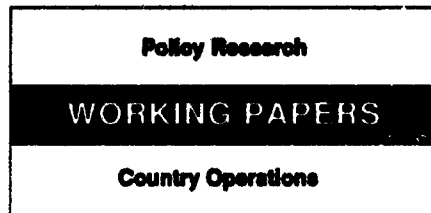


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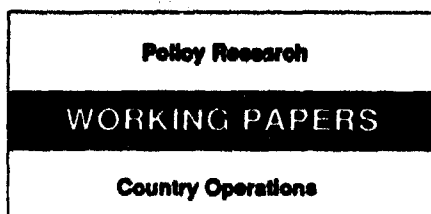
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Determinants of Value-Added Tax Revenue

A Cross-Section Analysis

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and
Fareed Hassan

Empirical analysis of value-added tax revenues on a sample of 34 countries conforms with conventional wisdom from theoretical and case studies. The key implication is that for value-added tax to provide superior revenues, it should be levied in a single rate on as broad a base as possible. And tax administration and enforcement must be tough to ensure compliance.



WPS 1203

This paper — a product of the Country Operations Division, Europe and Central Asia, Country Department I — is part of a larger effort in the department to emphasize public finance reform issues in policy dialogue and economic and sector work. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Faith Smith, room H5-245, extension 36072 (October 1993, 14 pages).

Value-added tax (VAT) has become a major tax instrument in over 50 countries and an important element in tax policy advice to developing countries. But few studies have empirically tested some basic hypotheses about the performance and key feature of VAT as a revenue-raising instrument.

Bogetic and Hassan examine the main determinants of VAT revenue in a simple cross-country framework using data from 34 countries to answer certain key questions: What empirical relationship emerges from existing data on VAT revenue and VAT rates for countries with a single VAT rate? How much, on average, can a 1 percent increase in the VAT rate be expected to raise VAT revenue as measured by VAT-to-GDP ratio? What key determinants of VAT revenue emerge from a cross-country analysis of the full sample of countries? Is there a statistically significant difference in VAT revenue performance between countries with a single VAT rate and countries with multiple VAT rates?

The results of their regressions generally confirm the conventional views on the key variables influencing VAT revenue performance:

the rate, the base, and rate dispersion. The rate and the base coefficients are significant and with the expected positive sign in all of the estimated versions of the model. An estimated model is used with appropriate caveats to predict VAT revenue potential in countries (such as Bulgaria) that are thinking of introducing a single rate VAT.

They also find that — other things being constant — VAT generates higher revenue in countries with a single VAT rate than in countries with multiple VAT rates. The difference in the estimated models for the two country groups is statistically significant, indicating a structural change. However this change in the pattern of VAT revenues cannot be explained exclusively in terms of differences in rate structure. A satisfactory explanation must include other factors, such as the base and tax administration capacity.

The key policy implications are simple: to provide superior revenues, VAT should be levied in a single rate on as broad a base as possible. And tax administration and enforcement must be tough to ensure compliance.

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DETERMINANTS OF VALUE ADDED TAX REVENUE: A CROSS-SECTION ANALYSIS

Željko Bogetić and Fareed Hassan

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DETERMINANTS OF VALUE ADDED TAX REVENUE: A CROSS-SECTION ANALYSIS

Željko Bogetić and Fareed Hassan¹

I. Introduction

Value-Added Tax (VAT) has become a major tax instrument in about 50 countries worldwide contributing to their budgets, on average, 5.1 percent of Gross Domestic Product (GDP) in 1988 (see Table 1 in the Appendix). The global trend to introduce VAT in more countries is continuing. Since 1988, another 8 countries, including Canada and Japan, have introduced VAT, and an additional 15 countries, including the U.S., are seriously considering its adoption (Tait, 1991). VAT has also become an indispensable component of the tax advice and tax reforms in developing countries². The growing practice of VAT is reflected in the extensive literature on technical, economic, and distributional dimensions of VAT, and there is a growing consensus on the "best practice" and desirable features required of a good VAT system³.

