha I Ya, Postnikov S V and Samoilov V A, Iz istorii statistiki byudzhetov naseleniya v SSSR, VS 1958,7,37

Matyukha I Ya, Postnikov S V and Samoilov V A, Statistika byudzhetov naseleniya, p 297 in Istoriya sovetskoi gosudarstvennoi statistiki, M 1960

McAuley A, The distribution of earnings and incomes in the Soviet Union, Soviet Studies Vol. 29 no. 2, April 1977, p 214

McAuley A, Economic welfare in the Soviet Union: poverty, living standards and inequality, George Allen and Unwin 1979, pp 51-8

Medin K, The introduction of probability sampling in Swedish acreage and livestock statistics in 1950, Statistical Review (published by Statistics Sweden, Stockholm) 1983,5,19

Medvedev Zh A, The rise and fall of T D Lysenko, Columbia UP 1969

Merinov I F, Vyborochnyi metod v selskokhozyaistvennoi statistike, p 115 in Vyborochnoe... (1966)

Metodologicheskie voprosy izucheniya urovnya zhizni trudyashchikhsya, Vyp. I, M 1959; Vyp. II, M 1962

Metodologicheskie osnovy sozdaniya ASGS, M 1977

Methodology conference TsSU USSR 20-21.2.1950, The American Statistician, June-July 1952 (translated from VS 1950,1,88)

Milner G V and Gilinskaya E B, Pokazateli i metody izucheniya urovnya zhizni naseleniya po territorii strany, UZS t. 42, M 1981, p 6

Mints L Ye, Zadachi perspektivnogo planirovaniya potrebleniya, in Opredelenie... (1962)

Mints L Ye, Statisticheskie metody perspektivnogo planirovaniya potrebleniya, p 9 in Opyt... (1968)

Mints L Ye, Statisticheskie balansy i ekonomiko-matematicheskie modeli v planirovanii, M 1976, pp 170-182

Mochalov B M, Tovarnoe obrashchenie v epokhu kommunisticheskogo stroitelstva, M 1965, p 169

Morozov M, Uluchshat' organizatsiyu obsledovanii byudzhetov kolkhoznikov v Gruzinskoi SSR, VS 1961,4,75

Moser C A and Kalton G, Survey methods in social investigation, Heinemann 1971

Motkin G A, Avtoreferat: Statistika okruzhayushchei sredy kak podsistema ASGS, M 1977

Muchnik I B et al, Problemy postroyeniya vsesoyuznoi territorialnoi vyborki dlya sotsiologicheskikh issledovanii, SI 1978,1,162

Myasin Ye B and Frenkel V M, Raschet srednikh srokov sluzhby izdelii dlitelnogo polzovaniya po dannym oprosov naseleniya, UZS t. 42, M 1981, p 228

Nazarov M G, Parteshko N S and Rumyantsev V N, Statistika truda, M 1981

Nekrolog: Ye O Kabo, UZS t. 17, M 1970, p 272

Nekrolog: P P Maslov, UZS t. 32, M 1978, p 313

Nemchinov V S, Polinomy Chebycheva i matematicheskaya statistika, M 1946

Nemchinov V S, editorial statement in UZS t. 1, M 1955

Nemchinova I I, Povyshenie urovnya i izmenenie struktury pitaniya semei rabochikh i sluzhashchikh, p 66 in Rost narodnogo blagosostoyaniya v usloviyakh razvitogo sotsializma (ed. D N Karpukhin), M 1977

Neshitoi A S and Shatalova T F, Statisticheskie metody regionalnogo issledovaniya roznichnogo tovarooborota, UZS t. 37, M 1980, p 231

News and Notes (published by the Royal Statistical Society), Vol. 8 no. 2, October 1981, p 1

Neyman J, On the two different aspects of the representative method: the method of stratified sampling and the method of purposive selection, JRSS (97) 1934, p 558

Nikolayeva L A, Avtoreferat: Planirovanie vyborochnykh obsledovanii s uchetom zatrat, M 1974

Nikolskaya A, Ob ekonomike sovetskoi sem'i, p 160 in SSSR: vnutrennie protivorechiya 2, Chalidze Publications, New York 1981

Nikonova O N, Voprosy issledovaniya sezonnosti sprosa i potrebleniya, p 136 in Voprosy... II (1972)

Obshchaya teoriya statistiki (G S Kildishev et al), M 1980

Ofer G and Pickersgill J, Soviet household saving: a cross-section study of Soviet emigrant families, 1978

