Faculty Working Papers

AGGREGATE ECONOMIC PROBLEMS IN
SOVIET-TYPE ECONOMIES

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I. Introduction

Several years ago Edward Ames expressed doubt that "macroeconomic models of the Soviet economy can be constructed along lines analogous to those of private enterprise economies."[1] Although Ames did not spell out his reservations in detail, they apparently arose from the questionable relevance of the principal demand sub-model of the typical Western macro-model to an economy in which investment outlays as well as government final purchases are centrally determined. For, by implication, in a closed economy, consumption outlays must therefore be fixed as a residual share of real GNP. If so, then it would appear to follow that, at the macro-level at least, money and markets do not really matter in any fundamental sense in the Soviet economy, and, in fact, most Western Soviet specialists have presumed that this is essentially the case. Hence, for example, the popular description of the Soviet system as a "command economy."

The implication that consumption can be fixed by the government as a residual of a determinate level of GNP, however, is unrealistic in an economy with a free labor market. In this case the supply of labor schedule, determined by individuals balancing the opportunity cost of wage income against the utility derived from leisure, will, given any real wage, limit the quantity of labor supplied. Since the quantity of labor is an important determinant of total output, the real wage and the level of total output cannot be determined independently. The real wage, the money wage divided by the general price level, is directly related to the quantity and quality of consumer goods and services

available. Thus, the supply of consumer goods cannot be treated as a residual in a planned economy which does not also determine the allocation of labor.

Since planners in a Soviet-type economy are not completely free to determine both the level and mix of output, significant insights into macro-economic problems in a "command economy" may be gained using an aggregate demand macro model similar to those models used in the analysis of market economies. In the remainder of the paper we develop a general macro model similar to those used in standard macro textbooks and use it to shed additional light on some well known macro problems of Soviet-type economies.

II. The Model[2]

In our model households hold two types of assets, goods and money. Money consists of currency and savings deposits, the latter paying interest, the rate set by the government. Households supply labor and earn income in the form of wages, bonuses, and interest. Enterprises demand labor and supply goods, attempting to maximize their bonuses within the constraints set by the government. The government demands goods and services and determines the allocation of investment funds. The economy may be described by the following equations.

Labor Market:

(1)	$N_h = N_h(W/P, \bar{N}_L)$	labor supply
(2)	$W/P = f'(N_e)$	labor demand
(3)	$N_h = N_e$	Labor mkt clearing condition

Commodity Market:

(4) $GNP = f(N_e)$ — aggregate supply

(5) $C = C_h(Y_d, r, M_h/P)$ — consumption function

(6) $GNP = C + \bar{I} + \bar{G}$ — commodity mkt. clearing condition

Money Market:

(7) $\frac{M_h}{PM_h} = \alpha((y_d, r, \frac{M_h}{P})$ — money demand

(8) $\frac{PM_h}{P} = \frac{M_s}{P}$ — money market clearing condition

(9) $Y_d = (W/P)N + B/P + 1/P(\bar{U}-\bar{T}_h)$

(10) $B = B(GNP/G\bar{N}P^*)$

where N_h = household's supply of labor

W = nominal wage

P = the price level

N_L = the labor force

N_e = the demand for labor

GNP = total real output

C = consumption

Y_d = disposable income

r = interest rate on savings deposits

M = money (currency & savings deposits)

B = bonus payments

$\bar{U}$ = interest income paid to households on savings deposits

$\bar{T}_h$ = personal income tax payments.

