

DRAFT PAPER – NOT FOR QUOTING WITHOUT PERMISSION

VAT AND EXCISES

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I. INTRODUCTION

The Meade report was explicitly confined to direct taxation: it was initially to intended to review the whole tax system, but faced with tight time constraints the committee chose to exclude indirect taxes.¹ One reason for this lesser priority, were accorded little attention in Meade, perhaps, was that the UK had at that time only recently implemented a major indirect tax reform,² introducing a value-added tax (VAT) to replace the earlier ‘purchase tax’ (a single-stage sales tax) as a requirement of entry into the European Community. The Committee may well have judged that after this major rationalisation there would be little appetite for further reforms to the UK’s indirect tax system for some time to come. In fact, developments in indirect taxation, notably the rise of the VAT, have been amongst the most marked changes in the U.K. taxation since the publication of *Meade*. And, ironically given their relative neglect of the topic, one of those most consistent with the central thrust of the report—its advocacy of expenditure taxation.

For the present review, there is evidently a need to look much more closely than did *Meade* at the role that is and ought to be played by the value added tax—the essentials of which are summarized in Box 1—and excises within the overall fiscal system:

- At a theoretical level, developments since the Meade report have considerably altered our understanding of the contribution that can be made by indirect taxes—both VAT and, despite their even longer pedigree, excises—to raising revenue and pursuing distributional and other social objectives.
- The VATs of several ‘old’ EU member states—including, prominently, that of the U.K.—have now run for some 35 years, and a fundamental review, in the light of experience with more modern VATs, is overdue.
- The elimination of internal frontiers in the EU has brought new and challenging issues of administration, enforcement, and tax competition in relation to the VAT and excises, undreamt of 30 years ago and as yet still unresolved.
- Indirect tax policy in the U.K. is more explicitly constrained by international agreements than is any other area of tax policy (with the sole exception of tariff design). To a large degree, assessing indirect tax policy in the U.K. requires assessing

¹ The only substantive discussion of indirect taxes is in the context of one of the more radical reform options, the ITVAT, under which existing income taxes would be transformed into a tax on expenditure using a VAT-type mechanism.

² We sidestep long-standing definitional issues by taking ‘indirect taxes’ as synonymous for present purposes with general consumption taxes, notably the VAT, and excises.

it in the EU, and whether these constraints have helped or hindered the design of the indirect taxes.

- Recent developments--notably the growth of trade in international services and e-commerce, and high profile VAT fraud—have raised challenges that question basic design features of the VAT, to that causes some to doubt its future.

Box 1. A VAT primer

Value added tax (VAT) is levied on the sale of goods by registered businesses (those with annual turnover above a minimum threshold, currently £61,000). VAT is applied to sales both to private consumers and to other businesses (in contrast to the retail sales taxes levied in the US, which generally tax sales to final consumers only).

Business purchasers are, however, able to offset the VAT they have paid on their purchases ('input VAT') against their 'output VAT' liability on their sales. The result is that no net revenue is collected from the taxation of intermediate goods sales (business-to-business or B2B sales), but the tax revenue is collected gradually, throughout the chain of production and distribution. This reduces the scope for evasion compared with a retail sales tax levied at the same rate on sales, and it avoids the need for businesses and the revenue authorities to draw an "end user" distinction between the taxation of a firm's sales to final consumers and to other businesses.

For example, consider a simple chain of production consisting of two firms. Firm X makes sales of £30,000 to final consumers and no B2B sales. In the course of production, it uses inputs purchased from Firm Y at a cost of £10,000 plus VAT. Firm Y makes no sales to consumers and uses no taxed inputs; its entire £10,000 output is sold to firm X.

If the sales of both firms are subject to VAT at the UK standard rate of 17.5%, Firm Y will be liable for £1,750 in VAT on its sales to X. Firm X will be liable for output VAT of £5,250 on its sales of £30,000, but can offset the £1,750 tax paid on its inputs against this, giving a net VAT liability of £3,500. The VAT collected from Firm Y is thus, in effect, refunded to Firm X. Total VAT collected from the two firms taken together is £1,750 + £3,500 = £5,250, which is equivalent to 17.5% of the (tax-exclusive) value of the sales made to final consumers.

