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On the Possible Functioning of the Social Sector According to the Principles of the Private Sector (Taxation Aspect)

The present work attempts to substantiate the possibility of the functioning of the social sector according to the principles of the private sector, and a variant of a model of the economy is proposed on this basis.

Introduction

Economic theory devotes a special place to problems of the private and social sectors. When we speak of the "market economy" in the narrow sense, we usually mean the private sector, because its functioning is specifically based on so-called market principles. The social sector, however, is not based on the market: the distribution of the results of its work, that is, social (and quasisocial) goods, is not manifested in the form of their direct purchase and sale, but the financing of their production is in the nature of a forcible act because the state forces physical persons and legal entities to pay the taxes that serve as its source.

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The article is published as a formulation of the problem.

The goal of the present article is to substantiate the possibility of the social sector to function according to the principles of the private sector when, even if elements of force are present, they are minimal and concern only an insignificant part of society. In other words, we are talking about the construction of an economic model whereby the system of taxation may be replaced by a certain other system (which will be discussed below) that minimizes the element of force. We must express the reservation that the present work is only a theoretical interpretation of the problem under investigation.

As we know, different theoretical schools are negatively disposed toward taxes and their role in economic policy. But since taxes are intended to pay for state spending on society's needs, virtually no one suggests that the economy function without taxes. At best, the question of abolishing one or another type of tax, for example corporate profit tax, is discussed [1, p. 72].

An economic model in which the principles of functioning of the private and social sectors—if not entirely identical, then largely similar—may be of definite interest not only for countries with developed market systems but also for countries in the stage of transition to market economies. This conclusion is suggested by the analysis of the complexities that arise in the area of tax and fiscal policy in countries whose economies are in the process of transition [2].[1]

The solution of the problem of constructing the given model requires a reinterpretation of the results of state activity in the area of economic regulation: at the same time, we should correspondingly correct our ideas about the market proper. Theory distinguishes between the free and the real (operational) market.

It is common knowledge that the state intervenes in market processes to prevent the free market from being a fiasco [5, p. 92] so that the real market will be manageable. But the state is not always able to attain this "noble" goal, at which point a fiasco occurs [5, p. 100].

Based on the definition of social goods as noncompetitive and nonexclusive (for example, [6, pp. 504–5]), in [7, pp. 11–15; 8, pp. 35–7; 9, pp. 58–60; 10, pp. 38–40], it is shown that everything undertaken by the state sector to regulate the market is a social or quasisocial good. In addition to national security, public order, and the like, these goods also include: the exclusion or at least the considerable lowering of (external) effects; the supplying of the economy with the necessary quantity of money; the elimination or substantial lowering of internal

components (i.e., asymmetrical information); the elimination or at least the significant curtailment of market power to the extent possible; a legal basis and social atmosphere for maintaining and facilitating the functioning of the market system; the egalitarian good[2]; economic stabilization; goods and services produced by public utilities; and so on. Within the framework of a given country's state sector, there may also be enterprises whose products are private goods that are usually classified as quasisocial. Without disparaging their communality, we shall abstract from the latter in our subsequent discourse.

Thus, the entire surrounding world of goods may be divided into two groups: private and social. Other things being equal, depending on who produces the goods, the economy can also be divided into two sectors: private (produces private goods) and state (produces social goods).

The production of any good involves the participation of production factors that are the basis for distributing proceeds from the realization of goods. Modern economic theory recognizes four factors of production: land, capital, labor, and entrepreneurial ability. The incomes corresponding to them are: rent, interest, wages, and entrepreneurial profit (see, for example, [13, vol. 1, pp. 37–8]). In addition to these factor incomes, the price of a good includes depreciation deductions and indirect business taxes that are unearned state revenues (see [13, vol. 1, p. 140]). However, in [7, pp. 15–19; 8, pp. 37–8; 9, pp. 56–8; 10, 40–43; 11, pp. 5–8; 12], it is argued that the state's economic ability is an independent factor of production.[3] Incomes from services rendered by this factor of production are indirect taxes on business, which, in the context of the fifth factor, are classified as state profit. Thus, five factors participate in the production of any goods and the price of these goods incorporates the corresponding incomes.

It is inadmissible to equate the state's economic ability with the state sector of production: the difference between them is not as great as the difference between entrepreneurial ability (as a factor of production) and the private sector. We also note that it is not the state itself, but only its economic ability that is a factor of production. There are analogies here, too, because it is not the entrepreneur himself but rather his entrepreneurial ability that is a factor of production.

As we know, the owner of a private good is an entrepreneur, who, upon selling his good and receiving income (earnings), distributes it among factor incomes. The situation with social goods is similar: they

belong to the state, which, upon selling them and receiving income (earnings), must also distribute it among factor incomes.

There is a substantial difference between the sales of private and social goods. The acquisition of the former is usually individual, while the acquisition of the latter is collective. Despite this, payment for the acquisition of social goods and private goods, as a rule, is also individual. Direct taxes that are paid individually by physical persons and legal entities also serve as such payment [15, p. 246].

