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AUSTRIA

Selected Issues

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Approved by the European Department

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THE IMPACT OF GOVERNMENT SIZE AND THE COMPOSITION OF REVENUE AND EXPENDITURE ON GROWTH

A. Introduction

1.   The debate surrounding the size of the public sector and the tax structure has taken center stage in Austria. The government has declared its intention to lower the tax burden as a share of GDP from 44 percent in early 2000 to 40 percent by 2010 while maintaining a broadly balanced budget over the cycle. The first major step of the tax reform is being taken in 2004-05.

2.   The purpose of this paper is threefold. First, it investigates empirically whether the reduction in the size of the government is likely to have a positive impact on real GDP growth. Second, it explores which taxes and expenditure categories have the largest impact on growth in order to guide the authorities in their endeavor to reduce the size of the public sector. Third, since employment and investment are important determinants of the level of GDP, and employment is also related to the overall level of welfare, it investigates the impact of government size and the various tax and expenditure categories on investment and employment.

3.   It is often argued that an excessively large public sector is detrimental to economic growth because government expenditures crowd out the more productive private sector, while the taxes necessary to finance these expenditures distort economic decisions, and hence reduce real GDP further. However, a more balanced approach recognizes that, because of various market failures associated with externalities, incomplete information, and public goods, government expenditures (and even some types of revenues) may have a positive impact on growth. The issue then is to determine the size and composition of the public sector that would maximize economic growth.[1]

4.   Alas, the empirical literature is not conclusive on this issue. There is no clear empirical evidence to support the general presumption that a higher tax burden has an adverse impact on growth (see Tanzi and Zee (1997), Gerson (1998), and Disney (2000) for a detailed survey). For example, Disney (2000) concludes, based on a survey of findings concerning the impact of tax and welfare policies on employment, unemployment, and economic growth in OECD countries, that cross-country macroeconomic studies shed only limited light on the issue. Likewise, Tanzi and Zee (1997) conclude that the empirical literature is less definitive than one would have thought and is somewhat disappointing in its support of the conclusions derived by the theory. Some authors (e.g., Daveri and Tabellini (2000)) conclude, based on the observed increase in unemployment, the slowdown in

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[1] The analysis of the redistributive role of the public sector, and hence its impact on welfare, is beyond the scope of this paper.

economic growth, and the increase in labor tax rates in the EU between 1965 and 1995, that higher labor tax rates are detrimental to economic growth. On the contrary, other studies that estimate the impact of taxes on growth fail to find any significant effect on growth (e.g., Easterly and Rebelo (1993), and Stokey and Rebelo (1995)). For example, Easterly and Rebelo (1993) experimented with thirteen different measures of the tax burden and found only one—an estimated marginal income tax computed by regressing income tax revenue on GDP—to be statistically significant in explaining growth.

5.   As with the case of taxation, the empirical evidence of the growth effects of public expenditures is inconclusive. Ram (1986) found, based on cross-country regressions, that growth is negatively correlated with the level of expenditures but is positively correlated with the rate of change in total public expenditures. Easterly and Rebelo (1993) and Barro and Sala-i-Martin (1995) found that growth is negatively correlated with public consumption net of education and defense spending. Knight, Loayza, and Villanueva (1996) found a significant adverse impact of military expenditure on growth. In contrast, Levine and Renelt (1992) found that neither military nor public expenditures on education have a robust correlation with growth. With regard to public investment, while Easterly and Rebelo (1993) found a positive correlation between public investment and growth, Levine and Renelt (1992) found that the correlation is not robust.

6.   The failure to find robust evidence of the effect of taxes and expenditures on growth may be due to an omitted variables problem, particularly the exclusion of expenditures—which are correlated with taxation and may an impact on growth—from the estimation of the impact of taxes, and likewise the exclusion of taxes from the estimation of the impact of expenditure. In the words of Tanzi and Zee (1997), "the most severe difficulty in isolating the impact of taxation on growth arises because key nontax fiscal variables, such as public expenditure and budget policies, that are often not independent of tax policy can also affect growth."

7.   Studies that incorporate the full spectrum of fiscal policy include Miller and Russek (1997), who found (for panel data for 39 countries over 1975-84) that deficit-financed changes in expenditures and taxation have an adverse effect on growth. Kneller, Bleaney, and Gemmell (1999) investigate the various categories of expenditures and revenues. Using a panel of 22 OECD countries between 1970-95, they conclude that an increase in productive expenditure (defined as general public services, defense, education, health, housing, and transport and communication expenditures) enhances growth, and an increase in distortionary taxation (defined as taxation on income and profits, payroll and manpower and property, and social security contributions) reduces growth. However, their analysis does not address the impact of overall government size on economic growth, which is the main focus of our paper.

8.   In this paper, using panel data for 18 OECD countries between 1970–2002, we extend the existing body of empirical analysis along three dimensions. First, we estimate the impact of the government size, in addition to tax and expenditure composition, on real GDP growth. Second, we investigate the impact of various revenue and expenditure components on real

GDP growth. Finally, we investigate the impact of government size and revenue and expenditure composition on private investment and employment.