O'Muircheartaigh C and Wong S T, The impact of sampling theory on survey sampling practice: a review, paper presented to the Conference of the International Statistical Institute at Buenos Aires 1981

Onikienko V V and Popovkin V A, Kompleksnoe issledovanie migratsionnykh protsessov, M 1973

Onoprienko G K, Vyborochnyi analiz ispolzovaniya rabochego vremeni, M 1968

Opredelenie potrebnosti naseleniya v tovarakh, Kiev 1962

Opyt primeneniya matematicheskikh metodov i EVM v ekonomiko-matematicheskom modelirovanii potrebleniya (eds. I K Belyaevskii et al), M 1968

Orekhova I A, Avtoreferat: Spetsialno organizovannoe statisticheskoe nablyudenie v sisteme rabot sovetskoi gosudarstvennoi statistiki (1917-1969 gg), Leningrad 1970

Organizatsiya i metody izucheniya sprosa - materialy Vsesoyuznoi nauchnoi konferentsii sostoyavsheisya v sentyabrye 1969 g, M 1971

Organizatsiya i planirovanie denezhnogo obrashcheniya (ed. V S Gerashchenko), M 1981

Organizatsiya torgovli (USSR Ministry of Trade), M 1978, pp 41-2

Orlean G Ya, Popov G S, Solomonov S L et al, Izuchenie mneniya naseleniya o rabote gorodskoi polikliniki, SZ 1982,2,48

Orlov A V, Upravlenie sprosom i predlozheniem tovarov, M 1983

O vazhneishikh voprosakh sovershenstvovaniya gosudarstvennoi statistiki, VS 1968,7,15

Ovsiyenko V Ye, Vyborochnoe statisticheskoe nablyudenie, p 3 in Vyborochnoe... (1966)

Panina P, Oblastnoe soveshchanie rabochikh i sluzhashchikh Moskovskoi oblasti, vedushchikh byudzhetnye zapisi, VS 1974,3,75

Parfenova A, O tsentralizovannoi razrabotke na schetno-perforatsionnykh mashinakh materialov obsledovaniya byudzhetov naseleniya, VS 1964,2,73

Parfenova A and Rumyantsev V, Byudzhety naseleniya i izuchenie sprosa, ST 1967,4,18

Parusov Ye and Balasanyan V, Opyt ispolzovaniya mini-EVM v otdelakh Gosplana SSSR, PKh 1977,5,129

Pavlova N M and Rabkina N Ye, Aktualnye voprosy pensionnogo obespecheniya starosti, p 54 in Dokhody... (1976)

Pavlova N M and Rabkina N Ye, Ekonomiko-statisticheskii analiz i modelirovanie pensionnogo obespecheniya, UZS t. 42, M 1981, p 59

Pawlowsky Z, Studies of consumer demand in Poland after World War II, p 1933 in Recherches récents sur les études de marché et l'analyse de la demande, Paris 1961

Pearson K, The early history of statistics, in The history of statistics in the seventeenth and eighteenth centuries against the changing background of intellectual, scientific and religious thought - lectures by Karl Pearson at UCL 1921-33 (ed. E S Pearson), Griffin 1978

Peers J, Soviet demographic trends and policies - a political problem, paper presented to the 1981 conference of the Centre of Russian and East European Studies, University of Birmingham

Petrenko Ye S, Avtoreferat: Problemy proyektirovaniya vyborochnykh sotsiologicheskikh issledovanii (na primere opisaniya bolshikh gorodov RSFSR), M 1973

Petrova N A, Ispolzovanie metodov mnogomernoi statistiki dlya analiza vzaimosvyazi truda i blagosostoyaniya, p 100 in Sotsialno-ekonomicheskie... (1976)

Pivovarov V, Oblastnoe sobranie predstavitelei semei, vedushchikh zapisi svoikh byudzhetov, VS 1967,9,85

Planovyi differentsirovannyi balans dokhodov i potrebleniya naseleniya, M 1981

Pletneva A S, Vyborochnoe obsledovanie prodazhi i tsen selskokhozyaistvennykh produktov na kolkhoznykh rynkakh, p 295 in Vyborochnoe... (1966)

Podgornov S, Vazhnye usloviya uspeshnogo obsledovaniya byudzhetov trudyashchikhsya, VS 1957,1,68

Pogosov I A, Vyborochnoe izuchenie stoimostnykh pokazatelei proizvodstva produktsii, p 194 in Vyborochnoe... (1966)

Poletayev V Ye, Rabochie Moskvy na zavershayushchem etape stroitelstva sotsializma, M 1967, p 243