Where goods are VAT zero-rated, the seller charges a VAT rate of zero on its sales but is still entitled to credit for the input VAT paid. This can lead to negative VAT payments (i.e. refunds) where firms sell zero-rated goods but have standard-rated inputs.

For example, if the sales of Firm X in the above example are zero-rated, while Firm Y's sales are standard-rated, Firm X would charge no VAT on its sales and would be due a refund of the £1,750 VAT paid on its purchased inputs.

Where goods are VAT-exempt, the firm's sales are not subject to VAT but the firm does not have the right to reclaim the VAT paid on its inputs.

If Firm X in the example is selling VAT-exempt goods, it would charge no VAT on its sales but would not be able to reclaim the £1,750 VAT paid on the inputs purchased from Firm Y. Firm X's sales would thus indirectly bear some VAT, in the form of the VAT charged earlier on the inputs purchased from Firm Y. This VAT would 'stick', and the price at which Firm X makes its sales would need to reflect this input tax.

Despite its length, this chapter is selective rather than exhaustive. [__ It is also at this point incomplete: Further empirical work is planned, as are discussions of international services and distributional/incidence issues]. The focus, for the most part, is on the strategic design issues that we expect and/or hope to shape the development of indirect tax policy in the U.K., and the EU, in the coming years.

[__ Plan of paper]

II. THE ROLE AND DESIGN OF INDIRECT TAXES

One of the most striking changes in the structure of the UK tax system since Meade has been the shift from direct to indirect taxation, the latter meaning, for present purposes, the VAT and excises. In 1975, these together accounted for about 23.7 percent of total tax revenue; by 2004, they amounted to 30.7 percent. Looking within this total, however, it is reliance on the VAT, not indirect taxes in general, that has increased: while VAT revenue increased from 8.9 to 19.5 percent of total revenue over this period, that from the excises declined from 14.8 to 11.3 percent.³ This trend—the first and most dramatic step in which came with the first budget of the Thatcher government in 1979, which raised the basic rate of VAT from 8 to 15 percent and reduced the standard rate of income tax to 30 percent (from 30) and highest rate to 60 percent (from 83)⁴—to a large degree brought the UK closer to, rather than further from, the EU norm. It poses, nevertheless, two key questions for the design of the VAT and excises: What is the appropriate balance between direct and indirect taxation, and what is the best structure of indirect taxes?

A. The balance between direct and indirect taxation

The appropriate mix between direct and indirect taxes is one of the oldest issues in public finance: it was a key issue, for example in mid-Victorian politics, when the future—indeed

³ Revenue from income taxation also declined quite markedly relative to GDP, from 15.8 to 13.2 percent, as did that from excises, from 5.2 to 4.1 percent. (These figures are from *OECD Revenue Statistics*, 2006).

⁴ The standard rate of VAT was raised to 17.5 percent, its present level, in 1991. A reduced rate of 8 percent, mainly for domestic energy use but subsequently extended to other items, was introduced in 1994, and lowered to 5 percent in __.

survival—of the income tax remained in doubt.⁵ More recent and formal theory has brought relatively few additional insights. The most important, perhaps, is a recognition that, in principle at least, the balance is to some degree arbitrary, there being a broad similarity in terms of their impact on individuals' budget constraints—and hence, in the absence of some form of fiscal illusion, on their behaviour—between a uniform tax on consumption and a uniform tax on wage and profit income. This equivalence is especially clear for the value added tax, the base of which⁶—sales less intermediate inputs—is precisely the sum of wages and cash-flow profits. But it holds too for any form of tax on final consumption, so long as all commodities are taxed at the same proportional rate, as a simple consequence of the equality between the sources and uses of funds. This is immediately clear for a consumer who lives only one period and receives income only from these sources: for them, a tax of 20 percent on all the income they receive is equivalent to a 25 percent tax on everything they spend.⁷ In an intertemporal context, since the present value of consumption equals the present value of wage and profit income plus initial assets less bequests, the equivalence is somewhat more subtle: a uniform consumption tax, levied at an unchanging rate over time,⁸ is equivalent to a proportional tax on wage and profit income combined with a tax on initial assets and subsidy to bequests at the same rate.