Certain expenditures are required to produce social goods. The three principal sources of these expenditures at the disposal of the state sector are: tax receipts, interest-bearing loans in the form of state securities, and the emission of money (which does not yield interest to its holders). Tax receipts are of predominant significance in all relatively normally functioning states.

Thus, on the one hand, taxes are used as expenditures for the production of social goods, while on the other, they are payment for their acquisition by consumers. But if taxes were not collected, it would be impossible to produce the social goods everyone needs and hence there is every justification for considering taxes in the theory of payment for them.

The production of private goods is not tantamount to the consumer obtaining the advantages they bring; this is achieved only after the given goods have been purchased. But to obtain benefits from social goods, it is sufficient to produce them. This is explained by the fact that there is no interrelationship between payment for consumption and the actual consumption of the given goods. Because of this, taxpayers do not know the specific use that is made of the taxes that are collected from them. However, the nonexclusiveness and noncompetitiveness of social goods create the real possibility that they will be consumed by individual persons without the appropriate taxes being paid. Special organs created by state authority are struggling against this situation. As a consequence, the payment (more precisely, the collection) of taxes acquires the character of a forcible act.

With regard to taxation, the ideal system would obviously be one in which both physical persons and legal entities are interested in paying taxes[4] or at least in not evading their payment. This requires that when taxpayers pay their taxes, they thereby realize their own economic interests.

If we are able to design the model of a market in which forcible

taxation by the state is absent (or at least reduced to a minimum), that is, if the functioning of the state sector does not coincide, it will at least maximally approximate the functioning of the private sector, then the given market may be called *complete* [8, p. 41; 10, p. 46; 16, pp. 1–6]. At the same time, it should be remembered that the state's economic ability is an independent factor of production whose income is in the form of indirect taxes on business (qualified as state profit) and it is assumed that exclusively social (or quasisocial) goods are the results of the functioning of the state sector.

Theoretical prerequisites to the functioning of the social sector according to the principles of the private sector

It was noted above that taxes perform two functions simultaneously: the financing of expenditures on the production of social goods and payment for their consumption. In order to see how appropriately these two functions are merged in the existing system of taxation, let us see how they are manifested in terms of the production and consumption of private goods.

Let person A decide to produce a certain private good, but he does not have sufficient funds (or no funds at all). He then turns to person B, borrows the sum he needs, and organizes the production of the desired good. A pays B interest during the entire term of the loan. Upon the expiration of this term, A returns the borrowed money to B.

If B has a demand for the private good produced by A, when B comes to the market, he will pay A's price for this good.

Thus, B lends A money to produce a certain private good and charges appropriate interest; at the same time, when B buys the given good, he pays A his price. It should be emphasized that the given interrelationship between the two persons (producers and consumers of private goods) is an elementary act of the market system that is repeated many times.

In order that the state sector might join the market (i.e., begin functioning according to the principles of the private sector), it should obviously "adopt" the described interrelationship between producers and consumers of private goods with respect to the production and consumption of social goods.

By analogy with the cited example, A is the state sector, which

produces goods, and B is all society, which consumes them.

State profit and the emission of money (i.e., the state's own resources) in a normally functioning economy cannot secure the required volume of expenditures by the state sector on the production of social goods. Therefore, it resorts to loans in the form of interest-bearing securities issued by it and to the collection of direct taxes. In the first instance, the state sector acts precisely like person A, while in the second instance, the collection of direct taxes is its goal [7, pp. 22–5; 8, p. 40; 10, p. 46]. If the state sector does not have sufficient resources of its own (and they are always insufficient) for the production of social goods, then following market principles, it has the obligation not to confiscate, but to borrow part of the incomes of physical persons and legal entities, that is, to act like A with respect to B in our example.

Thus, according to market principles, the state sector should borrow money from private persons and corporations instead of collecting direct taxes. Because, at the same time, the latter are consumers of social goods produced by the state sector, they are called upon to pay for their consumption, that is, to act like person B. Social goods, like private goods, are also the result of economic production and thus they have a price. As P. Studenskii appropriately notes:

> Economic production also includes the government's administrative services even though they are not sold to individual citizens and therefore do not have a market price. Since these services entail expenditures on labor, capital, and materials, which are paid for by the government in the name of society, they are collectively "bought" by people through the payment of taxes and other fees (contributions, etc.) as well as loans. In this sense, they have an economic price [15, p. 246].

Consequently, direct taxes taken in the form of a debt and loans in the form of state securities perform two functions simultaneously: the financing of expenditures for the production of social goods and payment for the consumption of the latter. The merger of these two functions stems primarily from the fact that, unlike private goods, for which there is a time lag between the completion of their production and the beginning of their consumption, the completion of the production and the beginning of the consumption of social goods practically coincide in time. In other words, produced social goods are consumed immediately without "waiting" for them to be purchased by consumers.

Despite the great similarity between direct taxes in the form of debt and loans in the form of state securities when the question is formulated in this way, there is also a substantial difference between them. Social goods are consumed not only by the private but also by the state sector. Consequently, part of them should be paid by the state sector. Therefore, the loan in the form of state securities acts in the capacity of the money that the state sector borrows from the private sector to pay for state consumption of private goods and this money must be repaid. Direct taxes, however, as payment for the consumption of social goods by the private sector need not be repaid, even though interest is charged for them, because the given taxes initially (before their transformation into payment for the consumption of social goods) are borrowed by the state sector for investment in the production of these goods.