9.   The main conclusions from the empirical analysis are the following. First, government size has an adverse impact on real GDP growth, investment as a share of GDP, and employment. Second, the ratio of direct taxes to indirect taxes also has a negative impact on real GDP growth, investment, and employment. By way of illustration, the empirical findings suggest that if Austria reduced its government size as a share of GDP by 5 percentage points and reduced direct taxes by 3 percentage points while increasing indirect taxes by a similar amount—changes that would bring Austria to about the EU average—the long-term growth rate would rise by about ½ percentage point per year. In addition, such a shift would raise investment and employment.

B. Stylized Facts of the Austrian Government Budget

10.   To set the stage for the empirical analysis, we start by presenting some stylized facts of the Austrian government size and budget structure. Along with other EU15 countries, Austria's government has expanded since the 1970s (Figure 1). Notwithstanding the recent shift toward fiscal consolidation, which led to a (small) fiscal surplus in 2000—the first in over 30 years—the size of the government in Austria remains one of the largest in Europe. Austria ranks among the top EU15 countries in terms of the ratios of expenditures and revenues to GDP (51.6 percent and 50.4 percent, respectively, in 2003). At the same time, the tax burden of 44.1 percent to GDP in 2003 is among the largest in the EU15 (Figure 2).

Figure 1. Austria. Government Revenues and Expenditures, 1975-2003
(In percent of GDP)
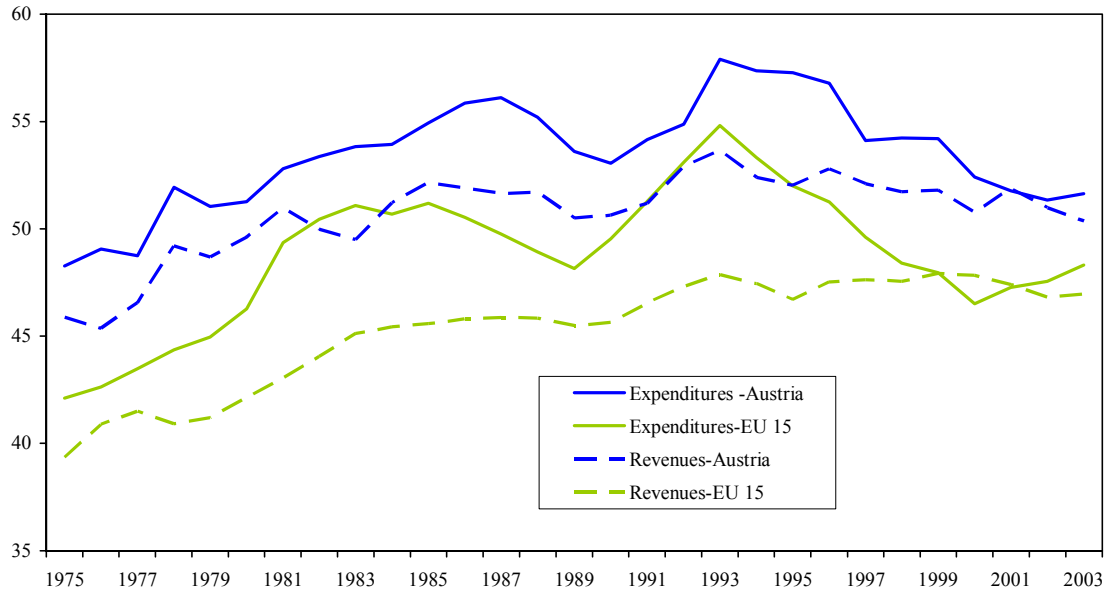
Source: OECD.

Figure 2. Austria: Government Expenditures, Revenues and Taxes, 2002-03
(In percent of GDP)

