PUBLIC EXPENDITURE GROWTH IN GREECE AND PORTUGAL: Wagner's Law and Beyond

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WAGNER'S LAW AND BEYOND
by
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Abstract

In the tradition of Wagner's law, this study examines the relationship between aggregate income and public expenditures in Greece and Portugal during the years 1958-85. Unlike more conventional specifications, our analysis focuses on the movement of different components of public expenditures. Permanent income, relative prices, stabilisation policy and socio-political factors emerge as the main determinants of public expenditures, while the results reveal significant differences in responses to these determinants across components of expenditures and between the two countries.
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INTRODUCTION

For several decades now considerable attention has focused on the growth of the size of the government sector. Accounts of this phenomenon have span a seemingly wide range of, in truth, partly complementary hypotheses, notably: Wagner's law, displacement effects, productivity lag, bureaucracy and institutional factors.

This study dwells on Wagner's law as a way of ordering the experience of Greece and Portugal in the years 1958-1985. In the process, however, it aims to throw some new light into research on Wagner's law in general.

Wagner's law postulates that during the industrialisation process as the per capita income of a nation increases the share of public expenditures in total expenditure increases. The rationale for such a relation is often traced to demand, and thus in empirical studies the validity of the law is sought in terms of whether or not the income elasticity of demand for public expenditure is greater than unity. Yet, in the context of demand one may safely presume that a complete statement of the underlying pattern of behaviour that the "law" purports to capture, will entail more than per capita income alone as the determinant of public expenditure. Moreover, in so far as the factors underlying Wagner's law pertain to a longer-run horizon, there are questions about the relevant concept of income to be used, that seems too ill-advised to bypass by exclusive attention to the contemporaneous relationship between expenditure and income. What is more, at any point in time public expenditures are also likely to reflect
decisions taken for reasons other than those pertaining to the choices encapsulated in Wagner's law. These issues play much in what follows.

Section I describes the experience of Greece and Portugal, two countries that during the period under review exhibit several similarities in the political as well as the economic spectrum. After presenting the main class of models encountered in other empirical studies, only two of which focus on Greece and none specifically on Portugal, section II develops a more general specification that combines aspects of demand theory with a long-run perspective and short-run stabilisation policy responses, while also allowing for possible displacement effects in the relationship between public expenditures and income. The empirical results derived from estimating the general specification are discussed in section III, and the broad pattern of findings is summarised in the concluding section.

I. PUBLIC EXPENDITURE GROWTH IN GREECE AND PORTUGAL

Greece

Starting from a level of $1460 in 1960, per capita income in Greece has increased to $4313 in 1985 (both figures at 1980 US dollars). Chart 1 shows the path of the share of public expenditures in GDP\(^2\) and of the principal components of the total, namely, government consumption, investment, transfer expenditures (the sum of subsidies plus transfer payments) and interest payments. It also shows the path of the ratio of public revenue to GDP.

Throughout the period under consideration the percentage of the total of public expenditures displayed a sharp upward trend and has more than doubled, rising from less than 25 per cent of GDP at the beginning of the
Chart I. Government Expenditure and Revenue Shares in Greece
period to more than half of GDP in 1985. This overall picture, however, disguises the fact that different patterns prevail during different phases and that there have been important differences in the time paths of the various components of public expenditures.

Closer inspection of the graph reveals that significant changes in the growth pattern of individual spending programmes are related to major political events like the military coup of 1967, the return to democratic government in 1974 and the accession to power of the socialist party in 1981. Accordingly, the period 1953-85 can be divided into four sub-periods 1958-67, 1967-1974, 1974-81 and 1981-85. In the first sub-period the share of public expenditure in GDP increased from 24 per cent in 1958 to 34 per cent in 1967. More than half of this increase took the form of rises in transfer expenditures, while consumption and investment rose only modestly. In the next sub-period, 1967-74 the growth of the shares of consumption and transfers declined, while the rate of growth of public investment accelerated. In 1973, the year of the first oil shock, all relative shares fell sharply, but the decline was more than made up in the next two sub-periods owing to different reasons for different components of expenditures.

Following the deterioration of relations with Turkey, and the 1974 invasion of Cyprus, the new government faced urgent needs for sizeable defence programmes. But apart from defence, certain categories of consumption expenditures, notably, administration, health and education, also grew sharply, reflecting partly a change in social priorities but also increased cost of provision for certain types of public services.