Poplavskii I, O vyborochnom metode i drugikh formakh sokrashchennogo nablyudeniya v transportnoi statistike, VS 1927,3,126

Popov V, Stal' i shlak, Znamya 1949,2,33

Posobie po statistike dlya raionnykh (gorodskikh) informatsionno-vychislitelnykh stantsii (tsentrov) i inspektur gosudarstvennoi statistiki (ed. A V Nevzorov), M 1980

Postnikov S, Novyi etap v razvitii statistiki byudzhetov rabochikh, sluzhashchikh i kolkhoznikov, VS 1951,6,18

Postnikov S V, Kak luchshe organizovat' obsledovanie byudzhetov rabochikh, sluzhashchikh i kolkhoznikov, VS 1952,3,73

Postnikov S, O metodakh otbora rabochikh, sluzhashchikh i kolkhoznikov dlya obsledovaniya ikh byudzheta, VS 1953,3,14

Postnikov S, O gruppirovkakh byudzhetov naseleniya po dokhodu, VS 1961,6,44

Postnikov S V, Primenenie vyborochnogo metoda pri byudzhetnom obsledovanii krestyanskogo naseleniya v 1918-1951 gg, p 53 in Vyborochnoe... (1966)

Potrebnosti, dokhody, potreblenie - metodologiya analiza i prognozirovaniya narodnogo blagosostoyaniya, M 1979

Primenenie matematiki i elektronnoi tekhniki v planirovanii, M 1961

Primenenie matematicheskikh i statisticheskikh metodov v izuchenii problem narodnogo potrebleniya Vyp. II (ed. Yu A Barinov), M 1962

Problemy ispolzovaniya rabochei sily v usloviyakh nauchno-tekhnicheskoi revolyutsii, M 1973, pp 122-69

Problemy nauchnogo kommunizma Vyp. 2, M 1968

Pyatakova F S and Lysenkov Yu M, Sovershenstvovanie territorialnogo planirovaniya tovarooborota, Kiev 1981

Rabkina N E and Rimashevskaya N M, Osnovy differentsiatsii zarabotnoi platy i dokhodov naseleniya, M 1972

Rabkina N E and Rimashevskaya N M, Raspredelitelnye otnosheniya i sotsialnoe razvitie, EiOPP 1978,5,16

Rabochii klass SSSR (1951-1965 gg), M 1969, pp 230-1

Raikh A and Volkov A, O metode rasprostraneniya vyborochnykh dannykh Vsesoyuznoi perepisi naseleniya, VS 1980,3,19

Raitsin V Ya, Normativnye metody planirovaniya urovnya zhizni, M 1967, pp 43-57, 75

Raitsin V Ya, Matematicheskie metody i modeli planirovaniya urovnya zhizni, M 1970

Razvitie obshchestvennogo proizvodstva BSSR i rost narodnogo blagosostoyaniya, Minsk 1983

Razvitie teorii i metodologii statistiki v trudakh V I Lenina, M 1971

Resheniya partii i pravitelstva po khozyaistvennym voprosam t. 3, M 1968, pp 670-3

Rimashevskaya N M, Metodika postroyeniya differentsirovannogo balansa dokhodov i potrebleniya semei rabochikh i sluzhashchikh, p 83 in Opredelenie... (1962)

Rimashevskaya N M, K metodike ischisleniya pokazatelei dokhodov i potrebleniya rabochikh semei, p 108 in Statisticheskie... (1964)

Rimashevskaya N M, Ekonomicheskii analiz dokhodov rabochikh i sluzhashchikh, M 1965

Rimashevskaya N M, Metod momentnykh nablyudenii v konkretnykh sotsiologicheskikh issledovaniyakh, in Problemy... (1968)a

Rimashevskaya N M, Voprosy sovershenstvovaniya statistiki urovnya zhizni, p 154 in Dokhody... (1968)b

Rimashevskaya N M, Sovershenstvovanie metodov sbora informatsii o sprose naseleniya, p 210 in Organizatsiya... (1971)

Rimashevskaya N M, Differentsirovannyi balans dokhodov i potrebleniya semei trudyashchikhsya kak instrument analiza i planirovaniya zhiznennogo urovnya naseleniya, p 4 in Dokhody... (1976)

Rimashevskaya N M and Ovsyannikov A A, Potrebitelskoe povedenie naseleniya: teoriya i rezultaty modelirovaniya, EiMM 1981,6,1085