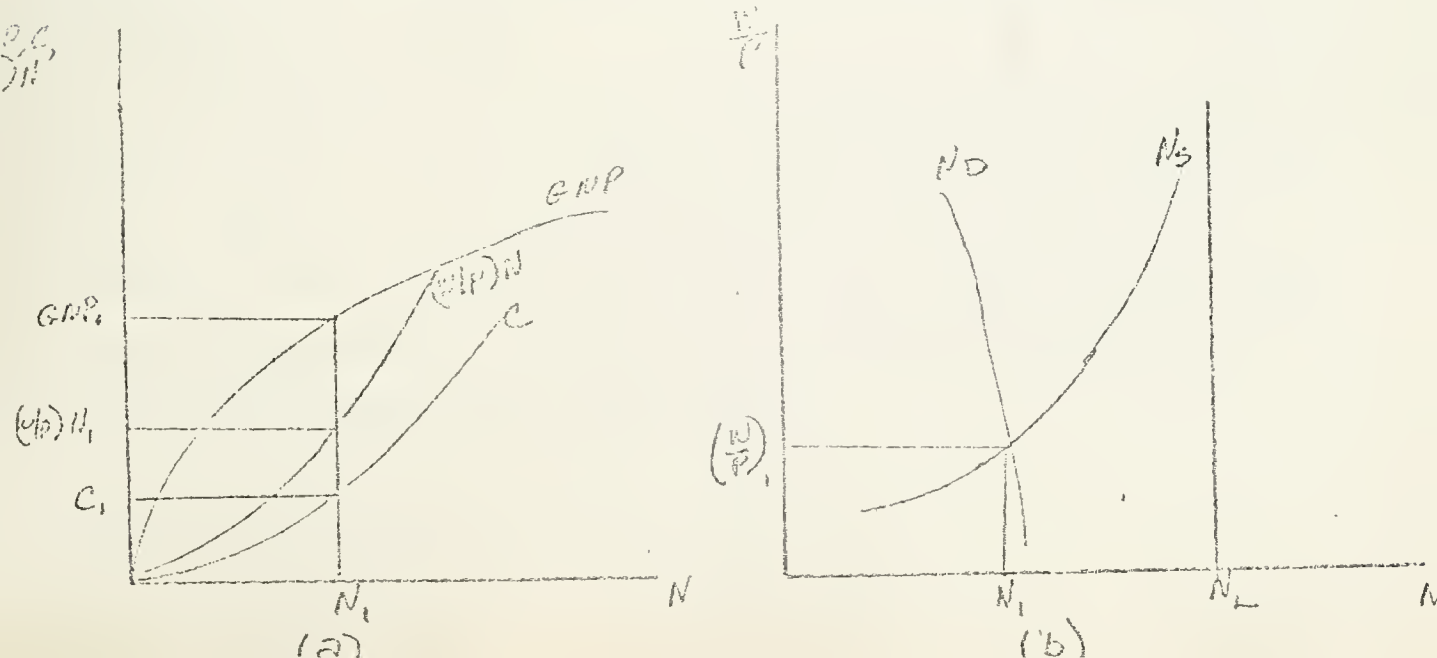
GNP^* = targeted level of output

The model contains ten equations with nine endogenous variables, N_h, N_e, W, P, GNP, C, Y_d, M_h, and B and seven exogenous variables, N_L, $\bar{r}$, $\bar{I}$, $\bar{G}$, $\bar{U}$, $\bar{T}_h$, and GNP*. Following Walras' Law we eliminate one equation, leaving an equal number of equations and unknowns.

The labor demand schedule is assumed to be highly inelastic since the quantity of labor demanded will be largely determined by the planners.

Considering this model as a whole, there is good reason to suppose that it does not yet resemble the Soviet economy in at least one very important respect, for it presupposes perfectly flexible money wages and prices through which aggregate demand and aggregate supply may be brought into equilibrium by price adjustments. Although official prices in the Soviet Union are not perfectly flexible, neither are they completely rigid. There is ample evidence to show that both wages and prices respond with a lag to disequilibrium pressures. Thus, the model outlined above which focuses on conditions for equilibrium in the major macro subsectors of the economy is useful for indicating the cause and consequences of macro disequilibrium in a Soviet-type economy.

The diagrams below represent the supply and demand for labor and the aggregate supply curve where output is a function of employment.



In diagram (a) the total wage bill and total consumption corresponding to every level of GNP are drawn. The consumption line is drawn assuming a given rate of interest (r) and quantity of nominal cash balances (M). The equilibrium level of real output is GNP, and in an economy with no government sector, the interaction of households and firms would determine the price level and the interest rate and thus the location of the consumption schedule and the division of GNP between consumption and investment. If, however, the government independently sets the levels of G and I, there will be only one set which will satisfy the market clearing conditions in both the labor and commodity markets. If the government sets $\bar{I} + \bar{G} = GNP_1 - C_1$, the supply and demand for labor are equal and the demand and supply of goods are equal.