However, very few studies have empirically tested some basic hypotheses about key features and the performance of VAT as a revenue-raising instrument. This is surprising since there now exist relatively rich data on the VAT revenue performance (e.g., Government Finance Statistics, IMF), rates and other important characteristics of this tax. In particular, revenue performance and its

^{1/} The authors are a Country Economist and a Consultant at the World Bank, Washington D.C., Department for South-East Europe. Helpful and thought-provoking comments and criticisms from Alan A. Tait, Carlos A. Silvani, Milka Casanegra de Jantscher, Dan Hewitt and R. Kyle Peters are gratefully acknowledged. The authors are solely responsible for any remaining errors.

^{2/} See Goode (1993).

^{3/} See, for example, the collection of papers in a World Bank book edited by Gillis, Shoup and Sicat (1990). A comprehensive treatment of practical problems and options in implementing a VAT is given in Tait (1988). Also, see chapter one by Bird and Casanegra de Jantscher (on tax administration), chapter five by Due and Greany (on the introduction of VAT in Trinidad and Tobago), and chapter eight by Silvani (on compliance), in the recent IMF volume on tax administration edited by Bird and Casanegra de Jantscher (1992).

determinants⁴ has been one issue of special relevance for fiscal authorities. The emerging conventional wisdom, based largely on practice and numerous country case studies, suggests that a single rate VAT (with the rate between 10 and 20 percent), with very few exemptions and, therefore, a broad base is superior to a VAT with multiple rates and many exemptions which reduce its base and complicate administration⁵. With more quantitative data on VAT now available, there is considerable scope for empirical research on VAT, both in comparative and cross-sectional studies.

The objective of this paper is to examine the main determinants of the VAT revenue in a simple cross-country framework. Specifically, we seek to answer the following three questions. First, what empirical relationship is emerging from the existing data on VAT revenue and VAT rates for single VAT rate countries, and how much, on average, a one percent VAT increase in the rate can be expected to raise VAT revenue, as measured by a VAT-to-GDP ratio? Second, what are the key determinants of VAT revenue emerging from a cross-country analysis of the full sample of countries (those using single rate and those that practice multiple VAT rates)? And third, is there a statistically significant difference regarding the VAT revenue performance between single VAT rate countries and countries that adopted multiple VAT rates? It is hoped that answers to these questions can provide firmer quantitative background for policy prescriptions regarding VAT. Also, robust estimates of the VAT revenue may provide guidance on revenue potential to policymakers in countries which are currently planning to introduce a VAT.

The structure of the paper is as follows. Section II provides a brief, stylized overview of existing VAT rate structures, revenue performances and tax bases. The empirical methodology and the estimated models are presented and discussed in section III. Section IV contains concluding remarks and policy implications.

II. VAT Rates, Base and Revenue Performance: Some Stylized Facts

An inspection of a sample of 49 countries on which we were able to collect various data on VAT revenues, rates and bases reveals at least five interesting stylized facts about the VAT⁶.

First, a worldwide average VAT rate of 14.4 percent generates 5.1 percent of GDP implying the average revenue productivity ratio⁷ of 0.35 percent of GDP: each one percentage point of VAT

⁴/ Apart from the good revenue potential, neutrality and efficiency are also the reasons for superiority of this tax in contrast to other common tax instruments such as a turnover tax.

⁵/ See World Bank (1991).

⁶/ See table 1 in the appendix.

⁷/ See Tanzi (1993) p.18, table 1, which defines revenue productivity as the ratio between the VAT revenue and VAT rate. In that paper, Tanzi quotes Silvani's data on 22 single VAT rate countries with average revenue-to-GDP ratio of 4.3 percent, average rate of 11.6 percent, and the implied revenue productivity ratio of 0.37. Our sample extends Silvani's data to include countries with multiple VAT rates, resulting in somewhat lower overall revenue productivity ratio.

rate generates, on average, 0.35 percent of GDP revenue. Average revenue productivity ratio for multiple VAT rate countries (0.35 percent) is slightly *lower* than the ratio for the single VAT rates countries (0.37). Therefore, the use of more than one rate does not help raise more revenue and, indeed, it seems to reduce the revenue performance of a VAT vis-a-vis countries that use single rates.

