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GOVERNMENT EXPENDITURES, THE REVENUE CONSTRAINT AND WAGNER'S LAW: THE CASE OF TURKEY

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Government Expenditures, the Revenue Constraint and Wagner's Law: The Case of Turkey*

1. Introduction

Economists are interested in what determines government expenditures. They are, however, often frustrated because here we operate in a kind of a no-man's land between economics and political science. In fact, the model describing this determination is at best political and usually it is economico-political,[1] a variety of reasoning that is very difficult to theorize upon.[2]

A simple purely political model of determination of government expenditures was offered by Adolph Wagner.[3] His model may be formulated

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[1]The idea that models explaining government expenditures are political is now generally accepted, but quite often they are economico-political and this mixed nature, though of great importance, is rarely recognized, and its implications accounted for.

[2]In the case of economico-political models much of the empirical work in the form of "Wagner's Law" is falsely interpreted. In this paper I also show the rarer case in which a political model applies but it may have a surprising meaning.

[3]Wagner's Law requires that government expenditures on a given public good, increase with an increase in national income (see Wagner [22], [23], and [24]).

There is a good reason (see Goffman [5]) to restate this law in terms of elasticities, namely to test that the income elasticity of a given type of government expenditures is positive. Richard A. Musgrave [13, p. 74] claims that one should be more restrictive and require this elasticity to be larger than one, otherwise the finding is trivial. Horst Claus Recktenwald [18] disputes that Wagner stated this law so narrowly. I show here that in some cases this elasticity of total government spending is a measure of effective progressiveness or regressiveness of the tax structure. In the latter case it is certainly not trivial to find it to be only a positive fraction.

mathematically as follows:

1-1. $G_i = f(Y,....)$, where Y is the national product, or national income or GNP, and G is the government expenditure on the i^{th} group of state services (including goods). By putting G_i on the left side in this equation we stress that it is a dependent, to be explained, variable. Y, instead of being on the right side tells us that it is considered a "near" exogenous variable[4] of this model. As the only variable to be explained is G_i, and this is a political variable,[5] the model is pure political.

If Y is in fact "near" exogenous, and not endogenous, it makes sense to inquire about either the slope of the relationship, $B = \partial G_i/\partial Y$, or its elasticity $E = \partial \log G_i/\partial \log Y$, and depending on the observed nature of this relationship it is customary to claim it to be a constant to be estimated either from a linear or a loglinear equation. This is the basic content of Wagner's Law.

Insofar as G_i's are already aggregates of similar government expenditures one may form the highest aggregate, namely $G = \sum_i^m G_i$, where G stands for total government expenditures on goods and services. Would

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[4] This means that Y is a jointly dependent variable with G_i, but for practical purposes this dependence is so small as to permit dropping this relationship out of sight, because only small distortion results. See also Krzyzaniak [9].

Where G_i is a major component of the total government expenditure series the "smallness" of the feedback from G_i into Y should not be taken for granted but further investigated. If it turns out that G_i in fact affects Y strongly, we need a whole simultaneous equations model. Moreover, in case of joint dependence of G_i and Y an economic variable, our model will become economico-political (see also fn. 2).

[5] The distinction between economic and political variables will be argued here later.

then the relationship

1-2. $G = f(Y,....)$ make sense? Could the feedback from G into Y still be considered "small"? Not according to the standard economic theory especially in its Keynesian version which requires

1-3. $Y = f(G,....)$, where Y is the endogenous, to be explained variable and G, the "near" exogenous one. If so, the Keynesian equation (1-3) is economic, because its only endogenous variable is Y, an economic variable. One has the uncomfortable feeling that in general neither (1-2) nor (1-3) equations are completely correct, but that both Y and G have to be considered jointly dependent. If so, the income elasticity of total government expenditures measures no "causal" relationship. Wagner's Law is then invalid, even if the estimate is significant.

In general, this may be so, but need not be in special cases. Nature, which in economics means economic history, often provides us with experiments at varying degrees of simplification. Then strong claims are possible, and Wagner's Law for the most aggregated form need not be a completely empty box.

Consider an underdeveloped nation. Its domestic new capital formation is inadequate. Foreign capital is not rushing in to underwrite the domestic capital needs. It has to be coaxed among others with stable currency. Consequently, the government has to pursue balanced or near balanced budgetary policy. As the country's political institutions are also undeveloped, its tax policies are rarely tampered with. The latter occurs mainly in times of major national emergencies (wars, political revolutions, etc.). Where the revenue

intake determines government outlay, and tax policies cannot be tampered with, we may speak of the "revenue constraint." Could we claim Wagner's Law in this situation? If so, in what sense?

First, we must require that the feedback from $\sum_{i}^{m} G_i = G$ to Y is "small". How can that be? I argue that the country is underdeveloped. There may exist a dual economy, one small sector of it working with modern, the other large working with traditional technology. Also the traditional sector usually suffers from structural disguised unemployment. Further, the relative importance of public expenditures to the national product is comparatively low. In such a case government expenditures, at least in the short run, would influence Y only a little. This in turn justifies the interest in the slope, B, or the elasticity, E, of the relationship between G and Y. The political model called Wagner's Law seems thus to be resuscitated, but at a heavy price.

The revenue constraint changes interpretation of Wagner's Law. It no longer describes the relationship between government expenditures but between tax policies (which are also political variables) and the national product. E equals $\partial \ln G / \partial \ln Y$, but stands for $\partial \ln T / \partial \ln Y$, where T is tax revenue. In such a situation, if we find that $E > 1$, we may claim only that on the average the tax structure in the country was progressive, i.e. the revenue was rising faster than national income. If $E = 1$, there was an average proportional response, and for $E < 1$ the average tax structure was regressive. The estimates of E also point only to very broad averages that include vector of tax rates, loopholes and the effects of tax avoidance and tax evasion.

Note, however, that whether the tax structure is on the average regressive or progressive does not permit us to draw direct inferences as to its redistributive effects, but only to its change over time.