2003 Expenditures

2003 Revenues

2002 Taxes

Source: OECD.
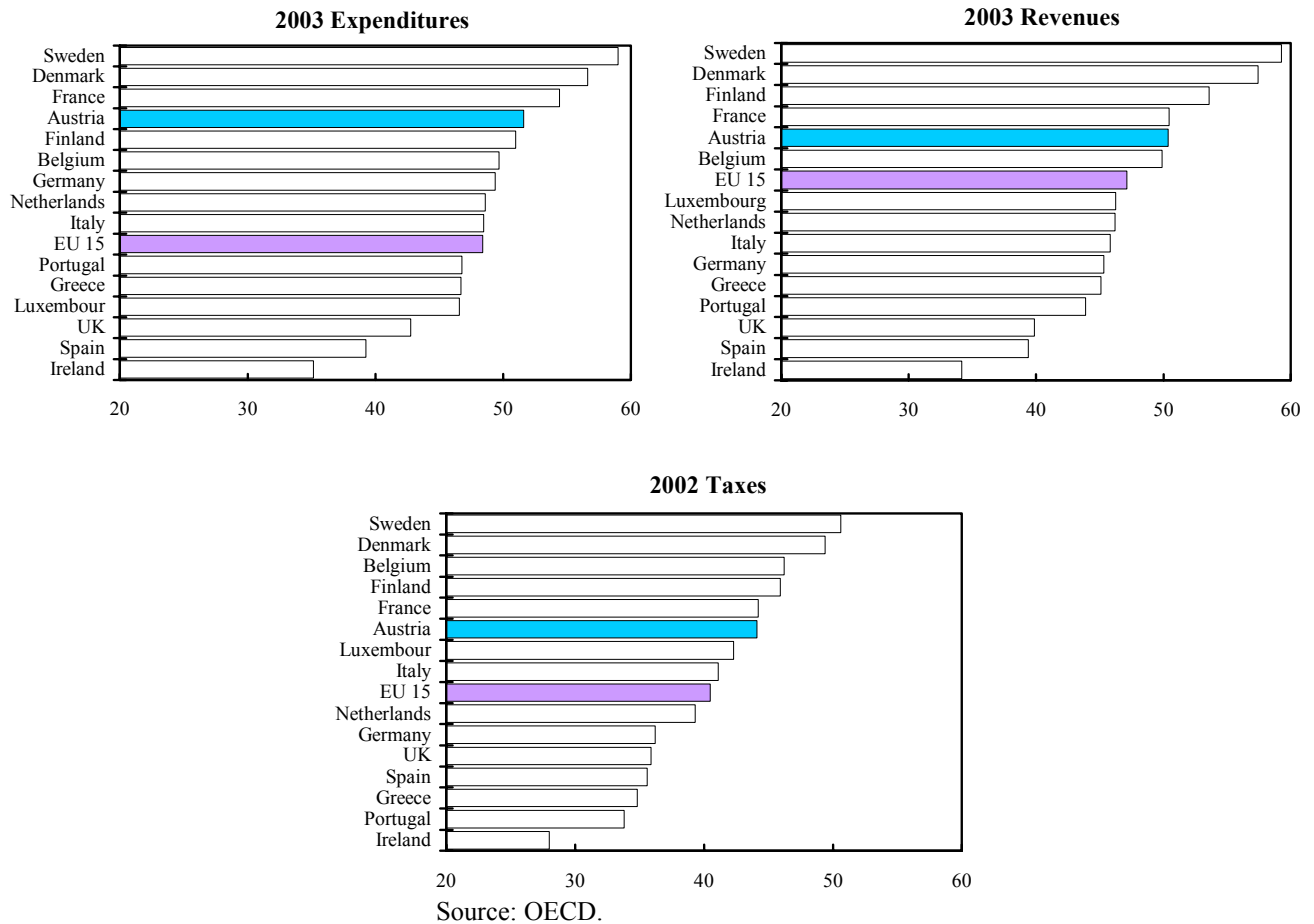
11.   In addition to having a large public sector relative to the EU15 average, the composition of revenues is skewed toward direct taxes. The distribution of expenditure, on the other hand, is broadly in line with the EU15 average. Note, however, that the shares of expenditures on social protection and public services are somewhat larger in Austria (41.5 percent and 16.4 percent in 2001), while the share of expenditures on other categories—defense, public order, and safety—is somewhat below the EU15 average (Figure 3).

12.   The differences in taxation are large. Direct taxation as a share of total revenues is higher than the EU15 average—partly because of large social security contributions. Of particular importance is the fact that the ratio of direct to indirect taxes in Austria, which was below the EU average in the 1970s, has been rising during the last three decades while it remained stable on average in the EU15 (Figure 4). As a result, in 2003 the share of direct taxes to indirect taxes in Austria was much larger than the EU15 average.

Figure 3. Austria: General Government Expenditures, Functional Classification, 2001
(In percent of total expenditures)
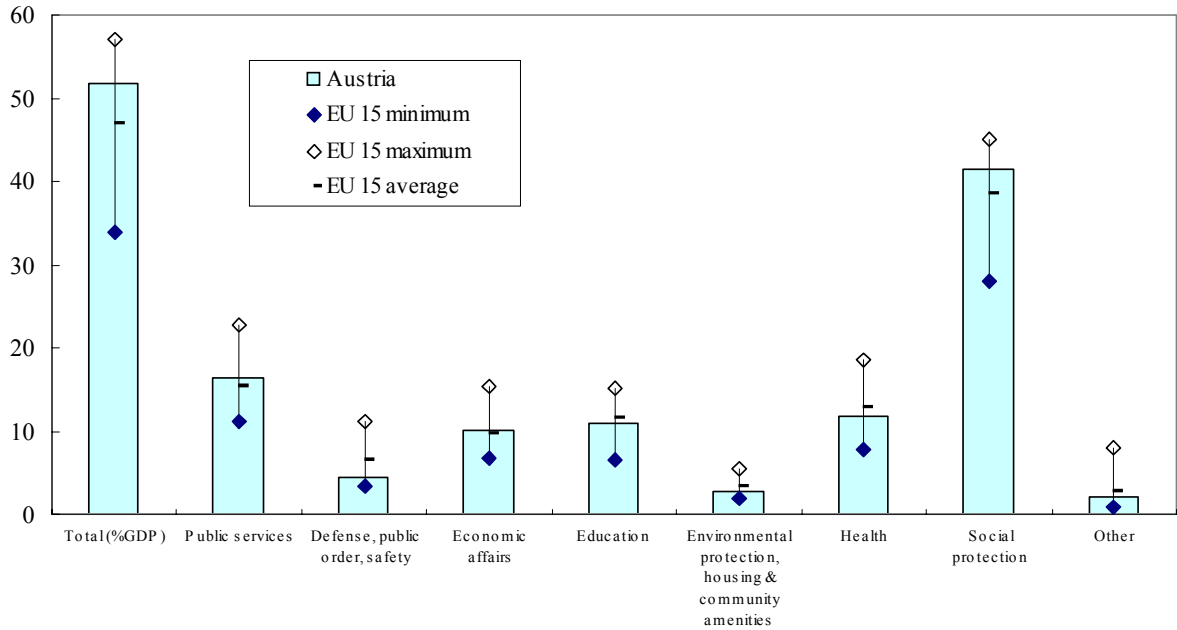
Source: Eurostat.