Second, the most commonly used single VAT rate is 10 percent, used in 9 countries representing about 20 percent of the total, followed by the rate of 15 percent, which is used in 3 countries. This is consistent with the recommendations of most tax advisors to adopt the VAT at a single rate between 10 and 20 percent⁸.

Third, twenty five countries (constituting 50 percent of the total) have a single rate (ignoring the zero rate and/or exemption on some services, exports, etc). Seven of the remaining 25 used two rates; nine used three rates; and the remaining nine use more than three rates. These multiple rates offer a greater opportunity to fit the VAT to various social and political ends. However, rate differentiation raises administrative and compliance costs which undermines the VAT revenue performance (see Tait, 1988).

Fourth, the VAT revenue and revenue productivity varies significantly across countries. The minimum revenue productivity ratio of 0.044 is found in Guinea which uses a single VAT rate of 13.6 percent. On the other end of the spectrum is Israel with the ratio of 0.653 -- fifteen times higher than in Guinea -- using a single rate of 15 percent. The quality and efficiency of tax administration and the size of the base, the hallmarks of the Israeli VAT system, are important factors behind this performance.

Fifth, following Cnossen (1991), the tax base for a VAT can be broadly classified into four categories: (i) all goods and services (G+S); (ii) goods and selected services (G+ST); (iii) goods only (G); (iv) consumer goods and capital goods (G+CG); or (v) consumer goods, selected services, and capital goods (G+ST+CG). Two thirds of the countries apply the broad base (G+S), while nine countries use goods and select services (G+ST) as the base. Evidently, there is a wide diversity in the size of the VAT base across countries, but the general preference towards a broad based VAT is clear.

The above facts are the averages based on the existing practice of VAT. Deviations from these averages and the structures of the VAT in countries that use or are planning to introduce a VAT, is a subject of potentially fruitful research. This is the course we take in this paper, focussing on the VAT revenue performance.

III. Hypotheses Models and Results

In this section we present the hypotheses and models used to test - using regression techniques - the main determinants of VAT revenue which are suggested by the studies and practice of VAT, and are consistent with the data. The recent contributions to the VAT literature (see Tait 1988, 1991;

⁸/ World Bank (1991).

Gillis *et al.* 1990; Khalilzadeh-Shirazi *et al.*, 1991) provided the theoretical basis for the following set of empirically testable hypotheses.

Gillis *et al.* (1990), in their survey of the VAT lessons, noted that VAT has developed a worldwide reputation as a governments' " money machine", as few other single tax instruments can mobilize as large revenue as a well designed and implemented VAT. The experiences of the 49 countries (see Table 1, appendix) show that, over the range of existing rates, with few exceptions, the VAT revenue rises with the rate. Therefore, we posit a positive relationship between VAT rate (variable: RATE) and revenue.

The "comprehensive" VAT is typically levied on a broad base which includes all goods and services (G+S). However, countries vary in their coverage of the base, particularly with regard to the treatment of services. The negative impact of extensive exemptions on the size of the base can be quite dramatic. For instance, Kay and Davis (1990) estimate, on the basis of a survey of 32 countries, that the complete exemption of all services excludes from the VAT base between 45 to 78 percent of a country's GDP. This, in turn, increases the pressure on the fiscal authorities to use higher rate to mobilize a target VAT revenue from a smaller base. Also, it is evident that some countries that use almost identical rates experience very different revenue performance. One source of different performances is often the size or the coverage of the base. We therefore define the BASE variable which captures whether a VAT is levied on all goods and services or on some subset of such comprehensive base. The underlying hypothesis is that the wider the base, the smaller is the number of goods and services exempted, and the larger the VAT revenue-to-GDP ratio. A simple dummy variable is used to measure differences in the size of the base. It assumes the value of one if the base comprises all goods and services (G+S), and zero otherwise⁹.

Tait (1988) pointed out that administrative and compliance costs rise dramatically as the number of VAT rates increase. Thus rate differentiation, through higher costs, may adversely affect revenue. Furthermore, single rate is almost always revenue superior to multiple rates with little rate dispersion. Therefore, when countries use more than one rate, rate dispersion tends to be substantial. Consequently, it may be that it is dispersion of rates, rather than the number of rates per se, that may adversely affect VAT revenue. To test this hypothesis we measure the absolute dispersion among countries' multiple VAT rates (variable RANGE), defined as the absolute difference between the highest and lowest VAT rate¹⁰.

