VAT ATTACKS!

SECOND BEST PERSPECIVES ON THE VALUE ADDED TAX

Michael Keen[*]

August 26, 2006
This version: September 13, 2006

Abstract: Like the theory of the second best that this congress marks, the VAT is now fifty years old. Judged by the extent and speed of its spread around the world, and the revenue that it raises, the VAT would seem to have been a remarkable success. Over the last few years, however, it has come under a series of attacks. This paper addresses two of the most prominent of these. One is the view that the VAT does a bad job of taxing the informal sector—and that tariffs might consequently be a better revenue-raising instrument for many developing countries. The other is the fear (raised mainly in the United States) that the VAT is actually too effective in raising revenue. It is argued here that there is more truth to the latter claim than to the former, in the sense that there is emerging evidence that the VAT has proved a particularly effective form of taxation—though whether this should be grounds for fear rather than celebration is far from evident. More generally, the many unanswered questions concerning the VAT reflect an unfortunate disconnect between the development of the tax itself and of second best tax analysis.

I. INTRODUCTION

With this congress we mark fifty years of the theory of the second best. But there is another fiftieth (or so) anniversary that our profession should take note of. In 1954, France extended a previous tax and gave it a new name: the 'value added tax.' Since then, of course, just as second best thinking has come to dominate theoretical public finance, so the VAT has risen to a position of extraordinary practical importance. Since its birth in France only fifty years ago, it has come to be adopted by more than 130 countries, including not only all OECD members other than the United States, but also many developing countries. And nor is its spread finished, with several more VATs planned for the coming months and years.

So now is an appropriate time to reflect further on the VAT, both to take stock of what it has (and has not) achieved, and to reflecting on the links (or absence thereof) between the practical development of the VAT and of the second best approach to public finance. My purpose in this talk is to touch on both of these issues, and in doing so—above all—to stimulate further interest in the tax, which, for reasons I shall come back to, has been extraordinary neglected.

In terms of stock-taking, some degree of introspection and dissatisfaction is—so I am told—perfectly natural when one reaches fifty. In the case of the VAT, it would certainly seem that the tax does something right: the world likes it enough, in any event, to raise about 20 percent of its tax revenue in this way. Over the last few years, however, the VAT has been subject to a range of attacks, from both theorists and practical people.

Some of these, in truth, really have little to do with the VAT as such. Take for example the argument that the VAT is a regressive tax. Most of the discussions and analyses of this issue would remain exactly unchanged if the VAT were replaced by some other form of general consumption tax—such as a retail sales tax—characterized by the same structure of rates on final consumption. The arguments are generally not rooted, that is, in the distinctive feature that marks out the VAT from other forms of commodity tax: that it is in principle levied on all transactions, with sellers receiving credit or refund for the VAT charged on their inputs against the VAT chargeable on their own sales.[1] It could be that some rate structures are less practicable under the VAT than under, say a retail sales tax, and that this implies some difference in their distributional impacts. But if that is the point, then that is where the discussion of whether the tax is intrinsically regressive should be rooted. Typically, however, it is not.

---

[1] Attention is confined throughout the discussion and analysis to the invoice-credit method, destination-based VAT: that is, to a VAT charged, in principle, on all sales with credit or refund for all VAT paid on purchases, with imports fully taxable and exports charged at a zero rate. With the sole exception of Japan, there appear now to be no national VATs that are follow a design model different from this.

A first point then is that if one is to attack the VAT it is important to be clear whether the criticisms are unique to the VAT, or equally applicable to alternatives.

With that proviso, there seem to me three lines of recent attack on the VAT which touch—or might seem to touch—sufficiently close to the structural essence of the tax to deserve close attention:

- One is the argument that the VAT functions poorly when—as in most developing countries—there is a large informal sector. Piggott and Whalley (2001) provide elegant illustrations of the general point that broadening the base of a consumption tax may be welfare reducing in the presence of informality. This observation is developed into a more thoroughgoing criticism of the VAT by Joseph Stiglitz at the IIPF congress in 2003 (see Stiglitz (2003)). Aspects of the argument are developed further in Emran and Stiglitz (2005),[2] who derive a series of results on the welfare effects of shifting between tariffs and the VAT which they believe "raise serious doubts about the wisdom of the indirect tax reform policies pursued by a number of developing countries."[3]

  As will become clear, some of these latter arguments come very close, in my view, to misrepresenting the VAT as actually implemented. They do, nevertheless, stress that the implications of informality for tax design have been widely and inappropriately neglected—and that the current intellectual foundations of standard policy prescriptions are correspondingly weak.

  The second attack is close to paradoxical: that the VAT is simply too easy a way for a government to raise money. This, most notably, was one of the key reasons why the recent presidential panel on tax reform in the United States found itself hung on the issue of whether or not to adopt a VAT: "Some panelists were….concerned that introducing a VAT would lead to higher total tax collections over time and facilitate the development of a larger federal government—in other words, that the VAT would be a 'money machine'."[4] Of course proponents of the VAT have traditionally used this as the central argument in favor of the tax, claiming that it is a more than usually non-distortionary and practicable way of raising revenue.

  Underlying both views, however, is a common presumption that the VAT has indeed proved itself a particularly effective form of taxation. But the simple question then arises: Is this in fact true?

---

[2] See also Munk (2004).

[3] Emran and Stigliz (2005), p.599 (abstract).

[4] President's Advisory Panel (2006, p. 192.