Thus, it is argued theoretically that in the system of the complete market, when the state sector is one of its elements, there should be no forcible collection of taxes; they should be replaced by *state loans that are nonrepayable, but that yield interest*,[5] which, jointly with state profits, repayable loans in the form of state securities, and the emission of money, are used to finance expenditures on the production of social goods. Consequently, in the functioning of the social sector on the basis of principles of the private sector, conditionally speaking, we have an "economy without taxes."

The simplest budgetary models for "economies with and without taxes"

In order to construct a budget model of an "economy without taxes," we must first of all examine the basic correlations of the existing system of the state budget (SB).

Its expenditure portion consists of expenditures on the purchase of goods and services (G); on covering the cost of state securities when they mature ($\underline{B}$); and on the payment of interest (rB) on state securities (B), where (r) is the interest rate. Thus, the expenditures of the SB equals: $G + \underline{B} + rB$. Its revenues form from total tax receipts (T).

The excess of expenditures of the SB over revenues is covered by loans in the form of state securities ($\overline{B}$) and in the extreme situation by the emission of money (ΔM). As a result, in this case we have the budget equality

$$T + \overline{B} + \Delta M = G + B + rB, \tag{1}$$

As a rule, in practice $\overline{B} > \underline{B}$ or $\Delta B = \overline{B} - B > 0$ (see, for example, [13, vol. 1, p. 367]), therefore (1) is transformed

$$T + \Delta B + \Delta M = G + rB, \tag{2}$$

where $B = B_0 + \Delta B$; B_0 is the value of state securities at the beginning of the fiscal year.

T may be classified according to types of aggregate tax receipts: individual income taxes (T_h); taxes on corporate profits (T_p); taxes and contributions to social insurance funds (T_e); and indirect taxes on business (T_b).

Consequently

$$T = T_h + T_p + T_e + T_b. \tag{3}$$

Substituting (3) in (2), we obtain

$$T_h + T_p + T_e + T_b + \Delta B + \Delta M = G + rB. \tag{4}$$

All types of T in the SB form from deductions from aggregate factor incomes. Thus, T and contributions to the social insurance fund are taken out of aggregate wages W and aggregate entrepreneurial profit π. For example, according to [1, p. 80], both households and corporations pay the same rate of tax t_e from actually paid wages, and its maximum sum W_e is determined and is subject to the given tax. Thus

$$T_e = t_e W_e + t_e \pi_e + 2tW_e, \tag{5}$$

where $W_e = \pi_e$ and $W_e < W$.

To calculate T from corporate profits, the amount of these profits that are taxable is first determined. In our relatively simplified case, $\pi - t_e\pi_e$, is such a quantity because corporations always have the possibility of shifting their share of contributions for social insurance to expenditures (see, for example, [1, p. 81]). If we denote the corporate profit tax rate by t_p, the corresponding T to the budget will be

$$T_p = t_p(\pi - t_e\pi_e). \tag{6}$$

The amount of T from individual income taxes forms from all aggregate factor incomes at the disposal of households and, in particular, W minus payments to the social insurance fund $W - t_e W_e$, aggregate interest R, aggregate rent L, and aggregate dividends $q_h(1 - t_p)(\pi - t_e\pi_e)$, where q is the share of dividends paid by a household and net corporate profits (i.e., profits minus taxes). If we denote the rate of individual income tax by t_h, then

$$T_h = t_h[W - t_e W_e + R + L + q_h(1 - t_p)(\pi - t_e\pi_e)]. \quad (7)$$

In our case, while not disparaging their communality, we shall limit taxes on business to value-added tax (VAT), which consists of factor incomes and depreciation deductions D. Let t_b be the VAT rate. Then,

$$T_b = t_h[D + W + R + L + \pi - t_e\pi_e]. \quad (8)$$

Correlations (4)–(8) form the basic articles of the SB. Of all state expenditures on the purchase of goods and services, special distinction is made for expenditures on social insurance—E, which is financed by budget receipts from taxes and contributions to the social insurance fund, that is,

$$T_e = E. \quad (9)$$

It must be noted that receipts from taxes and contributions to the social insurance fund may not be expended for other purposes (see, for example, [1, pp. 78–9]).

Let us see how budget correlations (4) and (9) are transformed for an "economy without taxes."

For the sake of simplicity, we shall assume that the state sector produces some one (aggregated) type of social good.

The state sector uses both its own and borrowed funds to make expenditures G on the production of the given social good. The emission of money (ΔM) and state profits $\pi^p{}_g$ that are obtained from the production of private goods and that are paid by corporations are the former; the increase in loans in the form of state securities ΔB and state loans C that are nonrepayable, but that yield interest are the latter. All these funds, except for covering the noted expenditures, should also

ensure the payment of interest on nonrepayable state loans ω. Thus,

$$C + \Delta B + \Delta M + \pi^{p}_{g} = G + rB + \omega. \tag{10}$$

We note that (10) under conditions of an "economy without taxes" has the same semantic load as (4) for an "economy with taxes."

