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REPRESSED INFLATION AND PRICE CONTROLS IN THE SOVIET HOUSEHOLD SECTOR

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I. Introduction

Many writers on the Soviet Union (Bronson and Severin, 1973; Bush, 1973; Katsenelinboigen, 1977), have expressed the view that the Soviet economy is characterized by repressed inflation. The evidence for this view has been largely circumstantial since it is difficult to collect and systematically analyze the data necessary to determine the presence or extent of repressed inflation. The growth of savings deposits, queues, the growth of the second economy, have all been cited to support the view that there has been persistent repressed inflation in the Soviet Union, but all this evidence can be explained using alternative hypotheses.[1] The purpose of this paper is to describe the work which has been done to date developing the appropriate macroeconomic framework in which to analyze the causes and consequences of repressed inflation in the context of a centrally planned economy (CPE), and to attempt to extend this work to include a second economy in which prices and wages are not controlled by planners.[2]

It has been my contention that Soviet households, like their Western counterparts, behave in ways consistent with utility maximization. It is, therefore, useful and appropriate to analyze Soviet household behavior using neoclassical theories of consumer behavior (Pickersgill 1976, 1979; Ofer

and Pickersgill, 1979). Soviet households make significant choices in two broad areas of concern to one investigating repressed inflation and the second economy: one, decisions to supply labor, and two, decisions to purchase consumer goods. Households make choices with respect to their education, occupation, and employment which affect both their lifetime income and the aggregate supply of labor available to the planners. They are free to allocate their income to consumption and saving which in turn affects the aggregate demand for consumer goods.

Although the Soviet economy is characterized as a centrally planned economy, scholars have long recognized that all decisions are not centralized. There has been a considerable amount of work done on decentralized decision-making at the enterprise level and the interaction between planners and managers (Nove, 1977; Birman, 1978). There is a smaller, but growing, body of literature on decentralized decision-making at the household level, and the interaction between households and planners (Millar and Pickersgill, 1977; Ofer and Pickersgill, 1979). The focus of this paper is the interaction between households and planners in the labor and consumer goods market in the first and second economies.

Households may supply labor to both sectors[3] and may demand goods produced in both sectors. Conditions affecting the supply and demand for labor and goods in each sector will affect behavior in the other sector. I am particularly interested in describing household behavior in both sectors when the first sector can be characterized by repressed inflation. The conclusions about the consequences of repressed inflation change significantly when it is relatively easy for a household to transfer labor

and purchasing power from the controlled to the uncontrolled sector. I would like to make it clear at the outset, however, that I am not implying that repressed inflation is a necessary condition for the operation of a second sector. There are many other factors contributing to the existence and growth of the second sector, such as incorrect relative prices, restrictions on private activity and the ownership of certain items, and inadequate policing of socialist property which would make second sector activity profitable (Grossman, 1977).

The remainder of this paper is divided into three parts. In Part II I will describe the interaction between households and planners in the framework of a general macroeconomic model consisting of only one sector in which prices and wages on all markets are controlled by the planners. In recent years there has been a significant amount of work done on fixed price, "disequilibrium" macroeconomic models in which households and firms may be rationed in the goods and labor markets (Barro and Grossman, 1976, Malinvaud 1977). The presence of rationing in one market in turn affects behavior in unrationed markets. Richard Portes has recognized the applicability of these models, often referred to as effective demand models, to centrally planned economies (CPEs), and has adapted these models to fit the institutional characteristics of the CPEs (Portes 1976, 1978, and Muellbauer and Portes, 1978). I will rely primarily on Portes and Muellbauer's (PM) work in describing the interaction between households and planners in the absence of a second, uncontrolled sector.

In Part III I will try to extend the PM model to incorporate a theory of the interaction between households and planners when households may choose to allocate labor to the first or controlled sector and/or to the second or uncontrolled sector. I plan to limit my discussion to activity in the second sector which involves illicit production, that is the use of labor to produce goods and services which are substitutes for goods and services produced in the first sector. Others will comment on theft, corruption, commodity speculation and, other varieties of second sector activity. To analyze the individual's decision to allocate labor to second sector production I have used the Ehrlich model (Ehrlich, 1973) on participation in illegitimate activities. After modeling the individual's decision, I attempt to integrate the two models and reconsider the concepts of balance and repressed inflation in the context of the PM model.

II. Macroeconomic Equilibrium and Disequilibrium in a Centrally Planned Economy

The most useful approach for analyzing the nature of macroeconomic equilibrium in the Soviet economy follows from the "disequilibrium macroeconomics" or effective demand models developed by Barro and Grossman (1971, 1976), Malinvaud (1977) and others. In these models prices and wage are fixed and there are several possible equilibrium regimes. Households and producers may be rationed in the goods and labor markets, their condition in the rationed market affecting their behavior in the unrationed market. Thus, the model is capable of describing equilibrium regimes characterized by unemployment, repressed inflation, or balance in both the goods and labor markets.

Portes (1976, 1978) and Muellbauer and Portes (1978) have adapted the effective demand models to fit the institutional characteristics of the CPEs. The focus of this section of the paper will be the characteristics of the PM model under the regime of repressed inflation, a situation in which households are rationed in the goods market and producers are rationed in the labor market.

In this model there are two sets of actors - households and planner/producers, and three commodities - an all purpose good, labor, and money. Households earn money income by supplying labor, purchase goods, and hold money balances; the change in their money holdings represents saving. Households and planners interact in the goods and labor market. All prices and wages are set by the planners and market transactions must satisfy the following three conditions:

(1) aggregate trades on each market balance,

(2) exchange is voluntary, and

(3) buyers and sellers cannot be rationed simultaneously in the same market.

The nature of the rationing scheme is not specified, but we can assume that households are rationed on a first come, first serve basis, and PM assumes that when planners are rationed on the labor market they allocate labor to maximize the efficiency of capital.

A. Household Behavior

Following the PM model, we assume households maximize utility over time, where the momentary utility function is given by

$$U_t = U[c(t), T-\ell(t)],$$

subject to the budget constraint

$$m_0 + w\ell = c + m \ .$$

We derive the following notional or unconstrained demand and supply functions for goods and labor.

$$(1) \quad c = c^d \underset{+}{(m_0} \ , \underset{+}{w}), \ \ell = \ell^S \underset{-}{(m_0} \ , \underset{?}{w}) \ .$$

The signs of the first derivatives are indicated below each function.

The symbols used are

c = flow of goods purchased by households

ℓ = flow of labor services sold by households

m = real stock of money balances held by households

w = real wage rate

The subscript 0 indicates a stock at the beginning of a period and the lack of a subscript the stock at the end of a period.