- The third is that the VAT has proved vulnerable to significant fraud—the attack on the VAT, in this case, is by criminals rather than theorists. The European Commission (2004), for example, reports that losses from fraud have amounted to 10 percent of net VAT receipts in some member states. Most famously, the cost of carousel fraud in particular—a class of schemes exploiting the zero-rating of exports and deferral of tax on imports from other member states in the European Union—has been put at around €2.1 billion in Germany (roughly 1.5 percent of VAT revenue) and at £1.12 -1.9 billion in the United Kingdom (about 1.5-2.5 percent of total revenue).[5] Nor is fraud a problem only for developed countries: one scam in Sri Lanka reportedly cost RSs 24 billion, a sizable part of all VAT collections.[6] Even if relatively manageable in revenue terms, these attacks are of a spectacular kind—netting profits measured in the millions—that often attract widespread attention, and the example that they set may consequently erode compliance with the tax more generally. They have lead at least one commentator to argue that "the writing is on the wall for the VAT system."[7]

These are all potentially deep criticisms of the VAT. In what follows, however, I consider only the first two. This is not to say that the third is the least important. Indeed I suspect, if anything, quite the opposite: these attacks have led Austria and Germany, for example, to propose extending reverse charging to all B2B transactions—which would in effect convert the VAT into a sales tax. The fraud issue is perhaps the hardest of all, and I neglect it only, in honesty, because it is one on which I have little novel to say.[8]

Before turning to these issues, however, it is useful to consider the broad issue, raised at the outset, of the links between the VAT and second best tax analysis. These, as will be seen, turn out to bear directly on the VAT attacks just outlined.

II. SECOND BEST PERSPECTIVES ON THE VAT

There is not, to put it mildly, a large literature on the VAT: there are, for example, only four papers in the *Journal of Public Economics* with 'VAT' in the title. And while many more papers speak of a 'VAT,' many do not capture any of the distinctive features of the VAT outlined above: all too often, 'VAT' is used as synonymous with 'consumption tax.' But, as

---

[5] 'A Tax Net Full of Holes,' *The Economist*, May 13th, 2006.

[6] http://www.colombopage.com/archive/April18143912SL.html

[7] Quoted in *Financial Times*, 20 June 2006.

[8] For a sense of the issues, see European Commission (2004), Sinn, Gebauer and Parsche (2004), and the collection of papers on alternatives to zero-rating exports within federations in *International Tax and Public Finance* in 2002.

noted earlier, a VAT has a quite distinct structure. What, it is natural to ask, might be the appeal of this particular form of tax? This, surely, is a question that the second best approach to tax analysis should by now have helped us to answer.

When one approaches this issue in second best terms, however, there quickly emerges a tension—perhaps an inconsistency—in the argument usually given for the superiority of the VAT over other types of commodity taxation.[9] The VAT is preferable to a turnover tax, the argument goes, because, when it works as it should—with an unbroken chain of VAT charged and credited or refunded at all stages of production—it avoids distorting the input prices faced by business and so creating the production inefficiencies that, Diamond and Mirrlees (1971) taught us, are unlikely to have any place in a Pareto efficient tax system. Indeed in this respect the remarkable spread of the VAT can be seen as the greatest triumph, and vindication, of optimal tax theory.

But there is more to the argument for a VAT than that. Why is it any better than a retail sales tax? Well, the argument goes, this is because if, for some reason, final sales escape tax, revenue will be protected by having been collected at earlier stages in the production process.

So: the VAT is preferable to one alternative because it does not ultimately tax business inputs, and is preferable to another because it does.

The tension may be more apparent than real, however. When there are constraints on the distorting tax instruments that the government can deploy, production inefficiency, in an appropriate form, generally becomes desirable (Newbery, 1986). Thus it may be that the input taxation that remains under the VAT when some final sales cannot be taxed serves, under those circumstances, a constructive purpose. Or, on the other hand, maybe a cascading turnover tax—or even a tariff—would be better.

There are in some cases technical reasons that prevent some transactions being brought into tax: it is not easy, for example, to allocate the value added in the provision of financial services between buyer and seller in such a way as to ensure proper functioning of the crediting mechanism. And costs of administration and compliance may warrant excluding some perfectly honest traders from the VAT. But noncompliance is clearly one key reason for incompleteness of coverage. This indeed is the essence of the informality issue raised above. And noncompliance immediately creates quite distinctive problems for the VAT. Under most taxes, tax actually paid is bounded below at zero—or at least, for refundable credits such as those under the EITC, is bounded below. For VAT it is not. Hence the attraction of VAT fraud for serious and sophisticated criminals.

Some of the most distinctive and challenging second best issues raised by the VAT thus stem from the incompleteness of its coverage, whether due to outright noncompliance or the

---

[9] As, for example, in Ebrill et al (2001).

constraints implied by the challenges of administration and compliance. It is these that are at the root of the various attacks outlined above—including the money machine argument, though in this case it is the absence of these limitations, not their presence, that is seen as the root of the problem. In particular:

- The informality criticism raises a question to which our second best intuition should quickly call us to pay attention: How should VAT be designed when some transactions will escape the tax? In particular: For developing countries, would tariffs (or some other kind of tax) do a better job?

- Since it is in principle unclear—even when its coverage is complete, but especially when it is not—whether the VAT is indeed superior to other forms of indirect taxation, the question arises: Is there any empirical evidence that the VAT has indeed proved a particularly efficient tax? Viewed from another perspective—has it proved a money machine?

It is striking, and troubling, that after fifty years of both the VAT and the second best approach to tax design, these questions have hardly been addressed. The rest of this paper tries to make some progress on these issues, beginning with the latter.

III. IS THE VAT A MONEY MACHINE?[10]

Before turning to the question of whether the VAT has proved to be a 'money machine'— and the prior question of what exactly that irresistible phrase might mean—it is useful to start with a much better-defined question, and one that is clearly key to evaluating the role that the VAT has come to play in raising the world's tax revenue:

Has the VAT proved to be a particularly effective tax?

The revealed preference for the tax in itself seems to suggest very strongly that it has. Not only have 130 countries implemented a VAT, only five have ever removed one: Ghana, Grenada, Malta, Belize, and Vietnam. And all of these have now either reintroduced it, or plan to do so soon.