9/ The shortcoming is that the dummy variable does not capture the variance of less comprehensive bases, which can be quite wide. The ideal variable, for the construction of which our data are not adequate, would be the size of the base, as measure by a percent of GDP covered by the VAT base. A variable defined in this way would make it possible to estimate the relative revenue contributions of increases in VAT rates versus increases in the base through the expansion of base (i.e., elimination of existing exemptions).

10/ We have also tried other measures of dispersion including standard deviation. However, results were not satisfactory. One reason could be that since standard deviation measures variation from a mean, in a small sample it may not display sufficient variation. However, when we simply used the number of VAT rates, instead of our RANGE variable, the results were very similar.

Therefore, we postulate the following general model: increases in VAT revenue are due to increases in VAT rates and the coverage and size of the tax base, while rate differentiation raises costs and thus negatively affects revenue. That is:

$$REV = F (RATE^+, BASE^+, RANGE^-) \quad (1)$$

where: REV variable is defined as VAT revenue as percentage of a country's GDP; RATE is defined as VAT rate (in percent); BASE is defined as a VAT base variable taking the value of 1 if the base comprises all consumer goods and services (G+S), and 0 otherwise; and RANGE is a measure of rate dispersion, defined as the difference between highest and lowest VAT rates. The signs above the dependent variables denote the expected direction of influence.

Due to missing observations, mostly on revenue, the original sample of 49 countries had to be reduced to 34 countries for full sample models, 20 countries for single-rate country models, and 14 countries, for multiple rate models. The choice of the year was 1988, largely based on the Silvani data as quoted by Tanzi (1993, p.18). We compiled additional data on revenue, rates and base from various World Bank and IMF sources (see Table 1 in the Appendix).

We estimated linear versions of the general model (1) using the Ordinary-Least Squares (OLS) technique¹¹. The estimated models are given in Table 1 below. The most important determinant of VAT revenue is the VAT rate, which is significant at well below one percent, and with the expected sign in all estimated versions of the model (see Table 1) indicating the robustness of the estimates. The RATE variable dominates the results, with a coefficient of determination of 0.75 for the single rate VAT model and 0.57 for all countries model (see Table 1).

A. The Sample of Single VAT Rate Countries

A simplest estimated relationship between revenue and rate from the sample of 20 single VAT rate countries is depicted in Figure 1. For this group of countries, VAT generates, on average, 4.7 percent of GDP with an average rate of 11.3 percent: each 1 percent of VAT rate generates 0.50 percent of VAT revenue. The estimated VAT rate that will generate positive revenue, which can be interpreted as the minimum rate from the revenue perspective, is close to 2 percent (see Figure 1)¹¹. The RATE coefficient is strongly significant and, in the linear model, explains 71 percent of the variation in VAT revenues¹².

The estimated relationship can be used to predict the *potential* VAT revenue in a country contemplating the introduction of a VAT, given a proposed single VAT rate. For example, following some other Eastern European countries (i.e., Hungary and former Czechoslovakia), Bulgaria is planning to introduce a VAT rate at the single rate of 18 percent. Given this rate, our model suggests

^{11/} The exponential form, also tried, does not seem to fit the data.

^{11/} It should be noted, however, that this is *not* to be interpreted as the rate at which VAT, as a tax instrument, breaks even, because its costs are not taken into account.

^{12/} Note that this a univariate model (not reported in Table 1) which excludes the BASE variable.