Turkey is a good example of a simplified historical experiment offering us a case of the revenue constraint. Its tax policies did not change too often or too deeply, its borrowing represented only a small percentage of the Turkish budget, and its budget had little effect on the level of employment, the economy being heavily rural. The estimate of "E" for Turkey turns out to be about equal to one. This permits us to claim that on the average the tax structure of Turkey[5] over the periods analyzed here was neither progressive nor regressive.

2. On the General Model of Determination of Government Expenditures.

The model considered applicable to the Turkish data is simple, permitting us to estimate Wagner's Law. The general model would be, of course, highly complex and at first look resemble, let us say, the model of determination of consumption expenditures by a single consumer. In case of state consumption and of individual consumer consumption we start with a problem of choice. The consumer reveals his preferences in markets, and the state in its budget. Unfortunately, the resemblance stops here.

For an individual consumer we assume a multidimensional ordinal

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[5] An individual tax policy in a country may be at variance with this average measure of progressivity or regressivity, but then there must exist another tax policy or a set of them in that country that offsets this variance in the other direction.

utility map. A higher number of it means only a higher rank to the satisfaction level; it is not a cardinal measure of exactly how much more his satisfaction is higher. Were we to explain consumer behavior at this level of argument, we would need separate (though possibly joint) determination of purchases of all the different types of private goods bought by a given consumer. In this the explanation would resemble that of government expenditures, and would show the same difficulties. But for an individual consumer we can say more. Assuming that his utility map is stable and independent, that markets supply him with given prices, and he is endowed with a budget his choices will have predictable features. He will vary the composition of goods (quantities and types of goods) until the ratio of marginal utilities of two goods he buys will be reflected in their price ratios. Conversely, a dollar spent marginally on any of these goods will give him the same satisfaction. Thus, relative prices of goods would reflect their values.

No such a unifying feature connects government expenditures. The marginal government dollar spent on one type of goods cannot be claimed to have the same value for the citizens of the state as the dollar spent on another type. Government makes choices, but they are not economic. They are political.

The main reason for the political nature of the government choice model lies in the nature of some goods and services supplied by the state. Such goods need not be adequately supplied by the free play of markets. We may call such goods and services public. States, of course, may supply a mix of public and private goods, if

they wish so, and the argument offered here applies only to the public component.

In their extreme form[6] public goods are nothing but externalities available to large numbers of people.[7] Their consumption by one person leaves the total available to others unchanged. Further excluaion of some persons from their consumption is either not possible or very costly. Because of the free supply of public goods to all members, consumers of such goods have little or no incentive to reveal their preferences for such goods.

The state substitutes its own preferences and imposes it on the citizens. But whom does the state represent? In democracy, at least, it is supposedly representing the will of the majority of the people and hopefully the preferences for such goods will be properly revealed at voting booths. As long, however, as the private preferences are not completely revealed, and the state is not heeding them 100%, there will be imposition of the state on private choices. The private and public choices will not mesh and no exact economic calculus would be involved in state preferences.[8] The state choices will remain political, not economic.

In general, we observe that (a) on the revenue side of government operations, the variables are economico-political (for example

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[6]For modern formulation of the theory of public goods see Samuelson [19] and [20], and Head [6].

[7]For small groups agreements within the group (compacts) could reveal preferences of individual members.

[8]No matter how carefully one would try to measure costs and benefits in monetary terms, the non-monetary aspects (for example, political) of such expenditures may be overriding the economic calculus.

tax revenue, state borrowing and lending, paper money printing, money supply) but usually they can be separated into economic (for example, tax bases) and proper political ones (for example, policy instruments), and (b) on the government expenditure side the variables are also economico-political but their separation into economic and political ones is not obvious. Separation seems impossible.

What difference does it make if variables are economic, political or economico-political? The difference determines the nature of the models. If all endogenous (jointly dependent) variables are "economic," the model may be called economic. In such a case in aggregated models any non-economic variable,[9] for example, a political one, could be considered (near) exogenous.[10] Vice versa in a political model an economic variable may be so considered. In an economico-political model,[11] however, we may have to go outside the world of economic or political variables to find explanatory variables. Insofar as determination of a government expenditures model calls for an economico-political one, we may despair (at least at present) as to its proper specification. Fortunately, in the case of Turkey we may formulate a much simpler purely political model.

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[9] A more careful delineation between sciences than that of present custom would allow the departmental principle to be operative. Under this principle any variable determined outside of the field of economics could be used in economic model as near exogenous. Vice versa in a political model, an economic variable, for example, GNP, could be used as a near exogenous variable explaining endogenous policy instruments, at least partially and/or with a variable lag.

[10] For the discussion of the near exogenousness, see Krzyzaniak [9].

[11] The only well known model of the last type is Karl Marx's model of economic and social development as explained by changes in technology of production. German Historical School in Economics would have welcomed development of economico-political and even of higher complexity models.

3. The Basic Simplified Model

Several economists[12] noted that during the earlier[13] stages of economic development the necessities of life are pressing citizens of a country very strongly (Engels' Law) forcing the government to forego free pursuit of an optimal supply of public goods. The state spends only what it can collect.

Where the "revenue constraint" applied the model explaining government expenditures in a developing economy may be partitioned into independent parts. Specifically, if we note the total revenue, T, the total government expenditure, G, and expenditures on particular public good, i, G_i. Then $\Sigma G_i = G = T$, and this equation does not depend jointly on the values of individual G_i's. In fact, one may first determine the total expenditures from the $G = T$ equation and then because of the constraint $\Sigma G_i = G$ proceed to find the explanation not for G_i's but for their percentage share in G. Defining such shares, g_i, where $g_i = G_i/G$, the second submodel would consist of several jointly dependent equations determining all g_i's subject to the macro constraint $\Sigma g_i = 1$.

In this paper only the first submodel, explaining T or G is sought. The model is small with respect to the number of equations required to be make it complete,[14] and no longer is economico-political. At first

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[12] See [7], [13], [16].

