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Wage Expenditures of Central Governments

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Abstract

Central government wage expenditures accounted for 7 percent of GDP in 99 countries during 1980-90 (unweighted average). Regression analysis indicates that federations, countries with high populations and high per capita incomes, heavily indebted countries, and small low-income economies tend to have lower central government wage expenditures as a percent of GDP. Access to private nonguaranteed foreign financing is associated with higher wage expenditures, while public and publicly guaranteed foreign financing is not; the public and publicly guaranteed foreign financing is often provided for government capital projects. Medium-term structural adjustment programs, on average, have a negative association with wage expenditures, while short-term stabilization programs do not. The negative correlation between central government wage expenditures and per capita income appears related to the level of centralization of government expenditures. General government wage expenditures are higher in industrial countries than in developing countries.

JEL Classification numbers:

H5, H7

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Summary

The issue of what determines the level of central government wage expenditures is important in the design of effective reform programs. This paper provides estimates of the impact of (1) institutional factors that influence the level of decentralization of government; (2) the availability of resources; (3) whether or not a country has a Fund-supported program; and (4) preference-related variables. These estimates provide a basis for the comparison of central government wage expenditures across countries in the tradition of Heller and Tait (1984) and possibly for identifying government productive inefficiency or an ambitious set of central government objectives.

Cross country-time series empirical investigation is carried out based on a simple model of public choice, which suggests a two-equation recursive system consisting of a "total expenditure" and a "wage share" equation. The estimation procedure takes account of the possible bias resulting from correlation between the errors of the "total expenditure" and the "wage share" equations. The data span 1980-90 and cover 99 countries.

The paper has five main findings. First, federations and countries with large populations--which are viewed as proxies for fiscal decentralization--have lower central government wage expenditures as a percent of GDP. In addition, central government wage expenditures appear to decline with per capita income, presumably because decentralization and also abundance of human capital increase with economic development. Second, general government wage expenditures appear to increase with per capita income, as indicated by a comparison of industrial countries and developing countries for which general government data are available. Third, the paper finds that private nonguaranteed foreign financing is associated with higher central government expenditures and, indirectly, with higher wage expenditures. Public and publicly guaranteed net financing, provided often for public sector capital projects are associated with higher total government spending but have only a marginally significant association with wage expenditures. Fourth, medium-term structural adjustment programs, which often include civil service reform measures, have a significant negative association with wage expenditures, while short-term stabilization programs, without such measures, do not. Fifth, there appear to be systematic differences in expenditures on wages across forms of government. Wage expenditures during the sample period were lower (compared to market-oriented democracies) in socialist countries, probably on account of the fact that government employees received a large portion of compensation as in-kind benefits. These findings can be used to bring countries with diverse characteristics on a comparable basis. They do not necessarily carry policy implications and do not lead to the conclusion that certain forms of government are preferable from the point of view of fiscal consolidation.

I. Introduction

During 1980-90, wage expenditures, narrowly defined, represented about one-fourth of central government expenditures and on average accounted for 7 percent of GDP. 1/ However, there is a great deal of variation among the 99 countries included in this study. Several countries allocated over 15 percent of GDP to central government wages, while quite a few spent less than 2.5 percent of GDP. Among country groups, central government wages in the Middle East and North African countries accounted for 10 percent of GDP, while for industrial countries, federations, heavily indebted countries, and countries with high populations central government wages accounted for 4 percent to 5 percent of GDP.

Alternative institutional arrangements are undoubtedly an important explanatory factor for the observed variance. Countries with highly decentralized governments can be expected to have lower central government wage expenditures. In many countries the central government provides extensive grants to lower level governments or quasi-public organizations that effectively act as agents supplying public services, paid for by the central government. In such cases, a large portion of these transfers are effectively hidden wages. Alternatively, with a high degree of decentralization and an important role for lower levels of government, the responsibilities of the central government will be circumscribed. 2/

Economic variables, such as per capita income and the availability of foreign financing, have an important impact on wage expenditures through the budget constraint and preferences for private versus public goods.

On a policy level, central government expenditures reflect the role of government in society. Since labor is an input into the production of public services, large wage outlays are likely to represent an ambitious set of objectives of the government. Alternatively, large wage outlays could represent an implicit or explicit goal of the government to provide employment for certain groups, such as college graduates or unskilled workers with a high incidence of unemployment. Finally, high central

1/ The definition of the government wage bill used in the Government Finance Statistics Yearbook (GFS) includes all cash payments to civil servants and military personnel in return for services rendered contained in current expenditures. However, there are many ways in which central government expenditures support wage payments indirectly. For instance, wages payments incorporated in the capital budget or wages paid by other organizations that receive substantial (possibly total) support from the central government in the form transfers--such as government supported nonprofit institutions and lower levels of government--are not incorporated in central government wages.

2/ For instance, most of the countries that spent less than 2.5 percent of GDP on central government wages are federations. However, as is noted below, whether or not a country is a federation is only a rough indicator of the degree of decentralization in a country.

government wage outlays could be indicative of general inefficiency in the production of government services.

The purpose of this paper is to examine trends and patterns of wage expenditures of central governments in order to gain insight into their determinants. The analysis builds on the work of Heller and Tait (1984) which provides a comprehensive analysis of government employment and pay, based on data obtained from a direct survey with countries. Heller and Tait estimate equations for employment and wages separately using data on state governments, local governments, and public enterprises. One of their findings is that general government employment per inhabitant increases with per capita income while central government employment declines with per capita income, reflecting the greater importance of local government in industrial countries. Heller and Diamond (1990) estimate a wage expenditure equation for central government in the context of their study of how budgetary retrenchment and structural adjustment affect the mix--both functional and economic--of government spending. Unlike Heller and Tait, they use panel data (for developing countries only, during 1975-86). Their empirical analysis uses a two-step approach. First, estimates for functional categories of expenditures are derived. Second, these are used to estimate determinants of economic categories of expenditures (wages, interest, etc.). In the case of the wage equation, only education expenditures (among functional categories) is significant. Education expenditures in turn are found to be positively related to the population under age 14 and negatively affected by outstanding foreign debt. Van Ginneken (1990) examines the composition of central government expenditures and finds that higher interest payments were associated with declines in wage expenditures in Latin America, but not in Africa where other current expenditures bore the brunt of adjustment. A useful review of related literature is given in Stevenson (1992).

In the present study, a two equation system is estimated, albeit a different one from Diamond and Heller, following Hewitt (1992). Wage expenditures (as a share of GDP) are related to total central government expenditures (as a share of GDP) and factors which would affect their share in total expenditures. Total central government expenditures is in turn related to its determinants. The system of equations is estimated using the SUR technique. The analysis includes political variables such as the degree of decentralization in government and form of government.

The paper is organized as follows. Section II gives a description of the pattern of wage expenditures across country groups and trends over time. Section III describes the econometric model. Section IV reports the empirical results. Section V discusses general government wages and the share of central government wages compared to the share of state and local government wages for 21 countries. Section VI concludes.

II. Patterns and Trends in Central Government Expenditures

The data on central government wages and total expenditures are mostly derived from the Government Finance Statistics Yearbook (GFS).

The GFS definition of central government wage expenditures is reasonably comprehensive. All salaries, bonuses, and cash allowances to workers contained in central government current expenditures for services rendered 1/ are counted, including payments to military personnel. Among the major categories of wage payments that are not included are wage payments contained in capital expenditures (or development budgets), in-kind payments, and wage payments by independent government organizations and lower levels of government which are financed through central government transfers or grants. 2/

1. Central government wage expenditures

The wage bill of central governments averaged over 7 percent of GDP from 1980 to 1990 using unweighted data (Table 1). Wage expenditures in industrial countries averaged about 5.5 percent of GDP compared to about 7.5 percent of GDP for developing countries. The paper argues that this difference reflects the higher degree of decentralization in government spending in industrial countries. Industrial countries are more often federations (one third of industrial countries in our sample are federations), government spending, and in particular wage expenditures, are more decentralized. In decentralized systems, transfers to other levels of government occur in lieu of direct provision of labor intensive services such as education. General government wage expenditures, in fact, appear to be larger for industrial countries than for developing countries (see Section V).

Using weighted data, wage expenditures averaged only 5 percent, reflecting the fact that larger countries tend to have more decentralized governments and consequently relatively smaller central government wage expenditures (see Appendix III, Tables 2, 3, and 4). Large countries (with populations over 50 million) allocated only 5 percent of GDP to central government wages and federations about 4 percent of GDP for the same reason. Appendix III, Table 7 provides data on average wage expenditures of individual countries.

Central government wage expenditures were higher than average in the Middle East and North Africa (9.5 percent) and sub-Saharan Africa

1/ Severance payments are not included.

2/ Practices can vary considerably among different countries. In some countries local employees and staff of hospitals and universities are paid directly by the central government and accordingly are included in central government wages. In other countries these institutions are entirely independent. Wages of public enterprises are not included in central government wages.