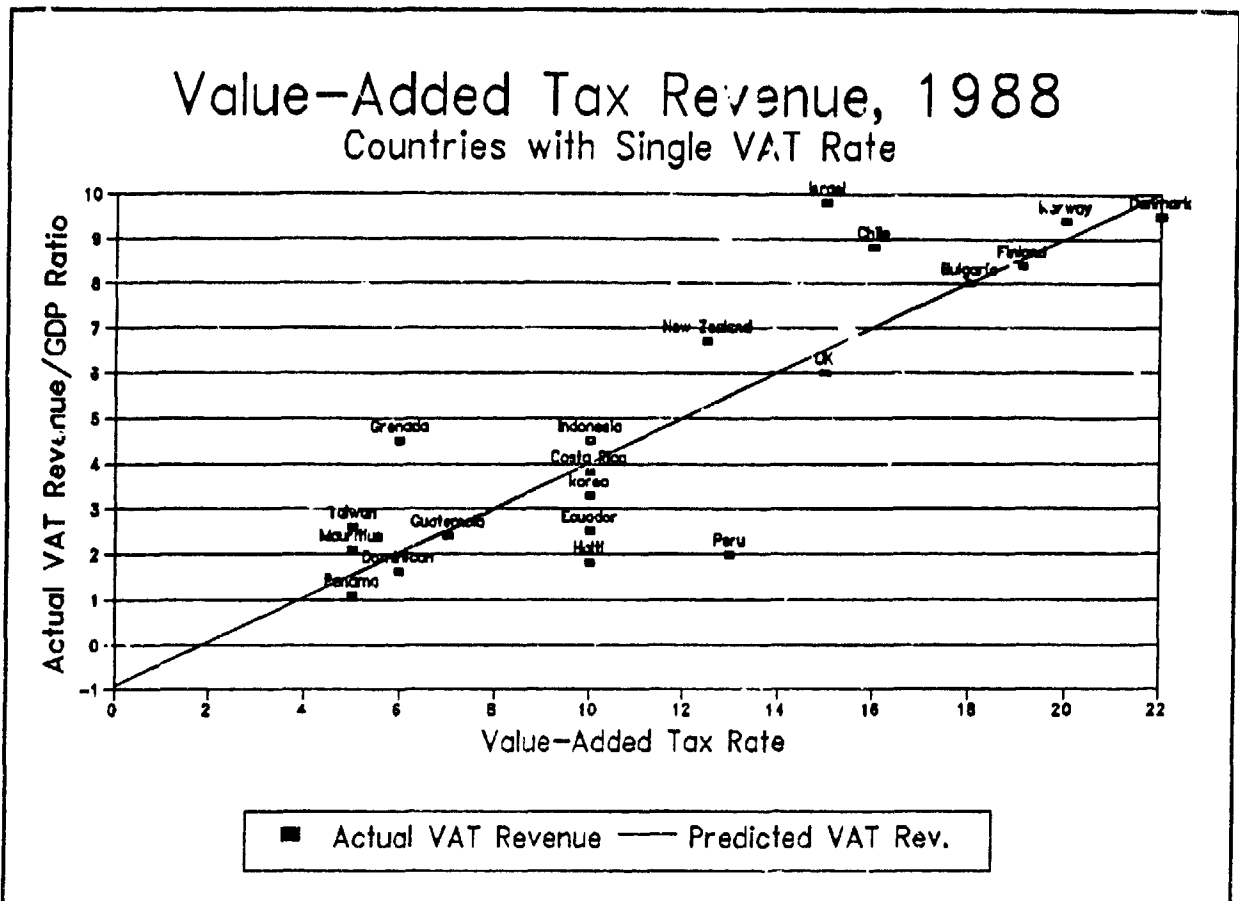


Figure 1

that Bulgaria's VAT has the potential to mobilize approximately 8.1 percent of GDP in VAT revenues once the VAT system is in fully operational. Whether this revenue *potential* will turn into *actual* revenue, however, will depend on other VAT characteristics. In particular, two caveats should be kept in mind when making similar predictions. First, although the estimated relationship is fairly robust, prediction assumes that other important characteristics of Bulgaria's VAT (i.e., size of the base or the number of exemptions) are equal or very close to the average characteristics of the countries in the sample. To the extent a country's proposed VAT features, for instance, larger number of exemptions (and, hence, smaller base), the predicted relationship on the basis of the above model will overestimate the VAT revenue potential; or, more precisely, the *actual or expected* revenues will be lower than the estimated potential. The second caveat is analogous but has to do with tax administration capacity: the lower this capacity than for an average country in the sample, the lower will be the potential revenues than predicted by the model. Nevertheless, the model provides a very rough picture of the order of magnitude when anticipating revenue potential of a new VAT. In the particular case of Bulgaria, it is probably safe to assume that the above potential will not be reached in the near future, since it takes time to make the VAT fully operational. Furthermore, it takes time to make Bulgaria's tax base and administrative capacity more in line with the average country in the sample. Assuming a realistic tax "gap" (ratio of potential and actual

revenue) of around 65-75 percent, that country could probably be expected to raise between 5 and 6 percent of GDP in actual VAT revenues, when the VAT becomes fully functional¹³.