Changes in social priorities also underly the acceleration of the growth of transfer payments that occurred in 1974, a tendency which has assumed even
greater proportions after 1981, so that in 1985 transfers account for one-fifth of GDP. Similarly, 1974 marks the rapid increase in the share of interest payments on public debt, which reflects both the increase in government borrowing as a result of running budget deficits and the higher nominal interest rates as a consequence of the higher inflation rates. On the other hand, between 1974 and 1981 government investment declined in the attempt of the government to ease off the inflationary pressures in the economy. That trend was, however, reversed after 1981, when the socialist government pursued expansionary fiscal policies, and the share of public investment rose from 6.5 per cent of GDP in 1981 to 9 per cent in 1985.

Finally, Chart 1 also shows the time path of public revenue which lies entirely below that of total public expenditure. The two are shown to grow practically together until 1973 when the expenditure ratio shifted upward to a higher path; the margin has again widened in 1981 implying an exceedingly higher budget deficit as a ratio of GDP that developed partly as a result and partly as a response to the economic conditions at the time.

Portugal

Between 1960 and 1985 income per capita in Portugal almost trebled (from $999 to $2734, both figures measure at 1980 US dollars). Chart 2 shows the time profile of the share of total public expenditures to GDP in Portugal for the period 1958-85, and also the breakdown of this total into consumption, investment, transfer expenditures and interest payments on public debt. It also shows the time profile of the ratio of government revenue to GDP.

During the period under review the ratio of public expenditures to GDP rose
Chart 2. Government Expenditure and Revenue Shares in Portugal.

Percentages of GDP at current prices
from 17 per cent of GDP in 1958 to 42 per cent in 1985. All categories of expenditure shared in this increase; but the various components of the total display substantially different patterns of growth.

Broadly speaking, both with regard to public expenditure as well as the finance of such expenditure, one may distinguish two subperiods: pre-1974 and post-1974.

During the first sub-period, a period in which the attitude to public finance was such as for the balance of revenues to expenditures to be in surplus, the share of government expenditure in GDP rose from 17.4 per cent in 1958 to 22.2 per cent in 1973. This increase was predominantly the result of rises in public consumption spending, reflecting mainly increases in military spending that were connected with the wars in Portugal’s African colonies. The second sub-period, 1974-85, has been a period of major political and economic change, a period that has witnessed a number of policy reversals, and also a period described by the abandonment of the previous balance budget attitude to public finance in favour of mounting budget deficits.

Following the April 1974 Revolution (and thus the end of fortyeight years of dictatorship), two provisional governments presided over the granting of independence to all of Portugal’s colonies in Africa, and also introduced a wide range of economic changes, most notably: extensive nationalisation of industry and finance, land reforms, sharp increases in real wages (minimum wage legislation), dramatic extension of social security provisions (that were previously practically non-existent), a variety of subsidies to consumption and production, and financial support to more than half a million Portuguese returning from the overseas colonies. Moreover, there was a substantial increase in numbers employed in the administrative public
sector. The corollary of these changes, as can be seen from Chart 2, was a sharp rise in transfers, and a more moderate increase in government consumption (reflecting the balance of increases in the size of the administrative public sector, increases in wage costs, and a sharp reduction in the size of the armed forces).

The socialist government that emerged from the 1976 elections put a brake on the increase in transfers and, moreover, restrained wage increases, as part of the 1977-78 austerity programme. By 1979, the share of transfers had fallen to 13.6 per cent of GDP; thereafter, however, it increased again under the centre-right coalition government that emerged from the 1979 elections.

By 1984 the ratio of total public expenditures to GDP stood at more than 45 per cent with transfers accounting for about half of the total. The socialist government that took office in 1983 introduced a new austerity programme aiming to stabilise the economy and to bring public spending under control, and indeed by the end of 1985 (when the social democrats took office) public expenditure was in decline.

**XI. Wagner's Law: Towards a More General Specification**

It may seem too much of an abstraction to seek to compress such complex patterns of the growth of public sector activities into the narrow mould of a simple relationship between public expenditures and national income growth. But in the tradition of Wagner's law it is indeed posited that, over longer periods at least, such a simple relationship can be identified.

From the postulates of "the law", that is, as per capita income increases
the share of public expenditure increases, one may proceed to estimate

\[ \ln G = a + b \ln Y + (1-b) \ln N \]

where \( G \) denotes real public expenditures, \( Y \) denotes real income (GDP) and \( N \) denotes the size of population, so as to establish whether, in accordance with the law, \( b \) is greater than unity.

Econometric estimation of (1), or of equivalent expressions, has been the subject of a large number of studies. As in other areas of empirical research, a wide range of conflicting empirical estimates have been reported, implying no unique pattern of behaviour across countries and over time.