Table 1. Central Government Wages as Percent of GDP, 1980-90

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Average
Total	7.2	7.3	7.4	7.4	7.2	7.1	7.2	7.1	7.0	7.1	7.3	7.2
Industrial countries	5.7	5.8	5.8	5.7	5.6	5.5	5.4	5.5	5.4	5.3	5.4	5.6
Developing countries	7.6	7.8	8.0	7.9	7.7	7.6	7.7	7.6	7.5	7.6	7.9	7.7
Western Hemisphere	6.8	7.0	7.1	7.0	6.7	6.3	6.1	6.1	6.1	6.1	6.2	6.5
Sub-Saharan Africa	8.6	8.8	8.8	8.5	8.3	8.0	8.0	7.9	7.8	7.9	8.1	8.3
Middle East and North Africa	8.7	8.5	9.0	9.1	9.0	9.2	10.2	9.9	10.3	10.2	10.3	9.5
European non-industrial countries	7.4	6.8	6.4	6.8	6.4	6.4	6.8	6.8	6.8	7.1	7.3	6.8
Far East and Central Asia	5.4	5.8	6.4	6.7	6.3	6.7	7.0	7.0	6.6	6.9	7.2	6.5
Country groups with special characteristics:												
Federal countries	4.3	4.5	4.6	4.4	4.0	4.2	4.2	4.1	3.9	4.0	4.0	4.2
Heavily indebted countries	6.0	6.4	6.2	6.2	5.8	5.2	4.9	5.0	5.0	5.2	5.1	5.5
Small low-income economies	7.6	7.7	7.6	7.3	7.1	7.0	7.0	6.7	6.6	6.6	6.8	7.1
Countries with population over 50 million	5.3	5.3	5.3	5.1	4.9	5.1	5.0	4.7	4.7	5.0	5.1	5.1

Source: IMF, Government Finance Statistics

(8.5 percent of GDP) and lower in the Western Hemisphere countries (6.5 percent of GDP), the Far East and Central Asia (6.5 percent of GDP), and non-industrial European countries (7 percent of GDP). Heavily indebted countries spent 5.5 percent of GDP, and small low-income economies 7 percent of GDP.

As a share of central government expenditures, wages averaged 24 percent during 1980-90 (Table 2). Among industrial countries, wages were 15 percent of central government expenditures compared to 27 percent among developing countries, in which they varied from 20 to 30 percent. As before, the large difference between industrial and developing countries appears to reflect the impact of decentralization on the composition of government expenditures.

By its very nature, only gradual trends can be discerned from this relatively short time period. No overall trend emerges from the total data set. However, industrial countries gradually reduced central government wages in proportion to GDP. About two thirds of the industrial countries included in this data set lowered wages as a share of GDP from 1980 to 1990. Among the developing countries as a group, no trend is discernable. However, Western Hemisphere countries and sub-Saharan African countries lowered wage expenditures relative to GDP, as did the heavily indebted and small low-income economies. The Middle East and North Africa, non-industrial Europe, and Asia increased wages as a share of GDP during this time period. ^{1/}

2. Central government total expenditures

During the 1980s, central government expenditures typically constituted 32 percent of GDP (Table 3). The share of GDP was higher in industrial countries than in developing countries (38 percent versus 30 percent). Among developing country regions, the share was highest in the Middle East and North Africa (42 percent) and lowest in the Western Hemisphere (23 percent). Heavily indebted countries had a smaller share than developing countries on average, while small low-income economies spent about the average.

While in general the share of central government expenditures in GDP was the same in 1990 as in 1980, there was a notable pattern in the data in the early 1980s. In industrial countries, the share rose substantially from 1980 to 1982, and did not start falling again until 1986. The same pattern is observed in the developing countries in the Western Hemisphere, in the Middle East and North Africa region, and for heavily indebted countries (though in the latter two cases the increase was less prolonged). By contrast, the share was on a declining trend during the first half of the 1980s in sub-Saharan Africa and in small low-income economies. In the Far

^{1/} There appears to be a small hump in the wage data in 1982, for both industrial and developing countries. This hump could be related to the recession of 1982 (both through higher wage expenditures and lower GDP).

Table 2. Central Government Wages as Percent of Total Central Government Expenditure, 1980-90

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Average
Total	24.5	24.2	23.9	24.2	24.4	24.3	23.7	23.7	24.3	24.4	24.4	24.2
Industrial countries	16.5	16.1	15.4	15.1	15.0	14.7	14.7	15.1	15.4	15.2	15.3	15.3
Developing countries	26.9	26.9	26.6	27.1	27.4	27.3	26.5	26.4	27.0	27.1	27.1	26.9
Western Hemisphere	32.1	31.4	30.1	30.3	29.3	28.1	29.4	29.7	29.3	29.8	30.0	30.0
Sub-Saharan Africa	29.0	29.2	28.7	29.0	29.6	29.5	27.0	26.2	27.0	26.8	27.3	28.1
Middle East and North Africa	23.2	21.9	21.6	22.2	23.5	24.6	26.8	27.8	30.0	28.8	27.3	25.2
European non-Industrial countries	23.7	20.5	20.2	19.5	18.3	17.6	19.8	20.1	20.3	21.3	22.0	20.3
Far East and Central Asia	19.5	20.3	21.9	23.2	24.1	24.0	22.7	23.2	23.7	24.3	24.1	22.8
Country groups with special characteristics:												
Federal countries	16.7	15.7	15.5	15.7	15.5	15.8	14.9	15.0	15.0	15.2	15.4	15.5
Heavily Indebted countries	25.8	25.2	21.4	22.8	23.2	21.7	22.1	23.2	22.2	23.3	22.9	23.1
Small low-income economies	27.2	27.7	27.6	27.3	27.5	28.1	25.0	23.2	23.3	23.0	23.9	25.8
Countries with population over 50 million	19.9	19.9	19.4	18.6	19.4	19.9	19.6	19.4	19.2	20.3	20.5	19.6

Source: IMF, Government Finance Statistics

Table 3. Total Central Government Expenditures as Percent of GDP, 1980-90

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Average
Total	31.5	32.3	33.2	32.5	31.6	31.7	32.3	32.0	30.9	31.0	31.8	31.9
Industrial countries	36.4	37.9	39.6	39.6	39.5	39.5	38.7	38.4	37.1	36.1	37.2	38.2
Developing countries	30.0	30.3	31.2	30.4	29.3	29.3	30.2	29.9	28.9	29.4	30.2	29.9
Western Hemisphere	21.4	23.2	24.7	23.6	23.5	24.2	22.1	21.9	22.0	21.7	21.5	22.7
Sub-Saharan Africa	32.0	31.2	31.7	30.1	29.6	28.7	30.4	31.2	30.0	30.6	31.2	30.6
Middle East and North Africa	40.6	42.2	45.6	45.4	42.7	42.2	42.7	39.2	38.7	38.1	40.2	41.6
European non-Industrial countries	34.1	37.7	35.3	36.3	35.9	39.2	38.7	38.2	36.6	37.7	37.2	37.0
Far East and Central Asia	27.2	27.3	27.6	27.7	25.3	27.1	30.1	29.0	27.0	28.6	29.5	27.9
Country groups with special characteristics:												
Federal countries	25.2	27.4	27.7	27.0	25.7	26.4	27.9	27.2	26.5	26.5	26.6	26.7
Heavily indebted countries	23.5	25.7	27.8	25.9	23.8	24.8	22.9	22.9	23.5	23.1	22.8	24.3
Small low-income economies	31.0	29.1	28.7	28.0	27.6	26.7	28.9	30.5	29.6	30.5	30.7	29.2
Countries with population over 50 million	27.1	27.3	28.1	27.8	26.1	26.9	27.5	26.2	26.6	26.5	26.7	27.0

Source: IMF, Government Finance Statistics

East and Central Asia developing countries, the share was flat for the first half of the 1980s, and jumped to a higher average level in the second half of the decade.

Intuitively one would link the increase between 1980 and 1982-86 to developments in 1982, namely high interest rates and the ensuing debt crisis and recession. One can postulate that there was counter-cyclical hiring and spending in the aftermath of the recession of the early 1980s. In Africa (and small low-income countries), the decline in share may be related to the tightening of the resource constraint. A number of developing countries had increased central government expenditures during the late 1970s leading to a need for adjustment in the 1980s. In highly indebted countries the pattern of government expenditure may reflect interest rate developments and the decline in foreign borrowing availability in the years following 1982.

III. A Model of Central Government Wage Expenditures

Multifarious considerations enter into central government decisions on employment and wages, which together determine the level of central government wage expenditures. Wage expenditures are primarily an input into the production of government services so that wage expenditures are largely determined by the demand for government services, which in turn is a function of preferences and incomes. Relative factor prices influence the proportion of labor hired vis-à-vis other factors of production. Additionally, political and economic factors--such as the availability of foreign financing and the size of the interest bill--influence hiring practices and pay scales. 1/

1. Framework of the analysis

In order to investigate the impact of some of these factors, consider a public choice model where the leadership of the country endeavors to maximize what it considers to be social welfare by allocating expenditures

1/ This paper does not attempt to assess the impact on wage expenditures of inefficiency or of countercyclical hiring by the government. Data on unemployment in developing countries are too sparse to use in a test the hypothesis of countercyclical hiring. See Kraay and Van Rijckeghem (1994) for a test of the hypothesis of countercyclical hiring based on unemployment for OECD countries and on the real effective exchange rate as a proxy for competitiveness and the motive to hire countercyclically for developing countries.

between private consumption, wage expenditures, and other government expenditures. 1/

$$U = U(C, WE, OE) \quad (1)$$

where, U = social welfare as perceived by the leadership,
 C = private consumption (and expenditures at other levels of government),
 WE = central government wage expenditures,
 OE = other non-interest central government expenditures.