[13] Musgrave also sees a possibility that (especially in later stages of full economic development) a stickiness of habits may occur, restraining democratically elected governments from too much tampering with the tax system and its rates. This would reestablish the regime of "the revenue constraint" over government expenditures in later stages of economic development. Despite this, however, in a fully developed economy we may suspect joint dependence of G and Y, hence the model will remain economico-political.

[14] A complete model has as many equations as there are endogenous (jointly dependent) variables.

look it seems to remain so, but this impression could be misleading. First, we note that T variable must be near identical with G.[15] Fortunately, tax revenues are themselves multiplicative functions of tax bases times tax rates. Noting tax bases Y_j's and tax rates X_j's we find $T = \sum_{j=1}^{m} X_j Y_j$ or in vector notation $T = X^{*\prime}Y^{*}$ where

$$X^{*} = \begin{matrix} X_1 \\ X_2 \\ \cdots \\ X_m \end{matrix} \quad \text{and} \quad Y^{*} = \begin{matrix} Y_1 \\ Y_2 \\ \cdots \\ Y_m \end{matrix} .$$ In turn this yields

3-1. $T = G = X^{*\prime}Y^{*}$.

Obviously G and X^{*} variables, being "political," are jointly dependent.[16] The real problem is G. In general we suspect it of having a strong feedback from economic bases, thus we should consider it an economico-political variable. Fortunately, as already noted, for an underdeveloped nation, with its large pool of structural unemployment, the observed income does not depend strongly on the level of government expenditures. Thus G can be claimed a purely political variable. In such a case, equation (3-1) with other equations explaining the X^{*} vector represent a political model. Its reduced form[17] subject to an identifiability constraint would be a good predictor of G and X^{*}. The case of Turkey is even less complex.

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[15] See Krzyzaniak [9, p. 210].

[16] In the preceding section I argued that in general it is so. Keynesians claim that $Y = f(G)$, and I here seek justification for the case of $G = h(Y)$.

[17] In the case of "the revenue constraint," but without fixedness of the tax structure, some sort of Wagner's Law may be formulated but the relationship need not be linear in logarithms and other near exogenous variables besides Y may have to appear in the reduced form of equation for G.

An underdeveloped nation has problems with devising new tax structures. The pool of governmental management talent is small. As a consequence the tax structure is not changed over a longer period of time, and this structure is tampered with only in times of strong political shocks. Then while there is little feedback from G to X^*, the feedback is large from X^* to G. In such a case, the endogeneity of G and X^* may be also broken. This I claim for modern Turkey. Instead of having equation (3-1) and other equations explaining X^* variables, we are only left with equation (3-1), X^*'s and Y^*'s being the (near) exogenous variables of this equation, which is already in a reduced form.

Suppose now that all tax policies, including their rates, remained constant over a longer period of time, and that the national product and the various tax bases grew also at a constant rate. Then the national product is an index for all bases and we may write equation (3-1) as

3-2. $G = X^* \cdot Y^* = (a_o \bar{X}) (Y)^{A_1} = e^{A_o} Y^{A_1}$.

where a_o is a coefficient in which we are not particularly interested and we may write $A_o = \log (a_o \bar{X})$. For Wagner's Law we are interested the most in A_1.[18] It reflects, however, the nature of the tax structure; namely, if $0 < A_1 < 1$ the tax structure on the average must have been regressive, for $A_1 > 1$ progressive, and for $A_1 = 1$ the overall

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[18] A_1 is an estimator of income elasticity of government expenditures E, namely $A_1 = E = d \log G / d \log Y$. We remember here that thanks to revenue constraint $T = G$, thus in fact $A_1 = d \log T / d \log Y$. In other words, even if we regress G or Y we do not get the proper Wagner's Law. G and T are collinear.

tax policy at impact had no regressive or progressive features, hence the initial distributional effects of taxes were preserved over time.

Taking logarithms of equation (3-2) the submodel collapses to a linear relationship:

3-3. $\log G = A_o + A_1 \log Y$, a mistaken form of Wagner's Law.

Inasmuch as tax rates did not remain fixed over the period for which equation (3-3) is sought one would have to consider displacement effects of major political events in the form of shifts in the intercept or in the slope of Y. We shall find later that for Turkey from 1950 on there is no evidence of displacements.

Wagner's Law has a long standing among economists, and its content represents an effort at explanation of determination of government expenditures. But in an undeveloped nation under the "revenue constraint" it is a relationship between the tax side of the budget and not a relationship between public wants, given an increase in the national product. In this particular case one may also answer the contention between Musgrave and German Wagnerists[19] as to whether a fractional estimate of A_1 is a trivial finding or not. As A_1 points now to the overall progressiveness or regressiveness of the tax structure[20] it is not trivial to find that this structure is regressive.

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[19] See footnote 3.

[20] For a correct evaluation of this measure, transfers to persons being negative taxes should be kept on the revenue side as negative revenues. Then the measure A_1 represents the effective regressivity or progressivity of the tax structure on the average, including loopholes and tax evasion. Of course, one could go directly after this measure by regressing the tax revenue minus transfers on the national income.

4. The Turkish Tax System over Time

There are no surprises in the present day tax system in Turkey; there e ists a heavy reliance on indirect taxation which is explained by the unadvanced stage of economic development of Turkey. My purpose, however, is to find what was the Turkish tax system and to establish the existence of "the revenue constraint" on the expenditures of the Turkish government.

Unfortunately, official and unofficial comprehensive reviews of changes in the Turkish tax system are lacking. I review here changes in the Turkish tax system as they may be ascertained from publications and papers. There are unavoidable defects in this approach. Compilations may have gaps especially in the earlier periods. Where the gaps are filled, the adequacy of information may be questioned. Specifically, one may want to know more than is available. For example, when a change in the tax system or in the tax rates occurred one may want to know exactly when it was legally enacted, and when it became operative. In the available literature often only the fiscal year is given in which the change became operative.