Studies which have used specification (1) to test Wagner’s law have restricted arbitrarily the parameters of income and population and, without exception, have left the restriction untested. Obviously, equation (1) is nested within the more general form

\[ \ln G_t = a + b \ln Y_t + c \ln N_t \]

Yet, from an econometric viewpoint equation (2), though more flexible than (1), is itself limited, since it confines attention to a contemporaneous relation of expenditures to income.

More generally, there are at least two reasons why one may not content oneself with the kind of structures explored in conventional empirical studies of Wagner’s law. The first of these relates to the fact that from an economic standpoint the postulated relationship is too ad hoc, too much couched on casual empiricism and broad notions about markets and the state to content the theorist. The second stems from the fact that any data set in terms of which the proposition is to be assessed embodies in it a variety of other processes that ought to be delimited if an accurate
assessment of the main proposition is to be made.

(1) An Engel curve and a permanent income hypothesis of Wagner's law

In the former context, the appropriate place to look for formal conceptual antecedents is evidently consumer demand theory. From this standpoint Wagner's law is akin to Engel's law, or rather its inverse. Public sector services constitute luxuries, and, therefore, in contrast to the aggregate of private goods and services, exhibit income elasticities greater than unity.

To put it in these terms is not, of course, to explain why public services should exhibit income elasticities greater than unity. But it is to recognise that: (a) while this may be true for some public services it may not be true for others; (b) in a time-series context regard must be paid not only to the growth of income but also to changes in relative prices; and that (c) a more articulate statement of the proposition warrants a more articulate statement of the budget constraint that enters the choice between private expenditures and public expenditures.

The first of these clearly implies that in assessing the validity of the proposition we should focus on different components of public expenditure - though we may, of course, thereafter, also examine the extent to which significant differences in the elasticities of response of these different components to changes in the budget constraint can be identified. The second, emphasises the fact that in a time-series context real public expenditures will generally depend (in addition to real income) also on the price of these expenditures relative to the price of private goods. Moreover, in the grand scheme of things where the opportunity cost of public spending is private expenditures, one has to recognise that the
arrangements for the realisation of these expenditures reflect some longer-term commitments and are therefore likely to be subject to a notional longer-term budget constraint. Just as for the Friedmanesque decision-taking unit of the theory of consumption behaviour, permanent income, therefore, comes easily to mind. In other words, in the context of the long-run framework to which Wagner's law explicitly refers it is permanent income, \( Y^*_t \), rather than current income, \( Y_t \), which for given relative prices determines the desired level of public expenditures. This is reflected in the inertia characterising public expenditure programmes; so that, as Alt and Chrystal (1981) note: "Expenditure comes to be planned in relation not to contemporaneous income alone but to levels of income experienced over some time, and expenditure plans are too sticky to change in the light of short-run fluctuations in income" (pp. 42-43)\(^{10}\).

Abstracting for the moment from the issue of differences between components of expenditure, the above suggests the following equation:

\[
\ln G_t = a + b\ln Y^*_t + \ln(C/P)_t
\]

where \( G_t \) denotes the real level of public expenditures, \( C \) denotes the price index of public sector outputs and \( P \) denotes the price index of private expenditures, so that \( (C/P)_t \) denotes the relative price of public expenditures\(^{11}\). Alternatively, in the event in which we acknowledge that the aggregative choice reflects individual preferences and thus income per capita, the demand equation is written

\[
\ln G_t = a + b\ln Y^*_t + \ln N_t + \ln(C/P)_t
\]

Taking a leaf from Friedman (1957), \( Y^*_t \) may be defined as a weighted average of current and past values of measured income with geometrically declining weights, i.e.,

\[
\ln Y^*_t = k\ln Y_t + (1-k)\ln Y^*_{t-1}
\]
where \( 0 \leq k \leq 1 \) denotes the expectation formation parameter. Substituting into (4) yields the relationship

\[
\ln G_t = a + bk \ln Y_t + c \ln N_t - c(1-k) \ln N_{t-1} +
\]

\[
e^{-k} \ln (C/P)_{t-1} - e(1-k) \ln (C/P)_{t-1} + (1-k) \ln G_{t-1}
\]

a functional form, which, relative to previous specifications, features as determinants of government spending relative prices and lagged values of the explanatory variables, as well as a lagged dependent variable.