But one might hope too for some harder evidence, and a direct approach to the issue is developed and applied in Keen and Lockwood (2006a; KL). This exploits the simple idea that if the VAT were indeed an especially effective way of raising revenue—in the sense of implying a reduction in the marginal social cost of public funds—then, all else equal, one would expect countries with a VAT to raise more revenue than those without. To tease out

---

[10] This section draws on Keen and Lockwood (2006a, 2006b).

this point—and explore too some further arguments to follow—some simple formalities are useful.

Suppose then that policy is made so as to maximize a welfare function of the form:

$$W = U(R) - \left(\frac{1}{2}\right)\theta R^2 \tag{1}$$

where R denotes the level of tax revenue (all used to finance public expenditure) and θ parameterizes the (in)efficiency of the single tax instrument assumed to be at the government's disposal: the more efficient the tax instrument, the lower is θ. The necessary condition on R,

$$U'(R) - \theta R = 0 \quad, \tag{2}$$

is then easily seen to imply that R is decreasing in θ: access to a more effective tax results in more revenue optimally being raised. This then suggests estimating equations of the form:[11]

$$r_{it} = \alpha V_{it} + \beta_v' V_{it} X_{it} + \beta' X_{it} + \mu_i + \lambda_t + u_{it} \tag{3}$$

where r_{it} denotes the ratio of tax revenue to GDP in country i at time t, V is a dummy indicating the presence ($V=1$) or absence of a VAT,[12] X a column vector of other variables that may affect tax revenue (the usual suspects including openness, GDP per capita, and dependency ratios); the remaining terms are country- and time-specific effects and an idiosyncratic error. In effect, equation (3) is a standard 'tax effort' equation augmented by inclusion of a VAT dummy, which in turn is allowed to affect tax revenue both directly and in interaction with other variables. The argument that the VAT would be associated with higher tax revenue if its presence significantly increased the effectiveness of the tax system then translates into the hypothesis that $\alpha + \beta_V' X_{it} > 0$; a claim, it should be noted, that is in general country- and time-specific (a point to which we shall return).

Two further aspects of this empirical strategy should be stressed. First, note that the revenue variable on the left of (3) is total revenue, not revenue from sales taxes or any other subset of tax instruments. The question is not whether the VAT raises more than predecessor sales

---

[11] The simple analytics in the text relate to the level of revenue, rather than, as in (3), the share of revenue in GDP; a significant limitation, since effects on production efficiency mean that, in practice, GDP may itself be affected by the adoption of a VAT. KL show that an estimating equation of the form in (3) remains appropriate in these more relevant circumstances.

[12] Not all VATs are the same, of course, so that use of a dummy of this kind oversimplifies. But data deficiencies, especially outside the OECD, leave little scope for more subtle characterizations.

taxes, or than the customs duties that in many countries it has in part served to replace; it is the impact of the VAT on overall revenue raising capacity that is of interest. (Whether the VAT has replaced revenue from other sources will, however, prove a key issue for the money machine question, and is taken up below). Second (and again relevant to the money machine question) this approach does not rest on any view that the VAT is 'good' if and only if it increases the revenue ratio: it could be, for instance, that any additional revenue it raises is, from some wider social perspective, wasted. Rather the strategy is simply to take an increase in the revenue ratio associated with the presence of the VAT as signaling an increase in the effectiveness of the tax system.

One issue that arises in estimating (3), of course, is the potential endogeneity of V. KL therefore estimate this revenue equation jointly with a probit for adoption of the VAT, the determinants of which—though not our concern here—are of interest in themselves. Broadly speaking, four key factors emerge as critical to the spread of the VAT, with adoption being more likely for countries that are less open, have neighbors that have already adopted the VAT, are participating in an IMF program, and have weak prior revenue performance..

What then does the evidence say on the effectiveness of the VAT? Looking at an unbalanced panel of 143 countries[13] observed between 1975 to 2000, KL find:

- Allowing the VAT to affect only the intercept in (3), the presence of a VAT has a significant positive effect on overall revenue, suggesting that it has indeed been associated with an increase in the effectiveness of the overall tax system. But the effect is not very large: adoption increases the revenue ratio by 3.4 percent—about one half of a percentage point of GDP, for example, at an initial revenue ratio of 15 percent.

- Interaction effects, however, seem to be important. The revenue gain associated with the VAT is larger at higher income levels and, somewhat less robustly, is also greater in more open economies.

Since the intercept effect of the VAT now becomes significantly negative, one implication is that VAT may—as anticipated above—increase tax effectiveness in some countries but not in others. Table 1 gives an indication of the implied pattern of effects from the VAT, broken down both by region and as between countries that, as of 2000, did and did not have a VAT. These calculations, it should be stressed, are no more than illustrative: they simply reflect, for example, one particular set of point estimates. The implication, however, is reasonably clear. There are strong signs of an increase in tax effectiveness from adoption of the VAT in most countries, both those currently with and those without one, and these are quite sizable. This effect is noticeably less clear-cut in sub-Saharan Africa, however: while no great precision

---

[13] Formerly socialist countries are omitted.