Rodzinskaya I Yu, Materialnoe blagosostoyanie i stabilnost' semei, SI 1981,3,106

Roganova T N, Chislo i sostav semei v SSSR, p 260 in Vsesoyuznaya perepis naseleniya 1970 goda - sbornik statei, M 1976

Rogova O L and Rakovskaya O A, Statistika sberezhenii naseleniya, UZS t. 42, M 1981, p 82

Romanenko I P, Avtomatizatsiya planovykh raschetov: opyt ispolzovaniya EVM v praktike planirovaniya, M 1977, p 34

Rostovskaya oblast' za 50 let, Rostov 1967

Rovinskaya N, Sobranie semei, vedushchikh byudzhetnye zapisi, VS 1965,3,80

Royall R M, On finite population sampling theory under certain linear regression models, Biometrika 57 (1970) p 377

Rumyantsev V A, Prognoz sprosa na tovary dlitelnogo polzovaniya i kulturnogo naznacheniya na baze byudzhetnykh obsledovanii domashnego inventarya, p 283 in Opyt... (1968)

Ryabushkin B and Skvortsova N, O sistemnom statisticheskom izuchenii poter' v materialnom proizvodstva, VS 1982,5,3

Ryabushkin T and Simchera V, Nekrolog: P P Maslov (1902-78), UZS t. 32, M 1978, p 313

Ryauzov D, V Moskovskom Dome Uchenykh, VS 1982,4,75

Rzhanitsyna L, Soviet family budgets, Progress Publishers, M 1977, pp 90-124, 140-1

Sabinin P, Byudzhety rabochikh i sluzhashchikh razrabatyvat' na schetno-perforatsionnykh mashinakh, VS 1966,8,78

Sadunashvili L I, Tseny i elastichnost' sprosa na tovary, p 206 in Opredelenie... (1962)

Safronova V P, Avtoreferat: Vyborochnyi metod v praktike sovetskoi statistiki, M 1968

Samoilov V A, Primenenie vyborochnogo metoda pri obsledovanii produktivnosti skota, nakhodyashchegosya v lichnoi sobstvennosti kolkhoznikov, p 174 in Vyborochnoe... (1966)

Sapelnikov Ya, Shnirlin Yu and Levin A, Neosushchestvimye predlozheniya, ST 1959,7

Sarkisyan G S, Uroven', tempy i proportsii rosta realnykh dokhodov pri sotsializme, M 1972, pp 45-7

Sarkisyan G S, Narodnoe blagosostoyanie v SSSR, M 1983

Sarkisyan G S and Kuznetsova N P, Potrebnosti i dokhod sem'i, M 1967

Sarkisyan M T, Lichnye potrebnosti v teorii i praktike sotsialisticheskogo vosproizvodstva, Yerevan 1982

Savinkov V, Obshchie svedeniya o PVK M5000, VS 1975,7,57

Savinskii D V, Kurs promyshlennoi statistiki (4th edn.), M 1954, pp 392-7

Sayenko O P, Byudzhet sovetskoi sem'i, Znanie M 1983

Sbornik statisticheskikh materialov 1981, TsSU M 1982

Segal B M, Alkogolizm - klinicheskie, sotsialno-psikhologicheskie i biologicheskie problemy, M 1967

Semenova A S and Volkov A G, Tekushchee vyborochnoe obsledovanie naseleniya v SShA, UZS t. C-1, M 1959, p 229

Sergeyev S S, Selskokhozyaistvennaya statistika s osnovami ekonomicheskoi statistiki (2nd edn.), M 1968, pp 407-10

Shamanskii P P and Zuyev M R, Nekotorye voprosy sblizheniya zhiznennogo urovnya kolkhoznikov s zhiznennym urovnem rabochikh i sluzhashchikh, p 187 in Sbornik nauchnykh rabot sotrudnikov Belorusskogo filiala NII truda, Minsk 1976

Sharot T, The negative binomial model of buying behaviour, paper presented to the International Meeting on the Analysis of Sample Survey Data and Sequential Analysis at the Hebrew University of Jerusalem in June 1982

Shcherbakov V, Iz opyta raboty po statistike byudzhetov kolkhoznikov, VS 1951,1,82

Shenfield S D, Record of conversation with Yu V Arutyunyan on his visit to Birmingham, 1981

Shenfield S D, Why does sampling play such a secondary role in Soviet statistics?, Discussion Papers of the Centre of Russian and East European Studies of the University of Birmingham, Series RC no. B18, 1982a