(2) **Government expenditures in the short-run**

By design, the last equation implies that government spending reflects entirely long-run decisions regarding the allocation of total expenditures as between private and public goods. In practice, however, changes in government expenditures over time also reflect the pursuit by the authorities of shorter-term objectives, notably stabilization policy. This implies that besides any longer-run relationship between permanent income and government expenditures, in general, the relationship between government spending and measured income will reflect also the countercyclical adjustments to government spending, that the authorities implement in an effort to reduce fluctuations in excess demand.\(^{12}\)

On such reasoning it seems desirable to complement the longer-run framework traced in the preceding sub-section by introducing in the estimable equations some index of the deviations of current nominal demand, \( X_t \), from its long-run sustainable path, \( X^*_t \). Let \( X_t / X^*_t \) be this index.\(^ {13}\) In place of (4) then we have

\[
\ln G_t = a + BLnY_t + c \ln N_t + e \ln (C/P)_{t-1} + f \ln (X_t / X^*_t)
\]

where by hypothesis \( f < 0 \), and in place of (6)
\[
\ln C_t = ak + b k \ln Y_t + c \ln N_t - c(1-k) \ln N_{t-1} + \\
\quad e \ln (C/P)_t - e(1-k) \ln (C/P)_{t-1} + \\
\quad f \ln (X/X^*)_t - f(1-k) \ln (X/X^*)_{t-1} + (1-k) \ln G_{t-1}
\]

Supposing that analogously to permanent income, the normal level of nominal demand is described by a Koyck lag structure, i.e.

\[
\ln X^*_t = m \ln X_t + (1-m) \ln X^*_{t-1}; \quad 0 \leq m \leq 1
\]

we have, after substitution of (9) into (8), the general form of our model

\[
\ln C_t = a km + b k \ln Y_t - b k (1-m) \ln Y_{t-1} + \\
\quad c \ln N_t - c(2-k-m) \ln N_{t-1} + c(1-k)(1-m) \ln N_{t-2} + \\
\quad e \ln (C/P)_t - e(2-k-m) \ln (C/P)_{t-1} + e(1-k)(1-m) \ln (C/P)_{t-2} + \\
\quad f(1-m) \ln X_t - f(2-k)(1-m) \ln X_{t-1} + f(1-k)(1-m) \ln X_{t-2} + \\
\quad (2-k-m) \ln G_{t-1} - (1-k)(1-m) G_{t-2}
\]

From this the conventional specification of Wagner's law, equation (1), can be had by setting \( k=m=1 \), \( e=f=0 \) and \( c=1-b \).

(3) Structural breaks

Both for Greece as well as for Portugal the political events highlighted in Section I above suggest the likelihood of structural breaks. Indeed, on the evidence described, one may suggest that these political changes, keynote changing perceptions about the role of the state and social priorities, and hence about the pattern and the growth of government expenditures.

To probe into this issue of political "displacement effects" we allowed for changes in the constant term of the demand equations, in the form of three shift dummy variables for Greece and one shift dummy variable for Portugal.
Accordingly, we have

\[(11) \quad \ln C_t = a_k m + a_k m U_t + \ln k \ln Y_t = \ln k (1-m) \ln Y_{t-1} + \]
\[c \ln N_t = c (2-k-m) \ln N_{t-1} + c (1-k) (1-m) \ln N_{t-2} + \]
\[e \ln (C/P)_t = e (2-k-m) \ln (C/P)_{t-1} + e (1-k) (1-m) \ln (C/P)_{t-2} + \]
\[f (1-m) \ln X_t = f (2-k) (1-m) \ln X_{t-1} + f (1-k) (1-m) \ln X_{t-2} + \]
\[(2-k-m) \ln G_{t-1} = (1-k) (1-m) G_{t-2} \]

where \(Z_1 = [z_1, z_2, z_3]\) is the vector of dummy variables. For Greece \(z_1 = 0\) from 1958 to 1965 and \(z_1 = 1\) from the military coup of 1967 to the end of the period; \(z_2 = 0\) from 1958 to 1973 and \(z_2 = 1\) from the restoration of democracy in 1974 to the end of the period; and \(z_3 = 0\) from 1958 to 1980 and \(z_3 = 1\) from the 1981 accession of the socialists to power until the end of the period. For Portugal \(z_1 = 0\) from 1958 to 1973 and \(z_1 = 1\) from the Revolution of 1974 to the end of the period, while \(z_2 = z_3 = 0\) throughout the period. \(U = [u_{67}, u_{74}, u_{81}]\) is the vector of the relevant coefficients that measure the shifts in the underlying relationship of expenditure to income that is presumed to have occurred after 1967, 1974 and 1981 respectively.