If the government sets $\bar{I}$ and $\bar{G}$ at a level less than GNP, - C,, the demand for goods is less than the supply and there will be downward pressure on prices. The extent of the price decline determines the increase in the real wage, which will create an excess supply of labor. The decrease in prices will increase the real value of money balances and shift the C curve up, thereby reducing the excess supply of goods. A disequilibrium situation would continue to obtain, however, in the labor market. If prices did not fall, inventories of consumer goods would rise.

If the government sets $\bar{I} + \bar{G}$ at a level greater than $GNP_1 - C_1$, the demand for goods will exceed the supply and there will be upward pressure on prices, reducing the real wage and the quantity of labor supplied. The increase in prices will reduce the real value of money balances and shift the C curve down, reducing excess demand at the current level of GNP, but GNP will be falling due to reduced labor supplies.

In the above examples, it cannot be determined unambiguously whether or not the model is stable because it is not sufficiently well specified for this purpose. Consider the second case where aggregate demand exceeds aggregate supply. Stability conditions require that aggregate demand decline as P rises. Otherwise, with N_h, N_e and W/P fixed by the labor market equations (1), (2), and (3), the production function, equation (4), could not be satisfied because the demand for goods and services exceeds the supply. Since I and G are fixed independently of the price level and of the other variables endogenous to the model, everything depends upon the response of equation (5), the consumption function, to price level changes. This in turn depends mainly on the influence of M_h/P (the Pigou effect) as prices rise (fall).

More importantly, it is common knowledge that deliberate state price policy makes the aggregate price level quite "sticky" in the short run in the Soviet Union, and this fact rules out the degree of flexibility that would be required to guarantee equilibrium in all cases. What are the consequences of sticky prices in the case of the selection of a level of G and I which create an excess demand for goods? In an economy like that of the contemporary Soviet Union, we would expect a persistent deficiency in the supply of consumer goods to have, sooner or later, a significant impact upon the other supply and demand equations. The measured average of prices, P, is the appropriate price deflator in determining the prevailing real wage (W/P) when the supply of goods available at P appears to be perfectly elastic to the consumer. This is not the case where there are shortages. The unavailability of goods at current prices and the costs of queuing raises the true average price level and lowers the real wage, resulting in a decrease in the supply of labor. This phenomenon can alternatively be described by the inclusion of M_h/P in the supply of labor function. An excess demand for goods implies an excess supply of cash which

can be reduced only through a reduction in work effort if prices are sticky. The labor supply equation may be rewritten in the form:

$$(12) \qquad N_h = \Pi\ (W/P,\ N_h,\ M_n/P),$$

where it is assumed that $\frac{\delta\ \Pi}{\delta\ M_n/P} < 0$. Thus, as total net financial savings increases, in excess of desired saving, the supply of labor, expressed as a function of the real wage, would shift left and output would fall.

It is reasonable to assume that there is considerable flexibility in the supply of labor by Soviet households. First, in an economy characterized by persistent excess demand for consumer goods, queuing offers a very worthwhile exercise of "leisure" time. The trade-off is between adding to savings and realizing already accumulated purchasing power. Second, the female participation rate is extremely high in the Soviet Union, but, by common report, working women still bear almost exclusive responsibility for household chores, shopping and child care. Consequently, as purchasing power accumulates in the face of a restricted supply of goods, it would not be unreasonable to expect a proportion of the female labor force to withdraw from the market in part or completely. Third, growing family financial savings may permit youths to delay entry and pensioners to forego post-retirement employment. Fourth, the quality of labor inputs offered might very well decline as unwanted financial savings grow, for the real wage attendant upon job advancement, for example, would tend to carry less incentive force, especially because the Soviet worker cannot readily be threatened with dismissal on such grounds. Finally, and more generally, on our assumptions the labor market is the only major market in the economy in which household preferences may be expressed more or less fully, and thus it would appear to make sense to suppose that dissatisfaction elsewhere would ultimately be reflected in it. The introduction of the carry-over variable M_n/P in the labor supply equation does this effectively, and

it implies that, other things equal, a persistent consumption gap would ultimately be transformed into an adverse effect upon the attainable level of GNP.