The Turkish budgetary year itself was changed from time to time. Prior to 1950 the budget was on a calendar year basis, and from 1951 was on the 12 month basis, from March 1st to the end of February the next year. For 1950 the budgetary year was 14 months long and covered the time from January 1, 1950 to the end of February, 1951. The expenditure data for that year, shown here in Table 5, have been appropriately scaled down [to (12/14) fraction for that year].

Let us start the review with Ilhan Ozer [15]. He notes that the revenue of the general budget of Turkey came from taxes, custom duties, monopolies, rents, sale of public property and foreign aid. He then shows the share of these sources in the total revenue. For the 1965 budget he finds:

Type of revenue source	As a percent of the total revenue
Personal income tax	21.5
Manufacturer's excise tax	13.9
Aid	11.1
Monopolies	9.6
Custom duties	8.6
Gasoline tax	5.9
Stamp tax	4.4
Corporation income tax	3.7
Sugar tax	3.1
(Compulsory) savings bonds	3.1

The sources quoted above add up already to 84.9 percent of the total revenue. The remainder was taken up by: a defense tax from building tax, an inheritance and gift tax, a motor vehicle tax, a transportation tax, a communication tax, a foreign traveling tax, a banks and insurance tax, etc.

The indirect taxes thus produced the major portion of revenues. Özer [15, p. 83] shows the following shares of direct and indirect tax revenues.

Fiscal Year	Percent of total tax revenue	
	direct taxes	indirect taxes
1960	38.3	61.7
1961	39.2	60.8
1962	32.8	67.2
1963	32.5	67.5

Although there was a relative shift to even more indirect taxation from 1962 on, absolute yields of all taxes were rising, but at different rates.

Let us now consider changes over time in the various taxes starting with the personal income tax. The tax was introduced June 3, 1949.[21] The rates were progressive, rising from 15 to 45 percent[22] depending on the income tax bracket of the payee and on the source.[23] The highest bracket up to TL 100,000 paid the highest marginal rate, but people with incomes higher than this bracket paid a flat 35 percent rate.

Changes occurred after 1960. In that year a turbulent political activity ended up with an officer group seizing power from the new Democratic Party.[24] General Gürsel became acting President and Prime Minister and the new regime made some changes in the Turkish tax structure.[25] Specifically in 1961 the income of large scale industrial farms became taxable. In 1962 the tax rate for incomes < TL2500 was reduced from 15 to 10 percent, and the highest brackets differentiated, the highest bracket marginal rate increased to 65 percent. For incomes higher than TL 500,000 an average flat rate of 60 percent applied. Also, personal deductibles were increased.

Concomitantly with changes in the income tax Turkey introduced a compulsory savings system in 1962. All income tax payers had to buy

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[21] See: Z. Y. Hershlag [8], and Thomas D. Roberts [17].

[22] Soon the rate for the top bracket was increased to 50 percent.

[23] Agricultural incomes were excluded from this tax.

[24] This party was organized in 1946 and in 1950 won majority in the Turkish election. It formed then the Menderez government which was overthrown a decade later.

[25] See, for example, Economic Survey by OECD [4], Thomas D. Roberts [17] and Z. Y. Hershlag [8].

government (6 percent) savings bonds maturing in ten years at least in the amount of 3 percent of their taxable income. These bonds were non-negotiable for five years.[26] In 1967 this was revised, exempting taxable incomes < TL 1,400 completely.

On the face of it assuming that the income tax was not shifted, the legal provisions made the Turkish income tax progressive. Finding here that overall the Turkish income tax structure was neither progressive nor regressive (i.e. that the income elasticity of government revenue and expenditure was only insignificantly different from one) suggests that other taxes must have been regressive to offset income tax progressivity. But such a straightforward conclusion may be erroneous. The progressivity of legal provisions could have been also more than offset by existence of intended and unintended loopholes, tax avoidance and tax evasion. In Turkey the problem of tax evasion is especially acute.[27] This may have nullified most of the progressive features of the Turkish income tax.

A corporation income tax was imposed June 7, 1949. Its rate was

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[26] See Roberts [17].

[27] Zeki Döşlüoğlü [3] gives a review of loopholes and reasons for the high tax avoidance and evasion in Turkey. Sadullah Aygun and Zeki Döşlüoğlü [1, p. 250] estimate that in 1963 personal income tax collection yielded TL 2,228 million but another 75 percent of this figure, namely TL 1,671 million, was not collected because of tax evasion. The same authors also show the distribution of taxable income and of tax liability by income brackets, and claim that upper income brackets because of their high share in taxable income reported must have benefitted highly from this evasion. Moreover, they do not pay the income tax which they should because of self-assessment system and the income effect (incentive to cheat is high for them). The middle income groups (salary and wage earners) do not assess their incomes themselves, but have them reported by their employers, which cuts on cheating.

K. Tanyu Yürükoğlu pays attention to the legal provisions alone and finds this tax progressive.

10 percent on net profits of capital associations and cooperatives and 35 percent on other corporations.[28] Later the rate on other corporations was lowered to 23 percent. In 1961 the rates were increased: on capital corporations and cooperatives to 20 percent and on other corporations to 36 percent.

Insofar as the ownership of corporations was held mostly by persons in high income brackets, and the tax was not shifted either backward or forward, this tax could have contributed to the progressivity of the Turkish tax structure. Unfortunately, I know of no information that would substantiate any claim as to the short and/or long run incidence of this tax in Turkey.

Excise taxes are an old tax device in Turkey. Manufacturer's Excise Tax provisions were readjusted[29] in 1949 and spelled out in a code, dated July 23, 1956. The code shows that most of the rates were ad valorem and varied considerably up to 75 percent rate for luxuries, which would have made this tax progressive. Usually there was an offsetting tax at the same rates on foreign imports that competed with taxes domestic goods.

The same code also had provisions for taxation of banks and insurance companies (20 percent rate), for transportation (from 6 to 25 percent rate depending on the type of transportation and nature of the transported good or person) and on communications (10 percent rate). If not shifted these taxes may have been regressive. Changes in the rates of these taxes were quite frequent, but small.

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[28] See Ilhan Özer [15].

[29] See Z. Y. Hershlag [8].