In general, of course, displacements may also impinge on the values of the elasticities of response to particular variables including the value of the income elasticity. And this being said we wish to stress that our particular treatment of such episodes reflects merely the constraints in terms of degrees of freedom that our small sample sizes impose. On the other hand, even when the displacement effect is confined to a shift in the intercept of a relationship such as (11) or (1), leaving that is the income elasticity unchanged, it is important to note that the occurrence of positive displacements may itself constitute evidence in favour of Wagner’s law. Thinking, for example, of a case where over time the ratio of government expenditures to income conforms to a step function, positive displacements may in fact signify discrete adjustments of public
expenditures to levels more in accord with underlying social preferences and rising income, in circumstances where political and/or administrative arrangements permit only a much more moderate continuous response.

III. EMPIRICAL ESTIMATION

In line with the analogous exercises of our precursors, we have so far abstracted from explicit consideration of different components of public expenditure. Yet as we have already noted, while for some services Wagner's law may hold, for others it may not.

Allowing for the latter, at the empirical level, we distinguish between three components of public expenditure - notably: government consumption, GC; government investment, GI; and government transfers, GT. Equation (11) is taken to describe the appropriate specification for each of these three categories of expenditure.

From this standpoint there is no reason to suppose that across all three components of expenditure:

(a) the income elasticities are the same (i.e., $b_C = b_I = b_T$); or that

(b) the responses to changes in population are the same (i.e., $c_C = c_I = c_T$); or that

(c) the relative price elasticities are the same (i.e., $e_C = e_I = e_T$); or that

(d) the stabilisation policy coefficients are the same (i.e., $f_C = f_I = f_T$).

On the other hand, with regard to permanent income and also with regard to the normal nominal income of the stabilisation index, consistency commands that $k_C = k_I = k_T$ and $w_C = w_I = w_T$. For it would obviously be schizophrenic to suppose that permanent income is conceived to be of a different magnitude when public consumption expenditures are contemplated than when (say) public investment expenditures are contemplated; or that a different index
of normal nominal demand conditions the countercyclical adjustments of investment expenditures than that which conditions the countercyclical adjustment of either of the two other components of public expenditures.

Common values for \( Y_t^* \) and \( X_t^* \), in turn, imply that in estimating the relationships pertaining to the three components of expenditures cross equation restrictions must be imposed, and, hence, that the three equations must be simultaneously estimated. Maximum likelihood estimation, which even in the single equation context is necessary in view of the overidentifying restrictions encompassed in (11), permits the cross equation restrictions to be imposed in a convenient way.

In accordance with the demand element in our hypothesis GC, GI and GT are defined in real terms. Real income is measured as GDP at constant prices. Relative prices describe the ratios of the respective government expenditure deflator divided by the implicit GDP deflator. Aggregate nominal demand is measured as GDP at current prices. Our data sample refers to the period 1958-85 for both countries.

Table 1 presents for Greece and Portugal the parameter estimates obtained from the three analogues of (11). Table 2 presents a sample of chi-square ratios pertaining to the validity or otherwise of various constraints that may be entertained in the context of the general form.

The results permit the following inferences:

(i) For Greece as well as for Portugal the chi-squared ratios reported in the first and the second rows of Table 2 reveal that relative to equation (11) the conventional specification, equation (1), cannot for any category of expenditures be assigned even a 0.5 per cent probability of occurrence.
<table>
<thead>
<tr>
<th></th>
<th>Greece</th>
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<th>Portugal</th>
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<tr>
<td></td>
<td>GC</td>
<td>GI</td>
<td>GT</td>
<td>GC</td>
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<tr>
<td><strong>a</strong></td>
<td>-14.72</td>
<td>-15.59</td>
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<td>(1.52)</td>
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<td><strong>u_{67}</strong></td>
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<td>(1.23)</td>
<td>(1.30)</td>
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<td><strong>u_{74}</strong></td>
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<td>(4.79)</td>
<td>(3.45)</td>
<td>(0.28)</td>
<td>(2.91)</td>
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<td><strong>b</strong></td>
<td>0.87</td>
<td>0.98</td>
<td>1.86</td>
<td>1.17</td>
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<td></td>
<td>(9.41)</td>
<td>(2.88)</td>
<td>(5.84)</td>
<td>(9.58)</td>
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<td><strong>c</strong></td>
<td>0.90</td>
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<td>(1.40)</td>
<td>(0.32)</td>
<td>(0.27)</td>
<td>(0.35)</td>
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<td><strong>e</strong></td>
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<td>(4.21)</td>
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<td><strong>f</strong></td>
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<td>(2.67)</td>
<td>(0.15)</td>
<td>(2.04)</td>
<td>(2.31)</td>
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<td><strong>k</strong></td>
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<td>0.82</td>
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<td>(7.27)</td>
<td>(7.27)</td>
<td>(7.27)</td>
<td>(3.00)</td>
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<td>0.63</td>
<td>0.63</td>
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<td>(5.93)</td>
<td>(5.93)</td>
<td>(2.62)</td>
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<td><strong>SEx10^{-1}</strong></td>
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Notes: Figures in parentheses denote t statistics. SE is the standard error of the regression.
<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Restrictions</th>
<th>$\chi^2$ (DF)</th>
<th>Probability of acceptance</th>
<th>$\chi^2$ (DF)</th>
<th>Probability of acceptance</th>
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<tr>
<td>Conventional specification</td>
<td>$k_i = m_i - i; c_i = 1 - b_i$ and $\bar{u}_i = \bar{e}_i - i$</td>
<td>151.56 (20)</td>
<td>$\Gamma &lt; 0.005$</td>
<td>10.20 (14)</td>
<td>$\Gamma &lt; 0.005$</td>
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<td>Conventional specification with structural break</td>
<td>$k_i = m_i - i; c_i = 1 - b_i$ and $\bar{e}_i = \bar{e}_i - i$</td>
<td>62.94 (11)</td>
<td>$\Gamma &lt; 0.005$</td>
<td>13.08 (11)</td>
<td>$\Gamma &lt; 0.005$</td>
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<td>Consistency</td>
<td>$k_c = k_T$ and $m_c = m_T$</td>
<td>5.75 (4)</td>
<td>$0.10 &lt; \Gamma &lt; 0.25$</td>
<td>2.76 (4)</td>
<td>$0.25 &lt; \Gamma &lt; 0.50$</td>
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<tr>
<td>Consistency and unitary expectations</td>
<td>$k_c = k_T$ and $m_c = m_T - 1$</td>
<td>41.76 (4)</td>
<td>$\Gamma &lt; 0.005$</td>
<td>41.32 (4)</td>
<td>$\Gamma &lt; 0.005$</td>
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<td>Zero population effects</td>
<td>$c_i \cdot c = c = 0$</td>
<td>1.99 (3)</td>
<td>$0.50 &lt; \Gamma &lt; 0.75$</td>
<td>1.68 (3)</td>
<td>$0.50 &lt; \Gamma &lt; 0.75$</td>
</tr>
<tr>
<td>Per capita formulation</td>
<td>$c_i = 1 - b_i$</td>
<td>2.10 (3)</td>
<td>$0.50 &lt; \Gamma &lt; 0.75$</td>
<td>2.15 (3)</td>
<td>$0.50 &lt; \Gamma &lt; 0.75$</td>
</tr>
<tr>
<td>Identical income elasticities</td>
<td>$b_i = b_i - 1$</td>
<td>9.62 (2)</td>
<td>$0.01 &lt; \Gamma &lt; 0.025$</td>
<td>0.52 (2)</td>
<td>$0.50 &lt; \Gamma &lt; 0.75$</td>
</tr>
<tr>
<td>Identical and unitary income elasticities</td>
<td>$b_i = b_i - 1$</td>
<td>9.87 (3)</td>
<td>$0.01 &lt; \Gamma &lt; 0.025$</td>
<td>2.52 (3)</td>
<td>$0.25 &lt; \Gamma &lt; 0.50$</td>
</tr>
</tbody>
</table>

Notes: $\chi^2$: Chi-square ratios from pairwise comparisons with the general specification (11); DF: degrees of freedom.
Such an unambiguous rejection of the standard specification attests to the importance of the additional influences that our maintained hypothesis seeks to acknowledge.

(ii) An important element in the rejection of the conventional specification (and its counterpart that allows for structural breaks) is that public expenditures depend on permanent rather than current income and are, moreover, conditional on perceptions of movements in aggregate demand.

(iii) Both for permanent income and also for normal nominal income neither for Greece nor for Portugal are the consistency conditions \( k_m^c walk= walk \) and \( m_{w_{q}} m_{w_{q}} w_{q} \) violated.