The implication of this equivalence is that the shift towards indirect taxation in the U.K. has in part had effects equivalent to an increase in the rate of wage taxation (to some degree negating, in principle, one aspect of the reduced rates of income taxation) combined with—and all at the same rate—a cash flow tax on profit income, a lump sum tax on accumulated savings at the time of the increase (empirical studies in other contexts suggesting that this could have been a source of significant efficiency gain, but at the expense of the elderly) and an increased incentive to leave bequests (this impact being mitigated to the extent that taxpayers are altruistic and recognize that their heirs will themselves pay more tax on their own consumption). This is, of course, a move towards a form of expenditure tax, of the broad kind favored by the Meade report, but without the attention to distributional aspects, in both the progressivity of the tax itself and the taxation of bequests, to which it paid close

⁵ See for example Matthew (___), who notes that in his famous comparison of direct and indirect taxes to “two attractive sisters” to both of whom he felt it allowable to pay his addresses, Gladstone carefully did not say he felt obliged to pay them equal attention.

⁶ The discussion ignores differences that arise from the treatment of international trade on a destination basis.

⁷ The only reason these numbers differ is that income tax rates are conventionally described in tax-inclusive form (including the tax itself in the base) and VAT rates in tax-exclusive form (excluding it).

⁸ If its rate is expected to change over time (to increase, say), then a uniform consumption tax affects (reduces) the return on savings and so is in part equivalent to a (positive) tax on capital income.

attention.⁹ In this sense, the shift towards the VAT has been a victory for *Meade*, albeit one marred by the non-uniformity of the VAT to which we turn below.

These equivalencies also imply that the choice across these equivalent tax combinations can be driven largely by considerations of administration and compliance. And these can plausibly point towards the simultaneous deployment of taxes that would be entirely equivalent if enforcement were costless, as a means of diversifying enforcement risk. It may be optimal, for example, to deploy both a VAT charged only on sales by relatively large firms (excluding the smaller in recognition of a fixed element in compliance and administration costs) and a uniform wage tax levied by withholding: the latter capturing a large part of taxpayers' sources of funds, but perhaps relatively ineffective in reaching the self-employed, the former capturing a large part of the use to which income is put but not purchases from smaller firms. This point is stressed by Boadway and Pestieau (1994), who show that when some income escapes tax a uniform commodity tax—which would otherwise serve no purpose—has a positive role to play even when a fully nonlinear tax can be levied on wage income. Beyond this, however, it has received relatively little formal attention. The work of Slemrod and Yitzhaki (1987)¹⁰ provides a conceptual framework for determining the appropriate tax mix when enforcement is imperfect, requiring the marginal cost of public funds, defined to include both administration and compliance costs, to be equated across tax instruments. But it remains unclear, in practice, whether the balance currently struck in the U.K. is in any sense broadly appropriate. [__ To investigate/discuss further] These practical considerations also have implications for the form in which indirect taxes should be levied, an aspect of a wider question to which we now turn.

B. The structure of indirect taxes

There are broadly two aspects of this issue: the way in which commodities should be taxed, and the rates at which they should be taxed.

The starting point on the former is the Diamond-Mirrlees (1971) production efficiency theorem: in the absence of externalities and non-competitive behavior, and in the absence of restrictions on distorting tax instruments or the ability to levy firm-specific taxes on pure profits,¹¹ any Pareto-efficient tax structure has the feature that production decisions are left

⁹ Indeed the combination of a uniform (origin-based) VAT and a tax at the same rate on labor income (with some exempt amount) is precisely the Hall-Rabushka form on expenditure tax.

¹⁰ Recounted for this project by Slemrod, Whiting and Shaw (__).