The existence of black markets helps to dispel any money illusion and to make explicit the true real wage. This is true of legal, unregulated markets such as the collective-farm market as well, which sell products also carried in state and cooperative retail outlets (at lower prices). Income earned in the public sector may of course be used to purchase goods produced in the private sector. The increased availability of goods which are scarce or nonexistent in the public sector is equivalent to an increase in the real wage in the public sector. The catch, however, which has long been a problem on the collective farm, is that workers may try to transfer labor time and state-owned materials from the public to the private sector if returns are higher there. In any event, the growth of what has been referred to in the Soviet Union as the "second economy" increases the share of economic activity not under the control of the planners, a result considered highly undesirable in the Soviet Union.

III. Macroeconomic Policy

We have outlined the criteria for macroeconomic equilibrium in a Soviet-type economy and examined possible disequilibrium states characterized by insufficient or excess aggregate demand. The problem of insufficient aggregate demand on the part of households is easily remedied and certainly does not appear to be a problem in the Soviet Union.[3] The problem of excess aggregate demand is more difficult to solve, and our model implies that the failure to implement counterpolicies will have serious consequences and may eventually undermine the growth objectives of the central planners. Now, obviously, a reduction in the share of GNP absorbed by G and I taken together would serve

to reduce the consumption gap and restore equilibrium. Soviet planners have been extremely reluctant to do this in the past for fear of reducing the growth rate. It appears, however, that planners have not been willing to increase the share of investment further, a necessary step to maintain the past rate of growth of the capital stock. In fact, maintaining the current share of investment in GNP will result in lower growth rates in the future.[4] Let us now look at the possibility of using certain macroeconomic policies to reduce the excess aggregate demand itself or reduce the consequences of excess aggregate demand without reducing the share of G and I in total GNP.

Price Policy

The evidence is clear that, at least during the post-Stalin period, the overriding objective of state retail price policy has been the attainment of aggregate price-level stability.[5] Widespread queuing and the fact that prices on uncontrolled markets commonly stand well above those in state and consumer cooperative outlets indicate that many official prices, particularly those on quality consumer durables, are below market clearing levels. Many quality final products, particularly animal husbandry products, have in fact for many years sold at levels that require state budget subsidies to producers. What are we to make of this apparent unwillingness of the state to increase prices to eliminate excess demand and what would be the macroeconomic consequences if they reversed their policy?

An increase in prices would reduce consumer demand and therefore queuing time in state stores as well as the profitability of black market operations. This action may result in the worker devoting more time to his official place of employment. An increase to a market clearing level of P, however, only makes explicit the true real wage and level of real cash balances. Unless the Soviet

consumer suffers from a money illusion, the increase in P causes no reduction in the real wage or in the real value of money balances. Thus we should not expect a shift of the labor supply or consumption functions. If the initial disequilibrating levels of GNP*, I and G are maintained, an increase in the general price level will not restore equilibrium due to the persistence of an excess demand for labor at the current real wage, for the targeted level of output is still inconsistent with the share of output devoted to consumption.

Moreover, an increase in P that created an expectation of further increases in the future might actually make things worse in the current period by inducing households to spend now rather than later. Taking the long-run view, then, it may indeed by preferable policy to promote the popular expectation of a constant general price level in order to validate and thus encourage private voluntary saving. But whatever the case, it is not necessarily unreasonable, where the consumption gap is substantial and expected to persist, for policy authorities to shun price-level increases.

Interest Rate Policy

In our model the interest rate (r) paid by the state simultaneously affects consumption and the desired level of cash balances. The rate of interest paid on private savings deposits (and on government debt instruments in private hands) has been surprisingly stable, and the level seems extremely low given the high rate of investment.[6] If $\frac{\delta C_h}{\delta r} < 0$, an increase in the rate of interest would reduce the level of excess demand by reducing consumption demand. The equilibrium real wage consistent with GNP* would now also be consistent with the desired share of G and I. A problem would arise again in the future, of course, should increased interest income not be accompanied by increased quantities of consumer goods. In the short-run, however, Soviet

interest rate policy appears to be irrational, which may simply reflect traditional Soviet (and Marxist, for that matter) mistrust and consequent underutilization of financial instruments.