Customs duties were also changed over time. A codification occurred in 1949, setting tariffs on the average from 15 to 17 percent. In May 1964 these tariffs on the average were increased[30] to 25 percent.

In 1963 a Foreign Travel Expenditures Tax was introduced.[31] The rate was 50 percent on purchases of foreign exchange. The same year buildings, banks, and insurance transactions, gasoline, inheritance and gifts, and stamp tax rates were increased.

Prior to 1950 deeper changes in the tax structure occurred from time to time, especially with the advent of World War II. As we go back, however, the quality of the data becomes poorer. Consequently, in the econometric work I restricted myself only to the period from 1950 on.

5. Data

The econometric model to be fitted should relate: (1) central government expenditures, noted G, (2) GNP, noted Y, (3) net central government borrowing and (4) transfers to persons. Items (3) and (4) should be subtracted from G.

Such series in Turkish lira, noted here TL, could be either in constant or in current money units. The latter measures are preferable because the objective of this paper is to measure the average progressivity or regressivity of the Turkish tax structure, and most of the tax rates have bases expressed in current TL. Only gasoline tax rates, some excise tax rates, and some custom duties are specific,

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[30] See Öser [15, p. 87].

[31] See Economic Survey [4].

i.e. have their bases measured in physical units.

The model calls for regression of government expenditures, noted G,[32] less net government borrowing,[33] less transfers to persons,[34] on GNP, noted Y. Unfortunately, only G and Y have a longer time coverage. I faced two choices. One was to restrict the time coverage. The other was to use only G and Y series, thus have both longer time coverage and more degrees of freedom, but data less exact. The second alternative turned clearly superior, the loss from inexactness of data being bearable.

It turns out that net government borrowing and transfers to persons were comparatively small items of the budget.[35] Because of this not

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[32]One has to decide whether these expenditures should include spending by the local government in Turkey or not, and whether budgets or various public enterprises have to be included. The latter (data shown separately for Turkey in annexed budgets) do not arise (with some reservations) from proper governmental functions, hence except for net subsidies the data from annexed budgets can be disregarded.

As for inclusion of the local government data, there were other reasons not to do so. The local government in Turkey is a small operation, its revenue depending heavily on transfers from the central government. The inclusion of local government thus adds little to the central government. Table 1 offers insights into this aspect.

As the time coverage for the expenditure data including the local government in full are scarcer only the central government expenditures series is fitted in this paper.

[33]For the series on net government borrowing and its relative percentage in G, see Table 2.

[34]For Turkey it is difficult to separate clearly the "true" transfers to persons from that to institutions. Most transfers, however, can be assigned as mainly to institutions, and only the social security series mainly to persons (it represents payments of the Turkish pension plan to government employees). Table 3 shows the absolute figures and the relative share in G of all transfers and of transfers under the social security heading.

[35]See footnote 33, 34, and Tables 2 and 3.

much was lost by disregarding them. Were these items true constants, they would affect the intercept[36] but not the slope of the relationship. Insofar as they are not constants but small, they change the slope a little and probably increase the error term thus yielding a slightly poorer estimate of income elasticity of G.

6. Graphical and Econometric Analysis

As noted before, Turkish data collection improved with time. In current TL there are good data from 1950 in both GNP (Y variable) and G. I offer such data in Table 4 for the period 1950-1969. I also relate the two series in graph 1. The double log relationship yields nearly a straight line with a slope of about 45^{o}. There is no evidence that the tax structure changes noted in the preceding section displaced either the slope or the intercept of this relationship.

Surprisingly, there is no direct, consistent estimate of GNP in current TL in the years preceding 1950, though such data exist for government expenditures, G, as far back as 1938. I was tempted to estimate GNP in current TL and so extend my coverage backwards to the year 1938. As there exist data for GNP in constant TL, I re-estimated the current TL series with the help of a crude price index. The data are offered in Table 5.

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[36] Specifically if the model adopts the view that net borrowing as a percentage of G is a constant, α, and transfers to persons as a percentage to G is a constant, β, then the true model is not equ. (3-3) but

(6-1). $\log [G(1-\alpha-\beta)] = A_o + A_1 \log Y + u.$

This, however, can be rewritten as

(6-2). $\log G = A'_o + A_1 \log Y + u$, where $A'_o = A_o - \log (1-\alpha-\beta)$.

The relationship between G and Y for the period 1938-48 is offered in Graph 2. In this case we note that there were shifts in the slope and the intercept of the relationship during World War II. Moreover, after 1944 the relationship seems to be very unstable, resembling that of a random walk. The end of war in the Mediterranean basin seems to have resulted in Turkey in an economic imbalance and a high price instability. Also during the World War II the Turkish government borrowed more freely than usual, which may have invalidated the revenue constraint assumption. With lesser faith in the data themselves I decided not to submit the data for the period 1938-48 to an econometric analysis.

In the econometric part I fitted data for the period 1950-69 to the following model:

6-1. $\log G = A_o + A_1 \log Y + u.$

The least squares technique of estimation yielded the following:

6-2. $\log G = -.996 + \underset{\substack{(.024)\\[42.252]}}{1.013} \log Y + u$ [37]

$DW = 1.369,\ R_a = .995.$

The correlation coefficient A_1 is very close to value '1', with that value included in the 95% confidence interval. One could interpret this finding as a support for the hypothesis that the Turkish tax structure[38] was neither regressive nor progressive. The error

[37] The round brackets under the coefficient A_1 show the standard error (corrected for loss of d.f.s.) of the estimate. The square brackets show the t statistics of this estimate. The multiple correlation coefficient R_a is also corrected for d.f.s.

[38] One could ask why then I fitted G and not T (tax revenue). My purpose here is to show that G is in the case of Turkey a substitute for T and if somebody seeks the income elasticity of government expenditures, $E = \partial \log G / \partial \log Y$, he will find my results but he should not claim this to be a "proof" of Wagner's Law interpreted the usual way.

terms when reviewed graphically did not show any sign of hetero-schedasticity. One would not expect it anyway in view of such nearly perfect fit (very high R_a). However, the DW statistics is somewhat disturbing. It falls in the region of uncertainty[39] as to existence or non-existence of a one-period lag positive autocorrelation. If that kind of autocorrelation is present, the estimate of A_1 is unbiased, but the variance of the error term may be underestimated. In other words, the fit need not be as good as the numbers given above suggest.