Extending the linear univariate model by including the base variable improves slightly the goodness of fit (by 4 percentage points), the RATE variable is still strongly significant, and the BASE coefficient has the anticipated positive sign, although it is only weakly significant at 10 percent level (see table 1). This is probably the result of the inability of the dummy variable to capture fully the diversity of tax bases in the sample.

B. Full Sample of 34 Countries

The regression results from the full sample of 34 countries (see first column in Table 1) give a VAT rate coefficient of 0.389, indicating that the VAT generates revenues of some 0.4 percent of GDP for every percentage point of the rate¹⁴. As expected, VAT revenue as a percent of GDP rises with increases in coverage and size of the tax base: the estimated equation shows a positive and significant base coefficient at the 6 percent level. The low significance can be attributed to the inadequacy of the available data as a measure of the true base.

The base dummy used here has the right sign but does not fully capture the diversity of VAT tax, hence its low significance. For instance, the BASE data in the appendix fail to distinguish between the Israel and UK VAT regimes. Both countries have a single rate of 15 percent and both have a (G+S) VAT tax base. However, Israel enjoys a higher revenue of 9.8 percent of GDP compared to 6 percent in UK (also see Figure 1). The difference, however, does not reflect lower *collection* efficiency in the U.K vis-a-vis Israel. The difference in revenue is explained by the difference in the size of the bases: Israel is an exception in that its VAT base includes the financial

^{13/} In fact, there are several subcategories of tax "gaps" including: the gap between potential and declared taxes, between declared taxes and paid taxes, and between taxes paid and those that are received by the treasury. Examination of the nature and sources of these tax gaps is identified as a fruitful area of further research (see: Bird and Casanegra, 1992, p.11).

^{14/} The RATE variable for multiple rate countries uses the standard rate in all regressions. The weighted average rate for these countries would be clearly preferable, but was unavailable at the time of writing. A subsequent comparison of (unpublished) weighted average rates collected by Silvani and the standard rates for ten multiple rates countries reveals that weighted rates are, mainly, lower than the standard rates. This means that the results of our regressions may underestimate somewhat the rate coefficient in the full sample model, and more so in the only multiple rate models, since lower weighted rates generating same revenues imply higher revenue productivity. However, it is not clear whether this bias affects the results significantly in the full sample model, which is dominated by the larger number of single rate countries (20 as opposed to 14 multiple rate countries). We are grateful to Carlos A. Silvani (International Monetary Fund) for these observations and for sharing his data, which suggested an obvious line of further research. Specifically, we plan to reestimate the above models as more weighted rates data become available and to explore, with Silvani, the multiple rate models and tax gap models in greater detail.

sector¹⁵ (Gillis 1990, p. 84), while the U.K. VAT uses extensive zero-rating for many services (e.g., food, all housing and some clothing and services), which could comprise 40 percent of the potentially broad VAT base. This means that when making country comparisons of observed differences in revenue productivity, when rates are identical across countries, it is not possible to infer that one VAT is more "efficient" in terms of collection. Observed differences probably reflect largely, if not entirely, the differences in the size of the base which, in turn, reflects different distributional considerations built into the VAT systems.