Table 1: Revenue effects of the VAT—Illustrative calculations 1/

	Asia-Pacific	Americas	EU+	North Africa and Middle East	Small Islands	Sub–Saharan Africa
Critical income level 2/	1,546	3,027	4,462	3,083	1,785	1,124
Countries with a VAT: 3/						
Number with $\Delta r > 0$	19	14	17	3	8	11
Number with $\Delta r < 0$	3	9	0	2	0	14
Average $(\Delta r / r)$	2.10	0.51	4.15	0.45	4.03	-0.81
Countries without a VAT: 3/						
Number with $\Delta r > 0$	6	3	--	9	13	8
Number with $\Delta r < 0$	1	0	--	0	1	6
$(\Delta r / r)$	4.73	6.24		0.02	2.87	0.91

Notes:
1/ Calculated from point estimates in column (4) of Table 2 of Keen and Lockwood (2006a). Regions defined as in Appendix I of Ebrill et al (2001). For countries that adopted a VAT within the sample period, the average percentage revenue gain from the date of adoption until the end of the sample period (2000) is calculated. For countries which have not adopted by 2000, the average predicted gain based on the averages of the control variables over the period 1990-2000 is calculated.
2/ Income level (200x USD, in PPP) above which adoption of the VAT would be predicted to increase the tax ratio, evaluated at region means of *OPEN*, *AGR* and *FED*.
3/ As of 2000.
4/ Total numbers of countries in any region may be less than region lists in Ebrill et al (2001) due to missing data

should be attached to the numbers reported there, or to their signs, the calculations do appear to bear out the widespread perception that implementation of the VAT continues to pose particular challenges in this region.

There are, thus, signs that the VAT has indeed broadly lived up to the claims of its proponents. But is also seems clear that country circumstances matter for the effectiveness of the VAT. For the more developed economies, the signs all point to a significant improvement in effectiveness. More generally too, the circumstances of many countries, but not all, are such that, all else equal, adding a VAT to the armory of their tax instruments has increased or—for those as yet without the tax—would increase the overall effectiveness of the tax system. In that sense, at least, the VAT does appear to be a 'money machine.'

Does the VAT 'cause' big government?[14]

But some of those who fear the revenue potential of the VAT—an argument of course most commonly found in the United States—seem to have in mind an even stronger claim than this: that the innovation of the VAT over the last forty years or so is in some sense responsible for the generally larger scale of government in Europe than in the US. And indeed the emerge of the differential in the size of government across the Atlantic is more or less coincident with the development of the VAT in the latter: between 1965 and 2002 the tax ratio in United States was broadly unchanged, at around 26.5 percent; in the European OECD countries, it rose from only a percentage point or so higher than in the US to about 12.5 points more.

This leads to another question: Has the VAT been a money machine in the sense that it 'caused' big government, or, on the other hand, did the desire for big government cause adoption of the VAT? At one level, this is essentially the question just addressed, with the answer being that the adoption of the VAT has indeed enabled larger government, in the sense that—certainly in the circumstances of the most developed economies—its presence has been associated with larger government. What the results just discussed leave open, however, is whether the benefits of this increased effectiveness have in part been taken in the form of a reduction in other and less effective forms of taxation or whether, on the other hand, the VAT has been just one of several sources of increased tax revenue. And this in turn relates directly to the stronger money machine claim.

To see the significance of this question, amend the simple framework above to have two tax instruments, indicated by subscripts A and B, and a parameter λ increasing in the strength of taste for government. So policy now seeks to maximize:

---

[14] This subsection draws on Keen and Lockwood (2006b).

$$W = \lambda U(R_A + R_B) - \left(\frac{1}{2}\right)\theta_A (R_A)^2 - \left(\frac{1}{2}\right)\theta_B (R_B)^2 \qquad (4)$$

In this setting it is straightforward to show that:

- A stronger taste for government (characterized as an increase in λ) leads to increased revenue from *both* taxes. (Indeed with the analogue of the necessary condition (2) holding for both taxes, the share of each in total tax revenue remains unchanged). Thus if it is the demand for larger government that has driven the adoption and growth of the VAT, one would expect revenue from taxes other than the VAT also to have increased.

- Increased effectiveness of one of the two tax instruments, say *A*, on the other hand, leads to increased revenue from *A* itself but to a *reduction* in the revenue raised from B. So to the extent that increased revenue is driven by access to a more efficient tax instrument, one would expect, to some degree, a partially offsetting *reduction* in revenue from other taxes.

The implication is striking. To the extent that the efficiency of the VAT has itself driven the increase in government size, that overall size should have increased by no more—and quite possibly less—than the revenue from the VAT itself. While this may at first sight seem puzzling, the reason is straightforward: if it is the greater efficiency of the VAT that has been driving developments, then one would expect part of the benefit of that to have been taken in the form of reduced reliance on less effective forms of taxation.

What, then, do the data say? Has the growth of the VAT been associated with a reduction in revenue from other sources (as a 'strong' money machine argument would suggest) or with a increase (as one would expect if, for instance, the growth of the VAT in Europe were a response to an increased need for revenue)?

Figure 1 shows total tax revenue, and revenue from the VAT (or sales taxes, in the case of the United States)—both relative to GDP—for all OECD members, as of 2004. This does not immediately suggest a strong relationship between overall tax revenue and revenue from the VAT alone. The low level of sales tax revenue in the US stands out. Beyond that, there is a strong positive association between VAT and total tax revenue—regressing the former against the latter gives a significant coefficient of 2.1—but clearly with much greater cross-country variation in the latter than in the former. Differences in VAT revenue across the OECD members clearly do not account for differences between them in the total tax revenue. But nor, on the other hand, do these differences in VAT revenues appear to be fully offset by reductions in revenue from other taxes.