To be sure that my results are correct I used the generalized least squares technique to remove autocorrelation. For this purpose first I fitted the relationship (6-3).

6-3. $u_t' = \zeta\, u_{t-1} + e_t'$,

and estimated ζ. I found $\zeta = .301$. In turn I formed new variables $G_t' = \log G_t - \zeta \log G_{t-1}$, and $Y_t' = \log Y_t - \zeta \log Y_{t-1}$.
These were then regressed in the model

6-4. $G_t' = A_o' + A_1' Y_t' + u_t'$.

In the process one observation (namely, that for 1950) was lost. The estimates were:

6-5. $G_t' = -.640, + .985\ Y_t' + u_t'$
$\qquad\qquad\qquad\qquad\quad (.046)$
$\qquad\qquad\qquad\qquad\quad [21.232]$
$\qquad DW = 1.979,\ R_a = .981.$

Once more I found that the income elasticity A_1', is very close to value '1' and the 95% confidence interval includes that value. The standard error of the estimate is now higher, and the resolution

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[39] The 5% significant level of upper $D_u = 1.40$ for 20 observations of u_t's.

remains high (high R_a). Moreover, the Durbin Watson statistic permits acceptance[40] of the hypothesis of no autocorrelation. I accept equation (6-5) as the better estimate of this relationship.

7. Evaluation

I have shown that by regressing G on Y one may easily get statistically significant estimates of the income elasticity of government expenditures, but their interpretation would be a problem. In many cases national income (product) and government expenditures are jointly dependent variables and then the income elasticity estimate of the latter cannot be given a "causal" interpretation. In such a case also its estimation by the least squares method is illegitimate, the estimate being both biased and inconsistent.

For Wagner's Law to represent a "causal" relationship one must require that $G = f(Y)$ and not vice versa, as the Keynesian theory taught us. Thus at least a convinced Keynesian cannot believe in Wagner's Law for highly aggregated series of government expenditures. Is there a place for Wagner's Law at all?

I have shown here that the correct direction of causality from the national income to the tax revenue to government expenditures can be assumed to hold in case of undeveloped nations operating under the revenue constraint. In such a case the income elasticity of government expenditures is, however, a statement on the effect of changes in income on the tax revenue and the size of that effect is a measure of

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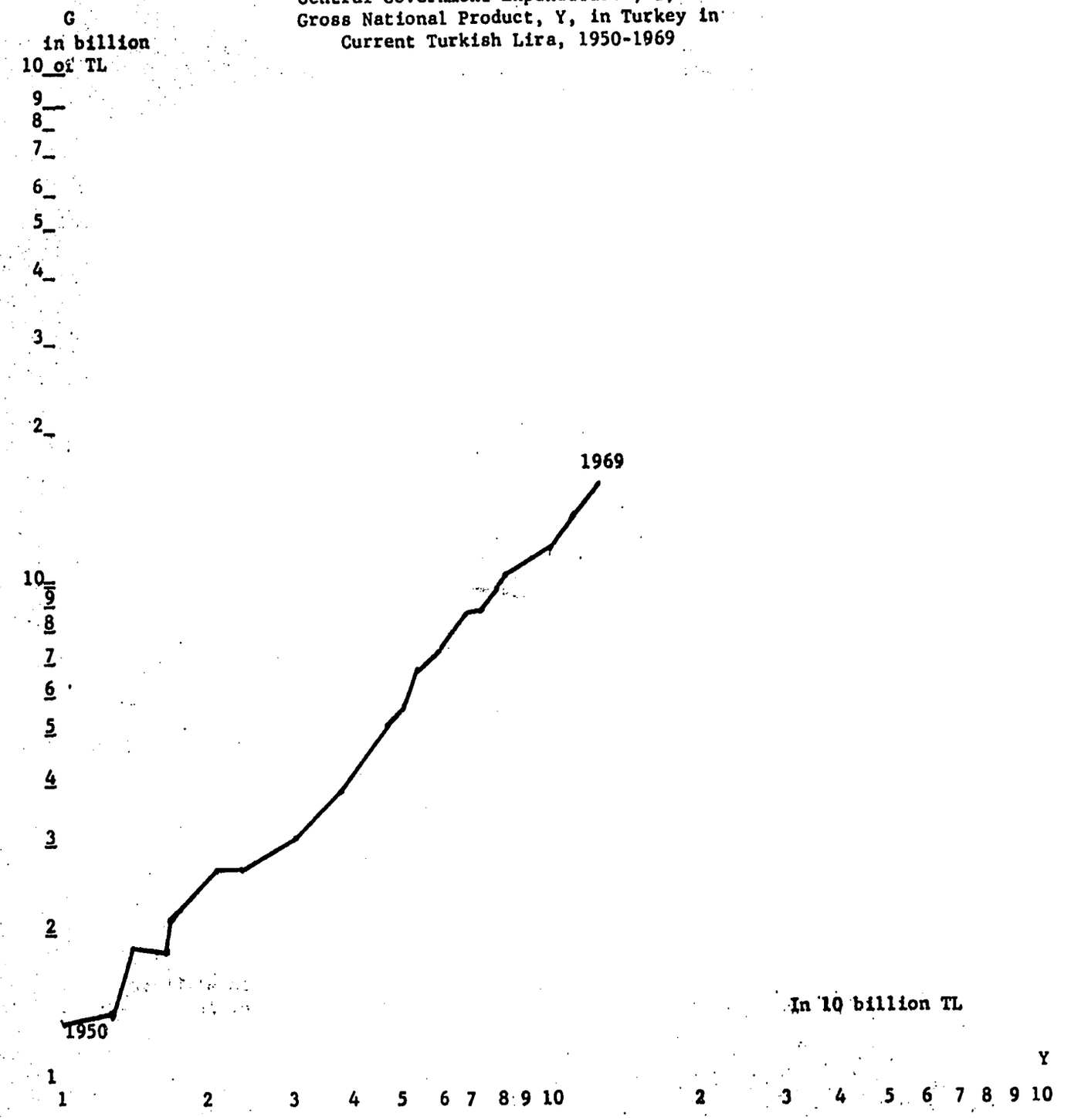
[40] For 19 observations 5 percent significant $D_u = 1.41$, the observed DW exceeding this value.