There are two financial constraints. The amount of government expenditure is constrained by GDP and the level of foreign financing (FF),

$$CGE = GDP + FF - C \quad (2)$$

Interest expenditures (IE) are treated as predetermined for simplicity. As such, they reduce the room for other central government expenditures (WE and OE).

$$CGE - IE = WE + OE \quad (3)$$

By assuming a Cobb-Douglas form for equation (1), the following system of equations is derived from constrained maximization (see Appendix I).

$$WE/GDP = F[(CGE - IE)/GDP; \text{"state" variables}] \quad (4A)$$

$$CGE/GDP = G[(GDP + FF)/GDP, IE/GDP; \text{"state" variables}] \quad (4B)$$

Equation (4A) will be referred to as the "wage share" equation and (4B) as the "total expenditures" equation. Wage expenditures are found to depend on central government expenditures net of interest expenditures and variables affecting its share in total government expenditures. Central government expenditures depend upon the resource constraint and the level of interest expenditures. The "state" variables include institutional and economic factors which influence the relative value placed by the leadership on C, WE, and OE in the social welfare function. Relevant institutional factors include the level of government centralization and the form of government. Economic factors include income of the country (through its impact on preferences) and parameters of the cost function for the provision of government services. The effect of these factors is assumed to be

1/ This welfare function can be derived from a "pure" welfare function, where welfare is a function of services, not expenditures, and a set of cost functions, see Hewitt (1992). Furthermore, this model does not offer any presumptions regarding the motivations of the leadership, for instance, the extent to which they endeavor to follow the preferences of the population at large.

transmitted through the parameters of the Cobb-Douglas function and thereby affect the relative value placed on C, WE, and OE by the leadership.

This system of equations is estimated using two-stage least squares (2SLS) and the seemingly unrelated (SUR) techniques. Note first that the system is recursive. While central government expenditures are an explicit determinant of wages, wages do not enter into the CGE/GDP equation. Second, the error terms in equations (4A) and (4B) are correlated, since wages are part of central government expenditures. The combination of recursiveness and correlation of the error terms across equations implies that the equation for government wages is subject to simultaneity bias. ^{1/} The data are not corrected for heteroskedasticity between countries or serial correlation within countries as the sample period is too short to meaningfully estimate standard errors or autocorrelation factors for each country. The fact that wages and total central government expenditures are divided by GDP provides a partial correction for heteroskedasticity.

A reduced form equation relating central government wage expenditures to the determinants of central government expenditures and the determinants of the share of wages in government expenditures is estimated to obtain the overall effect of variables which are present in the structural "wage share" and "total expenditures" equations. The results are given in Appendix III, Table 5.

2. Estimated equations

The actual equations estimated in the study are as follows, see Appendix III, Table 6 for summary statistics of the variables.

$$\begin{aligned} \ln(WE_{it}/GDP_{it}) = & \beta + \beta_1 \ln[(CGE_{it} - IE_{it})/GDP_{it}] + \beta_2 (Fisc_i) \\ & + \beta_3 \ln(GDP(US\$)_{it}/POP_{it}) + \beta_4 \ln(POP_{it}) + \beta_5 \ln(LA_i) + \beta_6 (PPG_{it}/GDP_{it}) \\ & + \beta_7 (HD_i) + \beta_8 (STBY_{it}) + \beta_9 (ESAF_{it}) + \beta_{10} (SLIE_i) \\ & + \beta_{11} (socialist_{it}) + \beta_{12} (monarchy_{it}) + \beta_{13} (military_{it}) \\ & + \beta_{14} (civil_{it}) + \beta_{15} (other_{it}) + \text{year dummy variables}(t) + u_{it}, \end{aligned} \quad (5A)$$

$$\begin{aligned} \ln(CG_{it}/GDP_{it}) = & \gamma + \gamma_1 \ln(IE_{it}/GDP_{it}) + \gamma_2 \ln(GDP(US\$)_{it}/POP_{it}) \\ & + \gamma_3 \ln(POP_{it}) + \gamma_4 \ln(LA_i) + \gamma_5 \ln(LIFE_{it}) \\ & + \gamma_6 \ln(EDUC_{it}) + \gamma_7 (PPG_{it}/GDP_{it}) + \gamma_8 (PRIFF_{it}/GDP_{it}) \\ & + \gamma_9 (SLIE_i) + \gamma_{10} (HD_i) + \gamma_{11} (STBY_{it}) + \gamma_{12} (ESAF_{it}) \end{aligned}$$

^{1/} This can easily be seen by substituting (4B) into (4A) and checking that correlation results between an independent variable and the error term.

$$\begin{aligned}
 &+ \gamma_{13}(\text{Fisc}_i) + \gamma_{14}(\text{socialist}_{it}) + \gamma_{15}(\text{monarchy}_{it}) \\
 &+ \gamma_{16}(\text{military}_{it}) + \gamma_{17}(\text{civil}_{it}) + \gamma_{18}(\text{other}_{it}) \\
 &+ \text{year dummy variables}(t) + e_{it}.
 \end{aligned}
 \tag{5B}$$

where:

- WE = central government wage expenditures (local currency),
- CG = total central government expenditure (local currency),
- IE = central government interest expenditures (local currency),
- POP = population,
- LA = land area (square kilometers),
- PCI = per capita income (purchasing power parity) in \$US,
- PPG = flow of public and publicly guaranteed foreign financing net of amortization,
- PRIFF = flow of private nonguaranteed foreign financing net of amortization,
- HD = heavily indebted nations (dummy variable),
- STBY = countries with a STBY (dummy variable), 1/
- ESAF = countries with a SAF or ESAF Fund supported program (dummy variable),
- SLIE = small low-income economies (dummy variable),
- Fisc = federal countries (dummy variable),
- LIFE = life expectancy (years),
- EDUC = percentage of school age population in secondary schools,
- countries $i = 1, \dots, 125$,
- years $t = 1980, \dots, 1990$.

Form of government variables:

- multiparty democracy = benchmark,
- socialist = socialist government,
- monarchy = hereditary ruler, without a working democracy,
- military = military government,
- civil = country engaged in civil war,
- other = other forms of government (primarily one-party states or unstable regimes).

Among the primary determinants of wage expenditures is the degree of government decentralization. Accordingly, a number of variables are included in the analysis to take account of this factor. It would be preferable to measure decentralization directly through comparison of central government expenditures with expenditures of other levels of government. However, as is clear from the data presented in Section V, information on general government expenditures is extremely limited (and in

1/ A small number of EFF programs are also included.

fact no longer reported in the GFS). Therefore, in order to account for this factor, proxy variables for the degree of decentralization are used.

The first is a dummy variable for federal countries. A federation means that three significant levels of government exist: the central government, states (or provinces, republics, regional governments), and the local governments. In contrast, in so-called unitary states there are normally two significant levels of government--central and local--and sometimes effectively one level. In federal countries, the intermediate level of government is often accorded significant powers which often leads to a more decentralized system of government. This is of course a very rough approximation and there are significant exceptions. For instance, Denmark and Belgium (during 1980-90) were officially unitary states, yet at the same time their system of government was quite decentralized. In fact, Belgium has subsequently become a federation. Likewise, Spain and Malaysia are categorized as federations, but in practice are more centralized than many unitary states. Population and land area are other factors incorporated in the framework that might affect the level of decentralization of governments. Since fiscal federalism, population, and land area are presumed to be associated with more decentralized government, it is expected that they will have negative coefficients in both equations. Decentralization leads to lower wage expenditures both because the overall role of central government is circumscribed and because transfers will constitute a higher share, and wage expenditures will commensurately constitute a lower share of total central government expenditures. 1/

A number of economic variables are included in the analysis. The level of private nonguaranteed foreign financing (i.e. nonguaranteed financing to the private sector) is assumed to affect the level of total central government expenditures relative to GDP, equation (4B), which in turn influences wages indirectly; a positive coefficient is predicted as foreign financing relaxes the resource constraint in a country. Equation (4A) indicates that private nonguaranteed foreign financing does not enter the wage equation directly. A second financing variable included in the analysis is the level of public and publicly guaranteed net foreign financing. Such financing is mostly directed at the public sector, is often concessional, and tends to be associated with capital projects. 2/ PPG is included in the "wage share" equation, to determine whether foreign assistance influences the structure of government expenditures. A positive coefficient is predicted in the "total expenditure" equation, as it was for PRIFF. A negative sign is predicted in the "wage share" equation on account

1/ The dummy for federal governments was constructed using the Europa World Yearbook, 1992. Land area and population are from the World Bank, Social Indicators of Development.

2/ The source for net public and publicly guaranteed and net private non-guaranteed foreign financing is the World Bank's World Debt Tables. The former includes lending by official and private creditors and concessional and non-concessional lending. Private non-guaranteed lending refers to lending to the private sector.

of the association because PPG and capital expenditures. The net impact of PPG on wages is uncertain.