Figure 4. Austria. Revenues: Ratio of Direct to Indirect Taxes, 1970-2002
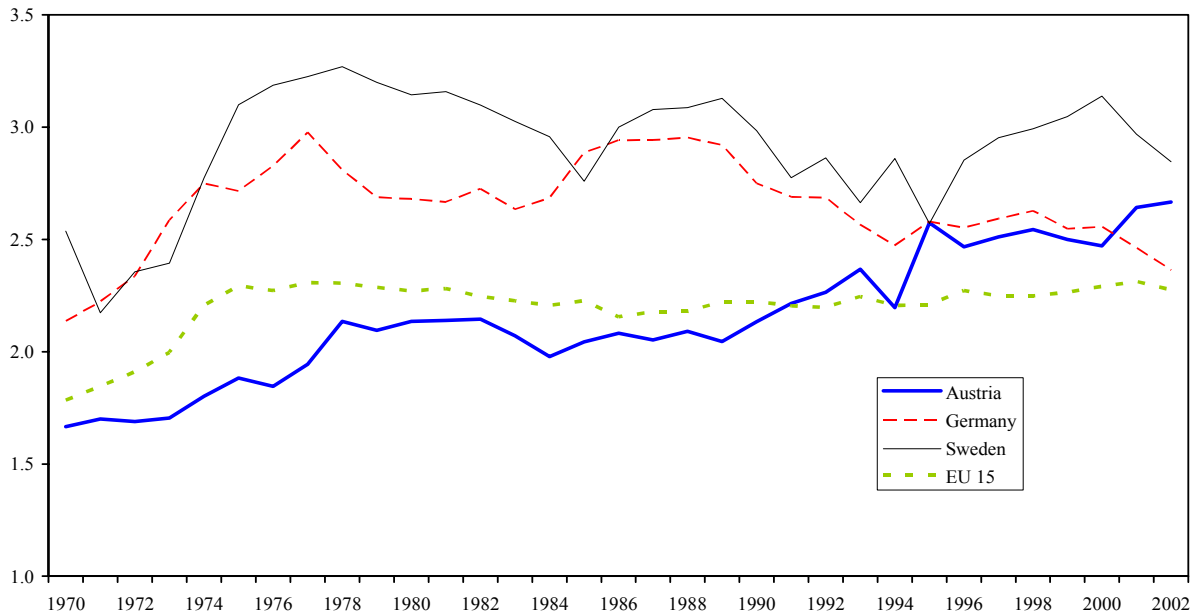
Source: OECD.

13.   Furthermore, Austria is characterized by a heavy taxation of the factors of production, mainly labor, and to a lesser extent, capital. Austria's effective tax rate on labor is estimated by the European Commission at 40.2 percent in 2001, much higher than the EU15 average (37 percent). Interestingly, while this rate declined in the EU during 1995-2001, it rose in Austria.

C. The Analytical Framework

14.   To estimate the impact of government size and various revenue and expenditure categories on real GDP growth, we use a panel data set consisting of 15 European countries,[2] Australia, Canada, and the U.S. covering 1970-2002. In addition to data on total expenditures, revenues, and the budget surplus, we include also various revenue and expenditure components, and control for nonfiscal variables that may affect GDP growth.[3,4] To avoid the correlation created by the business cycle (e.g., the budget surplus declines during years with high growth rates and increases during recessions), we follow the standard approach in the literature and use five-year averages to estimate the following equation:

$$y_{it} = \alpha + X_{it}\theta + \beta_1 Exp_{it} + \beta_2 \operatorname{Re}v_{it} + \beta_3 Surplus_{it} + \sum_j \gamma_j \frac{\operatorname{Re}v_{jit}}{\operatorname{Re}v_{it}} + \sum_j \delta_j \frac{Exp_{jit}}{Exp_{it}} + e_{it} \quad , \quad (1)$$

where y_{it}, is the annual per capita GDP growth rate in country i at period t (the average annual rate during a five-year period); X_{it} is a vector of nonfiscal variables, such as initial GDP, the ratio of private investment to GDP, and labor force growth; Exp_{it}, Rev_{it}, and $Surplus_{it}$ are, respectively, the ratios of expenditure, revenue, and surplus to GDP; and Rev_{jit} / Rev_{it} is the share of revenue component j in total revenues (for example, the ratio of direct tax revenues to total revenues); similarly, Exp_{jit} / Exp_{it} is the share of expenditure component j in total revenues (for example, the ratio of social benefits paid by the government to total expenditures). Finally, we use time dummies in the estimation to control for time shocks common to all countries in the sample, including a possible time trend.

15.   Before we present the results, a few words about their interpretation are in order. Since the sum of government revenues, expenditures, and surplus is by definition zero, one element of the budget has to be omitted in order to avoid perfect collinearity. The coefficients on the two remaining then fiscal variables measure the effect of a unit change in the relevant variable financed by a unit change in the omitted variable. For example, if expenditures (*Exp*)

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[2]Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, and the United Kingdom.