Table 1: Determinants of VAT Revenues: Regression Results

DEPENDENT VARIABLE: VAT revenue to GDP (%)	(1) All countries	(2) Single rate Countries	(3) Multiple Rates Countries	(4) Differences (2 - 3)
Constant	-0.880 (-0.953)	-1.746 (-1.907) ^c	-4.805 (-1.909) ^c	3.059 (1.168)
RATE	0.389 (6.293) ^a	0.503 (7.519) ^a	0.339 (3.025) ^a	0.164 (1.276)
BASE	1.426 (1.930) ^c	1.313 (1.937) ^c	4.490 (2.641) ^b	-3.177 (-1.774) ^c
RANGE	-0.071 (-1.863) ^c	---	0.021 (0.383)	-0.021 (-0.394)
R ²	0.61	0.77	0.66	
R ² (adjusted)	0.57	0.75	0.55	
F	15.85 ^a	29.83 ^a	6.35 ^a	
n	34	20	14	

Notes: The number in parentheses are t-statistics, where ^a stands for significance at the 1% level, ^b denotes significance at the 5% level, and ^c stands for significance at 10% level.

The RANGE variable, as postulated, is negatively associated with the revenue, albeit weakly statistically significant, indicating that rate differentiation raises the tax costs and hence may generate losses in terms of revenue. The result seems to provide empirical support to Tait's argument that both official administrative costs and traders' compliance costs rise sharply as the number of rates multiply, leading to potential revenue losses. Interestingly, in terms of welfare, Ballard, Shoven and Whalley (1982) reached the same conclusion.

^{15/} Practical problems in including banking services in the base of the VAT have been quoted as the main reason that led EC countries to exempt this sector from the VAT base.

C. Do Countries With Single VAT Rates Mobilize More Revenues?

The countries included in the study represent a diverse group on a wide spectrum of VAT structures, bases and revenues. In terms of VAT structure, two groups of countries are identified: single-rate and multiple-rate countries. Given the revenue performance data and the consensus preference of tax experts for single rates, we can ask a basic question: do existing data on VAT support the contention that countries with single rate mobilize more revenue than those that use multiple rates?

Separate estimates for single and multiple rates country subgroups are given in Table 1. With the exception of the RANGE variable (which has to be dropped in the single VAT rate model), the results of both country groups support the hypotheses confirmed by the estimates for the full sample of countries. However, the magnitude of the estimated coefficients in the two sub-groups vary. We carried out a structural change test (Chow 1960) to test the hypothesis that the regression coefficients, taken jointly, are equal. This hypothesis is rejected at the 5 percent level of significance. Thus, *the pattern of VAT revenue statistically differs between the two sub-groups of countries*. Of particular interest is the difference in the revenue generation coefficient. For the single rate group, the VAT generates 0.503 of GDP for every percentage point of the rate, which is nearly 50 percent higher than the multiple rates group coefficient of 0.339. However, this difference is not statistically significant. The difference can not be *exclusively* explained in terms of VAT rates. This implies that different revenue performance in the two groups of countries are due *not only* to the use of single or multiple VAT rates, but also to other factors, which probably include the VAT base and administrative capacity. Our empirical findings indicates that the difference in the base coefficient is weakly statistically significant (see column 4 in Table 1).

Our relying on the available standard rates, rather than weighted rates data for multiple rate countries, makes the results of multiple rates models tentative. However, despite needed improvements, our analysis provides preliminary estimates which are consistent with the theoretical and practical wisdom on VAT, with many country case studies, and with the available data. As such, it is hoped to provide a stimulus and a benchmark for further empirical research on VAT.

IV. Conclusion and Policy Implications

We empirically analyzed determinants of VAT revenue on a sample of 20 single rate countries, a full sample of 34 countries and a small sample of multiple rate countries. The results of the regressions conform to the conventional views on the key variables influencing the VAT revenue performance: the rate, the base, and the rate dispersion. The rate and the base coefficients are significant and with the expected positive sign in all of the estimated versions of the model, indicating their robustness. This robustness, particularly in the single rate models, makes it possible to use an estimated model, with appropriate caveats, to predict potential (and expected) VAT revenues in countries that are contemplating the introduction of a single rate VAT (e.g., Bulgaria). Also, the dispersion of rates is found to negatively affect VAT revenues.

Empirical results confirm another conventional view that VAT generates, other things constant, higher revenue in single VAT rate countries than in multiple rates countries. The difference in the estimated models for the two country groups is statistically significant indicating a structural change. However, this change in the pattern of VAT revenues cannot be exclusively explained in

terms of different in rate structures. Satisfactory explanation, therefore, must include other factors such as the base and tax administration capacity.