Interest expenditures are treated as being determined by past events in this study and are therefore exogenous within this analysis. It is hypothesized that interest expenditures will have a positive effect on CGE/GDP in equation (4B). In equation (4A) wages are a function of CGE net of interest payments. Therefore, CGE and IE are constrained to have the same coefficient with opposite signs in the empirical analysis. 1/

Per capita GDP (in U.S. dollars, using purchasing power parity weights) was included in the "wage share" and "total expenditure" equations as a proxy for level of development. 2/ In the "wage share" equation, the sign is expected to be negative because higher levels of development tend to be associated with more decentralized government and thus a higher share for transfers to local government and a lower share for wage expenditures in total expenditures. 3/ In the "total expenditure" equation, the sign is uncertain, as there are positive and negative influences. Government services are generally thought to be "luxury goods" and richer countries also have an enhanced ability to raise taxes, implying a positive relationship between overall expenditures (and indirectly wage expenditures) and GDP per capita. On the other hand, higher levels of development imply both greater decentralization and relatively low labor costs to the government in view of the reduction in scarcity of human capital. 4/

As the adopted formulation includes per capita GDP and population, both logged, it is theoretically possible that the coefficient on GDP per capita reflects the impact of GDP instead of GDP per capita and that the coefficient on population captures only the partial effect of population. 5/ Because there is no a priori reason to expect an impact of GDP on the ratio of government wage or total expenditures to GDP, the

1/ The source for interest expenditures is the IMF's Government Finance Statistics Yearbook.

2/ The data for per capita income in 1985 U.S. dollars, using purchasing power parity weights, was provided by Summers and Heston, for 1980-1988, and updated using real GDP growth from the IMF, World Economic Outlook, October 1992.

3/ If, with development, human capital becomes less scarce compared to other inputs in the government production function, without a fully offsetting increase in the use of labor compared to other factors of production, development will also be associated with lower wage expenditures as a share of overall expenditures. In our Cobb-Douglas model, relative factor prices have no impact on the share of wages in total expenditures.

4/ Recall the finding by Heller and Tait (1984) that general government employment increases with per capita income but that central government employment declines.

5/ In the "wage share" equation, for example, $\beta_3 \ln(\text{GDP(US\$)}_{it} / \text{POP}_{it}) + \beta_4 \ln(\text{POP}_{it})$ could be written as $\beta_3 \ln(\text{GDP(US\$)}_{it}) + (\beta_4 - \beta_3) \ln(\text{POP}_{it})$.

coefficients on GDP per capita and population are interpreted as correctly reflecting the impact of GDP per capita and population themselves.

Another set of variables which are potentially important are the form of government variables. The analysis predicts that the form of government could have an influence on the leadership's preferences for wage expenditures and total central government expenditures. Six mutually exclusive dummy variables are used. 1/ The benchmark is a multi-party democracy. The other alternatives include military government, monarchy (without a functioning democracy), socialist governments (without a functioning democracy), countries currently engaged in civil war, and other forms of government (mostly one-party states or highly unstable governments). Although no specific predictions as to the alternative signs are offered, there is a mild expectation that democracies will tend to have higher civil service wage expenditures than other forms of government.

Two dummy variables were included to account for whether or not a country has a program with the IMF. The IMF supports member countries in implementing policies aimed at reducing macroeconomic imbalances. In many cases, these countries experience unsustainably high levels of fiscal deficits, often as a result of unsustainably high government expenditures. Two different dummies are included to capture the effects of the two distinct types of IMF-supported programs. The first dummy variable accounts for programs supported by a stand-by arrangement (STBY). Stand-by arrangements generally are of a short duration, and their policy instruments are often limited to those that are macroeconomic in nature; the programs are not aimed at supporting any specific structural reform measures, such as civil service reforms. 2/ The second incorporates programs supported by either a structural adjustment facility (SAF) or an enhanced structural adjustment facility (ESAF). SAF and ESAF arrangements support medium-term measures aimed at structural reforms, such as reforms of pricing, trade, banking, and public finances. The policy instruments included under these arrangements are broader and seek restructuring of expenditures through reforms of civil service and social expenditures. In view of the longer duration of structural adjustment programs and their use of broader policy instruments, a different dummy variable would need to be included in regressions focussing on expenditure components such as subsidies and transfers, or as in the current paper, wage expenditures.

Most of the countries implementing SAF/ESAF programs face a large fiscal imbalance, arising from a limited capacity for tax administration and unsustainable government expenditure programs due to, for example, extensive budgetary subsidies associated with distorted prices or excessive and

1/ These dummies were compiled by the authors. The categories were chosen primarily for their ease of identification.

2/ The STBY dummy also includes a small number of EFF arrangements which comprise only 10 percent of the program years. EFF arrangements support medium-term structural programs, but are not a focus of this study. The dummies were constructed using various issues of the IMF Survey.

inefficient government employment programs often coexist with low and uncompetitive government wages. To reduce the fiscal imbalance and improve civil service efficiency, SAF/ESAF programs often support measures to reduce government wage expenditures, reduce public sector employment, and increase public sector wages to more competitive levels. Half of the SAF and ESAF programs were accompanied by World Bank loans incorporating civil service reform components. ^{1/}

In view of the need to reduce fiscal imbalances and government wage expenditures in many countries with STBY and SAF/ESAF programs and the fact that many countries have excessive employment, governments with both types of programs should normally reduce government wage expenditures. In practice, the success will depend, inter alia, on the political constraints faced by the governments of the program countries. Because SAF/ESAF programs often support civil service reforms and are of sufficiently long duration, expectations are that countries with SAF/ESAF programs will be relatively successful in reducing wage expenditures.

It should be emphasized that government wages are often increased, so as to make them competitive with the private sector and increase morale and productivity of employees. It is also worth pointing out that retrenched employees are most often not among the poor, and that civil service reforms typically provide severance pay, compensation, and/or retraining for retrenched employees. Fund-supported programs in general include a social safety net aimed at protecting the poor from the impact of reform. Rather than hurting the poor, civil service reform and reduction in wage expenditures tend to help countries allocate additional resources to social programs targeted to the poor.

IV. Determinants of Central Government Wages: Empirical Results

The results obtained by using the two-stage least squares combined with the SUR econometric technique are reported in Table 4. A reduced form estimate for wage expenditures using panel estimation techniques are reported in Appendix III, Table 5 and discussed in Appendix II.

The R-squared of 0.45 in the "wage share" equation is quite high considering the substantial institutional differences that exist between countries. The R-squared in the "total expenditure" equation is 0.43, which again is high considering the relatively simple analysis of total central government expenditures contained in the study.

^{1/} Based on Nunberg, forthcoming. Civil service reform measures include civil service censuses (functional reviews and head counts, in part, aimed at elimination of ghost workers and identification of vacancies), employment reductions (through a variety of methods, such as enforcement of retirement age, voluntary and involuntary retirement), and reform of wage and salary structures. See Nunberg and Nellis (1990).

Table 4. Determinants of Wage Expenditures ^{1/}

	Coefficient	t-ratio	Coefficient	t-ratio
	Ratio of Central Government Wages to GDP		Ratio of Total Government Expenditure to GDP	
Constant	1.280	2.00	3.150	6.63
Central government expenditures (net of interest)	0.831	3.69	...	...
Interest	...	...	0.044	12.30
Per capita income	-0.239	-7.76	0.086	4.35
Fund programs: STBY or EFF	0.094	2.07	-0.116	-4.44
Fund programs: ESAF or SAF	-0.036	-0.51	-0.135	-2.97
Federal countries	-0.335	-7.43	-0.019	-0.59
Population	-0.092	-5.92	-0.041	-4.64
Land area (in sq Km)	0.072	0.75	-0.110	-1.59
Public and publicly guaranteed net foreign financing	-0.013	-2.07	0.022	8.83
Commercial net foreign financing	...	...	0.020	2.09
High debt countries	0.077	1.17	-0.194	-5.62
Small low-income economies	-0.316	-6.22	0.059	1.59
Other forms of government	0.033	0.65	-0.084	-2.55
Socialist government	-0.560	-6.50	0.233	4.71
Monarchies	0.064	0.86	0.230	5.49
Military government	-0.084	-1.30	-0.162	-4.91
Civil war	0.053	0.65	-0.172	-3.61
Life expectancy at birth	...	...	-0.133	-0.98
Secondary school enrollment	...	...	0.033	1.54
1981	-0.006	-0.09	0.034	0.75
1982	0.002	0.04	0.030	0.67
1983	-0.004	-0.06	0.018	0.40
1984	-0.012	-0.19	-0.033	-0.73
1985	-0.017	-0.27	-0.042	-0.91
1986	-0.014	-0.23	-0.003	-0.07
1987	0.038	0.59	-0.022	-0.47
1988	0.042	0.65	-0.031	-0.65
1989	0.053	0.81	-0.034	-0.72
1990	0.066	1.01	-0.019	-0.41
R-squared	0.45		0.43	
Number of observations	1052		1052	

^{1/} Based on two-stage least squares--seemingly unrelated techniques.

1. Economic variables

As was predicted, CGE/GDP has a positive and significant association with wage expenditures (in proportion to GDP) in the "wage share" equation. Therefore, the explanation of the determinants of wage expenditures has two components: the direct component in the "wage share" equation and the indirect component through central government expenditures. In addition, as expected, interest expenditures have a positive association with total central government expenditures. 1/

Private nonguaranteed net foreign financing (PRIFF) and public and publicly guaranteed foreign financing (PPG) have a positive effect on CGE/GDP, as expected since they (directly or through the economy's budget constraint) increase available funding to government. PRIFF and PPG thereby indirectly enhance wage expenditures. From the specification of the model, equations (4A) and (4B), PRIFF is not incorporated into the "wage share" equation. PPG was included in the "wage share" equation to determine whether foreign financing of the public sector tends to influence the mix of government expenditures. The coefficient is negative and significant, which probably indicates that PPG receipts enhance the share of capital expenditures. With direct and indirect effects with opposite signs, the net effect, though positive, is not significant (the t-statistic is 1.58). 2/

Per capita income is found to have a negative and significant coefficient in the "wage share" equation. The possible reason for this result is that decentralization tends to increase with the level of development, while decentralization also affects central government responsibilities for wage expenditures more than for other expenditures (see Section V). Per capita income has a significant positive effect on CGE/GDP, indicating that income effects (government services as luxury goods or enhanced ability to raise taxes) more than offset the effect of reduced central government responsibilities (decentralization) and the effect of the reduction in scarcity in human capital and the wages central government must pay. Overall, i.e., after combining both equations into a reduced form, per capita income has a significant negative effect on central government wage expenditures.