(iv) In contrast, the population variable, essential to the conventional specification, is both for Greece and for Portugal insignificant — see Table 2. The restriction \( c=0 \) carries probabilities that (though different across categories of expenditure and across the two countries) are sufficiently large to confirm that omission of population from the set of explanatory variables results in no loss of generality. However, as is also shown in Table 2, the restriction implied by the per capita specification of Wagner's law, i.e. \( c_{1} = 1 - b_{1} \), carries probabilities of acceptance identical to that of the restriction \( c_{1} = 0 \). The reason for this apparent paradox is that, since the estimated value of \( b_{1} \) is not significantly different from unity, the restriction \( c_{1} = 1 - b_{1} \) is effectively equivalent to the restriction \( c_{1} = 0 \).

(v) Five of the six relative price coefficients are significant at the 10 per cent level and carry the anticipated negative sign. The remaining coefficient, notably for consumption in Portugal, is not significantly different from zero.
(vi) Regarding the part played by stabilisation policy, the results suggest, on the one hand, substantial differences in the pattern of responses across the various categories of expenditures, and, on the other hand, some important similarities between the two countries. Specifically, although all six coefficients have the anticipated negative signs, significant countercyclical responses are only identified in the case of consumption expenditures and transfers in Greece and for consumption expenditures in Portugal.

(vii) The displacement hypothesis is "vindicated" for all categories of expenditure with the exception of investment expenditures in Portugal. For Greece the precise parameter estimates suggest the occurrence of displacement effects in the post 1974 period, but not before. In particular, one detects positive displacements for consumption after both 1974 and 1981, negative displacement for investment after 1974, but positive displacement after 1981, and a positive displacement for transfer expenditures after 1981. For Portugal the results suggest positive displacement effects in 1974 for consumption and transfer expenditures.

(viii) The hypothesis that the three categories of government expenditure have identical income elasticities is rejected for Greece, while it carries rather high probabilities of acceptance in Portugal. The latter implies a uniform response of the different components of expenditures to a change in the budget constraint of the government, which further implies that the income elasticity of total (i.e. the sum of) public expenditures equals that of its components (as implicitly assumed in empirical studies of Wagner's law which use aggregate public expenditures as their dependent variable).

(ix) Finally, turning to the validity of Wagner's law, that is, the
hypothesis that the income elasticity of demand exceeds unity \((b > 1)\), the parameter estimates in Table 1, reveal a rather disparate pattern. For both Greece and Portugal the elasticity of investment expenditures is not significantly different from unity. The same is true of the elasticity of transfer expenditures in Portugal but not in Greece where this elasticity is significantly greater than unity at the 5 per cent level. The latter provides the only evidence for Wagner's law in Greece. As for Portugal, the only income elasticity that is significantly greater than unity even at the 10 per cent level is that of consumption, a fact that contrasts sharply with experience in Greece where at the same level of significance the income elasticity of consumption expenditures is found to be less than unity.

IV. SUMMARY AND CONCLUSIONS

In the tradition of Wagner's law, our aim in this study has been to examine the relationship between aggregate income and public expenditure in Greece and Portugal during the years 1950-85. Unlike more conventional specifications, our analysis has focused on the movement of different components of public expenditures. Permanent income, relative prices, stabilisation policy and socio-political factors have been shown to comprise the main determinants of public expenditures in both countries in the period under review. However, our results reveal significant differences in responses to these determinants across components of expenditures and between the two countries.

With regard to Wagner's law, that is to say, the proposition that during the industrialisation process as the per capita income of a nation increases the share of public expenditures in total expenditure increases, our findings reveal income elasticities of greater than unity only in the
case of transfer expenditure in Greece and (at a lower significance level) in the case of consumption expenditures in Portugal. For investment expenditures in both countries and for transfers in Portugal the income elasticities traced are no different from unity, while for consumption expenditures in Greece the income elasticity is less than unity.

These results contrast sharply with those of previous studies of the relationship between public expenditures and income in Greece and Portugal. In particular, in the case of Greece the studies of Bacon and Karayiannis (1980), Protopoulos (1981) and Abizadeh and Gray (1985), albeit for earlier periods, have all traced income elasticities of demand for public expenditures which support the operation of Wagner's law. In the case of Portugal the study of Wagner and Weber (1977) estimated an income elasticity of public expenditures not significantly different from zero, whereas the study of Abizadeh and Gray (op. cit.) suggested an income elasticity of greater than unity.