¹¹ Pareto efficient tax structures from a worldwide perspective may also involve production inefficiency if there are constraints on the effective ability to make international lump sum transfers, but this generally calls for the use of trade taxes and so does not bear directly on the domestic indirect tax design; See Keen and Wildasin (2004).

undistorted. The intuition is simply that any distortion of production decisions reduces aggregate output, which cannot be a sensible thing to do so long as there is some useful purpose to which that output can be put. Strictly, the conditions required are unlikely to be met in practice. Externalities are an obvious concern, the key point being that commodities generating external effects should on this account be taxed at the same rate whether used as intermediate goods or as final consumption: the damage done by carbon emissions is the same, for instance, whether fueling industry or private travel. Excises—being charged without any crediting mechanism—are well-suited to perform this role, as discussed in Section V below. The other requirements of the Diamond-Mirrlees theorem are also inherently implausible as descriptions of reality, but—with one exception—the precise consequences of their failure appear to be sufficiently circumstance-specific, and the political risks from allowing special treatment sufficiently troubling, for production efficiency to remain the best guiding principle for practical tax design. This is arguably, indeed, the most useful result to emerge from the optimal tax literature.

The exception relates to informality, which implies a restriction on the set of distorting tax instruments available in the form of an inability to tax some transactions. As noted by Newbery (1986), in such cases it is generally desirable to tax inputs as a surrogate for the missing output tax. The point is of some importance, since it is this that provides the principal rationale for preferring an invoice-credit VAT to a single-stage purchase tax: under the former, but not the latter, a trader who fails to charge tax on their sales is at least charged tax on their inputs, and revenue thereby protected through being collected throughout the chain of production. This ‘fractional’ nature of the VAT is a feature stressed by its practical advocates (and threatened, as will be seen in Section IV, by some of the current proposals for dealing with carousel fraud), and a prime consideration in arguing, along the pragmatic lines above, for substantial reliance on the VAT within the tax mix. But while influential in practice, the strength of this case for the VAT has received little analytical or empirical attention. Keen (2005) notes, for example, that it will generally be optimal to tax informal sector inputs more heavily than formal sector outputs—in contrast to a single-rate VAT, which taxes them at the same rate—which points to the use of some creditable withholding tax or other supplement on sales likely to be to informal sector operators. And issues arise too concerning the potential formation of VAT ‘chains’: firms selling to firms registered for the VAT will have an incentive, for example, to register themselves in order to recover the tax they themselves are charged on this inputs (their output tax being creditable to their customer), an aspect often seen as helpful to enforcement of the VAT. By the same token, however, de Paula and Scheinkman (2006), point out firms selling to unregistered firms have an incentive not to register (or at least comply) themselves, since that would imply charging their customer VAT that will remain unrecovered. Where the balance of these considerations lies is as yet unclear. Such empirical evidence as there is on the performance of the VAT (in Keen and Lockwood (2006a, b) suggests, however, that it has proved an effective form of tax: countries with a VAT, especially higher income countries, tend to have higher tax

ratios—modestly, but significantly so—than those without, suggesting that the VAT has had the effect of reducing their marginal cost of public funds.

Turning to the second aspect, the key theoretical question—given the equivalences noted above between a uniform proportionate tax on all elements on final consumption and the combination of a proportionate tax on wage income and other items—is that of whether it is desirable to tax some goods more heavily than others. This has received substantial attention in the optimal tax literature. One key insight—following results of Besley and Jewitt (___), Diamond (___), Deaton and Stern (___) and Atkinson and Stiglitz (1976)¹²—is that the case for such rate differentiation is weaker the greater is the government’s ability to pursue its distributional objectives by other means, including, but not only, by taxing (or subsidizing) income. The central point here is that differential commodity taxation is a very blunt instrument for the pursuit of equity objectives, with the zero-rating of food and children’s clothing in the U.K. being a classic example. For while it is indeed the case that the less well-off spend a higher *proportion* of their income on these items, they are likely to spend a smaller *absolute* amount on them, so that most of the revenue foregone by the reduced rate accrues to the better off: one estimate is that of every £100 foregone by the zero-rating of food, £11.50 accrues to the poorest 20 percent of the population and £28.75 to the top 20 percent (IMF, ___). If there were no other way of transferring resources to the poorest, this might be sensible policy. But it is unlikely to be so when, as in the U.K., there are a range of other instruments—not only the income tax, but the Working Families Tax Credit and other benefits—that could be targeted more directly upon them: it seems likely that, by such means, more than £11.50 of the £100 raised by eliminating the zero-rating could be channeled to the poorest, making that a better way of pursuing equity goals. Kay and Davis (___) and Hemming and Kay (___) provided an early classic illustrations of this point for the U.K., the latter showing for example that the distributional impact of eliminating g zero-rating could be very largely offset by cutting the standard rate of income tax and increasing the tax threshold.