Other economic variables that enter the analysis are the dummy variables for small low-income economies (SLIE) and highly indebted countries. The SLIE coefficient is negative and significant in the "wage share" equation and positive and insignificant ($t=1.59$) in the "total expenditure" equation. The net effect on wage expenditures is significantly negative. Heavily indebted countries have a negative and significant

1/ The condition that interest expenditures IE have a negative effect on the share of expenditures allocated to wages in the wage equation is imposed by regressing wage expenditures on central government expenditures net of interest expenditures.

2/ See the reduced form for wage expenditures (Appendices II and III, Table 5).

coefficient in the "total expenditure" equation and an insignificant coefficient in the "wage share" equation. 1/

2. Fiscal federalism and related variables

As predicted, the fiscal federalism dummy variable has a negative coefficient in the "wage share" equation. However, the coefficient is insignificant in the "total expenditure" equation, though negative. These findings are probably explained by the tendency of central governments to collect revenues for lower levels of government and provide them with intergovernmental transfers. Since these transfers are recorded as central government expenditures, a federation will not necessarily have lower CGE, but it will tend to have a lower share of central government wage expenditures. In the reduced form, fiscal federalism has a significant negative impact on wages as a percent of GDP.

Population has negative coefficients in the "wage share" and in the "total expenditure" equations. This is in line with the hypothesis that higher population leads to greater decentralization of government. The effect of land area is insignificant in the "wage share" equation and negative and insignificant ($t=1.59$) in the "total expenditure" equation.

3. Impact of Fund-supported programs

The estimated structural equations indicate that there is a statistically significant negative association of total central government expenditures (as a share of GDP) with stand-by and SAF/ESAF programs, but suggest no statistically significant negative association of the share of wages in total expenditures with either type of program. The reduced form estimates, taking into account both direct and indirect effects 2/ of Fund-supported programs on wage expenditures indicate that there is a statistically significant negative association of central government wages (as a share of GDP) with SAF/ESAF programs, but not with stand-by programs. In the case of stand-by programs, the coefficient in the "wage share" equation is positive and significant; this impact offsets the negative coefficient in the "total expenditures" equation. In the case of SAF/ESAF programs, the coefficient in the "wage share" equation is insignificant (but negative), so that the negative coefficient in the "total expenditures" equation translates into a negative association between SAF/ESAF programs and wage expenditures in the reduced form equation. These findings possibly indicate that wage expenditures are downwardly rigid in the face of reductions in expenditures under stand-by arrangements, while wage

1/ In the original formulation, debt as a proportion of GDP was included in the econometric specifications. However, this variable was found to be highly correlated with PPG and was dropped to avoid multi-collinearity.

2/ The direct effect refers to the possible restraining effect of a program on the share of wage expenditure in total expenditure; the indirect effect refers to the restraining effect of a program on wage expenditure through its effects on total government expenditure.

expenditures fall under SAF/ESAF arrangements in line with the decline in total government expenditures. 1/ The negative association of central government wage expenditures with SAF/ESAF programs is not a new finding. Nashashibi, et al. (1992) report that the 21 SAF/ESAF program countries reduced wage expenditures, on average, as a share of GDP during the program period and that this resulted from reductions in central government wage expenditures in 13 of them, more than offsetting the increases in the other 8 countries. The different results for SAF/ESAF programs and stand-by programs should be interpreted as resulting from the difference in duration (medium term for SAF/ESAF programs and short-term for stand-by programs) and in policy measures (structural measures in SAF/ESAF programs and macroeconomic measures in stand-by programs) between these programs, rather than from differences between the program countries themselves. 2/ 3/ This is indicated by the fact that many of the countries implementing a

1/ One possible explanation for downward rigidity of wage expenditures, in general, is circumvention of wage-guidelines of the Ministry of Finance, set in the context of either an incomes policy or fiscal consolidation. See Derek Robinson (1990) for a discussion of reactions of the civil service, such as accelerated promotion of staff, to policies of pay restraint.

2/ World Bank loans incorporating civil service reform components accompanied SAFs and ESAFs in half the countries in our sample with a SAF or ESAF (Nunberg, forthcoming).

3/ Panel estimation provides a decomposition of the effects within countries and between countries (Appendix III, Table 5). The first panel reports the total effect--i.e., OLS estimates based on pooled cross-section time-series (without the SUR adjustment), the second panel reports the "within" estimates (or fixed effects) and the third the "between" estimates. The "within" model isolates the effects of variables over time within countries. This is achieved by allowing each country to effectively have a different intercept term which adjusts for overall level differences in wages among countries. The "between" estimates use the mean values for each country (the "between" estimates are effectively based on only 99 observations). The finding of a relationship between the presence of a Fund program and wage expenditures within a country would strengthen the case for a causal relationship from presence of a program to wage expenditures. In the case of the STBY variable, the coefficients are insignificant in both the "between" and "within" equation. The coefficient in the "between" case for ESAF and SAF programs is also insignificant, which means that countries which have a program at some point, do not tend to have a lower level of wage expenditures on average over the period. The coefficient in the "within" estimation for SAF/ESAF is, however, negative and significant, implying that during the years that a country has a SAF or an ESAF, wage expenditures tend to be lower (Appendix II).

stand-by program also implement a SAF or ESAF at some point. 1/ Further, empirical work for a subset of countries indicates that the significant negative association between lower wage expenditures and SAF/ESAF programs reflect a negative association between employment and SAF/ESAF programs rather than between wage levels and SAF/ESAF programs. 2/

Evaluated at the sample average for wage expenditures as a percent of GDP, the difference in average wage expenditures between countries with programs and countries without is about 1 percent of GDP, holding everything else constant. This is larger than the estimate obtained by Nashashibi, et al., (1992), of 0.3 percent of GDP (over the program period) for a 21-country sample of countries with SAFs or ESAFs. 3/ The higher estimate could reflect the use of regression analysis, where "everything else," in particular foreign financing, is held constant. If foreign financing increases when SAF/ESAFs are in place, our equation predicts an increase in wage expenditures on account of this, so that in the net, SAF/ESAF programs may have a smaller negative association with wage expenditures than indicated by the coefficient on the SAF/ESAF dummy.

4. Form of government variables

The final set of variables concerns the impact of the form of government. The reduced form results indicate that democracies have higher wage expenditures than other forms of government, with the exception of monarchies. This could reflect spending under electoral pressure, including a role for government as the employer of the last resort in some democracies. The source of the positive coefficient for monarchies is a positive and significant coefficient in the "total expenditure" equation. This result probably reflects a higher degree of centralization of monarchies.

Socialist governments and military regimes, during the sample period (1980-90), have significantly lower wage expenditures than democracies in the reduced form equation. The socialist government coefficient is negative

1/ The 99 country sample includes 48 countries implementing at least one stand-by program and 22 countries implementing at least one SAF or ESAF program. Of the 48 countries implementing at least one stand-by program, 18 countries also implemented at least one SAF or ESAF during the sample period. Twenty seven of the countries with stand-by programs during our sample period are currently ESAF eligible. Thirty five of the countries with stand-by programs had per capita incomes below the current cutoff point for eligibility to concessional financing from the International Development Association (IDA) in 1990 (US\$ 835 per capita).

2/ See Kraay and Van Rijckeghem (forthcoming, 1994).

3/ The difference in estimates probably does not reflect different country samples as 17 of the 21 countries studied by Nashashibi, et al. were included in the present study. The total number of SAF and ESAF arrangements over the period was 34, of which 22 were included in the present study.

and significant in the "wage share" equation and positive and significant in the "total expenditure" equation, but of a lower order of magnitude. Lower central government wage expenditures in socialist countries probably reflect the fact that much of the public sector employment is in public enterprises, rather than in the civil service. Also, civil servants in socialist countries receive extensive in-kind benefits, which are not included in the wage bill reported by GFS. 1/ The military government coefficient is negative and significant in the "total expenditure" and reduced form wage equations. The finding that military governments have lower (wage and total) expenditures compared to democracies may be related to the absence of electoral pressures for government expenditures. 2/

Countries involved in civil war and countries in the category of "other" forms of government have a negative and significant coefficient in the "total expenditures" equation that is offset by a positive though insignificant coefficient in the "wage share" equation. The net impact on wages is insignificant for "other" forms of government and countries involved in civil war ($t=1.59$). 3/

V. General Government Wage Expenditures

The purpose of this section is to examine central government wage expenditures in the context of general government wage expenditures and total general government expenditures. Reliable general government data exist only for a very restricted sample of countries. GFS reports complete data on general government wage expenditures and local or state government wages for only 21 countries. Not surprisingly, these countries are by no means representative of the 99 countries used in this study. Central government wage expenditures among these 21 countries averaged (unweighted) only 4 percent of GDP compared to 7 percent in the larger sample

1/ World Bank supported work has found that in-kind benefits (including housing, holiday bonuses, childcare, health facilities, etc.) are an important component of compensation in formerly centrally planned economies.