progressivity or regressivity of the tax structure on the average, and including loopholes, intended or not, tax avoidance and tax evasion. Thus one may estimate the income elasticity of government expenditures, find a highly significant result, and still deny the true meaning of Wagner's Law. Note, however, that in this case the estimate has a meaning, and the application of least squares is legitimate.

In the case of Turkey we find that data support the hypothesis that from 1950 to 1969 the Turkish tax structure on the average was neither progressive nor regressive. That, of course, does not mean that Turkish taxes and government expenditures had no redistributive effects on the average. Also, in the mix of taxes and mix of expenditures some of these policies may have had strong redistributive effects, as long as other policies had compensating effects in the other direction. All this proves that despite growth of national income in Turkey since 1950, the progressive-regressive mix of policies resulted in no deviation from the rise of tax revenues in proportion to incomes.

Graph No. 1

Central Government Expenditures, G, and Gross National Product, Y, in Turkey in Current Turkish Lira, 1950-1969



Graph No. 2

Central Government Expenditures, G, and Gross National Product, Y, in Turkey in Current Turkish Lira, 1938-1948

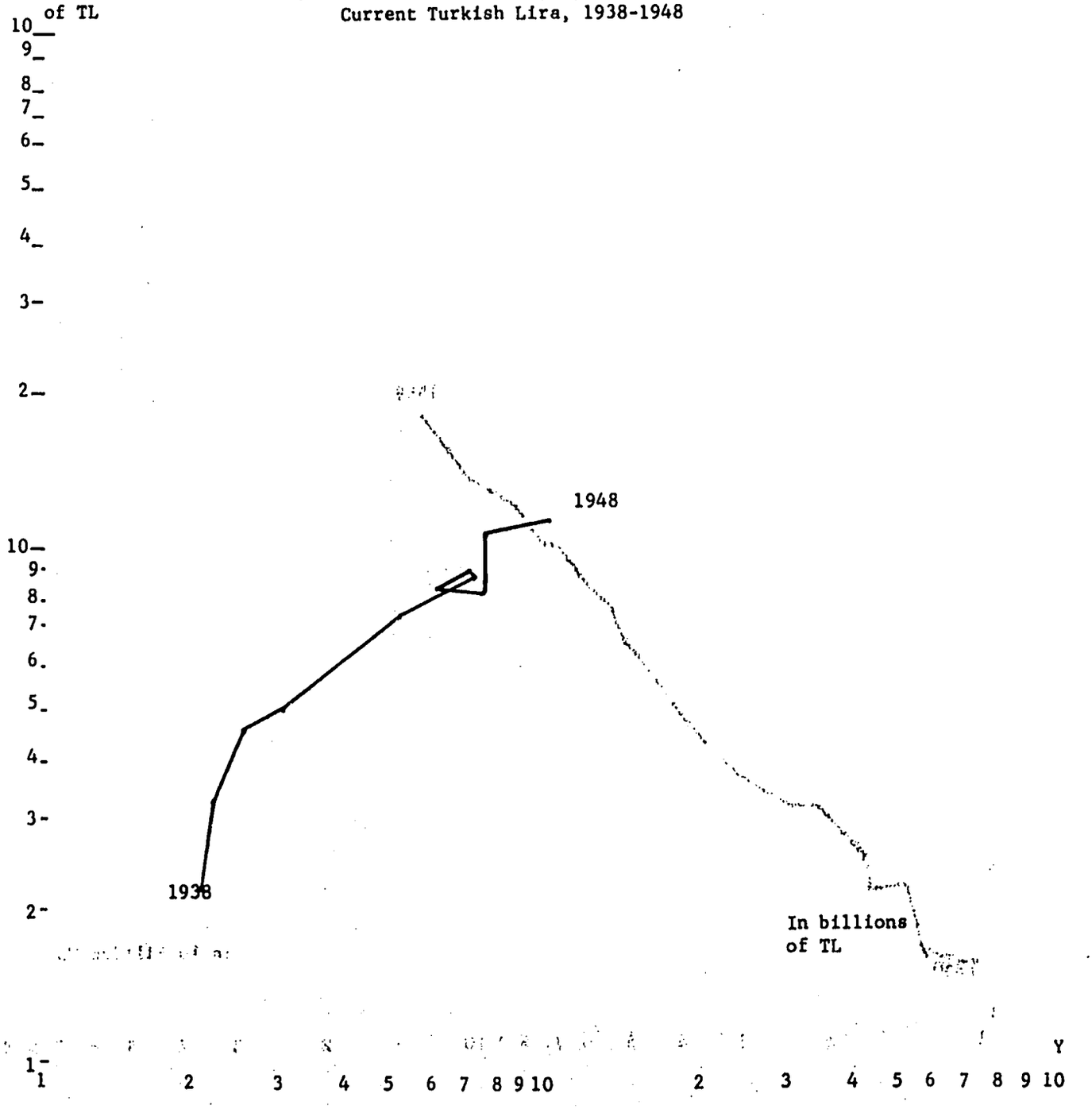


Table 1: Central and Local Government Expenditures in Turkey, in Millions of Current TL, 1950, 1953-63

Year (1)	Central govt. expenditures (2)	Local govt. expenditures (3)	Local govt. expenditures as percentage of those of central govt. (4) = [(3):(2)]100
1950	1.236	5	.4
1953	1.808	175	9.7
4	2.140	203	9.5
5	2.635	229	8.7
6	2.691	333	12.4
7	3.026	354	11.7
8	3.715	386	10.4
9	5.053	507	10.0
1960	5.480	518	9.5
1	6.667	620	9.3
2	7.012	687	9.8
3	8.434	759	9.0

Source: James W. Land [10, pp. 32-33, 42-43].