[3] Data sources are OECD for fiscal variables and WEO for the rest of the variables.

[4] Nonfiscal variables include the initial level of GDP and labor force growth.

are excluded from the estimation, the coefficient on revenues (*Rev*) corresponds to $\beta_2 - \beta_1$, and one estimates the impact of raising revenues and expenditures by the same amount, leaving the fiscal balance unchanged. Similarly, if *Surplus* is the omitted variable, the estimate on revenues (*Rev*), $\beta_2 - \beta_3$, captures the impact of raising revenues by lowering the fiscal balance accordingly.

16. Likewise, because the shares of the revenue (expenditure) breakdown sum to one, the estimation omits one category of revenues (expenditures). The results then estimate the impact of raising one component and decreasing the excluded variable by the same amount. For instance, if the share of indirect taxes in total revenues is excluded from the regression, the coefficient on direct taxes would measure the impact of increasing the share of direct taxes and decreasing the share of indirect taxes in total revenue.

D. Empirical Results

17. The results summarized in Table 1 show strong evidence that larger public sector and budget deficits are detrimental to growth. The impact of government size on the real GDP growth rate is captured by the coefficient of total revenue to GDP. The coefficient is negative and statistically significant, implying that government size has a negative impact on growth. Increasing revenues while holding the surplus constant (i.e., increasing expenditures—the excluded variable—by the same amount as revenues) has a negative impact on real GDP growth. The point estimate of the coefficient on revenues (column (1)), -0.05, suggests that decreasing the government size by 5 percentage points, all other things being equal, would raise GDP growth by ¼ percentage point. Turning to the impact of the budget surplus, we find that the coefficient of the ratio of the government budget surplus to GDP is positive and significant, implying that increasing the budget surplus will enhance growth. That is, increasing the surplus while holding revenue constant (i.e., reducing expenditures—the excluded variable) has a positive impact on real GDP growth.

18. With respect to the composition of revenues and expenditures, the estimations suggest two notable conclusions. First, shifting the tax burden from direct to indirect taxes enhances growth,[5] as one would expect given that direct taxes are more distortionary than indirect taxes. The point estimate (column (2)), -0.09, suggests that lowering the share of direct taxes in total revenues by 3 percentage points (while raising the share of indirect taxes by the same amount) would raise growth by ¼ percentage point. In terms of the breakdown of direct taxes, the coefficients on taxes on corporations and social security contributions are

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[5] The variable "direct taxes" is computed as the sum of tax revenues on income, profits, and capital gains; social security contributions; taxes on payroll and workforce; and taxes on property. "Other revenues" is calculated as the difference between total receipts by the government minus direct taxes and taxes on goods and services—which we denote "indirect taxes."

insignificant, implying that their impact is the same as the impact of taxes on income of individuals (the excluded variable). Second, estimates in columns (1) and (2) indicate that shifting expenditure from government consumption to other categories enhances growth, as one would expect given that government consumption is believed to be less productive than government capital spending.

E. Investment and Employment

19.   Before we present various robustness tests, we turn to investigate the impact of fiscal policy on the level of employment and investment. The analysis provides not only further support for the results above, but also identifies some of the channels by which fiscal policy affects growth.[6] The estimation equations are analogous to equation (1) but with the ratio of private investment to GDP or the employment ratio as a dependent variable.

20.   Table 2 presents the estimation for investment. Not surprisingly, the results are, in general, consistent with the impact of fiscal policy on economic growth (columns (1) and (2)). Government size has a negative effect on private investment. Specifically, a decrease in the government size of 5 percentage points would raise the ratio of investment to GDP by 1 percentage point. Likewise, an increase in the surplus of 1 percentage point financed with a decrease in expenditures (the excluded variable) would raise the ratio of investment to GDP by 0.2 percentage point. Turning to the composition of revenues and expenditures, the results show that shifting from direct taxes to indirect taxes (the excluded variable) would raise investment. Among the different types of direct taxes and expenditures, we find evidence that taxes on corporations are detrimental to investment, while subsidies have a positive impact on investment, indicating that firms react to economic incentives in their investment decisions. The results are robust to the inclusion of labor force growth and openness as regressors (columns (3)-(6)).

21.   Turning to the relationship among government size, budget composition, and the employment ratio, in addition to the fiscal variables, we include as independent variables in the estimation various exogenous institutional labor market variables that can be expected to have an impact on employment. The source of the data is Nickell (2003), and the included labor variables are the unemployment benefit replacement ratio, the unemployment benefit duration index, union density, a coordination index (which measures the level of coordination among unions in the wage bargaining process), an employment protection index, and a proxy for labor mobility (measured as the share of owner occupation, i.e., a higher owner occupation ratio indicates lower mobility).

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[6] Studying the relationship between government size, composition, and employment is also relevant because of the link between employment and social welfare.

22.   The results are presented in Table 3. Similar to the case of investment and GDP growth, we find that raising the surplus, lowering direct taxes, and increasing subsidies increase employment. However, the results do not provide evidence that the overall government size affects employment—the coefficient on revenues is negative though not statistically significant. Finally, the coefficients of the labor market institution variables have the expected signs: unemployment benefit and employment protection reduce employment as they lower incentives to search and accept a job offer as well as the level of effort for a given wage rate; low mobility reduces the employment ratio; and high coordination and union density increase employment because of the more centralized bargaining process.