2/ While individual country studies abound, in particular for democracies, the authors have not been able to locate any cross-country study of the relationship between form of government and government spending. For a development of the theoretical argument, see "Why are Representative Democracies Fiscally Irresponsible" by VV. Chari and H. Cole (1993).

3/ Two variables similar to the UNDP human development index are included in the CGE/GDP equation to account for level of development. The variables--life expectancy at birth and secondary school enrollment, as reported in the World Bank's Social Indicators of Development--have insignificant coefficients.

(Table 5). 1/ Undoubtedly this is because the countries which make the effort to collect and report data on general government expenditures are the more decentralized countries. In fact, the 21 country sample includes a much higher proportion of industrial countries than the full sample-- 57 percent compared to 20 percent--and of federal countries--38 percent compared to 13 percent in the full sample. 2/ Thus, the results below are not necessarily indicative of the ratios that would exist in the full data set.

Bearing these qualifications in mind, a number of interesting observations can be made. General government wage expenditures in the sample were about 9 percent of GDP. General government wage expenditures were 65 percent higher for industrial countries (11 percent of GDP) than for developing countries (6.8 percent of GDP), consistent with the hypotheses that government services are a luxury good and that industrial countries have a stronger institutional capacity to raise taxes.

Federal countries spent about 40 percent of GDP less on central government wages than nonfederal countries in both samples. Surprisingly, federal countries spent 33 percent less on general government wages than nonfederal countries (7.7 percent compared to 10.1 percent of GDP) and about 20 percent less on state and local wage expenditures, in the reduced sample. These findings probably reflect the low income level of federal countries in the reduced sample. 3/

In this sample, central government wage expenditures (as a percent of GDP) were only marginally higher for developing countries than for industrial countries, in contrast to the averages for the 99 countries where the ratio of CGE wages to GDP was 40 percent higher in developing countries than in industrial countries. This finding probably reflects the high incidence of federations among developing countries in the reduced sample compared to the full sample. 4/ State and local wage expenditures constituted close to 5 percent of GDP on average and were over three times higher in industrial countries than in developing countries.

1/ For Sweden and Norway the GFS data for general government wage expenditures are smaller than the sum of central and local government wages. Accordingly, general government wage expenditure in Table 5 is calculated as the sum of its components.

2/ The Industrial countries included in the sample are Austria, Belgium, Canada, Denmark, Germany, Ireland, the Netherlands, Norway, Spain, Sweden, the United Kingdom, and the United States. The developing countries included in this sample are Bolivia, Brazil, Hungary, India, Indonesia, Israel, Kenya, Paraguay, and Romania.

3/ Non-federal developing countries include relatively rich countries such as Hungary and Israel in the reduced sample.

4/ For developing countries, 33 percent of developing countries were federations in the reduced sample compared to 13 percent in the full sample. By contrast, 42 percent of industrial countries were federations in the reduced sample compared to 30 percent in the full sample.

Table 5: General Government Wages, Selected Countries ^{1/}

	General Government	Central Government	State & Local Government	State Government	Local Government
<u>(As percent of GDP)</u>					
Total	9.2	4.3	4.8	2.8	4.4
Industrial countries	11.0	4.2	6.7	3.3	5.7
Developing countries	6.8	4.4	2.2	2.2	1.9
Federal countries	7.7	3.2	4.3	3.2	2.3
Non-federal countries	10.1	4.9	5.1	1.9	5.5
<u>(As percent of general government expenditure) ^{2/}</u>					
Total	22.2	11.7	10.0	6.8	8.7
Industrial countries	22.6	8.9	13.5	7.0	11.4
Developing countries	21.6	15.5	5.5	6.5	3.9
Federal countries	19.4	8.6	10.3	8.0	2.9
Non-federal countries	23.9	13.7	9.9	4.0	19.4
<u>(As percent of total wage bill)</u>					
Total	100.0	51.2	47.2	35.9	38.5
Industrial countries	100.0	40.5	58.7	36.3	46.2
Developing countries	100.0	65.5	32.0	35.2	24.5
Federal countries	100.0	43.1	55.0	42.8	27.0
Non-federal countries	100.0	56.2	42.5	19.7	44.8
<u>(As percent of own government expenditure) ^{3/}</u>					
Total	22.2	13.9	36.7	31.2	38.6
Industrial countries	22.6	11.2	37.6	30.2	39.6
Developing countries	21.6	17.6	35.5	32.8	36.8
Federal countries	19.4	11.6	31.8	37.3	31.9
Non-federal countries	23.9	15.4	39.7	17.2	42.3
<u>(Number of countries)</u>					
Total	21	21	21	10	17
Industrial countries	12	12	12	6	11
Developing countries	9	9	9	4	6
Federal countries	8	8	8	7	6
Non-federal countries	13	13	13	3	11

Source: IMF, Government Finance Statistics.

^{1/} Latest year available 1988 to 1990.

^{2/} These numbers do not add up across columns because of the difference in country coverage in each column (see the bottom panel).

^{3/} Wages expenditures as a share of own government expenditures, e.g. general government wages as a share of total general government expenditures, CGE wages as percent of total CGE, etc.

Wage expenditures of general government were about 22 percent of total general government expenditures (Table 5 second panel). For the 21 countries as a whole, central government wage expenditures were about equal to state and local wage expenditures. However, there were large differences across groups of countries, with industrial and federal countries spending more on state and local wages.

As noted in the previous paragraph, central government wage expenditures constituted about 50 percent of general government wage expenditures in the reduced sample (Table 5 third panel). However, there is little question that this fraction was substantially higher for the 99 countries than in the reduced sample, since industrial countries and federations are over-represented in the reduced sample. In the reduced sample, the ratio of central government wages to general government wages was 66 percent for developing countries (compared to 41 percent for industrial countries), 56 percent for nonfederations (compared to 43 percent for federations), and 75 percent for nonfederal developing countries. Extrapolation based on four categories (federal developing, federal industrial, nonfederal developing, nonfederal industrial) suggests that the ratio of central government wages to general government wages in the entire sample was on the order of 67 percent. This high ratio reflects the fact that nonfederal developing countries accounted for a high proportion--70 percent--of the 99 countries.

The share of wages averaged 14 percent in total central government expenditures, 31 percent in total state government expenditures, and 40 percent in total local government expenditures (Table 5 fourth panel). This reflects the fact that a large share of central government expenditures constitutes transfers to other organizations and lower levels of government, while local government expenditures tend to include only minimal transfers to other organizations. It is also interesting to note that for federal countries the share of wages in own expenditures was higher at the state level and lower at the local government level than for nonfederal countries.

To conclude, the results in this section confirm the expectation that industrial countries spend more on general government wage expenditures, despite spending less on central government wages. The results are consistent with the hypotheses that government spending is a luxury good, that industrial countries have a better capacity to raise taxes, and that industrial countries have more decentralized systems of government spending. The results also confirm that federal countries have more decentralized systems of spending, particularly regarding wage expenditures.

VI. Conclusions

This study has examined the trends and determinants of central government wage expenditures in cross section time series data covering 99 countries during 1980-90 generating some 1,050 observations. The results are rich, given the presence of important institutional differences which affect central government wage expenditures across the countries studied.

By introducing a dummy variable for federations and a set of variables which explain why a country would have a more decentralized system of government (GDP per capita, population, and land area), the study is able to pool countries in one regression. The results indicate that the variables which proxy for decentralization generally perform as expected. There are several other interesting findings.

The study finds that both private nonguaranteed net foreign financing and public and publicly guaranteed net financing have a positive association with total central government expenditures. However, in contrast to private nonguaranteed net financing, public and publicly guaranteed net foreign financing has a significant positive coefficient in the "wage share" equation and an insignificant net impact on wages. While both types of borrowing clearly can increase government expenditure, the latter is often associated with public sector capital projects. SAF and ESAF programs have a negative association with wage expenditures while STBY programs do not. The former often support medium-term structural measures, including civil service reform aimed at public sector retrenchment and improvement of public sector efficiency; the latter support short-run macroeconomic adjustment. Finally, the paper finds that military governments and socialist governments spend less on wages than democratic governments, while monarchies spend more. Lower central government wage expenditures in socialist countries probably reflect the fact that government employees receive a large portion of compensation as in-kind benefits, while higher wage expenditures in monarchies probably reflect the higher degree of centralization in these countries. The finding that democracies have higher wage expenditures than military governments could reflect spending under electoral pressures, including a role for government as the employer of last resort in some countries. These findings can be used to bring countries with diverse characteristics on a comparable basis, and do not necessarily carry policy implications.

An important limitation of using central government data while pooling centralized and decentralized countries is that it is sometimes difficult to disentangle the effect of decentralization from the effect of development. For instance, the interpretation of the negative coefficient on per capita income in the central government wage expenditure equations reflects the combined effect of a negative correlation between development and centralization and a positive correlation between development and the demand for public services.

Future research could study centralized and decentralized countries, developing and industrial countries, or geographical areas separately. In addition future research could investigate, for a smaller set of countries, by including such variables as unemployment, capital/labor ratios, and the ratio of direct taxes to GDP, (1) counter-cyclical hiring by the government; (2) the impact of abundant labor relative to capital; (3) the impact of institutional constraints in raising taxes.