When the household determines its consumption and employment the change in cash holdings or saving is simultaneously determined and a separate demand for money function need not be formulated.

If households are rationed in the goods market, the quantity of goods consumed is determined by the supply of goods, and the supply of labor and the demand for money will be affected by the size of the consumer goods ration. The constrained or effective demand and supply functions are

$$(2) \quad c = c^S \ , \ \ell = \ell^{S'} \underset{-}{(m_0} \ , \underset{?}{w}, \underset{+}{c}) \ .$$

If households are rationed on the labor market, the amount of labor supplied being limited by enterprise demand, households' demand for consumer goods and money will be affected. The constrained demand and supply

functions are

$$(3) \quad \underset{+}{\ell} = \ell^d \ , \ \underset{+}{c} = c^{d'} \ (\underset{+}{m_0} + w - \underset{+}{\ell}) \ .$$

Ignoring the problems of different individual utility functions, and the problem of specifying a rationing scheme which may constrain different households differently, PM aggregate the above functions over all households.

B. Planner Behavior

Planners choose y^P (the planned flow of total real output), c^P, w, p and i^P (the planned stock of inventories at the end of the plan period) to maximize their utility, U, where u - U(c, x), and x equals the flow of goods purchased by the government, subject to the constraints imposed by behavioral and technical relationships.[4] There are several ways to model the specifics of planner behavior and the nature of the adjustment process when planned and actual values diverge. Following Portes (1978) it is assumed that $w = w^P$, $\ell^d = \ell^P$ and $x = x^P$. Thus, if planned and actual y diverge, the supply of consumer goods, $c_0^{s'}$, will be affected. Portes posits that

$$(4) \quad c^s = c^s(y \ ; \ m_0, \ i_0) = c^s(y), \text{ with } 0 < \frac{\partial c^s}{\partial y} < 1.$$

Given the nature of the adjustment process implied in (4), actual end of period inventories (i) are a residual.

C. Macroeconomic Equilibrium

The following equations form the complete model.

$$c^d = \begin{cases} c^d \ (w^P \ , \ m_0) \text{ if } \ell^d \leq \ell^s = \ell \\ c^{d'} \ (w^P \ , \ m_0 \ , \ y) \text{ if } \ell = \ell^d < \ell^s \end{cases}$$

$$c^s = c^s\ (y;\ m_o,\ i_o)$$

$$c = \min\ (c^d\ ,\ c^s)$$

$$\ell^d = \ell^p$$

$$\ell = \begin{cases} \ell^s\ (w^p\ ,\ m_o) & \text{if } c^s \geq c^d = c \\ \ell^{s'}\ (w^p\ ,\ m_o\ ,\ c) & \text{if } c = c^s < c^d \end{cases}$$

$$\ell = \min\ (\ell^d,\ \ell^s)$$

$$y = y\ (\ell,\ K_o) \quad K = \text{the capital stock}$$

$$i = i_o + y - c - x^p$$

Five equilibrium solutions or regimes are possible. In a situation of unconstrained equilibrium $c^d = c^s$ and $\ell^d = \ell^s$; neither buyers or sellers are rationed. Thus, notional and effective demand and supply functions are the same. A second possibility is repressed inflation in which $\ell^d > \ell^s$ and $c^d > c^s$. Households are constrained on the goods market and planners on the labor market. The effective labor supply function, $\ell^{s'}$, is operative. The other possible equilibrium solutions include $\ell^d > \ell^s$ and $c^s > c^d$, a situation characterized by excess supplies of consumer goods; $\ell^s > \ell^d$ and $c^s < c^d$, a situation in which households are rationed on both markets; and $\ell^s > \ell^d$ and $c^s > c^d$, a possibility where households are rationed in the labor market and there are excess supplies of consumer goods.

As stated earlier, the focus of this paper is the regime of repressed inflation. To understand the characteristics of the repressed inflation case it is useful to look at the economy in unconstrained equilibrium and analyze the causes and consequences of a move to the regime of repressed inflation. Figure 1 depicts a situation in which the planners have chosen a combination of the variables y, c, x. w, p and i such that there is

unconstrained equilibrium at y_1^*. Since consumers are not rationed in either market, the relevant functions are $c^d(m_0, w)$ and $\ell^s(m_0, w)$. ℓ_1^* unit of labor are required to produce y_1^* and w is sufficient for households to supply ℓ_1^*. Given m_0 and w, households wish to purchase c_1^* consumer goods, which is the amount supplied by the planners according to c_1^s.