Tax Policy

The model also suggests that excess aggregate demand could be narrowed by increases in personal income taxes, but Soviet policy has been directed instead to minimization of income tax liabilities and to a consequent heavy reliance upon indirect taxation. An increase in income taxes, however, reduces the after-tax real wage, which would have the same negative effect on work incentives as an accumulation of excess cash balances or an increase in the price level.[7]

Labor Market Policies

The Demand Side

The demand for plan-fulfillment bonuses (equation 10) suggests an alternative policy approach. The award of bonuses for plan fulfillment does not motivate managers to economize on labor inputs (or other inputs for that matter), which is why we have assumed that the labor demand schedule is highly inelastic. Except insofar as the profit target (and/or the planned money-wage bill) acts as a constraint upon managerial behavior, the individual manager need not compare the real wage and the marginal value product of additional labor, for any increase in real output contributes to plan fulfillment or over-fulfillment. The main constraint in this connection is provided by Gosbank supervision of wage-bill outlays, and even this may apparently be stretched if physical-volume targets are being fulfilled.[8]

During the past decade or so the Soviet managerial incentive system has been the subject of widespread criticism and reform, and the thrust has been

to elevate the relevance of the profit target relative to physical volume output targets.[9] Let us represent as a possible outcome a revision of equation (10):

$$(10)a \qquad B = f(\phi),$$

where B is a positive, but diminishing, function of enterprise profits. Such a change ought to make the demand for labor function more elastic and thus encourage more efficient use of labor power. It might also make managers more receptive to labor-saving innovation. Should this lead to an increase rate of growth of labor productivity, the effect upon the consumption gap would, of course, be favorable. And, indeed, it has been Soviet policy in the postwar years to share productivity gains by allowing money wages to rise somewhat while keeping the GNP price index relatively constant. However, it is not clear whether the overall effect of this kind of reform of managerial incentives would be to increase or to decrease the level of GNP managers taken as a whole would be prepared to produce, and there is some reason to suppose that the level of GNP would suffer in the initial stages as least. All in all, the kind of managerial incentive reforms that have been discussed and, in part, implemented during the last decade in the Soviet Union to not seem to be sufficient to ensure a resolution of the fundamental macroeconomic problem our model suggests.

In this connection, the general reform movement has also recommended the substitution of bank loans for interest-free capital grants in the hope that this would encourage more efficient allocation and utilization of capital investment outlays.[10] To be effective, however, the rate of interest (and capital charges on the existing stock of capital) would have to be raised substantially and deducted from enterprise profits prior to computation of managerial bonuses, for interest charges on both short and long-term bank loans are minimal at the present time. In any case, the main effect of coupling this reform with profit maximization would be, perhaps, to reduce unnecessary

inventory accumulation, for it could not affect fixed investment unless profit criteria were used in making investment decisions, which is highly unlikely to occur in the Soviet Union. Any improvement in efficiency due to the reforms will result in an upward shift of the production function, allowing consumption demands to be met without reducing the quantity of resources devoted to G and I.

The Supply Side

Finally any policy which succeeds in increasing the supply of labor or making it more inelastic with respect to the real wage will reduce excess aggregate demand at the current price level and given shares of G and I. The Soviets have achieved an extremely high labor participation rate at the same time as they have reduced the restrictions on labor mobility associated with the Stalin era. Labor time is lost, however, through disguised unemployment and job turnover. There has been a growing amount of attention paid to labor supply problems in the Soviet Union.[11]

Beginning in 1967 a nationwide network of administrative agencies has been established to increase the utilization of labor resources primarily by reducing labor turnover. Since it is generally agreed that a major cause of the high turnover rates is due to the gap between income aspirations and available job opportunities, this program implies an attempt to reduce freedom in the labor market.

IV. Conclusions

Given the limited prospects offered by the supply side of the model and the limited possibilities for utilizing price, interest rate, and tax policies without long-run negative effects on the labor market, sooner or later persistent excess demand for consumer goods must force a reduction in the share of GNP devoted to investment and government expenditures. Otherwise, in the

absence of direct labor controls, an acute labor shortage would develop, resulting in a reduction in total output.