11

Figure 1. Total Tax Revenue and VAT/Sales Tax Revenue in the OECD, 2004 1/
(In percent of GDP)
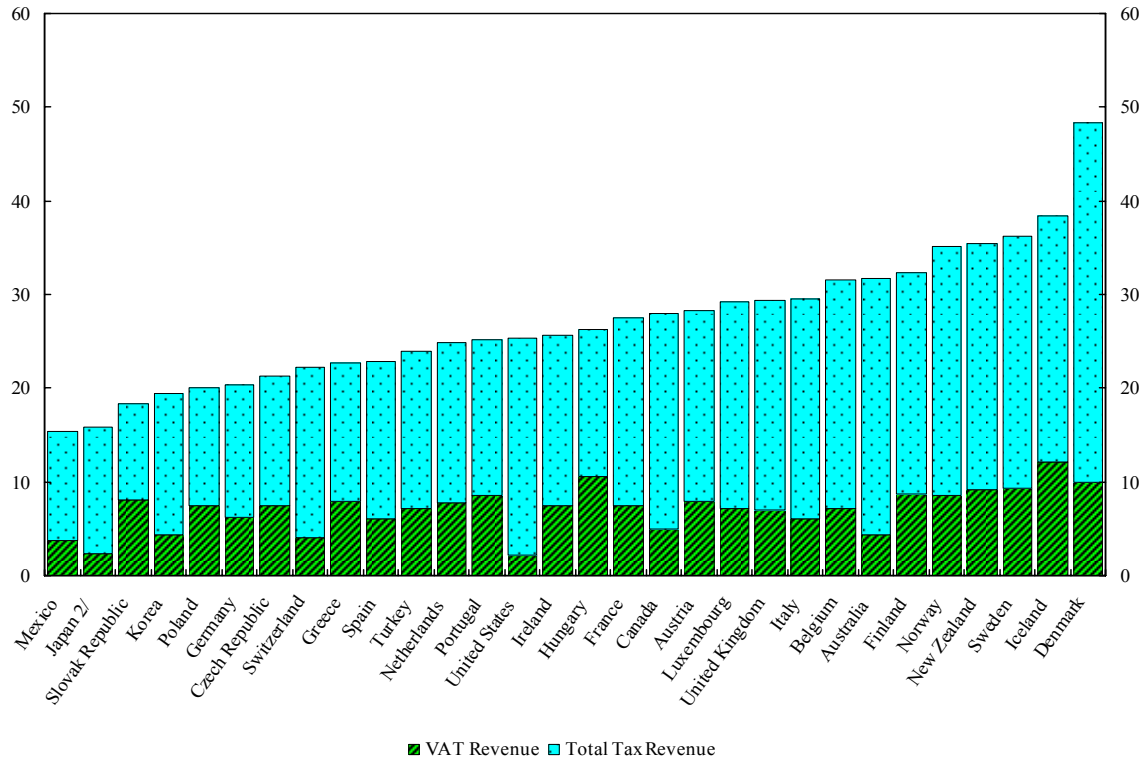
Sources: OECD, *Revenue Statistics*, 2005 edition and OECD, *Consumption Tax Trends.*
Notes: 1/ Excluding Social Security.
     2/ Central Government taxes only.

Such cross-country comparisons, however, can cast little light on the questions of interest here. It could be, for example, that changes in VAT revenues over time largely account for changes in total revenues within countries, while other factors explain differences in tax levels between them. To distinguish between the various possibilities, panel data are again needed. Keen and Lockwood (2000b) have begun to explore these issues, examining the relationship between VAT and total revenues in OECD countries[15] since 1975 (or the date of introduction of the VAT). This is very much work in progress, but some preliminary results begin to emerge.

[15] Reliable panel data on VAT revenues are not readily available outside the OECD.

With specifications relating total tax revenue (including social security), r, to revenue from the VAT alone (denoted v), both relative to GDP (and with proper controls), the question is whether a one point increase in v is associated with an increase in r of more or less than one point: if greater, then the VAT has simply been one source of revenue amongst others; if less, then the revenue it yields has been used to reduce reliance on other revenue sources—consistent with the 'strong' money machine view that the growth of government has been fueled, at least in part, by the VAT itself.

The emerging results suggest that total revenue has tended to increase more or less one for one with VAT revenue; with, if anything, somewhat greater signs of the latter. For example an error correction specification relating r to v, including controls[16] and a full set of country- and time-effects, suggests that a one point increase in VAT revenue is associated with an increase in total revenue of only about 0.1 points of GDP in the short run, and of about 0.85 points in the long run. This would be consistent, for example, with a natural presumption that VAT increases are often introduced in conjunction with reductions in revenue from other taxes; but suggests that subsequent adjustments tend to reduce the extent of such offsetting.

On balance—and it should be stressed again that these are very preliminary results—the OECD experience does thus seem to lend support to the view that the growth of the VAT has been more than an incidental adjunct of the growth of government. The evidence is consistent with the view that the efficiency of the tax has played a key role in fueling the growth of government, enabling, at the margin, some reduction in reliance on other and presumably less effective forms of taxation.

Is a money machine necessarily a bad thing?

Finally in this part, a remark on the money machine argument itself. The underlying view of the world of the panelists who raised this concern is, of course, one in which government, if unchecked, tends to become too big. This then leads to the argument that one way of constraining government size—in the absence of more direct checks—is to constrain the government to use inefficient tax instruments. The point dates back to the analysis of Brennan and Buchanan (1977) who indeed cite exactly the VAT as a leading instance.[17] Their framework is of a world in which citizens believe that policy in the post-constitutional phase will be made by Leviathans who, diverting some fixed proportion of tax revenue to their own use, will then simply seek to maximize tax revenue within the limits of the taxing powers granted to them in the constitution. Having in mind some desired level of tax revenue—reflecting that part of it from which they will benefit—citizens will then rationally

---

[16] Openness, per capita GDP and population.

[17] Brennan and Buchanan (1977), p.272.

support constitutional restrictions which limit to that level the maximized amount of revenue the leviathan can subsequently achieve.