Granted the statistical superiority of the specification adopted in this paper, relative to the conventional specification on which these earlier studies have relied, we are disposed to claim that our results provide a more accurate perspective on the operation of Wagner's law in Greece and Portugal. However, in the light of our remarks in Section II, regarding the possible nexus between Wagner's law and displacements, we are keen to acknowledge that our evidence does not preclude the possibility of a broad (discontinuous) pattern of evolution of public expenditure shares that conform to Wagner's law. Rather, what our results show is that the supposition that increases in the shares of public expenditures conform in some systematic way to increases in income or in income per capita does not comprise a principle that can generally be relied upon.
Notes

1. Useful surveys of this extensive literature can be found, for example, in Larkey et al. (1981) and Mueller (1987).

2. Public spending is the outcome of a complex process reflecting economic priorities, institutional factors and the ideological propensities of the government. While there seems little doubt that as a result of all these factors public expenditures have grown, calculating by how much they have grown is not a simple issue. Problems like what definition of the activities of the public sector to use, the reliability of data as time series are extended backwards, and adjustment for price changes account for this difficulty. These problems should be borne in mind in what follows.

3. Equation (1) is equivalent to \( \ln(G/N) = a + b\ln(Y/N) \), which constitutes the per capita formulation of Wagner's law, or to \( \ln(G/Y) = a + (b-1)\ln(Y/N) \), which constitutes the share-of-income formulation, see Michals (1975). In either case queries of course arise both with regard to what should be included in \( G \) (see, for example, Gandhi (1971)) and with regard to whether \( G \) and \( Y \) should be measured at nominal or real values, (see the exchanges between Beck (1979), Heller (1981) and Diba (1982)).


5. Some more recent studies have included other explanatory variables in addition to income, in order to account for other influences on the growth of public expenditures. Two sets of such additional explanatory variables are identified: (i) economic factors other than income, which are used to describe the stage of development of an economy, like the shares of agricultural and manufacturing output, the degree of monetisation of the economy, the openness of the economy to international trade and the rate of growth and composition of tax revenues. (ii) socio-political factors, other than the total size of the population, such as the percentage of the dependent population (age group below 15 years and above 65 years), the proportion of the population living in urban areas, the ideology of the party in office and other institutional features. For details, see, for example, Cameron (1978), Mann (1980), Abizadeh and Yousefi (1985) and Mann and Schultheiss (1986).


7. For a general model see Courakis and Tridimas (1990).

8. This is also hinted at in Peltzman (1980), Fratianni and Spinelli (1982) and Brocio and Marchese (1983).

9. For the use of relative prices as explanatory variables see the references in the previous footnote.

10. Permanent income as an explanatory variable has also been employed by Wagner and Weber (1977), albeit in a restricted form, and Ganti and Kolluri (1979). In passing at least, we wish to stress that sluggish responses of the kind described by Alt and Chrystal can also signify lags in the adjustment of public sector spending to its desired level. Such lags in response of public sector expenditures are recognised in the work of Henning and Tussing (1974).
11. Formally, the demand function (3) is derived upon assuming that the government maximizes a utility function \( U \), which has as its arguments the output of the private sector \( Q \), and the output of the public sector \( G \), i.e., \( U = U(Q,G) \), subject to the budget constraint \( PQ + CG = X \), where \( P \) and \( C \) are the prices of \( Q \) and \( G \) respectively, and \( X \) is nominal income. Taking the private sector output as the numeraire, the budget constraint is written \( C + (C/P)G = Y \), where \( Y = X/P \). Utility maximization then yields the normalized demand function for public sector output \( G = G(Y, (C/P)) \), which written in a log-linear form is equation (3).

12. Variables to cater for the stabilisation responses of the authorities feature with prominence in a number of studies, see for example, Henning and Tussing (1974) and Alt and Chrystal (1981). However, by using the current rate of unemployment as the indicator of fluctuations in the level of aggregate demand, Henning and Tussing exclude from their specification the responses of policy to inflationary pressures. Alt and Chrystal, on the other hand, correct for this omission by introducing in the regression equation the rates of unemployment and inflation, and the balance of payments, where all three were lagged by one period.


14. Peacock and Wiseman (1961) perceived the displacement effect as causing a shift in the level of government expenditures. Accordingly, studies based on the conventional specification of Wagner's law, equation (1), have tested for changes in the constant term of the equation, see Pryor (1968) and Musgrave (1969). Other authors, e.g. Gupta (1967), Bonin et al. (1959) and Diamond (1977), extended the concept of the displacement effect to also refer to changes in the growth rate of public expenditures and tested for changes in the income elasticity coefficient.

15. This implies rather restrictive assumptions regarding substitution across components of public expenditures and between each component of public expenditure and private expenditure, for details see Courakis and Tridimas (1990). However, estimation of a less restrictive form of demand for government expenditures was deemed extravagant given the small size of our samples.

16. That is, nominal expenditures divided by the own deflator in each case. Transfer expenditures were deflated by the private consumption deflator.
REFERENCES