Derivation of the Econometric Equations

The exact maximization problem that was examined was as follows,

$$\text{Max } W = AC^\alpha WE^\beta OE^\epsilon + \gamma(CGE - WE - IE - OE) + \lambda(CGE + C - GDP - FF). \quad (5)$$

C, WE, OE

The solution derived is,

$$WE/GDP = (CGE/GDP - IE/GDP)[\beta/(\epsilon+\beta)] \quad (6A)$$

$$CGE/GDP = [(GDP+FF)/GDP][\beta\lambda(\alpha+\beta)]/[(1+\beta)(\beta\lambda+\alpha\gamma)] \\ + [IE/GDP][(\alpha\beta\gamma\lambda)(\alpha+\beta)+(1-\alpha)(\beta\lambda+\alpha\gamma)]/[(1+\beta)(\beta\lambda+\alpha\gamma)] \quad (6B)$$

Where α , β , and ϵ are coefficients that represent the relative value in the social welfare function of the different types of expenditure and γ and λ are Lagrangian multipliers that represent the relative weight of the two constraints.

Panel Estimates

Panel estimates were derived for the reduced form equation wage expenditure equation (Appendix III, Table 5). Three different econometric specifications are employed, using the entire data set in each case. The first is the pooled time-series cross-section specification. The second is the "within" or fixed effects specification, which introduces a dummy for each country. The third is the "between" specification, which uses only the mean values for each country for all variables and thereby restricts the sample to 99 observations. The purpose of the different estimates is to isolate how the different variables affect wage expenditures. The "within" specification effectively assigns a separate intercept term to each country, thereby eliminating the influences of cross-country differences on the econometric estimates. Alternatively, the "between" specification eliminates the effect of variation over time within each country, and instead focusses on how country characteristics affect wage expenditures. The "within" and "between" estimates can be viewed as a decomposition of the pooled time-series cross-section specification.

In the "between" equation, only population and the fiscal federalism dummy are significant. They carry negative coefficients, confirming the expectation that these variables, usually associated with more decentralized government, are associated with lower central government wage expenditures.

In the "within" equation, the dummy for SAF and ESAF programs has a negative and significant coefficient. This implies that countries that enter a SAF or ESAF tend to lower their wage expenditures. However, since the coefficient in the "between" equation is insignificant, there is no (negative) association between the average likelihood of obtaining a SAF or an ESAF and the average level of wage expenditures. Because the dummy for SAF and ESAF programs is significant in the "within" equation, but not in the "between" equation, the significance of the dummy in the pooled equation indicates that there is probably a causal relationship from SAF or ESAF programs to wage expenditures. ^{1/} In contrast to the SAF/ESAF dummy, the STBY dummy is insignificant in the "within" equation (as it was in the "between" equation). The proxy for education (secondary school enrollment) carries a positive coefficient. Further, wage expenditures appear to be smaller from 1984 on, in the "within" equation.

The coefficient on interest expenditures has a perverse sign in the pooled time-series cross-section, probably reflecting correlation with an omitted variable. The results of the "between" and "within" estimation indicate that the reason for the positive impact of interest expenditures on wage expenditures is related to the cross-country correlation between the two variables, as interest expenditures carries a positive coefficient in

^{1/} This would not follow if the negative association in the "within" equation reflected a tendency by countries to implement Fund programs in years that wage expenditures are particularly low. There is no reason to believe that this would be the case.

the "between" equation, but a negative coefficient in the "within" equation (neither is significant). The reason could be that countries with high wage expenditures have high deficits and, therefore, high interest expenditures.

Table 1. Categories of Countries

Country Groups by Economic Development and Regions ^{1/}						Country Groups by Special Characteristics		
Industrialized Countries	Sub-Saharan Africa	Asia	Europe and Former Centrally Planned Economies	Middle East and North Africa	Western Hemisphere	Federal Countries	Heavily Indebted Middle Income	Small Low-Income Economies ^{2/}
Australia	Benin	Fiji	Cyprus	Algeria	Barbados	Australia	Bolivia	Benin
Austria	Botswana	India	Hungary	Bahrain	Belize	Austria	Brazil	Burkina Faso
Belgium	Burkina Faso	Indonesia	Malta	Egypt	Bolivia	Brazil	Chile	Burundi
Canada	Burundi	Korea	Romania	Iran	Brazil	Canada	Colombia	Central African
Denmark	Cameroon	Malaysia	Turkey	Israel	Chile	Germany	Côte d'Ivoire	Republic
Finland	Central African Republic	Maldives		Jordan	Colombia	India	Mexico	Chad
France	Chad	Pakistan		Kuwait	Costa Rica	Indonesia	Morocco	Comoros
Germany	Comoros	Papua New Guinea		Morocco	Dominican Republic	Malaysia	Nigeria	Ethiopia
Greece	Côte d'Ivoire	Philippines		Oman	El Salvador	Mexico	Philippines	Gambia, The
Iceland	Djibouti	Singapore		Tunisia	Guatemala	Nigeria	Uruguay	Guinea-Bissau
Ireland	Ethiopia	Solomon Islands			Mexico	Pakistan	Venezuela	Kenya
Japan	Gabon	Sri Lanka			Panama	Papua New Guinea		Lesotho
Netherlands	Gambia, The	Thailand			Paraguay	Philippines		Madagascar
New Zealand	Ghana	Vanuatu			Uruguay	Spain		Malawi
Norway	Guinea-Bissau				Venezuela	United States		Maldives
Portugal	Kenya					Venezuela		Mali
Spain	Lesotho							Mozambique
Sweden	Liberia							Niger
United Kingdom	Madagascar							Pakistan
United States	Malawi							Rwanda
	Mali							Senegal
	Mauritius							Sierra Leone
	Mozambique							Sri Lanka
	Niger							Tanzania
	Nigeria							Togo
	Rwanda							Vanuatu
	Senegal							Zaire
	Seychelles							Zambia
	Sierra Leone							
	Swaziland							
	Tanzania							
	Togo							
	Zaire							
	Zambia							
	Zimbabwe							

Sources: The Europa World Year Book, 1992, Europa Publications, Ltd., and IMF, World Economic Outlook, October 1992.

^{1/} Developing countries include all countries except industrialized and former centrally planned economies.

^{2/} Small low-income economies consist of nations with a per capita income less than \$425 in 1986.

Table 2. Central Government Wages as Percent of GDP, 1980-90, Weighted Averages

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Average
Total	4.7	4.7	4.7	4.6	4.4	4.4	4.5	4.6	4.6	4.4	4.5	4.6
Industrial countries	4.7	4.6	4.6	4.5	4.3	4.2	4.4	4.5	4.4	4.3	4.4	4.5
Developing countries	5.1	5.2	5.2	5.1	4.9	5.1	5.3	5.3	5.2	5.1	5.1	5.2
Western Hemisphere	4.3	4.8	4.7	4.4	3.9	4.0	3.5	3.4	3.5	3.8	3.5	4.0
Sub-Saharan Africa	7.0	6.8	6.3	6.2	6.9	6.7	7.0	7.5	7.5	7.6	8.3	7.1
Middle East and North Africa	10.9	10.5	10.5	9.8	9.3	9.8	10.3	9.7	9.9	9.0	8.4	9.8
European non-Industrial countries	5.1	4.1	3.4	3.8	3.5	3.3	4.2	4.3	4.4	5.6	7.1	4.4
Far East and Central Asia	3.0	3.1	3.1	3.1	3.1	3.2	3.4	3.3	3.1	3.1	3.1	3.1
Country groups with special characteristics:												
Federal countries	3.1	3.1	3.2	3.1	2.9	2.9	2.9	2.9	2.8	2.8	2.8	3.0
Heavily Indebted countries	4.0	4.6	4.5	4.1	3.6	3.8	3.5	3.5	3.6	3.9	3.6	3.9
Small low-income economies	5.1	4.8	4.5	4.1	4.2	4.4	4.6	4.6	4.3	4.4	4.7	4.5
Countries with population over 50 million	4.5	4.6	4.5	4.5	4.3	4.3	4.5	4.5	4.5	4.4	4.4	4.5

Sources: IMF, Government Finance Statistics, and authors' estimates.

Table 3. Central Government Wages as Percent of Total Central Government Expenditure, 1980–90, Weighted Averages

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Average
Total	16.9	16.6	16.0	15.9	15.9	15.6	16.3	16.8	17.0	16.8	16.5	16.4
Industrial countries	16.2	16.0	15.4	15.3	15.3	14.9	15.8	16.2	16.6	16.3	15.8	15.8
Developing countries	21.1	20.6	19.7	19.6	19.7	20.0	20.0	21.3	20.5	20.4	20.8	20.3
Western Hemisphere	21.0	21.5	18.7	18.6	17.8	16.3	13.5	13.3	12.7	12.9	13.3	16.3
Sub-Saharan Africa	26.5	26.8	25.4	26.0	27.1	27.0	26.8	27.4	28.3	29.0	29.8	27.3
Middle East and North Africa	28.0	26.0	25.0	24.2	25.0	28.8	31.2	34.0	32.6	34.2	32.1	29.2
European non-industrial countries	16.1	11.8	11.4	12.2	11.0	9.0	11.7	12.2	13.1	16.3	22.5	13.4
Far East and Central Asia	14.3	13.9	14.5	14.8	15.0	14.4	14.3	14.9	15.1	15.0	14.7	14.6
Country groups with special characteristics:												
Federal countries	12.5	12.4	12.2	11.7	11.6	11.1	11.0	11.2	11.1	11.2	10.8	11.5
Heavily indebted countries	18.9	19.9	17.7	17.4	17.2	16.2	13.7	13.8	13.2	13.4	13.8	15.9
Small low-income economies	21.2	20.9	20.9	19.3	18.2	18.8	18.2	17.7	16.9	16.9	17.4	18.8
Countries with population over 50 million	17.2	17.2	16.4	16.4	16.6	16.3	17.2	17.8	18.1	17.9	17.4	17.1

Sources: IMF, Government Finance Statistics, and authors' estimates.