The conclusion that welfare may be reduced by the use of efficient tax instruments is open to a number of objections, even if one accepts the view of policy makers as self-seeking. Fiscal rules of various forms, for example, may directly constrain overall revenues and spending, while allowing them to be financed in the most efficient way. Moreover, a simple and reasonably plausible relaxation of the extreme Brennan-Buchanan assumptions leads to quite a different conclusion. Suppose that policy makers in the post-constitutional phase do not simply seek to maximize the amount of spending, C, devoted to their own use, but also attach at least some positive weight to the well-being of the citizenry. More precisely, suppose they seek to maximize some function $\Omega(C,W)$ defined over not only C but also the citizenry's welfare W, with the latter reflecting the public expenditure R-C from which they benefit. So (returning for simplicity to the case in which there is only one tax instrument), equation (1) becomes

$$W = V(R - C) - \left(\frac{1}{2}\right)\theta R^2 \ . \tag{5}$$

Consider again the impact of an increase in the efficiency of available tax instruments. Since

$$\frac{dW}{d\theta}\Big|_C = \left(\frac{1}{2}\right)R^2 > 0 \ , \tag{6}$$

an increase in the efficiency of available instruments shifts outwards the possibility frontier in (C,W)-space from which the policy maker chooses. But then, so long as W is normal in the policy maker's preferences, on would expect them now to select higher values not only of C but also of W: thus an increase in the efficiency of available tax instruments does result in some increase in the citizen's welfare W. Most of the benefit may accrue to the policy maker, with the gain to the citizenry only small. But the gain is nevertheless, under plausible circumstances, positive—and hence the natural policy advice is to use the more efficient instrument.

This alternative political economy story is of course a very simplistic one. There may be more subtle arguments pointing to welfare losses from more efficient taxation, perhaps relating to distributional politics or wider imperfections of the political process. Prima facie, however, it seems to hard to make the effectiveness of the VAT an argument against its adoption.

IV. INFORMALITY AND BORDERS

Background

The importance of the challenges that informality poses for both tax design and administration are well-known. It is of course extremely hard to measure with any great accuracy the size of the informal sector—by which will be meant here simply the set of businesses and individuals that are less than fully tax compliant. Widely cited estimates nevertheless confirm the widespread presumption that it is often substantial, especially in the developing countries that I shall have particularly in mind in this section: Schneider (2002), for example, puts the informal economy in developing countries at, on average, 41 percent of Gross National Income. The existence of such a large part of the economy not fully in the tax system represents a potentially severe distortion both directly in the misallocation allocation of resources between formal and informal activities, and indirectly through the loss of revenue that it entails. It is likely, moreover, to induce inequities, and to reinforce weaknesses in wider governance.

The charge leveled against the VAT is that it is essentially a tax on the formal sector, and so is ill-suited for circumstances in which informality is a significant concern—which of course includes, very prominently, those of developing countries. A natural reaction to this is to ask: What would be better? And here interest turns to the potential role of import tariffs. These, the argument goes, are easy to administer and, in particular, will be borne by the informal sector too in so far as they import some of their inputs. Thus Emran and Stiglitz (2005), in particular, establish a series of results establishing circumstances in which a revenue neutral shift from import duties to (what they call) a 'VAT' reduce welfare.

This comparison between the VAT and tariffs, it should be stressed, is of more than conceptual importance. Many developing countries still rely heavily on the revenue raised by tariffs: in Sub-Saharan Africa, for instance, trade taxes still account for an average of about one-quarter of all government revenues, and in the developing countries of Asia and the Pacific they account for around 15 percent. As trade liberalization proceeds, the question arises as to how such countries might replace lost trade tax revenue from domestic sources. And the conventional prescription—the economics behind which will be spelt out later—attaches a key role here to the VAT, along with excises. On these issues, however, the emerging empirical evidence is troubling. Looking back at past episodes of lost trade tax revenue, Baunsgaard and Keen (2005) find that while middle-income countries have generally recovered lost trade tax revenue from other sources, many low income countries have not. Especially important for present purposes, they also find that the degree of revenue recovery is not significantly greater in countries that have a VAT than in those that do not. Part of the reason for that may be that the simple 0/1 dummy used in these regressions does not capture the importance of key design features of the VAT—the number of rates, the level of the threshold, and so on. But might it also be that the presence of a large informal sector in these countries renders the VAT structurally inappropriate for replacing lost trade tax revenue in this way?

VAT, tariffs and withholding taxes

In thinking through these issues, it is important to be clear on the nature and range of the tax instruments available to developing country governments.

And a key point here is simply that the VAT is levied on imports, including by those not registered for the VAT. Those who are registered for VAT will of course be able to claim a credit or refund against the tax due on their later sales. For those who are not, however, that VAT on their inputs will remain unrecovered. For them, the VAT that is charged on imports functions exactly like a tariff; and indeed is administered and collected in almost exactly the same way.

Nor is this point merely one of principle. In practice—as shown for a wide range of developing countries in the second column of Table 2—most developing countries raise more than half of their gross VAT collections on imports.

This point is recognized, I should note, by Emran and Stiglitz (2005).[18] In their formal results, nevertheless, the 'VAT' is defined as that part of the VAT that is not collected at the border. It is important to remember this, however, in interpreting the results. As can be imagined from the figures in Table 2, few practitioners would recommend the adoption of a VAT if, for some reason, it could not be collected at the border.

The VAT thus serves in part as a surrogate tariff, with the attractive feature that it bears only on the purchases of informal operators. This does not quite solve all our problems, however. For at the same time, of course, the VAT functions as a tax on final sales by producers in the formal sector. And in principle, one might want to charge these two taxes—on formal final sales, and on informal imports—at different rates. Absent a kind of rate differentiation that is both unusual and likely to be hard to implement, however, the VAT cannot do this: it taxes these two things at the same rate.

All this points to there being potential value in having available another tax instrument, explicitly targeted to informal sector imports. And indeed many developing countries do deploy such an instrument, though its conceptual and practical importance appears to have been entirely neglected in the theoretical literature (and indeed in much of the more practically oriented literature too). That instrument is withholding against income tax liability in the form of a charge on imports. As shown in the final column of Table 2, many developing countries impose taxes of this sort, in many cases at fairly high rates. In principle at least, these taxes are creditable for those paying income tax; for those in the informal sector escaping the income tax, however, they remain a final tax, again functioning as a de facto tariff. Such withholding taxes, it should be noted, appear to be perfectly WTO-consistent, since they have no bite for fully compliant taxpayers—at least in principle. In

---

[18] See their footnote 14.

practice, it is far from clear how far formal sector operators do indeed receive appropriate credit (or refund). Here, however, the focus is on the prior question of what use, if any, such taxes might have if they were properly implemented.