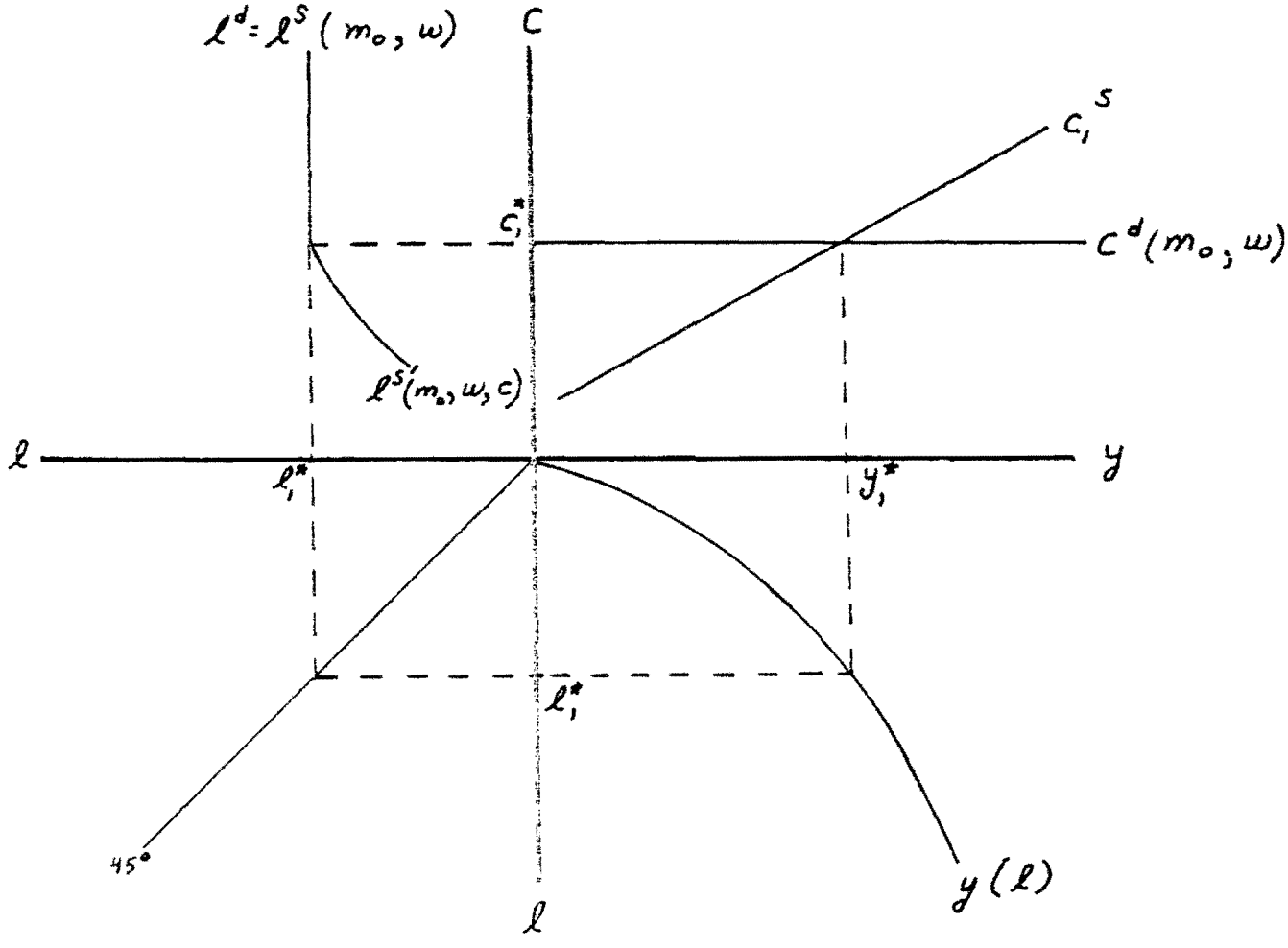

Figure 1
Unconstrained Equilibrium

Other unconstrained equilibrium combinations of y, c, ℓ, w, x and p are possible, each differing by the share of c and x in total y.

It is useful to draw the supply and demand for labor as a function of the real wage (w). It is assumed in this case that $\frac{\partial \ell}{\partial w} > 0$. The rational or unconstrained labor supply function is indicated in Figure 2 below as ℓ^S (m_0, w). The demand for labor (ℓ^d) is a function of the planned level of output y_1^*. The equilibrium real wage is w_1^* and this will generate the demand for consumer goods indicated in Figure 1, c_1^*.

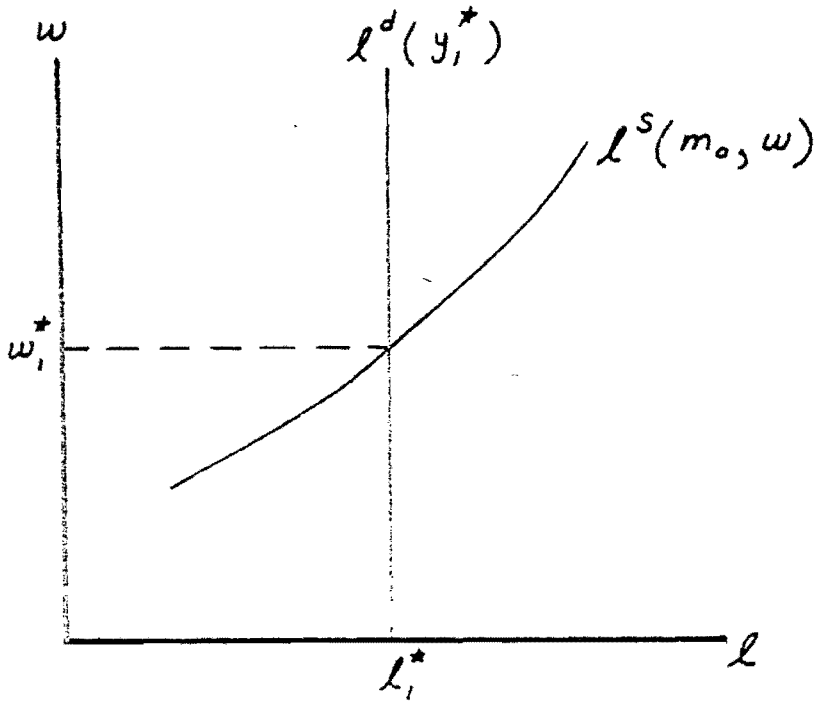

Figure 2
The Labor Market in
Unconstrained Equilibrium

In order to induce workers to supply additional labor and thus to increase the level of output, w must be raised. The increase in w will in turn generate an increase in the demand for consumer goods and money.

We can analyze the move from an unconstrained equilibrium to a constrained equilibrium by shifting the c^s function down and to the right from c_1^s to c_2^s. This case is illustrated in Figure 3. At y_1, $c^d > c^s$; consumers are now rationed in the market for consumer goods. The operative labor supply function is now the constrained function $\ell^{s'}$. As a result of the reduced supply of consumer goods, households will reduce the quantity of labor supplied and increase their holdings of money balances. The move to the right along $\ell^{s'}$ will result in a reduction in ℓ and y and, given the planners' consumer goods supply function, a further reduction in c. A negative supply multiplier process will result in a new equilibrium level of output below y_1 at y_2^*.