Shenfield S D, Record of conversations with N M Rimashevskaya and Yu Shevyakov on their visit to Birmingham, 1982b

Shenfield S D, The role of forecasting in Soviet State statistics, paper presented to the 1983 conference of the Centre of Russian and East European Studies of the University of Birmingham, 1983a

Shenfield S D, A note on data quality in the Soviet family budget survey, Soviet Studies October 1983b, p 561

Shenfield S D, Pripiski: false statistical reporting in Soviet-type economies, p 239 in Corruption - causes, consequences and control (ed. M Clarke), Frances Pinter Ltd. 1983c

Sheregi F E, Metodicheskie problemy vyborki i reprezentativnosti v sotsiologicheskoi praktike, SI 1977,1,112

Sheregi F E, Metodicheskii apparat prikladnoi sotsiologii 20-kh godov, SI 1978,1,192

Shiriyazdanov Sh Kh, Rabochii klass Kirgizstana v usloviyakh razvitogo sotsializma, Frunze 1979, p 372

Shkrebel' M, Iz opyta obsledovaniya byudzhetov kolkhoznikov, VS 1957,1,67

Shlyapentokh V Ye, Problemy reprezentativnosti sotsiologicheskoi informatsii, M 1976

Shubina N, Metodologiya raschetov chislennosti naseleniya v mezhperepisnoi period, VS 1973,10,18

Shulyak P N, Ekonomika torgovli, zagotovok i drugikh otraslei khozyaistvennoi deyatelnosti potrebitelskoi kooperatsiya, M 1970

Shurakov V V, Mashinnaya obrabotka statisticheskoi otchetnosti, M 1977

Shvili V V, Esteticheskie faktory sprosa (postanovka problemy i konkretnye issledovaniya), p 125 in Voprosy... II (1972)

Shvyrkov V V, K voprosu o sezonnosti potrebleniya prodovolstvennykh i promyshlennykh tovarov, p 213 in Opredelenie... (1962)

Shvyrkov V V, Zakonomernosti potrebleniya promyshlennykh i prodovolstvennykh tovarov, M 1965

Shvyrkov V V, Ekonomiko-matematicheskii analiz potrebitelskogo sprosa, M 1966

Shvyrkov V V, Matematiko-statisticheskie modeli prognozirovaniya sprosa i potrebleniya semei v SSSR, p 29 in Opyt... (1968)

Shvyrkov V V and Aidina L K, Model' raspredeleniya naseleniya po dokhodu, p 230 in Opyt... (1968)

Shvyrkov V V and Shvyrkova T S, Modelirovanie vnutrigodichnykh kolebanii sprosa, M 1973, pp 50, 56-7, 66, 76

Shvyrkova T S and Shvyrkov V V, Elastichnost' sprosa i potrebleniya, p 184 in Ekonomiko-... III (1966)

Sidlyarenko A, Khoroshii primer organizatsii statistiki byudzhetov, VS 1964,1,65

Sidlyarenko A, in Soveshchanie... (1964)

Sidlyarenko A, I Ya Matyukha "Statistika zhiznennogo urovnya naseleniya", VS 1975,1,79

Siks Yu P, Materialnaya obespechennost' sem'i i detnost', p 143 in Lichnoe potreblenie v mekhanizme vosproizvodstva naseleniya, Riga 1983

Simpozium "Sovetskaya statistika cherez 20 let", VS 1968,11,76

Siskov V I, Pravila soyedineniya koeffitsientov variatsii i korrelyatsii, VS 1974,10,20

Siskov V I, Razvitie statisticheskoi teorii v usloviyakh ASGS, VS 1975,6,29

Siskov V I, Primenenie matematiko-statisticheskikh metodov v usloviyakh ASGS, VS 1981,10,24

Siskov V I, Klimenko V P and Ivanov N D, ASGS (opyt razrabotki i sozdaniya pervoi ocheredi), M 1978

Sistema modelei narodnokhozyaistvennogo planirovaniya (eds. N P Fedorenko and E F Baranov), M 1982

Smit M, Vreditelstvo v planirovanii i statisticheskaya teoriya, PKh 1930,10-11,139

Sobranie rabochikh i sluzhashchikh Moskovskoi oblasti, vedushchikh byudzhetnye zapisi, VS 1983,3,68

Sobranie rabochikh i sluzhashchikh Moskvy, vedushchikh byudzhetnye zapisi, VS 1963,2,89

Soldatkin A I, Dinamicheskaya odnofaktornaya model' prognoza sprosa na chasy, p 117 in Opyt... (1968)