Table 2: VAT revenue from, and withholding taxes on, imports in selected countries

Country	VAT revenue from imports (In percent of gross VAT) /1	Income tax withholding on imports
Algeria	64.0	No
Argentina	33.3	Yes-3%
Armenia	64.3	No
Benin	62	Yes – 3%
Burkina Faso	55	Yes – 1% (5% if no TIN)
Cameroon	39.0	No
CAR	63.8	Yes – 10%
Egypt	60.5	Yes – 1%
Ethiopia	62.2	Yes – 3%
Gabon	43.3	Yes – 2.5%
Georgia	58.7	No
Guinea	83	Yes – 5%
Jordan	42.3	Yes – 2% (if importer is not a certified compliant)
Kenya	39.3	No
Kyrgyz	81.1	No
Lebanon	69.0	No
Madagascar	61.0	No
Malawi	53.0	No
Mali		ADIT* 3% (7.5% if no TIN)
Mauritania	73	Yes – 4%
Mauritius	48.5	No
Morocco	55.3	No
Niger	59	Yes – 4% (7% if no TIN)
Pakistan	52.0	Yes – 6%
Rwanda	46.1	Yes – 5%
Senegal	54	No
South Africa	46.0	No
Sudan	48.1	Yes – 3%
Tanzania	60.0	No
Togo	60.0	Yes – 1% (5% if no TIN)
Trinidad and Tobago	51.0	No
Tunisia	46.5	Yes – 10%
Uganda	56.2	Yes – 6%
Zambia	35.5	No
*ADIT for Mali: *Accompte sur divers impôts et taxe."*		

1/ For most recent year available, usually 2004 or 2005

Optimal tax structures

Consider then the problem faced by a typical developing country, which can levy three types of tax: a VAT, levied at a single rate on both formal sector sales and informal sector imports; a tariff; and an additional tax on informal sector imports. How should these be deployed?

Keen (2006) addresses these issues in a simple model in which formal and informal operators compete in the production of a nontradeable good, using a single imported intermediate good. There are constant returns in the formal sector, with the size of the informal sector then determined by decreasing returns.[19] There are also assumed, for simplicity, to be fixed coefficients in the informal sector.

A first and crucial lesson that emerges is that if the VAT and withholding tax are optimally deployed, then the tariff should be set to zero. Intuitively, with these other instruments targeted independently to the taxation of final sales and of informal inputs, there remains no useful purpose for tariffs: all they do is distort production in the formal sector.

The characterization of the optimal VAT and withholding taxes proves somewhat involved. Matters are clearest if informal sector profits have the same social weight as tax revenue—a useful simplifying assumption, rather than an especially plausible one. In this case the two taxes are characterized by:

$$T_V = \left(\frac{\delta - 1}{\delta}\right)\frac{1}{E(Q)} \tag{7}$$

$$\frac{T_W}{\rho} = T_V\left(\frac{1 - \alpha(\rho)}{\alpha(\rho)}\right) \tag{8}$$

where $\delta > 1$ denotes the marginal cost of public funds, E (> 0) the elasticity of demand, and α the share of the imported intermediate in informal sector costs. Thus the optimal VAT is characterized by the usual Ramsey rule, without direct reference to the existence of an informal sector. And the withholding tax, as one might expect, is higher the lower is the share of the taxed import in informal sector production costs.

One further special case nested within (7)-(8) deserves some emphasis: if the informal sector imports all its inputs, then the VAT alone is fully optimal. Intuitively, even though some final sales escape the VAT, one can do no better, in this case, than to deploy only the VAT, set at the rate implied by the Ramsey rule.

---

[19] Broadly the same model is also used by Piggott and Whalley (2001) and Stiglitz (2003).

The interest of this result is that it establishes—for the first time, as best I am aware—circumstances in which a 'real-world' VAT (meaning one that becomes an input tax for unregistered traders) is all that is needed: neither tariffs nor withholding on imports need to be deployed. Of course the circumstances required for this result are very special. Indeed that, in a sense, is the point. Outside this very restricted case, there is a purposive role for the withholding tax, although not for tariffs.

Matters become still more complex if, as one might expect, informal sector profits have lesser social value than does tax revenue. But the details need not concern us here: broadly speaking, this points to a lower rate of VAT and a higher withholding tax, to extents that depend on the size and supply responsiveness of the informal sector.

These results suggest a key role in developing country tax policy not only for the feature of the VAT that is acts as an import tariff on the informal sector, but also for the import withholding taxes that have previously been so neglected. And that suggests that these taxes may have a role to play in dealing with the revenue replacement issue raised above.

Before turning to this, however, one further point should be noted. This is that while the results reported here focus on the way in which the VAT taxes the informal sector on its imports, the VAT also serves essentially the same purpose on *all* inputs that informal operators purchase from formal. This calls attention too to a wide range of other withholding taxes deployed in many developing countries, such as withholding of VAT on their purchases by public and or large enterprises. Thus questions arise too as to how these are best designed and deployed. More generally, the analysis suggests that the borders that matter in thinking about the taxation of the informal sector are not simply the literal borders of the country itself; the borders that are crossed by transactions between formal and informal sectors may be at least as important in designing appropriate tax structures.

Revenue replacement

As noted above, standard policy advice stresses the use of indirect taxation, both VAT and excises, to replace any revenue lost as a consequence of trade reform. The argument is straightforward.[20] Suppose, in the framework above, one were to respond to a cut in the tariff on some good by increasing the VAT rate just enough to offset the impact on the consumer price of the reduction in formal sector costs. Consumers would then be left indifferent to the reform. And if there were no informal sector, it is easily seen, revenue would rise: in effect, the gain in production efficiency in the formal sector would materialize as an expansion in import demand, increasing revenue so long as the initial tariff is positive.