F. Robustness Tests

23.   We check the robustness of these results to several hypotheses. First, we investigate whether the results are driven by omitted variables that are country specific. Second, we test for the possibility of misspecification by adding additional explanatory variables. Finally, we use instrumental variables to explore whether the results are driven by endogeneity. Indeed, fiscal variables may be endogenous for two reasons. First, business cycles that affect fiscal variables and growth may cause endogeneity. Taking five-year averages rather than annual data corrects this problem, but perhaps some endogeneity still remains. The second source of endogeneity is explained by Wagner's Law, which states that government expenditures and revenues are higher in countries with higher levels of GDP per capita. However, this last source of reverse causality is not a serious concern in the estimation because it refers to the *level* of GDP rather than to the GDP growth rate.

24.   Table 4 presents the estimates obtained by including country-fixed effects in the regression (columns (1) and (3)). Country-fixed effects control for possible country-specific omitted variables that are constant over time. The results provide further support for the conclusions presented above in Table 1.[7]

25.   The possible set of variables that may have an impact on long-term growth in the context of our data set is not large because most countries in our sample are similar along many dimensions (for example, the level of corruption, rule of law, education level, and political stability). As a robustness test, Table 5 presents the results obtained by adding private investment and openness to the list of regressors. Note that the level of investment is

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[7] In cases of estimations with country fixed effects, the random effects technique is sometimes used as an additional robustness check. This technique assumes that the sample is randomly selected from a wider population. While this is intuitively appealing in some panel regressions (e.g., those based on a household sample), it is less so in the case of this paper, where the country sample is not random. Nonetheless, the random effect technique is tried and the results are consistent with those using country fixed effects (columns (2) and (4) in Table 4).

very likely to be endogenous (see for example, Mendoza, Milesi-Ferretti and Asea (1997)); openness may capture country size and location rather than economic fundamentals. Nevertheless, the coefficients of the fiscal variables are consistent with the findings above, providing further support for the conclusions.

26.   Finally, we investigate the possibility of endogeneity of the fiscal variables by using instrumental variables. The difficulty in this type of regression is finding appropriate instruments. We follow the common practice in the literature and use the first lag of fiscal variables and, in addition, the labor market institution variables described in the employment section above. The rationale of incorporating these labor market indicators in the instrument set is that they may be correlated with fiscal policy variables: governments with more generous employment benefits often provide other services, as well, and hence have a larger size.

27.   The IV results are presented in Table 6. Estimates in column (1) exclude private investment as regressor, while column (2) presents the results including investment, which is instrumented with its first lagged value. Compared with the results in Table 1, it does not appear that the earlier results are the outcome of endogeneity. Indeed, the results have similar signs and are mostly significant. The coefficients on government revenue, direct taxes, and government consumption are about the same. The only difference is that the coefficient of the budget surplus becomes insignificant.

G. Conclusion

28.   The empirical analysis presented in this paper shows Austria can enhance its long-term growth rate by reducing the size of its public sector and shifting the burden of taxes from direct to indirect taxes. We demonstrate that part of the impact of government size and budget composition on economic growth occurs through investment and employment. Further research is needed to investigate the direct impact of the government on productivity growth rate, and the specific channels through which the government influences productivity.

Table 1. Austria: Government Size, Budget Composition, and Growth

Dependent variable Real GDP growth per capita		
	(1)	(2)
GDP per capita in 1975 (in log)	0.06	0.15
	(0.45)	(0.82)
Government surplus to GDP	0.09	0.09
	(2.26)**	(1.70)*
Total revenues to GDP	-0.05	-0.04
	(2.53)**	(1.52)
Composition of revenues		
Direct taxes	-0.06	-0.09
	(2.45)**	(2.82)***
On corporations		0.07
		(1.31)
Social security contributions		-0.00001
		0.00
On income of individuals		
Other revenues	-0.08	-0.09
	(1.99)**	(1.99)**
Composition of expenditures		
Government consumption	-0.08	-0.11
	(3.17)***	(2.97)***
Social benefits paid by government		0.01
		(0.12)
Subsidies		-0.15
		(1.29)
Labor force growth	0.06	0.07
	(0.24)	(0.25)
Observations	117	114
Adjusted R-squared	0.44	0.44

Robust t statistics in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.
Regressions include an intercept and time dummies. Panel data, five-year average (1970-2001).