Result G is a certain social good noted above that is produced by the state sector. Unlike the great majority of private goods, this cannot be measured other than with a value measurer. Let $P(X_S)$ be the cost of a certain produced social good

$$P(X_S) = A_S + D_S + L_S + W_S + \pi_S + rB + \omega + \pi^{S}_{g}, \tag{11}$$

where A_S are expenditures of subjects of labor; D_S are depreciation deductions; L_S is rent; W_S is wages; π_S is entrepreneurial and π^{S}_{g} is state profit calculated relative to a social good.

It must be noted that in the case of social goods π_S is usually included in the cost of those that are produced at public utility enterprises.

It was said above that the completion of production and the beginning of the consumption of social goods is an almost simultaneous process, that is, expenditures on the production of social goods, at the same time, are their purchase. Therefore, expenditures on production and the purchase of social goods essentially coincide. The state sector additionally disposes over profit obtained by it from the use of the economic ability of the state as a factor of production for the purchase of these goods. Accordingly,

$$C + \Delta B + \Delta M + \pi^{p}_{g} + \pi^{S}_{p} = P(X_S). \tag{12}$$

Substituting (10) and (11) in (12), we obtain

$$G = A_S + D_S + L_S + W_S + \pi_S.$$

If we consider that $\pi^{p}_{g} = T_b$, and comparing (4) and (10), we will have

$$C - \omega = T_h + T_b + T_e. \tag{13}$$

Loans that are nonrepayable, but that yield interest and the corresponding interest income can be divided into three parts: into loans and interest that are paid and received by households (C_h and ω_h) and corporations (C_p and ω_p), and loans and interest that are jointly paid by households and corporations for the creation of an egalitarian good (C_e and ω_e). Then, if

$$C_h - \omega_h = T_h, \tag{14}$$
$$C_p - \omega_p = T_p, \tag{15}$$
$$C_e - \omega_e = T_e, \tag{16}$$

(13) will also be fulfilled.

Taking (16) into account instead of (9),

$$C_e - \omega_e = E. \tag{17}$$

If (4) and (9) are the basic budget correlations for an "economy with taxes," (10) and (17) are the basic budget correlations for an "economy without taxes." The interrelationship between these correlations is described in (13) to (16).

The question of the mechanism of the interrelationship between loans that are nonrepayable but that yield interest and these interest incomes remains open.

On the mechanism of an interest-bearing, nonrepayable loan

We shall limit the analysis of the mechanism of an interest-bearing, nonrepayable loan, which is not dependent upon who gives it to the state sector and for what purposes, to the general case for C and ω.

According to (13) to (16), interest-bearing, nonrepayable loans include interest incomes, that is,

$$C = C_r + \omega, \tag{18}$$

where C_r is the portion of the nonrepayable loan for which interest is computed.

If r_c is the interest rate charged for a nonrepayable loan and τ is the

number of years during which interest is paid on a nonrepayable loan, then, using the known discounting procedure,[6] we obtain

$$C_r = \frac{C}{(1 + r_c)^\tau}. \tag{19}$$

Substituting (19) in (18), we obtain

$$\omega = \frac{(1 + r_c)^\tau - 1}{(1 + r_c)^\tau} C. \tag{20}$$

Let us examine one variant of the mechanism of an interest-bearing, nonrepayable loan.

In order to give private persons and corporations the economic motivation to grant nonrepayable but interest-bearing loans, to all appearances, progressive taxation should be used. In particular, let us examine the following system.

For a certain period of time, the size of an interest-bearing state loan and the interest rate must remain constant, but the interest payment period is equal to the term of state loans in the form of medium-term securities, that is, bills of exchange and bonds, which should mature in a period ranging between one and ten years (see, for example [17, p. 49]). Nor can we exclude the variant in which the interest-payment period for nonrepayable state loans will be, let us say, thirty years, as in the case of long-term treasury bonds [13, vol. 2, p. 180].

Every succeeding time interval and size of an interest-bearing state loan must be greater and the interest rate higher than the previous one. Any citizen receiving income for the first time must "go through" all these time intervals in sequence, starting with the first—the shortest; the same also applies to a newly created corporation with the sole difference that in this case, in all probability, the size of the interest-bearing, repayable state loan, the level of the interest rate, and possibly the number of years in the given intervals, as well, will be different.

If a private person inherits a nonrepayable state loan, the amount of this loan must be added (a special procedure is required) to the amount of a state loan that the given person has accumulated prior to that time.

A similar approach also applies to the merger of two or more corporations.

It must be emphasized once again that interest is calculated only for part (albeit a considerable part) of the nonrepayable state loan, and

only after its entire annual sum has been entirely given to the state sector.