Table 4. Total Central Government Expenditure as Percent of GDP, 1980-90, Weighted Averages

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Average
Total	28.1	28.4	29.2	29.0	27.7	28.1	27.9	27.3	26.7	26.4	27.2	27.8
Industrial countries	28.8	29.0	29.7	29.6	28.3	28.5	28.0	27.6	26.8	26.5	27.6	28.2
Developing countries	24.4	25.5	26.7	26.2	24.7	25.6	26.6	25.1	25.6	25.2	24.5	25.5
Western Hemisphere	20.4	22.5	25.2	23.4	21.9	24.5	26.1	25.4	27.9	29.1	26.1	24.8
Sub-Saharan Africa	26.3	25.3	25.0	23.8	25.4	24.7	26.1	27.4	26.5	26.1	27.9	25.9
Middle East and North Africa	39.0	40.5	42.0	40.6	37.0	34.2	33.1	28.6	30.2	26.3	26.1	34.3
European non-Industrial countries	31.9	34.8	30.2	31.1	31.7	36.3	36.0	35.1	33.2	34.6	31.6	33.3
Far East and Central Asia	21.1	22.0	21.6	21.0	20.8	22.4	23.4	21.9	20.4	20.7	21.1	21.5
Country groups with special characteristics:												
Federal countries	24.6	25.2	26.2	26.4	25.2	26.1	26.1	25.7	25.4	25.2	25.9	25.6
Heavily Indebted countries	21.3	23.2	25.3	23.6	21.1	23.3	25.7	25.3	27.4	28.8	26.1	24.6
Small low-income economies	24.0	22.9	21.5	21.3	23.1	23.5	25.3	25.8	25.7	26.3	27.0	24.2
Countries with population over 50 million	26.4	26.6	27.4	27.2	25.8	26.4	26.1	25.3	24.9	24.7	25.3	26.0

Sources: IMF, Government Finance Statistics, and authors' estimates.

Table 5. Determinants of Wage Expenditures: Panel Estimates of Reduced Form 1/

	Coefficient	t-ratio
<u>Pooled Time-Series Cross-Section</u>		
Constant	4.390	6.26
Interest	0.013	2.57
Per capita income	-0.128	-4.50
Life expectancy	-0.283	-1.42
Education	0.009	0.28
Fund programs: STBY	-0.019	-0.51
Fund programs: SAF or ESAF	-0.161	-2.50
Federal countries	-0.384	-8.52
Population	-0.126	-10.10
Land area (in sq. km)	-0.056	-0.57
Public and publicly guaranteed net foreign financing	0.006	1.58
Commercial net foreign financing	0.043	3.15
High debt countries	-0.121	-2.47
Small low-income economies	-0.272	-5.12
Other forms of government	-0.064	-1.37
Socialist government	-0.347	-4.96
Monarchies	0.243	4.08
Military government	-0.242	-5.16
Civil war	-0.108	-1.60
R-squared	0.460	
<u>Within (fixed effects)</u>		
Interest	-0.002	-0.63
Per capita income	-0.011	-0.17
Life expectancy	0.955	1.58
Education	0.122	2.52
Fund programs: STBY	-0.016	-0.83
Fund programs: SAF or ESAF	-0.124	-3.87
Federal countries	--	--
Population	0.133	0.86
Land area (in sq. km)	-472.000	-0.35
Public and publicly guaranteed net foreign financing	0.002	0.84
Commercial net foreign financing	0.005	0.58
High debt countries	--	--
Small low-income economies	--	--
Other forms of government	-0.235	-2.53
Socialist government	--	--
Monarchies	--	--
Military government	-0.011	-0.21
Civil war	0.160	1.91
R-squared	0.060	
<u>Between (means)</u>		
Constant	7.500	1.28
Interest	0.021	0.90
Per capita income	-0.101	-0.92
Life expectancy	-0.707	-0.87
Education	0.053	0.42
Fund programs: STBY	0.083	0.33
Fund programs: SAF or ESAF	-0.646	-1.13
Federal countries	-0.399	-2.51
Population	-0.136	-3.01
Land area (in sq. km)	0.010	0.03
Public and publicly guaranteed net foreign financing	0.006	0.23
Commercial net foreign financing	0.064	0.96
High debt countries	-0.154	-0.87
Small low-income economies	-0.139	-0.61
Other forms of government	-0.069	-0.40
Socialist government	-0.378	-1.38
Monarchies	0.192	0.92
Military government	-0.304	-1.66
Civil war	-0.139	-0.53
R-squared	0.540	

1/ Year dummy variables were included in the regression but the results not reported in this table due to their insignificance (except for a significant negative coefficient in 1985, 1988, 1989 in the fixed effects).

Table 6: Descriptive Statistics of the Regression Variables

	Mean	Standard Deviation	Minimum	Maximum
Central government wage expenditures (percent GDP) <u>1/</u>	1.82	0.58	-0.088	3.04
Central government expenditures (percent GDP) <u>1/</u>	3.38	0.41	2.11	4.29
Interest (percent GDP)	2.94	2.90	0.00	26.23
Population <u>1/</u>	1.87	1.82	-2.81	6.72
Per Capita Income <u>1/</u>	7.85	1.09	5.52	10.05
Land in square km <u>1/</u>	0.50	0.23	-0.13	0.92
Urbanization (percent)	47.42	25.18	4.30	100.00
Life expectancy (years) <u>1/</u>	4.12	0.18	3.61	4.37
Education (percent) <u>1/</u>	3.59	0.91	0.69	4.72
DEBT (percent GDP)	36.37	39.19	0.00	339.45
PPG (percent GDP)	3.04	4.61	-6.75	50.55
Private foreign financing (percent GDP)	0.17	1.02	-2.46	12.26
Federation	0.17	0.37	0.00	1.00
Small low-income economy	0.28	0.45	0.00	1.00
Socialist system	0.05	0.22	0.00	1.00
Monarchy	0.07	0.26	0.00	1.00
Military government	0.24	0.43	0.00	1.00
Other type of government	0.19	0.39	0.00	1.00
Civil war	0.06	0.24	0.00	1.00
Stand-by arrangement	0.20	0.40	0.00	1.00
ESAF	0.06	0.24	0.00	1.00
High debt	0.12	0.32	0.00	1.00

Source: See text and Appendix III, Table 1.

1/ In logs.

Table 7. Central Government Wage Expenditures as Percent of GDP, 1980-90 Average

Country	Wage Expenditures	Country	Wage Expenditures
Algeria	9.32	Kuwait	11.65
Australia	2.43	Lesotho	16.39
Austria	4.02	Liberia	11.54
Bahrain	14.17	Madagascar	6.23
Belgium	10.20	Malawi	5.37
Barbados	7.50	Malaysia	9.44
Belize	10.65	Maldives	6.64
Benin	8.14	Mali	7.27
Bolivia	5.98	Malta	12.02
Botswana	8.16	Mauritius	9.14
Brazil	2.44	Mexico	4.52
Burkina Faso	8.06	Morocco	10.66
Burundi	6.10	Mozambique	5.33
Cameroon	6.04	Netherlands	5.18
Canada	2.22	New Zealand	7.13
Central African Republic	8.38	Niger	3.91
Chad	3.90	Nigeria	1.82
Chile	5.86	Norway	3.58
Colombia	2.78	Oman	7.36
Comoros	8.85	Pakistan	1.08
Costa Rica	9.38	Panama	11.54
Cote d'Ivoire	9.20	Papua New Guinea	10.77
Cyprus	9.84	Paraguay	3.42
Denmark	5.19	Philippines	4.09
Djibouti	18.40	Portugal	8.85
Dominican Republic	5.21	Romania	2.09
Egypt	8.16	Rwanda	5.58
El Salvador	7.21	Senegal	9.58
Ethiopia	10.08	Seychelles	14.12
Fiji	12.19	Sierra Leone	4.89
Finland	3.11	Singapore	6.37
Finland	7.76	Solomon Islands	11.29
France	7.25	Spain	7.02
Gabon	6.30	Sri Lanka	4.51
Gambia	2.66	Swaziland	11.22
Germany	3.83	Sweden	2.87
Ghana	12.53	Tanzania	5.48
Greece	4.64	Thailand	5.65
Guatemala	10.54	Togo	8.76
Guinea Bissau	3.86	Tunisia	9.73
Hungary	7.76	Turkey	5.88
Iceland	1.96	United Kingdom	5.01
India	2.93	United States	2.76
Indonesia	11.57	Uruguay	6.48
Iraq	6.32	Vanuatu	13.88
Ireland	6.49	Venezuela	7.01
Israel	7.54	Zaire	3.49
Japan	5.85	Zambia	6.81
Jordan	8.82	Zimbabwe	11.73
Kenya	2.38		
Korea			

Sources: IMF, Government Finance Statistics, and authors' estimates.

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