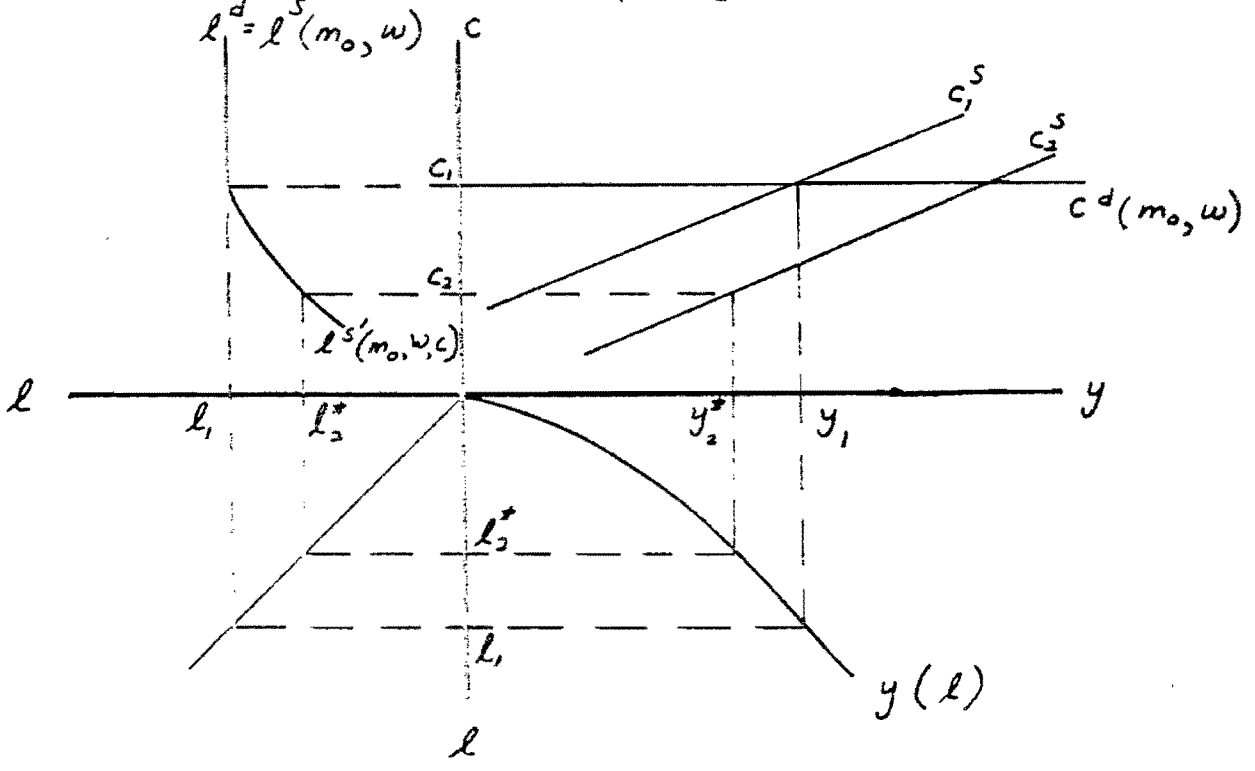

Figure 3
Repressed Inflation

The supply multiplier is 1/k where

$$k = 1 - \frac{\partial c^S}{\partial y} \quad \frac{\partial y}{\partial \ell} \quad \frac{\partial \ell'}{\partial c} \quad .$$

PM discuss the conditions necessary for stability. The net result of the move to repressed inflation is a decrease in ℓ and y and an increase in saving, the values of the partial derivatives determining the size of the decline in ℓ and y and the size of the increase in saving.

We can illustrate the regime of repressed inflation in the labor market in Figure 4 below. The rationing of households in the consumer goods market results in a reduction in the quantity of labor supplied at w_1. The quantity of labor supplied falls from its initial level ℓ_1, consistent with the original values of c_1, m_0 and w_1, to ℓ_2, consistent with m_0, w_1 and the reduced supply of consumer goods.

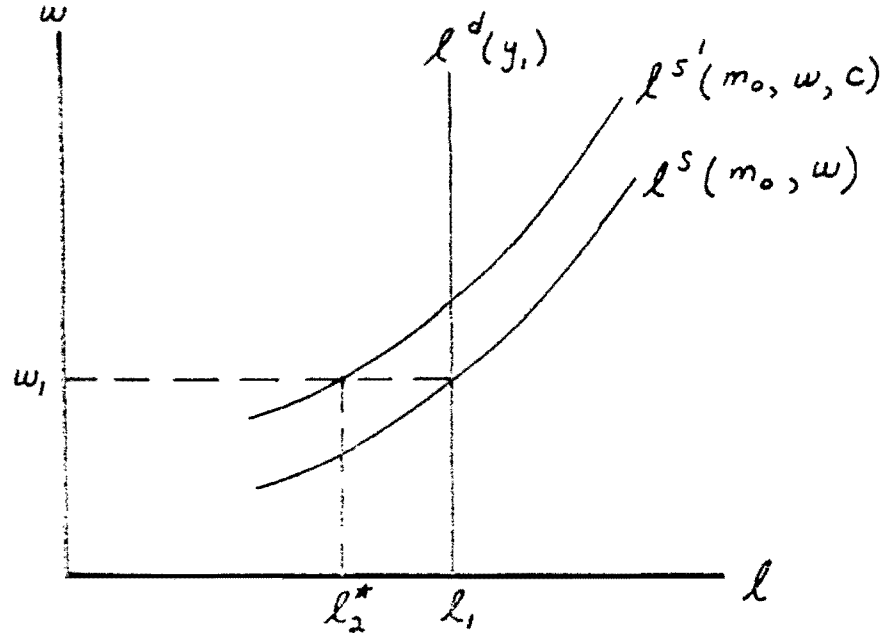

Figure 4
The Labor Market
in Repressed Inflation

We can also analyze the movement from an unconstrained to a constrained equilibrium by increasing planned output to y_3, where $y_3 > y_1$, increasing w, but not increasing c^s by as much as the increase in c^d that will be generated by the increase in w. This situation is illustrated in the labor market in Figure 5 where $\ell^{s'}$ represents the constrained labor supply function which is operative because $c^d > c^s$.