Interest charged over a period of ten years, for example, should accumulate in special time deposits from which the lender could withdraw money no earlier than in five (or more) years. Although interest on a nonrepayable state loan is calculated during the established period (in our case, ten years), the calculation of these loans is not limited in time to the sum accumulated in special time accounts. If for any reason (other than natural disasters, wars, etc.), the lender cannot return to the state sector the sum that is due to it for a nonrepayable state loan (entirely or at least partially), this debt must be financed from interest deductions that have accumulated in the given time deposits. In addition, in order that debtors not try to escape their obligation to pay nonrepayable state loans, it is also possible to introduce special fines that increase over time such that interest income computed according to the compound interest formula for these loans in the given special time accounts will be reduced (written off) in an amount equivalent to (or a portion of) the underpayment to the state. If accumulated interest payments from the indicated time deposits cannot entirely cover the annual sum the lender owes the state for nonrepayable loans, the loan funds that have accumulated must compensate for this shortfall, which will result in reducing the size of future interest incomes.

This tactic will make the lender in such a situation interested in repaying money to the state on time and in full, first, in order to obtain higher interest, and, second, so as not to lose both already accumulated, as well as, possibly, future interest incomes due to the write-off of part of the interest-bearing, nonrepayable state loan.

Let us examine the mathematical interpretation of the this mechanism.

Let the first period of time in which the size of the interest-bearing, nonrepayable state loan and the interest rate do not change, equal m_1 years; let the second period equal $(m_2 - m_1)$, and so forth, and k period equal $(m_k - m_{k-1})$ years. At the same time, $m_1 < m_2 - m_1 < \ldots < m_k - m_{k-1} < \ldots$. Through C^k, we denote the nonrepayable loan that is given to the state in an unvarying amount in every year of period k, and through r^k_c the interest rate that is charged in every year for these loans in period k. In this case as well, $C^1 < \ldots < C^k \ldots$ and $r^1_c < \ldots < r^k_c \ldots$.

We shall introduce coefficient υ_{ij}, which shows the share of interest charged in year i that the lender removes from the account and collects

in year j. Naturally, $0 \le \upsilon_{ij} \le 1$, (if $\upsilon_{ij} = 0$, then the borrower will take nothing in year j from the interest calculated in year i, but if $\upsilon_{ij} = 1$, he will take all interest in year j calculated in year r; consequently, in the general case $\sum_{j=i}^{\infty} \upsilon_{ij} = 1$).

Taking υ_{ij} into account, (20) is altered slightly to determine the sum of interest calculated for year n. Let $n < m_1$ and $n \le \tau$, then, based on (20), the amount of interest calculated in year n on a nonrepayable loan to the state in the first year will be

$$\omega_{1n}^1 = \frac{\prod_{j=1}^{n}(1+\upsilon_{1j}r_c^1) - 1}{\prod_{j=1}^{n}(1+\upsilon_{1j}r_c^1)} C^1; \text{ in the second } \omega_{2n}^1 = \frac{\prod_{j=2}^{n}(1+\upsilon_{2j}r_c^1) - 1}{\prod_{j=2}^{n}(1+\upsilon_{2j}r_c^1)} C^1,$$

and so forth, for a loan granted in year n: $\omega_{nn}^1 = \frac{\upsilon_{nj}r_c^1}{1+\upsilon_{nj}r_c^1} C^1$.

Thus, in year n (when $n \le m_1$ and $n \le \tau$), the sum of calculated interest is

$$I_{1n}(n \le \tau) = \sum_{i=1}^{n} \omega_{in}^1 = \sum_{i=1}^{n} \frac{\prod_{j=i}^{n}(1+\upsilon_{ij}r_c^1) - 1}{\prod_{j=i}^{n}(1+\upsilon_{ij}r_c^1)} C^1. \tag{21}$$

If $m_1 < n \le m_2$ and $n \le \tau$, then

$$I_{2n}(n \le \tau) = \sum_{i=1}^{m_1} \omega_{in}^1 + \sum_{i=m_1+1}^{n} \omega_{in}^2. \tag{22}$$

From (21) and (22), it may be concluded that if $m_{k-1} < n \le m_k$ and $n \le \tau$, then

$$I_{kn}(n \le \tau) = \sum_{u=1}^{k-1} \sum_{i=m_{u-1}+1}^{m_u} \omega_{in}^u + \sum_{i=m_{k-1}+1}^{n} \omega_{in}^k. \tag{23}$$

This formula becomes slightly more complicated when $n > \tau$ where $m_{k-1} < n < m_k$.

Let $n > i + \tau$, where $i = 0, 1, \ldots, \eta$ and $n = \eta + 1 + \tau$. Consequently, $m_k < \eta + 1 + \tau \le m_{k+1}$, or $m_k - 1 - \tau < \eta \le m_{k+1} - 1 - \tau$. In the general case, $m_{\sigma-1} < \eta \le m_\sigma$. Then, the sum of interest $I_{kn}(n > \tau)$ calculated for year n will consist of two parts, that is, of sums of calculated interest before year η inclusive and interest calculated starting with year $\eta + 1$

$$I_{kn}(n > \tau) = \sum_{u=1}^{\sigma-1} \sum_{i=m_{u-1}+1}^{m_u} \omega_{i,i-\tau}^{u} + \sum_{i=m_{\sigma-1}}^{n} \omega_{i,i+\tau}^{\sigma} + \\ + \sum_{i=\eta+1}^{m_\sigma} \omega_{in}^{\sigma} + \sum_{u=\sigma+1}^{k-1} \sum_{u=m_{u-1}+1}^{m_u} \omega_{in}^{u} + \sum_{i=m_{k-1}+1}^{n} \omega_{in}^{k}. \tag{24}$$

This correlation is of a more general nature than (21) to (23).