The implications for policymakers are clear: to generate superior revenues, a VAT should be levied in a single rate on as broad base as possible; it also must be accompanied by a strong tax administration to ensure enforcement and compliance.

Appendix

Table 1. Value Added Tax Rates, Revenue, and Base, Worldwide (1988)

Country	VAT Revenue as % of GDP ^a	Standard VAT Rate % _b	Tax Base ^c	Other VAT Rates ^d
Argentina	0.8	16.0	G+ST	25
Austria	6.1	20.0	G+S	10,32
Belgium	7.2	19	G+S	1,6,17,25, 33
Bolivia	2.6	10.0	G+S	single rate
Brazil	NA	17.0	G+CG	single rate
Chile	8.8	16.0	G+S	single rate
Colombia	NA	10.0	G+ST	4,6,15,20,35
Costa Rica	3.8	10.0	G+ST	single rate
Cote d'Ivoire	NA	25.0	G+SG	11.1,35.1
Denmark	9.5	22.0	G+S	single rate
Dominican Rep	1.6	6.0	G+ST+CG	single rate
Ecuador	2.5	10.0	G+ST	single rate
Finland	8.4	19.1	G+ST+CG	single rate
France	11.9	18.6	G+S	2.1,4,5.5, 22
Germany	3.8	14.0	G+S	7
Greece	8.9	18.0	G+S	3,8,36
Grenada	4.5	6.0	G+S	single rate
Guatemala	2.4	7.0	G+S	single rate
Guinea	0.6	13.6	NA	single rate
Haiti	1.8	10.0	G+S+CG	single rate
Honduras	NA	7.0	G+ST	6
Hungary	9.1	25.0	G+S	15
Indonesia	4.5	10.0	G+ST	single rate
Ireland	8.5	21.0	G+S	2.2,3.3,12.5
Israel	9.8	15.0	G+S	single rate
Italy	5.8	19.0	G+S	38 ^e
Korea	3.3	10.0	G+S	single rate

Luxembourg	6.8	12.0	G+S	3,6
Madagascar	1.5	15.0	G+S	single rate
Mauritius	2.1	5.0	G	single rate
Mexico	3.4	15.0	G+S	6,20
Morocco	NA	9.0	G+S	7,12,14,19,30
Netherlands	8.0	18.5	G+S	6
New Zealand	6.7	12.5	G+S	single rate
Nicaragua	2.3	10.0	G+ST	6,25
Niger	NA	25.0	G+S	15,35
Norway	9.4	20.0	G+ST	single rate
Panama	1.1	5.0	G+S	single rate
Peru	2.0	13.0	G+ST	single rate
Philippines	NA	10.0	G+S	single rate
Portugal	6.6	17.0	G+S	8,30
Spain	4.6	12.0	G+S	6,33
Sweden	7.5	25.0	G+S	single rate
Taiwan	2.6	5	G+S	single rate
Togo	NA	14.0	G+S	3*
Tunisia	2.8	17.0	G+S	6,29
Turkey	1.7	12.0	G+S	1,6,8,20
UK	6.0	15.0	G+S	single rate
Uruguay	7.0	22.0	G+S	12
Average	5.1	14.4		

Sources:

a. Government Finance Statistics, Yearbook, International Monetary Fund, 1992. The 1988 revenue values were used; b, c & *. Sijbren Cnossen (1991), "Design of the Value Added Tax: Lessons from Experience" in J. Khalilzadeh- Shirazi and A. Shah (eds), *Tax Policy in Developing Countries*, A World Bank Symposium, Washington DC, 1991, pp 74-75. For countries with single VAT rates, revenue and rate data are taken from Silvani as quoted by Tanzi (1993, p.18); d. Alan Tait (1991), "VAT Policy Issues: Structure, Regressivity, Inflation, and Exports" in Alan Tait (editor), *Value-Added Tax: Administrative and Policy Issues*, IMF Occasional Paper #88, Washington DC, 1991, pp 2-3. NA= not available. It was pointed out to us by Silvani and Casanegra de Jantscher that the revenue data for Argentina from GFS is probably an underestimate. We used published GFS data whenever possible for consistency purposes.

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