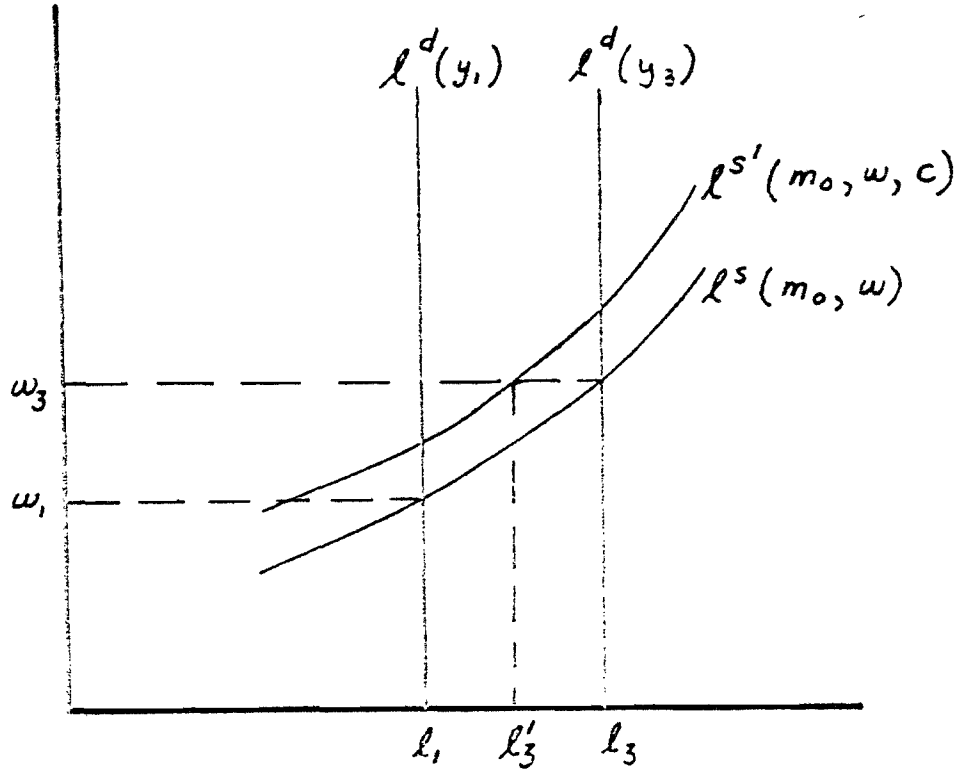

Figure 5

To achieve an output of y_3, planners must increase w_1 to w_3 and increase the supply of consumer goods to the level that will be demanded at m_o, w_3. If $c^s < c_2^d + w_3$ households will reduce the quantity of labor supplied below ℓ^3, which will reduce the actual level of output below y^3. If the

planned supply of consumer goods is reduced in response to the divergence between planned and actual y, ℓ^S and y will fall further.

It may be possible to generate an increase in y above y_1 merely by increasing w with no corresponding increase in c, although the increase in the supply of labor will be smaller than that generated by the movement along the unconstrained labor supply function $\ell^S (m_0, w)$. PM argue that planners may deliberately produce this situation as long as $\frac{\partial \ell^{S'}}{\partial w} > 1$. It must be remembered, however, that households will be accumulating unspendable money balances. Their willingness to engage in this accumulation will depend upon their expectations with respect to the duration of rationing. Over time one would expect to observe a shift to the left of $\ell^{S'}$ and a decrease in the demand for cash balances. The extent to which this phenomenon is observable in a CPE depends upon the constraints placed by the planners on the household's supply of labor. PM assume all exchanges are voluntary and thus there is no external constraint on the ℓ^S or $\ell^{S'}$ functions.

Although the Soviet planners do not allocate labor in the same way in which they allocate raw materials, intermediate goods, and capital, households are under considerable pressure to work in some capacity in the official economy. Although workers make choices with respect to their education, place of employment, date of retirement, and to a certain extent overtime in the primary or secondary job, they are constrained to enter the labor force and indicate an official place of employment. These constraints may alter the form in which the movement along ℓ^S and $\ell^{S'}$ manifests itself. It may be easier for a Soviet worker to increase leisure on the job rather than to reduce the number of hours at his/her

primary place of employment. Thus, it may be difficult to empirically observe the reduction in the supply of labor induced by the regime of repressed inflation. Theoretically, it should not be as difficult to observe the increase in saving rates, although the determinants of saving are more complex and cannot be explained by repressed inflation alone. (Pickersgill, 1979; Ofer and Pickersgill, 1979.)

In addition, the specific form of the rationing scheme may influence the effect on the quantity of labor supplied. If rationing is done on a first come, first serve basis, rather than by some coupon scheme, goods will have a time price as well as a money price. The nominal wage must be deflated by both prices to determine the operative real wage. Uncertainty about the availability of the supply of consumer goods will reduce the real wage, decreasing the return to work and increasing the return to leisure, which includes search activity.[5] Thus, the uncertainty often accompanying rationing may accentuate the reduction in the quantity of labor supplied, but at the same time make the reduction difficult to observe.

The argument to this point and the conclusions with respect to the effects of repressed inflation on labor supply and saving behavior depend crucially on the existence of only one sector in which all prices and wages are controlled. In the next section of the paper I will model the household's decision to participate in the second sector and discuss the implications of that participation on the supply and demand for labor and goods in the first sector.

III. Household Participation in the First and Second Sectors.

A. Modeling the Household Labor Supply Choice

In order to model Soviet household behavior it is necessary to make some simplifying assumptions about the choices available. I assume that Soviet households participate in the second sector in two ways. One, they purchase the goods and services produced in this sector, an activity involving no risk of income-loss or imprisonment. Two, they earn income by supplying labor to the second sector, an activity involving a risk of direct income loss and imprisonment, if apprehended. Soviet households choose to allocate their expenditures between goods available in the two sectors and their time between work in the legal, controlled sector, the illegal, uncontrolled sector, and leisure, which includes the time associated with the purchase of consumer goods from both sectors.

I have chosen to use a model of participation in illegitimate activities, developed by Isaac Ehrlich (1973), to analyze the Soviet household's labor supply choice. The problem facing the household is to maximize its expected utility subject to wealth and time constraints. Beginning with the utility function used in Section II above, where utility is a function of the flow of consumer goods (C) and leisure ($T - \ell$), we now divide total time (T) into three activities - ℓ_1, ℓ_2 and N, where

ℓ_1 = labor time supplied to the first sector,

ℓ_2 = labor time supplied to the second sector,

and N = leisure.

The return to activity in the first sector is $w_1 \ell_1$, where w_1 is the wage paid in the first sector, and $w_2 \ell_2$ is the return to activity in the second sector if the individual is not apprehended. If the individual

is apprehended the return to activity in the second sector falls to $w_2 \ell_2 - F_2(\ell_2)$, where $F_2(\ell_2)$ equals the discounted pecuniary and non-pecuniary value of the penalty. It is assumed that the probability of being caught, state a, is P, and the probability of not being caught, state b, is (1-P).

The household's choice can be formally described as one of maximizing its expected utility, where

$$EU(C, N) = (1-P)\, U(C_b, N) + PU(C_a, N)$$

subject to the constraints

$$C_a = -\left(\frac{M_a}{p}\right) + [\, w_2 \ell_2 - F_2(\ell_2)\,] + w_1 \ell_1 ,$$

$$C_b = -\left(\frac{M_b}{p}\right) + w_2 \ell_2 + w_1 \ell_1 , \text{ and}$$

$$T = \ell_1 + \ell_2 + N .$$

Given the amount of time devoted to leisure (N), the optimal allocation of labor between ℓ_1 and ℓ_2 must satisfy the condition that

$$\frac{-w_2' - w_1'}{(w_2' - f_2) - w_1'} = \frac{pu'\left(C_a, \frac{M_a}{p}\right)}{1-p\, u'\left(C_b, \frac{M_b}{p}\right)} ,$$

where

$$w_2' = \frac{dw_2}{d\ell_2} , \quad f_2 = \frac{dF_2}{d\ell_2} , \quad w_1' = \frac{dw\ell_1}{d\ell_1} .$$