According to (24), the payment of interest, as has been stated, was scheduled beforehand in time τ. During this period, the lender may charge interest (this process is described by coefficients of υ_{ij}) and use it as he sees fit.

As has been noted, (24) shows the sum of interest calculated for year n. But the lender also hopes to obtain interest income in the future from nonrepayable loans granted to the state up to year n inclusive. Consequently, in addition to interest that has already been calculated, he may also evaluate interest income that he considers guaranteed in the future. This total income I'_{kn} $(n > \tau)$ consists of interest already calculated for year n and interest income anticipated in the future from nonrepayable loans granted by this year inclusive

$$I'_{kn}(n > \tau) = \sum_{u=1}^{k-1} \sum_{i=m_{u-1}+1}^{m_u} \omega_{i,i+\tau}^{u} + \sum_{i=m_{k-1}+1}^{n} \omega_{i,i+\tau}^{k}. \tag{25}$$

Let us assume that in year n, $m_{k-1} < n \le m_k$, the lender did not grant the state nonrepayable loan C^k. In this case, as noted, money in the sum C^k will be taken from $I_{k,n-1}$ $(n > \tau)$ and given to the state. Thus, from his income the lender loses not only C^k, but according to (20), ω^k, as well

$$\omega^k = \frac{(1 + r_c^k)^\tau - 1}{(1 + r_c^k)^\tau} C^k. \tag{26}$$

The lender's "acquisitions" from the nonpayment of Ck make up not only C^k but also possible interest incomes during period $(n + \tau) - n = \tau$ years

$$(1 + \bar{r})^{\tau} C^k, \tag{27}$$

where $\bar{r}$ is the average interest rate forming in the capital market.

On the basis of (26) and (27), it is possible to determine the lender's "gain" from nonpayment

$$(1 + \bar{r})^{\tau} C^k - C^k - \omega^k = \left[1 + \bar{r} - \frac{2(1 + r_c^k)^{\tau} - 1}{(1 + r_c^k)^{\tau}} \right] C^k. \tag{28}$$

Let special fines $Z^k{}_n = z^k(n)C^k$, where coefficient $z^k(n)$ increases jointly with the growth of n and at the same time the rate of change of the given coefficient increases in every subsequent interval of time, be introduced as an economic deterrent to the evasion of payment of nonrepayable state loans.

When the fines are levied, the lender also loses potential interest income in an amount equivalent to these fines. As a result, such losses will total

$$\left[1 + \frac{(1 + r_c^k)^{\tau} - 1}{(1 + r_c^k)^{\tau}} \right] Z_n^k. \tag{29}$$

Considering these additional "gains" and "losses" of the lender from the nonpayment of taxes (28) and (29), income $I'_{kn}(n > \tau)$ changes by the magnitude

$$\Delta I_{kn} = I'_{kn}(n > \tau) - \left[\frac{2(1 + r_c^k)^{\tau} - 1}{(1 + r_c^k)^{\tau}} (1 + z^k(n)) - 1 - \bar{r} \right] C^k. \tag{30}$$

Obviously, if $\Delta I_{kn} < 0$, then the lender will clearly be interested in not evading the payment of C^k. But actually there will be a certain *limit to the interest in evading payment of a nonrepayable state loan* $\psi^k = \psi^k(C^k) \geq 0$, the definition of which is beyond the scope of the present article, such that if $\Delta I_{kn} < \psi^k$, the lender will always have an economic motivation to return C^k to the state on time.

Table 1

Interest-bearing, Nonrepayable State Loan

Indicators	Time intervals			
	first (2 years)	second (3 years)	third (4 years)	fourth (5 years)
Annual size of interest-bearing nonrepayable state loan, C dollars	80.00	96.00	120.00	160.00
Annual interest rate, r_C	3.00	3.50	3.80	4.00
Interest payments for every dollar for 10 years (compound interest), $(1 + r_C)^\tau$	1.344	1.411	1.452	1.480
Discount factor $1/(1 + r_C)^\tau$	0.744	0.709	0.689	0.676
Portion of nonrepayable loan for which interest is calculated, C_r	59.52	68.06	82.68	108.16
Interest income from nonrepayable loans, ω	20.48	27.94	7.32	51.84

Let us clarify the point using the following conditional example (Table 1). While it covers only four time intervals over a fourteen-year period, it may also be extended to subsequent intervals taking into account the increase in the values of the corresponding indicators.