---

[20] This argument, together with some extensions and qualifications, is developed in Keen and Ligthart (2002). For infinitesimal reforms, see also Anderson (1999) and Hatzipanayotou, Michael and Miller (1994).

If there is an informal sector, however, the revenue effect of this strategy becomes unclear. Increasing the VAT so as to maintain the consumer price will typically result in an expansion of the informal sector, so that some consumption may now escape taxation; and the total tax paid on each informal sector import may now fall, with the reduced tariff more than offsetting the increased VAT.

The results above point, however, to an alternative strategy—one that brings into play not only the VAT, but also the withholding tax—that is sure to increase both welfare and revenue in the face of the tariff cut. This is to increase the VAT rate, just as above, to maintain (or slightly lower) the consumer price; but also to simultaneously increase the withholding tax so to maintain unchanged the input price faced by informal traders.

There are of course limits to this strategy. As noted earlier, it may be that many compliant taxpayers do not in practice receive the full credit or refund of import withholding to which they are in principle entitled—a problem that increasing the rate of the latter, all else equal, will tend to worsen. It should also be noted, however, that such a strategy appears to be fully WTO-consistent, so long as denial of credit or refund is not used as a disguised tariff. It seems clear, in any event, that the withholding taxes which have become so important in practice and been so neglected in analysis (and policy advice) deserve closer attention than they have yet received.

V. CONCLUDING

After fifty years of experience with the VAT, and fifty years of progress in better understanding the principles by which tax systems should be designed, there remains—as, sadly, will be evident enough from this talk—much that is not known about the VAT. The analysis here has only begun to address two of the most outstanding issues: whether the VAT has lived up to the claims of its proponents (and justified the fears of its opponents) in terms of its revenue impact; and how the VAT and—importantly—related taxes, should be designed when taxpayers are less than fully compliant.

Why, given its obvious importance, has the VAT received so little attention? One reason, surely, is the relative lack of interest in the tax in the United States, which drives some much of the research agenda in our profession. Conversely, the VAT is especially important to developing countries, indeed for them VAT and trade reform are arguably *the* issues; and, to our shame, tax issues in developing countries hardly feature on the academic public finance research agenda at all. A second and more prosaic reason may the relative lack of comparable data on VAT revenues and design (other than the basics of rate structure), especially outside the OECD. There is also, perhaps, a third reason. Tolstoy has it that all happy families are alike, but every unhappy family is unhappy after its own fashion.[21] Much the same is true of

---

[21] In the opening line of *Anna Karenina*.

the VAT. If it functions as it should, any VAT is simply a tax on final consumption, to which all our simple textbook models in principel apply. But a less than perfectly functioning VAT is an analytical mess, with particularities of production relationships and compliance behavior immediately becoming key. And it is imperfectly functioning VATs that we observe in practice. Tolstoy, of course, chose to write about an unhappy family. Similarly, I hope this talk will have helped made the case that the study of imperfect VATs is not only worthwhile, but interesting too.

References

Anderson, James E. (1999), "Trade reform with a government budget constraint," in John Piggott and Alan Woodland (eds), *International Trade Policy and the Pacific Rim* (Macmillan Press: London).

Baunsgaard, Thomas and Michael Keen (2005), "Tax revenue and (or?) trade liberalization" IMF Working Paper 05/112.

Brennan, Geoffrey and James M. Buchanan (1977), "Towards a tax constitution for leviathan," *Journal of Public Economics*, Vol. 8, pp. 255-273.

Diamond, Peter and James A. Mirrlees (1971), "Optimal taxation and public production I-II," *American Economic Review*, Vol. 61, pp. 8-27 and 261-278.

Ebrill, Liam, Michael Keen, Jean-Paul Bodin and Victoria Summers (2001), *The Modern VAT* (International Monetary Fund: Washington D.C.).

Emran, Shahe M. and Joseph E. Stiglitz (2005), "On selective indirect tax reform in developing countries," *Journal of Public Economics*, Vol. 89, pp.599-623.

European Commission (2004), *Report from the Commission to the Council and the European Parliament on the Use of Administrative Cooperation Arrangements in the Fight Against VAT fraud*, COM(2004) 260 final.

Hatzipanayotou, P., M.S. Michael and S.M. Miller (1994), "Win-win indirect tax reform: A modest proposal," *Economics Letters*, Vol. 44, pp. 147-151.

Keen, Michael and Jenny Ligthart (2001), "Coordinating tariff reductions and domestic tax reform" (with Jenny Ligthart), *Journal of International Economics*, Vol. 56, pp. 407-425.

Lockwood, Ben and Michael Keen (2006a), "The Value Added Tax: Its causes and consequences," mimeo.

Lockwood, Ben and Michael Keen (2006b), "Is the VAT a money machine?" in preparation.

Munk, Knud J. (2004), "Tax-tariff reform with costs of administration," mimeo, University of Aarhus.

Newbery, David M. (1986), "On the desirability of input taxes," *Economics Letters*, Vol. 20, pp.267-270.

Piggott, John and John Whalley (2001), "VAT base broadening, self supply, and the informal sector," *American Economic Review*, Vol. 91, pp.1084-1094.

Schneider, Freidrich (2002), "Size and measurement of the informal economy in 110 countries around the world," Mimeo, University of Linz.

Sinn, Hans-Werner, Andrea Gebauer, and Rüdiger Parsche (2004), "The Ifo Institute's model for reducing VAT fraud: Payment first, refund later," *CESifo Forum*, February, pp.30-34.

Stiglitz, Joseph E. (2003), "Development oriented tax policy," PowerPoint presentation to Congress of International Institute of Public Finance.