Soliyeva Z S, Analiz struktury semeinykh raskhodov po gruppam "nastoyatelnosti", p 149 in Sotsialno-... (1976)

Solop M, Oblastnye sobraniya predstavitelei semei, vedushchikh zapisi semeinykh byudzhetov, VS 1970,12,81

Solovyev Yu P and Druker S G, Analiz i prognozirovanie struktury potrebitelskikh raskhodov, M 1981, pp 46-50

Sotsialno-demograficheskoe razvitie sela (eds. T I Zaslavskaya and I B Muchnik), M 1980

Sotsialno-ekonomicheskie problemy blagosostoyaniya, M 1976

Sovershenstvovanie gosudarstvennoi statistiki na sovremennom etape - materialy vsesoyuznogo soveshchaniya statistikov, M 1979

Soveshchanie ekspertov MOT po voprosam obsledovaniya semeinykh byudzhetov, VS 1968,4,78

Soveshchanie gruppy ekspertov i regionalnyi seminar yevropeiskikh statistikov po voprosam obsledovaniya domashnikh khozyaistv, VS 1962,2,91

Soveshchanie po statistike byudzhetov, VS 1953,4,90

Soveshchanie po statistike byudzhetov naseleniya, VS 1964,10

Soveshchanie po statistike byudzhetov naseleniya, VS 1979,9,(

Soveshchanie po voprosam planirovaniya tovarooborota i snabzheniya naseleniya prodovolstvennymi tovarami, PKh 1957,4,92

Soveshchanie... , Yerevan 1970 (exact title mislaid)

Soveshchanie rabotnikov byudzhetnoi statistiki, VS 1969,5,79

Sovetskaya torgovlya - statisticheskii sbornik, M 1964

Standartizatsiya pokazatelei v sotsiologicheskom issledovanii (eds. G V Osipov and E P Andreyev), M 1981

Starovskii V N, Blizhaishie zadachi sovetskoi statistiki, PKh 1967,7,19

Starovskii V N, XXIV s'yezd KPSS i zadachi sovetskoi statistiki, VS 1971,5,3

Statisticheskie i matematicheskie metody v izuchenii problem narodnogo potrebleniya (ed. A Kh Karapetyan), Yerevan 1964

Statisticheskoe izuchenie sprosa i potrebleniya, M 1966

Statistika selskogo khozyaistva, M 1973

Stephan F, History of the uses of modern sampling procedures JASA, March 1948

Stolmov L F, Izuchenie i prognozirovanie pokupatelskogo sprosa, M 1972, pp 65-71

Straumen V V, Pervaya ochered' ASGS v Latviiskoi SSR, Riga 1976

Strumilin S G and Sonin M Ya, Alkogolnye poteri i borba s nimi, EiOPP 1974,4,36

Struyev A, Torgovlya i proizvodstvo, Kommunist 1964,16,39

Sukhoruchkina I, Soveshchanie rabotnikov statistiki semeinykh byudzhetov, VS 1970,8,79

Syikova I, Rotatsionnaya vyborka v statistike byudzhetov semei, p 120 in Teoreticheskie i metodologicheskie problemy statistiki (translated from the Bulgarian), M 1979

Symons L, Russian agriculture - a geographic survey, G Bell and Sons Ltd. 1972

Talyzin N V, Obshchegosudarstvennaya sistema peredachi dannykh, Ekonomicheskaya gazeta 1978,36,7

Tatarskaya N and Guryanov A, Byudzhet rabochei sem'i, M 1957

Teoreticheskie narodnokhozyaistvennye modeli (ed. K K Valtukh), Novosibirsk 1980

Territorialnye problemy dokhodov i potrebleniya trudyashchikhsya, M 1966

Tipologiya potrebleniya (eds. S A Aivazyan and N M Rimashevskaya), M 1978

Trakhtenberg G L and Sablina T N, Metody izucheniya pokupatelskogo sprosa na promyshlennye tovary, M 1957

Treml V G, Alcohol in the Soviet Union - a statistical study, New Jersey: Centre for Alcohol Studies, Rutgers University 1982

Treml V G and Hardt J P (eds.), Soviet economic statistics, Duke UP 1972

Trofimova L, Izuchenie vnutrismennykh poter' metodom momentnykh nablyudenii, VS 1973,9,56

Trud v SSSR - statisticheskii sbornik, M 1936

Trud v SSSR - statisticheskii sbornik, M 1968

Tsanov M, O reorganizatsii statistiki semeinykh byudzhetov v Narodnoi Respublike Bolgarii, VS 1963,12,39