As Ehrlich describes, the necessary and sufficient condition for a strict global maximum involving participation in both sectors requires

that the household's indifference curve be strictly convex to the origin (implying a declining marginal utility of real wealth), and the opportunity boundary be linear or strictly concave (inplying a constant or declining marginal wage in both sectors or increasing marginal penalties). If we could assume that all Soviet households faced identical opportunities, i.e. w_1 and w_2 the same for all households, and had the same attitude toward risk, we could aggregate over all households to derive a labor supply function for ℓ_1 and ℓ_2. This is certainly not the case, however, as different occupational and cultural groups will have different opportunities and attitudes toward risk, and will face different pecuniary and non pecuniary penalties if apprehended. Using this model you would expect to observe activity in the second sector bunched among those groups where w_2 is high relative to w_1, e.g. dentists and doctors, and where the attitude of the authorities has been quite lax, reducing both P and F_2, e.g. Georgia and Armenia.

In any event, given an initial allocation of time between ℓ_1, ℓ_2 and N, if w_2 increases relative to w_1 or P or F_2 decreases, one would expect to observe a transfer of labor from the first to the second sector. This transfer will in all likelihood result in a decrease in the production of goods and services in the first sector and an increase in the second, which will affect the nature of equilibrium in the first sector. In the next section of the paper I will discuss the growth of the second sector in the context of the Ehrlich model, and in the following section, the consequences of labor transfers between the two sectors.

B. Application of the Model in the Soviet Context

In this section I would like to briefly outline the production opportunities available to Soviet households and the rewards and penalties associated with these opportunities. The aspect of household participation in the second economy of particular interest in applying the Ehrlich model to the Soviet case is unplanned private production. As others have described, there are many opportunities for profitable second sector activity, including the provision of services by the self-employed artisan, private production behind the facade of a collective farm, at the primary place of employment, or in an underground factory, and private construction teams (Treml, 1975; Grossman, 1977; Katsenelinboigen, 1977). I recognize that the output of many of these activities may not represent a net contribution to total Soviet output. Inputs may be stolen from the state sector and combined with labor to produce some value added.[6] But what is important in the context of this paper is that some value added be created in the second sector. Not only are there opportunities to earn income by producing in the second sector, but from a variety of reports the wages in this sector are substantially higher than the wages paid for similar activity in the first sector (Radio Liberty Research, 1977).

The economic environment created by the state provides both the opportunities and the risks associated with activity in the second sector. Since others will discuss the variety of factors responsible for the existence and growth of the second sector, I will only briefly outline the major forces promoting the development of second sector production. A

primary factor creating profitable opportunities for second sector production is the official state monopoly of the production and sale of nearly all goods. As is well known, the state determines the price, quantity and quality of all output produced in the first sector with little regard for the preferences of consumers. Although there may be some disagreement about the significance of repressed inflation in the centrally planned economies (Portes, 1978; Portes and Winter, 1978; Pickersgill, 1979), there is general agreement on the existence of disequilibrium relative prices, creating shortages and surpluses of particular goods and profitable opportunities for private arbitrage, including the production and sale of goods in short supply. Further the state may choose not to produce certain goods for which there is a demand. The effects of disequilibrium relative prices are compounded by the presence of the regime of repressed inflation. But it is important to understand that one can observe a thriving second economy in a centrally planned economy in the absence of repressed inflation. Finally, the state may choose to sell certain items at prices substantially above their cost of production, creating the opportunity for private entrepreneurs to produce and sell these goods below the official state price.

Although the basic conditions fostering a second sector have existed in the Soviet Union since the onset of central planning, there is reason to believe that the benefit/cost ratio has changed since the 1950's, and this change may have increased the level and variety of activity in the second sector, although there is evidence that the second sector existed during the Stalin period (Grossman, 1977). Since Stalin's death both the probability (p) and the cost of being apprehended (F_2) have declined,

although not along a smooth path. One would expect that the reduction of terror and the growth of cynicism, reducing the non pecuniary costs of second sector activity, would increase second sector activity. In addition, there have been forces increasing the return-to-work in the second sector. Rising incomes combined with the state's inability to provide quality consumer goods and services should raise the return to second sector activity.

In the West, rising incomes have produced a growing demand for services, and the service sector has been the fastest growing sector of most Western economies. The Soviet State has been notoriously poor in the provision of services, yet it is relatively easy for a Soviet worker to provide services in the second sector with little capital and a fairly low risk of apprehension. The increase in car ownership has created a demand for a whole variety of new services which the state seems reluctant to provide (Radio Liberty Research, 1977). This gap is creating profitable opportunities for the private provision of auto-related services.

The growing variety of consumer goods together with an increasingly sophisticated consuming population, combined with the inflexibility of the Soviet price system, have created an increasing number of opportunities in the second sector. These opportunities include not only the traditional black market activities of speculation and arbitrage but also the possibility of producing and/or providing the good or service in short supply.

C. The Macroeconomic Implications of Production in the Second Sector

1. The PM Model in a Balanced Regime - The Moonshine Case

As described in Section III, a balanced regime is characterized

by the absence of rationing in both the consumer goods and labor markets. It is awkward to discuss the determinants of second sector production in this case because there is in essence only one commodity being produced, thus no possibility of disequilibrium relative prices. If there is no repressed inflation and each market is in balance, it seems that there are no opportunities for second sector activity except for outright theft and resale of state property. I would like to explore, however, the interaction of the first and second sectors, while retaining the relative simplicity of the balanced regime. I have chosen to do this by beginning in a regime of balance as described in Section II C and shocking the model by introducing a taste for vodka, which the state refuses to produce.[7] This taste change opens up a possible profitable opportunity for the production and sale of moonshine (Samogon), its profitability depending upon its expected price, cost of production, and p and F_2.

I feel I should point out what will become obvious to the reader in the next two sections. The discussion of the impact of second sector activity on the entire economy in both this and the following section is extremely simplified. I recognize that in the Soviet economy the causes, manifestations, and implications of second sector activity are much more diverse and complex than I am able to encompass in my discussion. I proceed, however, with this simplification because it represents a first step in integrating two very important types of economic activity in the Soviet Union planned, public and unplanned, private production. I

anticipate that I and others will improve upon, extend, and formalize the analysis of the interaction of the two sectors which follows.