Although it would obviously be incorrect to describe this kind of economy as "market-oriented," the model shows that the effects of a single open market, the labor market, are pervasive. What this means is that ultimately the planners must either accomodate themselves to the rate of saving households are prepared to accept, or they must eliminate the open labor market. In the end, apart from some kind of persistent money illusion, "forced saving" implies "forced labor."

The recent actions taken by Soviet policy makers indicate that they have an understanding of this dilemma. On the one hand the share of consumption in GNP has been rising in recent years as a result of deliberate state policy.[12] On the other hand the Soviet discussion of labor supply problems and the passage of restrictive labor legislation suggests the possibility of a return to more controlled labor markets. A little freedom is a dangerous thing.

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Notes

1. Edward Ames. Soviet Economic Processes. (Homewood, Illinois: Richard D. Irwin Inc., 1965), p. 173.

2. The features of the contemporary Soviet economy that the model attempts to capture are widely acknowledged and do not require extensive documentation in most instances. Readers with scant knowledge of the structure of the Soviet economy may wish to consult one or more of the following descriptions: Paul R. Gregory and Robert C. Stuart. Soviet Economic Structure and Performance (New York: Harper & Row, 1974); Howard J. Sherman. The Soviet Economy (Boston: Little, Brown and Co., 1969); Abram Bergson. The Economics of Soviet Planning (New Haven: Yale University Press, 1964).

3. This does not imply that there is sufficient demand to purchase all consumer goods produced in the USSR at official state prices. The rise in unsold inventories of some consumer goods and the shortages of others indicates the existence of microeconomic problems in the Soviet Union.

4. See, for example, Abram Bergson, "Future Growth Strategy for the Soviet Economy," ACES Bulletin, Vol. 14, No. 1 (Spring 1972) for a discussion of the consequences of alternative growth strategies and the share of GNP devoted to consumption and investment.

5. For the official price indices see, for example, TsSU, Narodnoe khoziaistvo SSSR v 1973 g. (Moscow; 1974), pp. 678-79. See also Bergson, The Economics of Soviet Planning, especially Chapter 4. Bergson also states on p. 71

that "Probably the chief cause of the divergence of official retail prices from clearing levels lately has been the government's concern to maintain stable prices, or at least to avoid increases."

6. Rates of interest paid on private savings accounts are 2% or 3% depending on the type of account (that is, upon the liquidity of the account). See A.A. Poskonov (ed.), Kreditno-denezhnaia sistema SSSR (Moscow, 1967), p. 210. For a discussion of interest rate policy generally, see James R. Millar, "History and Analysis of Soviet Domestic Bond Policy," Soviet Studies, Vol. 27, No. 4 (October 1975), especially pp. 609-614.

7. See, for example, Gregory and Stuart, Soviet Economic Structure and Performance, pp. 140-149. It should be remarked that Western experience with income taxes that are both heavier generally and much more progressive suggests that Soviet income tax rates could be substantially higher and more progressive without serious work incentive problems. However, raising and differentiating tax rates now would almost certainly have negative incentive effects in the short run.

8. Christine N. Wollan, The Financial Policy of the Soviet State Bank, 1932-1970 (Unpublished Ph.D. dissertation, University of Illinois at Urbana-Champaign, 1972).

9. See, for example, A.N. Kosygin, "On Improving the Management of Industry, Perfecting Planning and Strengthening Economic Incentives in Industrial Production," The Current Digest of the Soviet Press, Vol. 17, No. 38 (October 13, 1965), pp. 3-15.

10. Ibid. See also, Ekonomicheskaia gazeta, No. 17 (April 1967), pp. 3-4.

11. See, for example, Murray Feshbach, "Manpower Management," Problems of Communism (Nov-Dec. 1974), pp. 25-33.

12. See, for example, G.E. Schroeder, "Consumer Goods Availability and Repressed Inflation in the Soviet Union," and K. Bush, "Soviet Living Standards: Some Salient Data," both in Economic Aspects of Life in the USSR. Main findings of Colloquium held 29th-31st January, 1975 (NATO-Directorate of Economic Affairs, n.d.).