Our example is related to a private person. Let us assume that he has not inherited nonrepayable state loans (or that he has not yet inherited them and it is not known whether he will). Upon receiving income for the first time in his life, this person must pay the state \$80 on the nonrepayable state loan at the end of the first year. It is understood that this is a ten-year loan, that is, interest will be charged over a ten-year period. This \$80 should, as has been noted, include interest charged for the nonrepayable state loan over ten years. At an annual rate of 3 percent, based on the compound interest formula, interest charges for every dollar over a ten-year period will be 1.344; its inverse is the discount factor. According to (19), when we multiply the latter by the indicated \$80, we will obtain the portion of the nonrepayable state loan (\$59.52) on which interest is charged. Thus, according to (20), a private person granting the state a nonrepayable loan of \$80 will receive \$20.48 back over a ten-year period—\$1.79 (\$59.52 × 0.03) in the first year; in the second, \$1.84 (\$61.31 × 0.03), and so on.

In the second year, this private person must pay the state sector \$80 under the same terms as in the first. In the third, he will have to pay \$96, from which interest will be charged according to the higher annual scale: 3.5 percent; interest charges over ten years will reach a total of \$68.06. It will continue in this way for three years. In the sixth year, he will have to pay \$120 on the loan to the state; of this amount, interest already calculated at the 3.8 percent rate will total \$82.68 over a ten-year period. This will be repeated four times. Starting with the tenth year, in a five-year period it will be necessary to pay the state sector \$160 a year for the nonrepayable state loan, on which interest will be charged on \$108.16 at the 4 percent rate.

Let the average interest rate equal 3.5 percent a year. Then, on the basis of Table 1, it is possible to calculate "gains" and "losses" (with the given fine coefficients) from the nonpayment of the nonrepayable loan (see Table 2).

From Table 1, it is obvious that $I'_{11} = 20.48$, $I'_{12} = 20.48 + 20.48 = 40.96$, $I'_{23} = 40.96 + 27.94 = 68.90$, and so on. In the first year, the lender realizes a "gain" from the nonpayment of a nonrepayable state loan ($1.411 \times 80 - 80 - 20.48 = 12.40$), while "losses" total $0.3 \times (80 + 20.48) = 30.14$. As a result, in the first year, the lender will ultimately "gain" from not paying the loan because $\Delta_{11} = 20.48 + 12.40 - 30.14 = 2.74$. The following lines in Table 2 are calculated in similar fashion. It follows from this that only starting in the sixth year will the lender feel the total brunt of "losses" due to the nonpayment of the loan. Consequently, starting in the sixth year, he will find it economically more advantageous to pay the state the nonrepayable loan than to evade its payment.

Beginning lenders have very little incentive to pay money on nonrepayable state loans because the interest rate is low (and the size of potential fines is not so significant); hence their actions must be monitored by a special financial inspectorate (like the modern tax inspectorate) even though this monitoring is limited in time (in our example, only the first five years). Beginning in a specific year (here, the sixth year) the lender is economically interested in paying the state's nonrepayable loan on time rather than evading payment. In other words, the forcible nature of the nonrepayable loan is extremely limited in time. This distinguishes the investigated model of an "economy without taxes" and the compulsory loans known from the history of wartime and postwar practice in the USSR, when the

Table 2

"Gains" and "Losses" from Nonpayment of the Nonrepayable Loan

Years	I'_{kn}	"Gains"	Coefficients of fines $[z^k(n)]$	"Losses"	ΔI_{kn}
1	20.48	12.40	0.3	30.14	2.74
2	40.96	12.40	0.4	40.19	13.17
3	68.90	11.51	0.6	74.36	6.05
4	96.84	11.51	0.8	99.15	9.20
5	124.78	11.51	1.0	123.94	12.35
6	162.10	12.00	1.3	204.51	-30.41
7	199.42	12.00	1.6	251.71	-40.29
8	236.74	12.00	1.9	298.90	-50.16
9	274.06	12.00	2.2	346.10	-60.04
10	325.90	13.92	2.6	550.78	-210.96

lenders' economic interests were not taken into account at all.

The given system of financing the state sector's expenditures differs fundamentally from the existing system. This is reflected first of all by the fact that the lender takes the place of the taxpayer.

If the level of taxes paid depends on income for the year, there is no clear interrelationship between incomes and the sum of money that is paid to the state sector on the nonrepayable loan. The state sector establishes annually increasing nonrepayable loans and interest rates for lenders and this should indirectly stimulate them to increase their incomes in order to obtain higher profits. Thus, we see the noninterference of the state sector in such an intimate sphere as the incomes of private persons and corporate profits.

Starting from the moment when the interest rate on nonrepayable state loans rises and when it exceeds the net interest rate,[7] there is significantly more incentive to pay the state the established sum on nonrepayable loans on time and in full. By this time, lenders should already have sufficiently large sums, both in their nonrepayable state loan accounts and in corresponding time deposits, which accrue increasing interest.

The effectiveness of the investigated system of interest-bearing, nonrepayable state loans will increase if the interest rate on nonrepayable loans takes the rate of inflation into account, that is, r_c becomes the real interest rate. In this case, interest income on nonrepayable state loans with inflation (ω') will exceed $\omega = C - C_r$, that is, $\omega' > \omega$.