Table 2: Net Central Government Borrowing in Millions of Turkish Lira (TL) and as Percentage of Central Government Expenditures, 1950, 1953-63

Year (1)	Net central govt. borrowing (2)	Central govt. expenditures (3)	Net central govt. borrowing as percentage of central govt. expenditures (4) = [(2):(3)]100
1950	13	1.236	.1
1953	155	1.808	8.6
4	174	2.140	8.1
5	316	2.635	12.0
6	206	2.691	7.7
7	92	3.026	3.0
8	180	3.715	4.8
9	175	5.053	3.5
1960	457	5.480	8.3
1	382[1/]	6.667	5.7[1/]
2	371	7.012	5.3
3	363	8.434	4.3

[1] Because of a particular year accounting procedure, this item is estimated from the series for 1961 on p. 76 less item F5, p. 79.

Source: James W. Land, [10, pp. 42-43, 76-77].

Table 3: All Transfers and Social Security Expenditures in Millions of Current TL, and as a Percentage of all Government Expenditures, 1950, 1953-63

Year (1)	All transfers[1] (2)	Social Security expend.[2] (3)	All govt. expenditures (4)	As a percentage of all govt. expend. all transfers (5)=[(2):(4)]100	Social Security expend. (6)=[(3):(4)]100
1950	321.4	83.4	1,314.9	24.4	6.4
1953	630.2	82.1	1,864.4	33.8	4.4
4	719.6	94.3	2,265.7	31.8	4.2
5	965.0	95.6	2,769.7	34.8	3.5
6	1,116.3	118.7	2,973.9	37.5	4.0
7	1,480.2	135.2	3,292.0	45.0	4.1
8	1,812.5	138.1	4,069.4	44.5	3.4
9	2,407.7	187.1	5,462.6	44.1	3.4
1960	2,752.2	184.8	5,915.8	46.5	3.1
1	3,078.5	208.2	7,245.5	42.5	2.9
2	3,061.0	216.8	7,784.0	39.3	2.8
3	3,866.9	229.0	9,192.9	42.1	2.5

[1]Most of transfers (Social Security being the most important exception) were passed predominantly to institutions and little to persons.

[2]This series represents mainly payments to retired civil servants and their families, thus it is a transfer to persons.

Source: James W. Land [10, pp. 22-25].

Table 4: Turkish GNP (Noted Y) and Central Government Expenditures (Noted G) in millions of TL, 1938-1948

Year	GNP in millions of constant TL 1948 = 100%	Consumer price index, P 1948 - 100%	Estimate of Y in current TL P · Q = Y	G in current TL
1938	7,038.1	.290	2,041.0	236.1
9	7,419.9	.293	2,174.0	325.8
1940	7,690.3	.325	2,499.3	446.3
1	7,528.1	.400	3,011.2	489.5
2	7,888.0	.675	5,324.4	740.9
3	7,250.5	1.006	7.294.0	888.2
4	7,165.6	.994	7,122.6	910.1
5	5,941.7	1.026	6,096.2	824.9
6	7,754.9	.991	7.685.1	818.1
7	7,747.5	.997	7,724.3	1,108.4
8	10,067.0	1.00	10,067.0	1,143.6

Source: For GNP in constant TL (noted Q) see Aysel Yenal [25]. It was necessary for the author to carry back 1948 estimates by indices of agricultural output, industrial output, etc. All estimates were then adjusted to obtain comparability. Intrapolation used for years with no estimates, assuming straight line trend.
For central government expenditures, see [11], and [12].

Table 5: Turkish GNP (Noted Y) and Central Government Expenditures (Noted G) in Billions of Current TL, 1950-1969

Year	Y	G[3]	log Y	log G
1950	10.3843[1)]	1.059[4)]	1.01652	0.02490
1	12.2708[1)]	1.369[5)]	1.08887	0.13640
2	14.3205	1.859[5)]	1.15596	0.26928
3	16.8210	1.808	1.22586	0.25720
4	17.1148	2.140	1.23337	0.33041
55	21.0595	2.635	1.32347	0.42078
6	24.3340	2.691	1.38622	0.42991
7	30.5287	3.026	1.48471	0.48087
8	38.5062	3.715	1.58553	0.56996
9	47.7264	5.053	1.67876	0.70355
1960	50.9695	5.480	1.70731	0.73878
1	53.7197	6.667	1.73014	0.82393
2	60.3088	7.012	1.78038	0.84584
3	69.0240	8.434	1.83900	0.92603
4	74.1977	8.519[2)]	1.87039	0.93039
65	80.0200	9.555[2)]	1.90320	0.98023
6	93.5780	10.221[2)]	1.97118	1.00949
7	103.9957[2)]	11.958[2)]	2.01703	1.07770
8	114.7524[2)]	13.720[2)]	2.05976	1.13735
9	128.3795[2)]	15.202[2)]	2.10850	1.18190
		Σ	32.16616	13.27490

[1] From [14, Table 1, p. 2].

[2] Provisional estimates.

[3] For the periods here considered the Turkish fiscal year does not coincide with the calendar year. Specifically the data for the year cover expenditures from month 1st of the year t to the end of February of the year (t + 1).

[4] As the 1950 fiscal year was 14 months long, the data shown here is 12/14 of the published data.

[5] Estimated with the help of data in Yorgi Demirgil [21]. He offers the missing data for 1951, 1952 as well as for 1950 and 1953, but his data differ from the comparable statistics here used; hence, to estimate data for 1951 I rescaled his data for that year in the same proportion as are his data to Land's data [10] for 1950. Similarly for 1952 I rescaled his data in the same proportions as are his data to Land's data for 1953.

Sources: For GNP at market prices see [21].
For central government expenditures, see James W. Land [10].

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