Tvildiani Yu, Prognozirovanie sprosa - funktsiya upravleniya, ST 1977,1,12

Uchebnoe posobie po otdelnym otraslyam statistiki (ed. M R Eidelman), M 1958, pp 180, 184, 194-99, 210-5

United Nations Economic and Social Council, Organisation of family budget surveys and practices adopted by statisticians to ensure full coverage in the collection and processing of survey forms in the USSR, CES/AC.48/4, 1978

Vagradyan D Ye, Obsledovanie potrebitelskikh byudzhetov metodom momentnykh nablyudenii, p 66 in Primenenie... (1962)

Valtukh K K, Tselevaya funktsiya potrebleniya: analiz i prakticheskoe ispolzovanie, Novosibirsk 1980

Valtukh K K and Ryzhenkov A V, Analiz struktury lichnogo potrebleniya Avstrii s ispolzovaniem funktsii poleznosti, p 277 in Teoreticheskie... (1980)

Vasilyeva V A, Byudzhety rabochikh prezhde i teper', M 1965

Venetskii I, Momentnye nablyudeniya byudzhetov naseleniya, VS 1968,3,93

Venetskii I and Bauman M, Reprezentativnost' momentnykh byudzhetnykh obsledovanii, VS 1975,3,23

Venetskii I and Chernysheva T, O predvaritelnoi proverke reprezentativnosti vyborochnoi sovokupnosti, VS 1978,8,18

Venetskii I G and Kildishev G S, Teoriya veroyatnosti i matematicheskaya statistika, M 1975, pp 220, 235

Venetskii I and Matyukha I, Proverka reprezentativnosti vyborki v obsledovaniyakh semeinykh byudzhetov, VS 1968,1,42

Venetskii I and Matyukha I, Vyborochnye obsledovaniya v praktike raboty tsentralnykh statisticheskikh organov stran-chlenov SEV, VS 1971,6,44

Venetskii I and Matyukha I, Soveshchanie statistikov sotsialisticheskikh stran po voprosam obsledovaniya semeinykh byudzhetov, VS 1975,2,79

Vitols Ya P, Nekotorye voprosy organizatsii izucheniya urovnya zhizni naseleniya metodom momentnogo nablyudeniya, p 29 in Voprosy... III (1972)

V kollegii TsSU SSSR, VS 1983,9,18

V kollegii TsSU SSSR, VS 1984a,1,21

V kollegii TsSU SSSR, VS 1984b,3,35

Vladykin G, Opyt raboty statisticheskogo upravleniya Kuybyshevskoi oblasti po statistike byudzhetov rabochikh i sluzhashchikh, VS 1955,6,74

Vladykin G, Razrabotka materialov byudzhetnykh obsledovanii na schetno-perforatsionnykh mashinakh, VS 1958,6,57

Volkonskii V A, O ratsionalnoi organizatsii byudzhetnykh obsledovanii, p 71 in Primenenie... (1962)

Volkonskii V A, Ob obyektivnoi matematicheskoi kharakteristike narodnogo potrebleniya, p 201 in Ekonomiko-... I (1963)

Volkov A G, Voprosy primeneniya vyborochnogo metoda pri obsledovanii naseleniya, p 50 in Primenenie... (1962)

Volkov A G, Avtoreferat: Vyborochnoe nablyudenie naseleniya, M 1971

Volkova G N and Komarova O B, Nekotorye voprosy prognozirovaniya raskhodov naseleniya na odezhdu, p 95 in Dokhody... (1976)

Volodarskii L, The use of the sample method in Soviet statistics, M 1969

Voprosy truda IV - Voprosy povysheniya urovnya zhizni trudyashchikhsya (ed. I Yu Pisarev), M 1959

Voprosy urovnya zhizni naseleniya - materialy respublikanskoi nauchnoi konferentsii "Problemy povysheniya blagosostoyaniya naseleniya i izucheniya sprosa na tovary narodnogo potrebleniya i uslugi" Sektsiya II, Riga 1972; Sektsiya III, Riga 1972

Voronov A N, Pokupatelnyi fond naseleniya i tovarooborot, M 1981

Voronova Ye N, Territorialnaya organizatsiya vnutrennei torgovli SSSR, Kiev 1981

Vorontsova L, Vsesoyuznoe soveshchanie rabotnikov statistiki byudzhetov, VS 1975,9,72