According to (13), nonrepayable but interest-bearing loans themselves include this interest. Moreover, if we consider that the place of direct taxes is taken by nonrepayable but interest-bearing loans, we may conclude that the state debt problem [18, ch. 16] is changing significantly. This requires special study. It should also be noted that the well-known Ricardian approach to the budget deficit [19] has no direct relationship to an "economy without taxes."

I am far from the idea that the proposed system of interest-bearing, nonrepayable loans is irreproachable. Improving or even devising an alternative to this system is the subject of future study.

Notes

1. This remark also applies fully to former Soviet republics, among which problems of tax and fiscal policy were particularly acute in Georgia [3, pp. 18–21, 96–100; 4, pp. 55–57].

2. In [7, pp. 13–15; 8, pp. 36–7; 9, pp. 58–60; 10, pp. 39–40; 11, pp. 11–13; 12], an egalitarian good that is created through the state's redistribution of incomes with the aim of attaining social tranquility is considered a special social good.

3. See [14, p. 338].

4. Unless otherwise stated, here and subsequently, the discussion will be of direct taxes because indirect taxes, as has been noted, are state profits.

5. "Nonrepayable loan" is a special terminological case. But since the author quite clearly explains the nature of the corresponding payment to the state, the scientific editing of the article left the term unchanged.—Ed. [of *Ekonomika i matematicheskie metody*].

6. Interest on C_r will be calculated according to the compound interest formula, as a result of which in τ years $C_r(1 + r)^{\tau} = C$.

7. The net interest rate is closest to the interest that is paid on long-term (practically risk-free) state bonds (a thirty-year annual loan in the United States). In the United States, in 1988, the net interest rate was roughly 9 percent [13, vol. 2, p. 181].

References

1. Deikin, A.I. *Mekhanizm federal'nogo biudzheta SShA (biudzhetnaia politika v 80-e gody)*. Moscow: Nauka, 1989.

2. *Nalogovo-biudzhetnaia politika v stranakh s ekonomikoi perekhodnogo perioda*. V. Tanzi, ed. Washington: International Monetary Fund, 1993.

3. "Respublika Gruziia." *Ekonomicheskie obzory MVF*. Washington: International Monetary Fund, 1994.

4. Papava, V. "The Georgian Economy. Problems of Reform." *Eurasian Studies*, 1995, vol. 2, no. 2.

5. Dolan, E. Dzh., and Lindsei, D. E. [Dolan, E.G., and Lindsey, D.E.] *Rynok:*

mikroekonomicheskaia model'. St. Petersburg: Rossiisko-britanskoe SP "Avtokomp," 1992.

6. Pindaik [Pindyck], R., and Rubinfel'd, D. *Mikroekonomika*. Moscow: Ekonomika. Delo, 1992.

7. Papava, V.G. *Gosudarstvo, rynok i ekonomika bez nalogov*. Tbilisi: Metsniereba, 1993 (preprint).

8. Papava, V.G. "Rol' gosudarstva v sovremennoi ekonomicheskoi sisteme," *Voprosy ekonomiki*, 1993, no. 11.

9. Papava, V. "A New View of the Economic Ability of the Government, Egalitarian Goods and GNP." *International Journal of Social Economics*, 1993, vol. 20, no. 8.

10. Papava, V. "The Role of the State in the Modern Economic System." *Problems of Economic Transition*, 1994, vol. 37, no. 5.

11. Papava, V.G. *Valovoi natsional'nyi produkt i natsional'nyi dokhod. Problemy real'nye i nadumannye*. Tbilisi: Metsniereba, 1992 (preprint).

12. Papava, V. *The Fifth Factor of Production and Productive Character of Transfer Payments—Budgetary Policy Modelling. Public Expenditures*. XXXVIIIth International Conference, April 13, 14, 1993. Applied Econometrics Association. Athens: National Technical University of Athens, 1993.

13. Makkonnell, K.R., and Briu, S.L. [McConnell, C.R., and Brue, S.L.] *Ekonomiks: Printsipy, problemy i politika*. Volumes 1, 2. Moscow: Respublika, 1992.

14. *Applied Economics*. Giffiths, A., and Wall, S., eds. London: Longman, 1995.

15. Studenskii, P. *Dokhod natsii (teoriia, izmerenie i analiz: proshloe i nastoiashchee)*. Moscow: Statistika, 1968.

16. Papava, V. *Model' ekonomiki bez nalogov*. Tbilisi: Metsniereba, 1994 (preprint).

17. Dolan, E. Dzh.; Kempbell, K.L.; and Kempbell, R. Dzh. [Dolan, E.G.; Campbell, C.L.; and Campbell R.G.] *Den'gi, bankovskoe delo i denezhno-kreditnaia politika* [Money, Banking, and Monetary Policy]. Moscow–Leningrad: LO SP "Avtokomp," PFK "Profiko," 1991.

18. Menk'iu, N.G. *Makroekonomika*. Moscow: Izdatel'stvo MGU, 1994.

19. Barro, R.J. "The Ricardian Approach to Budget Deficits." *Journal of Economic Perspectives*, 1989, vol. 3, no. 2.