Consider an individual making the calculation described in the Ehrlich model. He[8] may choose to devote his time solely to public sector, legal activity at the wage w_1, solely to the illegal production of moonshine at the wage rate w_2, with the probability p_1 of incurring the loss $F_2(\ell_2)$, or to a combination of the two activities. Let us assume that given his attitude toward risk, the net return to moonshine production exceeds the return to public sector work for small scale operations, but the probability of and penalty associated with apprehension increases with the scale of the operation. The situation is depicted in Figure 6 below.

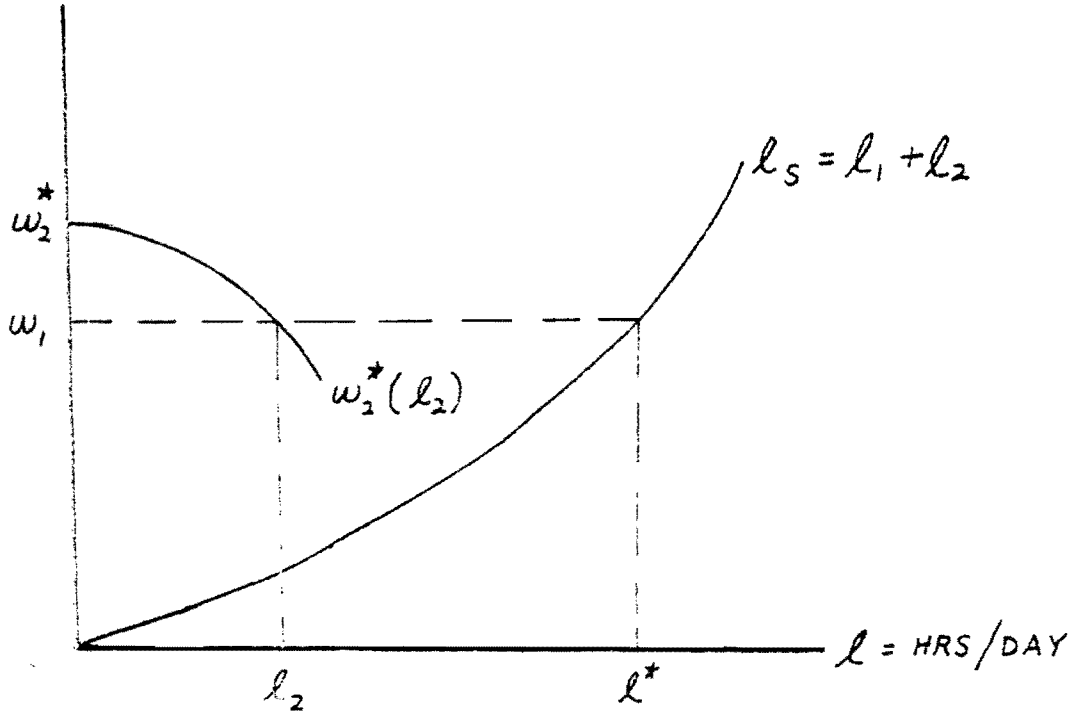

Figure 6
The Moonshine Case

In this case w_2^* equals the expected net return from the second sector, $w_2\ell_2 - pF_2(\ell_2)$, and declines as ℓ_2 increases. The individual will allocate ℓ_2 hours of labor time to the second sector and $\ell_1, (\ell^* - \ell_2)$, to the public sector.

What are the consequences of this individual's decision and that of other Soviet workers on the supply and demand for labor and goods in the first sector? It seems to me that there are several possible outcomes. The individual described in the case above has obviously diverted labor from the first to the second sector.[9] Assuming that his marginal product in the public sector is positive (a questionable assumption in some Soviet enterprises), there will be a reduction in the output of the first sector and an increase in the second. What happens to the balance in the first sector? Output has fallen; if prices are rigid, one would expect to observe rationing in the consumer goods market and a shift from ℓ^S to $\ell^{S'}$, depicted in Figures 3 and 4. But, output has risen in the second sector and is now available for purchase by all Soviet households at a price. The production of moonshine in the second sector has essentially lowered its price from infinity to some positive value. If the value of the moonshine exceeds the value of the drop in production in the first sector, the real wage in the first sector (w_1) has increased, shifting w_1 and w_2^* up and causing individuals to move along ℓ_S. The fact that it is profitable for some Soviet workers to transfer labor time from the first to the second sector implies that given the initial set of prices, consumer utility is

increased by the resource transfer. The demand for consumer goods and services produced in the first sector, C^d, is subject to both an income and a substitution effect. The demand for and subsequent production of moonshine in the second sector will reduce C^d, and the income effect generated by the increase in the real wage will increase it. The price of second sector output now appears in the demand function for first sector output.

One would not expect to observe everyone diverting labor to produce moonshine for two reasons. One, as the production of moonshine increases, its price and thus w_2^* decline. At the point where w_2^* equals w_1 no additional workers would choose to transfer labor from the first to the second sectors. Two, different individuals face different opportunities. Differing attitudes toward risk, differing probabilities and penalties associated with apprehension, differing access to raw materials, resulting in differing production costs, will cause w_2^* to vary from one individual to another. In equilibrium w_2^* will equal w_1 for each individual engaged in moonshine production, but the number of hours and total profit derived from ℓ_2 will vary over individuals.

Let us summarize the effects of the demand for and supply of vodka by the second sector. First, the demand for the output of the first sector (C^d) is reduced. The total quantity of labor supplied increases. Without a more detailed specification of the model, we cannot predict the quantity of labor supplied to the first sector. The direction of the net movement along ℓ_1^s is uncertain because it is composed of two parts. Some workers, like the individual depicted in Figure 6, are reducing their supply of labor to the first sector, while others are increasing the hours supplied to the state at the higher real wage to gain income to purchase the newly available moonshine. Thus at the original nominal wage, w_1, the quantity

of labor supplied to the state sector may increase, allowing the planners to increase employment and total output and divert the increased production to X, the flow of goods purchased by the government. Since the initial regime was balanced, unspendable cash balances were not accumulating, and except to the extent that vodka and money holdings are substitutes, one would not expect to observe a change in saving.

It seems to me that this outcome is not only possible but plausible. Although the qualitative evidence available indicates that the vast majority of Soviet citizens are engaged in the second sector activity, one must remember that this activity includes theft, bribery, and speculation as well as production. On the one hand, the profitable opportunities for illegal production would be limited to a narrower subset of the population than would the other activities. Setting oneself up to produce illegally may involve substantial costs as well as require specialized knowledge. On the other hand the opportunity to buy in the second sector is available with little risk to all. The increased motivation, in the form of the higher real state wages, would result in both increased hours, and equally if not more important, increased effort in the first sector to gain additional income to buy the output of the second sector. This effect will be more pronounced if households are accumulating unspendable cash balances in a regime of repressed inflation.