Table 2. Austria: Government Size, Budget Composition, and Private Investment

	Dependent variable Private investment					
	(1)	(2)	(3)	(4)	(5)	(6)
Government surplus to GDP	0.21	0.24	0.19	0.2	0.31	0.27
	(2.24)**	(3.12)***	(1.95)*	(2.64)***	(2.12)**	(2.36)**
Total revenues to GDP	-0.19	-0.16	-0.16	-0.14	-0.09	-0.09
	(4.53)***	(4.59)***	(3.80)***	(4.10)***	(1.30)	(1.53)
Composition of revenues						
Direct taxes	-0.08	-0.09	-0.06	-0.08	-0.16	-0.18
	(1.27)	(2.01)**	(0.97)	(1.87)*	(1.16)	(1.96)*
On corporations	-0.32	-0.3	-0.31	-0.3	-0.41	-0.38
	(2.49)**	(2.66)***	(2.39)**	(2.66)***	(2.67)***	(2.61)**
Social security contributions	0.04	0.04	0.03	0.04	0.09	0.1
	(1.32)	(1.93)*	(1.10)	(1.78)*	(2.12)**	(2.44)**
Other revenues	-0.15	-0.15	-0.13	-0.13	-0.35	-0.3
	(2.07)**	(2.25)**	(1.88)*	(2.07)**	(2.70)***	(2.56)**
Composition of expenditures						
Government consumption	0.04		0		-0.07	
	(0.49)		(0.01)		(0.85)	
Social benefits paid by government	0.03		0.02		-0.01	
	(0.40)		(0.21)		(0.10)	
Subsidies	0.96	0.79	0.93	0.81	0.69	0.64
	(4.92)***	(4.71)***	(4.89)***	(4.90)***	(2.86)***	(3.56)***
Labor force growth			0.31	0.26	0.38	0.33
			(1.82)*	(1.58)	(1.84)*	(1.77)*
Openness					0.003	0.002
					(0.32)	(0.24)
Observations	112	119	111	118	77	84
Adjusted R-squared	0.41	0.45	0.43	0.47	0.48	0.51

Robust t statistics in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.
Regressions include an intercept and time dummies. Panel data, five-year averages (1970-2001).

Table 3. Austria: Government Size, Budget Composition, and Employment

	Dependent variable Employment ratio	
	(1)	(2)
Government surplus to GDP	0.5	0.43
	(4.87)***	(4.86)***
Total revenues to GDP	-0.13	-0.14
	(1.51)	(1.56)
Composition of revenues		
Direct taxes	-0.3	-0.09
	(4.19)***	(1.35)
on corporations		-0.16
		(1.43)
Social security contributions		-0.13
		(2.38)**
Other revenues	-0.31	-0.21
	(3.15)***	(2.50)**
Composition of expenditures		
Government consumption	-0.004	0.04
	(0.04)	(0.36)
Social benefits paid by government		0.04
		(0.31)
Subsidies		0.8
		(3.26)***
Labor market indicators		
Unemployment Benefit Replacement Ratios	-3.33	-2.41
	(1.51)	(0.83)
Unemployment Benefit Duration Index	-3.89	-3.07
	(2.39)**	(1.96)*
Collective Bargaining Coverage (%)	-0.03	-0.02
	(1.55)	(0.83)
Union Density (%)	0.11	0.07
	(5.39)***	(2.97)***
Coordination Indexes (Range 1)	2.21	1.12
	(2.75)***	(1.27)
Employment Protection Index	-5.56	-4.58
	(5.59)***	(4.43)***
Mobility: Owner Occupation (%)	-0.17	-0.18
	(4.88)***	(5.23)***
Observations	86	86
Adjusted R-squared	0.84	0.88

Robust t statistics in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.
Regressions include an intercept and time dummies. Panel data, five-year averages (1970-2001).

Table 4. Austria: Robustness Check: Country Dummies and Random Effects Estimation

	Dependent variable Real GDP growth per capita			
	(1)	(2)	(3)	(4)
GDP per capita in 1975 (in log)	0.16	0.06	0.16	0.15
	(0.48)	(0.39)	(0.44)	(0.78)
Government surplus to GDP	0.1	0.09	0.02	0.09
	(1.31)	(2.26)**	(0.27)	(1.81)*
Total revenues to GDP	-0.1	-0.05	-0.18	-0.04
	(2.00)**	(2.64)***	(3.27)***	(1.50)
Composition of revenues				
Direct taxes	-0.02	-0.06	0.01	-0.09
	(0.35)	(2.88)***	(0.20)	(2.87)***
On corporations			0.17	0.07
			(2.53)**	(1.48)
Social security contributions			-0.17	0
			(2.75)***	0.00
Other revenues	-0.05	-0.08	-0.03	-0.09
	(0.72)	(2.56)**	(0.51)	(2.43)**
Composition of expenditures				
Government consumption	-0.09	-0.08	-0.14	-0.11
	(1.74)*	(2.66)***	(2.69)***	(2.89)***
Social benefits paid by government			0.17	0.01
			(3.02)***	(0.13)
Subsidies			0.07	-0.15
			(0.58)	(1.42)
Labor force growth	-0.01	0.06	0.05	0.07
	(0.04)	(0.51)	(0.21)	(0.54)
Country dummies	yes		yes	
Estimation	OLS	random effects	OLS	random effects
Observations	117	117	114	114

Robust t statistics in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.
Regressions include an intercept and time dummies. Panel data, five-year averages (1970-2001).