Vsesoyuznaya perepis' naseleniya 1970 goda (ed. G M Maksimov), M 1976

Vsesoyuznoe soveshchanie statistikov 4-8 iyunya 1957 g, M 1959

Vsesoyuznoe soveshchanie statistikov 22-26 aprelya 1968 g, M 1969

Vsesoyuznye soveshchaniya po statistike byudzhetov rabochikh, sluzhashchikh i kolkhoznikov, VS 1954,4,93

V statisticheskoi sektsii Moskovskogo Doma Uchenykh, VS 1961,6,82

Vyborochnoe nablyudenie v statistike SSSR - sbornik statei, M 1966

Weitzman P, Soviet long-term consumption planning: distribution according to rational need, Soviet Studies Vol. 26 no. 3, July 1974, p 305

Wheatcroft S G, Grain production and utilisation in the USSR before collectivisation, Ph.D. thesis, Centre of Russian and East European Studies, University of Birmingham 1980, Vol. 3, Appendix 11a, pp 305-6

Wheatcroft S G, A note on employment in Soviet industry 1926-1938, paper presented to the West European Conference on Soviet Industry and the Working Class in the Inter-War Years at the University of Birmingham in June 1981

Yablonovskii S, Opyt primeneniya vyborochnogo metoda v pervichnom uchete ispolzovaniya oborudovaniya, VS 1959,4,19

Yakhot O O, Statistika v sotsiologicheskom issledovanii, M 1966

Yakhot O O, Statisticheskaya zakonomernost' v sotsiologicheskom analize, M 1969

Yanov A, The origins of autocracy: Ivan the Terrible in Russian history, University of California Press 1981

Yastremskii B, Golyi empiritsizm i krivy raspredeleniya Pirsona, VS 1927,1,173

Yeliseyev V F et al, Ekonomika i planirovanie sovetskoi kooperativnoi torgovli (2nd edn.), M 1967

Yezhov A I, Sistema i metodologiya pokazatelei sovetskoi statistiki, M 1965, pp 313-26

Yezhov A I, Organisation of statistics in the USSR, Progress Publishers 1967, p 185

Yezhov A I, Organizatsiya gosudarstvennoi statistiki v SSSR, M 1968

You P S, Historical survey of the development of sampling theories and practice, JRSS A 114 (1951) p 214

Yukhimenko V V, Puzynin P G and Povolotskaya S I, Izuchenie i prognozirovanie sprosa na bytovye uslugi, Kiev 1983

Yuzbashev M, Matematiko-statisticheskaya otsenka rezultatov analiticheskoi gruppirovki, VS 1967,6,58

Zapselskii V Ya, Statisticheskie metody otsenki kachestva raboty promyshlennykh predpriyatii, Kiev-Donetsk 1982

Žarković S S, Note on the history of sampling methods in Russia, JRSS A 119 (1956) p 336

Žarković S S, Supplement to note on the history of sampling methods in Russia, JRSS A 125 (1962) p 580

Zaurov M I, Primenenie vyborochnogo metoda pri obsledovanii rezhima raboty oborudovaniya i rabochego vremeni v mashinostroyenii, p 207 in Vyborochnoe... (1966)

Zavrin I V, Statistiki po byudzhetam obmenivayutsya opytom, VS 1965,5,84

Zhabskii M I, Obosnovanie reprezentativnosti sotsiologicheskogo issledovaniya, SI 1983,2,148

Zhidikhanova A E, Perekrestnye gruppirovki v byudzhetnykh obsledovaniyakh, p 115 in Gruppirovki i korrelyatsiya v ekonomiko-statisticheskikh issledovaniyakh, TsEMI, M 1982

Zhilov I I, Ekonomika, organizatsiya i planirovanie kooperativnoi torgovli, M 1974

Zhutovskaya M, Obsledovaniya semeinykh byudzhetov v Indii, VS 1958,2,48

Zhutovskaya M L, Yedinovremennoe vyborochnoe obsledovanie sostava semei, dokhodov i zhilishchnykh uslovii rabochikh i sluzhashchikh nyeselskokhozyaistvennykh otraslei narodnogo khozyaistva, p 96 in Vyborochnoe... (1966)

Zinoviev A, The radiant future, The Bodley Head 1981, p 99

Zubrilin Yu V, O nekotorykh metodakh kratkosrochnogo prognozirovaniya raspredeleniya dokhodov semei rabochikh i sluzhashchikh, p 102 in Dokhody... (1976)

Zuyeva K, O gruppirovke raskhodov v byudzhetakh rabochikh i sluzhashchikh, VS 1965,9,62