Do these conclusions hold as additional profitable opportunities develop in the second sector, either as a result of further new taste developments or as a result of disequilibrium relative prices appearing in the first sector? As additional profitable opportunities open up, more time is devoted to production in the second sector; the net effect on ℓ_1 may be negative, reducing the output of the first sector.[10] This result

is still uncertain, however, because the increased availability of second sector output is raising the real wage, causing individuals to move along the supply curve of labor. Further, the increase in the real wage and consequent increase in income generated would tend to increase the demand for the output of both sectors, but the relative decline in the price of the output of the second sector may cause a substitution of second sector for first sector goods, thus decreasing C^d. Up to this point I have not mentioned the possibility that the transfer of labor time from the first to the second sector may be accompanied by the transfer of state materials as well. In this case the exploitation of second sector opportunities will increase the probability that the output of the first sector will decline.

2. The PM Model in a Regime of Repressed Inflation

The regime of repressed inflation is characterized by the rationing of households in the consumer goods market. Beginning at a position depicted in Figure 3 of Section II where $y = y_2^*$, $\ell = \ell_2$, and $C = C_2$, what will be the effect on y, ℓ, and C of the growth of a second sector producing those goods (C) which are rationed in the first sector? We know that at its current price there is an excess demand for C, and thus a possible profitable opportunity for private production. Again, as in the previous example, the net return to second sector produciton is determined by expected prices, costs of production and p and F_2. The assumption that w_2^* declines as the scale of the activity increases is maintained.

Assuming w_2^* exceeds w_1 for some indivduals, such as the one depicted in Figure 6, these individuals will reduce their allocation of ℓ to ℓ_1 and increase it to ℓ_2. Assuming a positive marginal product of labor, output

will drop in the first sector and rise in the second. If the marginal product of ℓ_1 and ℓ_2 were equal, the total production of C would remain constant, but search and queueing time would be reduced. The average nominal price of C would rise, since the price of second sector output would exceed the official price of first sector output, but the average total price, including search and queueing time, might well fall. Certainly the price of the marginal unit, infinity prior to the development of the second sector, would fall. Thus, there would be an increase in the real value of the marginal wage, and assuming $\frac{\partial \ell}{\partial w} > 0$, an increase in the total quantity of labor supplied, which would at least partially offset the original shift of the labor supply function (ℓ_1). Further, if consumers were no longer rationed in the consumer goods market due to the opportunity to buy unrestricted quantities of C in the second sector, the operative labor supply function would be ℓ^s rather than $\ell^{s'}$. It is possible, therefore, by allowing the second sector to diffuse the repressed inflation the total quantity of labor supplied and the total output of goods would rise. The incentive effects associated with the availability of second sector goods would be operating in this as in the moonshine case. Unspendable cash balances which had been accumulating under the regime of repressed inflation would now be valuable, reinforcing the labor incentive effect.

If the marginal product of ℓ_2 exceeded ℓ_1, the transfer of resources would clearly result in a net increase in the supply of consumer goods and services and a consequent increase in both the average and marginal real wage, apart from the effect of reduced search and queueing time.

The total quantity of labor supplied would increase, although one cannot specify whether ℓ_1 would increase or decrease. If households perceived the output of the second sector to be superior to the first, the demand for first sector output, C^d, would decline, bringing the first sector closer to balance.

If we can extend the PM model by assuming the production of more than one good in the first sector, the benefits of second sector production on the quantity of labor supplied and the level of total output will be enhanced. If repressed inflation is not spread evenly throughout the economy, the more profitable opportunities for second sector produciton would lie in those areas of greatest excess demand. Although there is no reason to believe labor would transfer out of those areas with the least excess demand, if transfers were randomly distributed throughout the first sector, there would be a net increase in consumer welfare as a result of the increased production of goods in greatest demand. The effect on the real wage and incentives would be greater than in the case just outlined.

The discussion of the output effects must be tempered by again considering the likelihood that the transfer of labor from the first sector will be accompanied by a transfer of resources. In fact, workers may exploit second sector opportunities while on their official job, transferring both state time and resources to the second sector.

IV. Conclusion

Many scholars have noted the state's tacit acceptance of certain legally questionable enterprise practices, such as the use of tolkach,

because the net effect of these practices is believed to contribute to plan fulfillment. This same attitude characterizes the state's behavior toward second sector activity. Small scale, private provision of goods and services flourishes in the Soviet Union, as any traveler can attest. Although the official attitude and the severity of punishment for second sector production has varied from time to time, imprisonment for small scale activity is rare. The state is certainly aware of the scope of the second sector and could increase the probability and severity of apprehension and punishment, respectively, but has not done so.

I have argued in this paper that there may be positive benefits from second sector production to both the state and the consumer, particularly if the operations are small, labor rather than material intensive, and concentrated among certain segments of the population. The loss of labor and materials from the first sector may be more than offset by the increase in consumer satisfaction generated from the unrationed goods, with increased work incentives on the part of those whose primary job affiliation is the state. Second sector production also allows the state to maintain stable official prices without all of the negative side effects of repressed inflation. This argument implies that there is an optimal size for the second sector, and that the authorities will allow it to operate while attempting to prevent a significant increase which may threaten the planned allocation of resources.

FOOTNOTES

1. For a discussion of the meaning of repressed inflation and the evidence necessary to analyze it in the Soviet context see Portes (1974) and Pickersgill (1977).

2. For a description of the second economy and the types of activity included in it see Grossman (1977).

3. I think it is useful to substitute the term sector for economy since both the first and second "economies" comprise the entire economy, and the behavior of individuals in one sector has repercussions on the other.

4. For a discussion of the planner's selection of an optimal level of output (y) see Portes (1978).

5. Gary Becker (1965) analyzes the household as both a utility maximizer and a producing unit. The household derives utility by consuming a composite good produced with both money and time, and is subject to both a money and time constraint.

6. See Schroeder and Greenslade, 1979 and Ofer, 1979.

7. I recognize that it is questionable to continue to describe the first sector as a balanced regime once the new taste appears. In fact, the demand for vodka would probably be accompanied in a free market by both a transfer of resources from the production of other commodities and a reduction in leisure.

8. For he read he/she; for him read him/her.

9. It might seem that the individual would divert leisure time to ℓ_2, but the marginal wage is w_1, and the marginal wage determines the total number of hours worked.

10. To the extent that there is an external constraint on individuals, requiring them to engage in a minimum amount of first sector activity, there will be a limit on the decline in labor supplied to the first sector.

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