Table 5. Austria: Robustness Check: Effects of Investment and Openness

	Dependent variable Real GDP growth per capita		
	(1)	(2)	(3)
GDP per capita in 1975 (in log)	0.02	0.07	0.12
	(0.15)	(0.36)	(0.49)
Government surplus to GDP	0.09	0.09	0.07
	(2.19)**	(1.77)*	(1.46)
Total revenues to GDP	-0.05	-0.04	-0.07
	(2.45)**	(1.74)*	(1.84)*
Composition of revenues			
Direct taxes	-0.08	-0.09	-0.1
	(3.07)***	(3.01)***	(2.26)**
On corporations		0.02	-0.02
		(0.39)	(0.40)
Social security contributions		-0.0003	0
		(0.02)	(0.22)
On income of individuals			
Other revenues	-0.09	-0.09	-0.1
	(2.11)**	(2.07)**	(1.81)*
Composition of expenditures			
Government consumption	-0.09	-0.11	-0.09
	(3.19)***	(2.73)***	(1.79)*
Social benefits paid by government		0.0006	-0.04
		(0.01)	(0.78)
Subsidies		-0.06	-0.02
		(0.41)	(0.12)
Private investment to GDP	-0.1	-0.09	-0.12
	(2.56)**	(1.53)	(1.97)*
Labor force growth	0.1	0.12	0.07
	(0.41)	(0.42)	(0.27)
Openness 1/			0.01
			(2.19)**
Observations	114	111	77
Adjusted R-squared	0.46	0.44	0.57

Robust t statistics in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.
Regressions include an intercept and time dummies. Panel data, five-year averages (1970-2001).
1/ Sum of exports and imports to GDP.

Table 6. Austria: Robustness Check: Estimates Using IV Method

Dependent variable Real GDP growth per capita	(1)	(2)
GDP per capita in 1975 (in log)	0.13	0.05
	(0.78)	(0.30)
Government surplus to GDP	0.05	0.08
	(0.63)	(0.98)
Total revenues to GDP	-0.04	-0.03
	(1.72)*	(1.69)*
Composition of revenues		
Direct taxes	-0.07	-0.08
	(2.27)**	(2.41)**
Other revenues	-0.09	-0.1
	(1.54)	(1.65)
Composition of expenditures		
Government consumption	-0.08	-0.1
	(2.05)**	(2.33)**
Laborforce growth	0.14	0.18
	(0.48)	(0.60)
Private investment to GDP		-0.1
		-1.32
Observations	97	97
Adjusted R-squared	0.42	0.45

Robust t statistics in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Regressions include an intercept and time dummies. Panel data, five-year averages (1970-2001)
Column (1): surplus, total revenue, direct taxes, other revenues, and government consumption
are instrumented with the lagged values and the following employment variables: union density,
employment protection, unemployment benefit replacement, unemployment benefit duration, and
coordination index. Column (2): in addition to the instruments used in column (1), the instrument
set in column (2) includes the first lag of private investment to GDP.

References

Barro, R., and X. Sala-i-Martin, 1995, *Economic Growth* (New York: McGraw-Hill).

Daveri, F., and G. Tabellini, 2000, "Unemployment, Growth and Taxation in Industrial Countries," *Economic Policy*, April.

Disney, R., 2000, "The Impact of Tax and Welfare Policies on Employment and Unemployment in OECD Countries," *IMF Working Paper*, WP/00/164.

Easterly, W., and S. Rebelo, 1993, "Fiscal Policy and Economic Growth: an Empirical Investigation," *NBER Working Paper*, 4499.

Gerson, P., 1998, "The Impact of Fiscal Policy Variables on Output Growth," *IMF Working Paper*, 98/1.

Henrekson, M., and S. Folster, 2001, "Growth Effects of Government Expenditure and Taxation in Rich Countries," *European Economic Review*, 45.

Hsieh, E., and K. Lai, 1994, "Government spending and economic growth: the G-7 experience," *Applied Economics,* 26.

Kneller, R., M. F. Bleaney, and N. Gemmell, 1999, "Fiscal Policy and Growth: Evidence from OECD Countries," *Journal of Public Economics,* 74.

Knight, M., N. Loayza, and D. Villanueva, 1996, "The Peace Dividend: Military Spending Cuts and Economic Growth," *IMF Staff Papers*, 43.

Levine, R., and D. Renelt, 1992, "Sensitivity Analysis of Cross-Country Growth Regressions," *American Economic Review*, 82.

Mendoza, G. E., G. M. Milesi-Ferretti, and P. Asea, 1997, "On the Ineffectiveness of Tax Policy in Altering Long-Run Growth: Harberger's Superneutrality Conjecture." *Journal of Public Economics,* 66.

Miller, S., and F. Russek, 1997, "Fiscal Structures and Economic Growth: International Evidence," *Economic Inquiry*, 35.

Nickell, S., and R. Layard, 1999, "Labor Market Institutions and Economic Performance" in Ashenfelter H. O. and D. Card (eds.), *Handbook of Labor Economics*, (Amsterdam: North Holland), Vol. 3.

Nickell, S. J., Nunziata, L., W. Ochel, and G. Quintini, 2003, "The Beveridge Curve, Unemployment and Wages in the OECD from the 1960s to the 1990s" in P. Aghion, R. Frydman, J. Stiglitz, and M. Woodford (eds.) *Knowledge, Information and Expectations in Modern Macroeconomics: in Honors of Edmund S. Phelps* (Princeton: Princeton University Press).

Ram, R.,1986, "Government Size and Economic Growth: a New Framework and some Evidence from Cross-Section and Time-Series Data," *American Economic Review*, 76.

Stokey, N., and S. Rebelo, 1995, "Growth effects of flat-rate taxes," *Journal of political Economy*, 103.

Tanzi, V., and H. H. Zee, 1997, "Fiscal Policy and Long-Run Growth" *IMF Staff Papers*, 44.

Volkerink, B., J. Sturm, and J. De Haan, 2002 "Tax Ratio in Macroeconomics: do Taxes Really Matter?" *Empirica, 29.*