With sufficiently rich possibilities for income-related payments, the potential case for differential commodity taxation thus rests primarily on efficiency considerations. Broadly speaking—and the underlying formalities are sketched in Box 2¹³—differential commodity taxation then has a useful role to play only in so far as can be used to mitigate the adverse incentive impact of taxes on wage income. And this requires taxing most heavily those goods that are most complementary with (or least substitutable for) leisure. More precisely, denoting by $\mathbf{q}(\mathbf{p}, h, \mathbf{z}, x)$ the vector of uncompensated demands for consumption goods \mathbf{q} ,

¹² [___ brief detail].

¹³ The discussion there is based on, and the ‘mimicking’ intuition sketched here developed in, by Edwards, Keen and Tuomala (1994) and by Nava, Marchand and Schroyen (___)

defined conditional on hours worked h , post-tax income (equal to total spending) of x , and individual characteristics \mathbf{z} , the key quantity in shaping the Pareto-efficient indirect tax structure is the dependence of \mathbf{q} on h . If this is zero—as will be the case if the underlying direct utility function is of the form $U(A(q), h, z)$, weakly separable between commodities and labor—then all individuals with the same after-tax income will choose the same consumption bundle (separability ensuring that the marginal rate of substitution between any two commodities is independent of hours worked), implying that indirect taxes can do nothing to differentiate between individuals of different earnings capacity who choose to earn the same income: thus no purpose is served by differential commodity taxation, a seminal result due to Atkinson and Stiglitz (1976). If, on the other hand, $\partial q_j / \partial h < 0$, so that the conditional demand for some commodity i is higher for those with more leisure, then a tax on commodity j can dissuade those with potentially high earnings from ‘mimicking’ those with lower earnings capacity by choosing to work less hard. In this way it eases the disincentive effects of the overall tax system, and hence, with an appropriate restructuring of the non-linear income tax, enables all to be made better off without loss of revenue to the government.¹⁴ While these results apply only in quite special circumstances—translated into an intertemporal context, for example, the analytical structure presumes non-linear taxation of lifetime income¹⁵—it is nevertheless central to understanding the role of indirect taxes in commodity tax design, and we therefore examine the empirical evidence on this for the U.K. below.

Box 2. Indirect tax design with optimal direct taxation

[__ notation to be made consistent with text] The central insights on this issue from the optimal tax literature emerge in a simple framework in which there are only two people, with identical preferences $U(x, h)$ defined on their consumption x of each of N commodities, and their hours of paid work h , but differing in their earnings capacity as described by an hourly wage rate w . (Assuming identical tastes is strong of course, but the analysis can be thought of applying to subgroups of a wider population that are identified by demographic or other essentially invariant characteristics upon which their income tax treatment can be conditioned). Faced with consumer price Q , reflecting commodity taxes t and a non-linear income tax schedule defined on their earnings wh , each individual seeks to maximize their utility subject to the budget constraint

$$\sum_{k=1}^N q_k x_k = wh - T(wh). \text{ It simplifies matter to think of households choosing not } h \text{ but their earnings}$$

¹⁴ [__ Spell out mimicking intuition to construct a pareto gain]

¹⁵ Boadway and Pestieau (__) explore limits to, and extensions of, the Atkinson-Stiglitz (1976) theorem, one implication that follows from their analysis being, for instance, that if the common direct utility function is of the somewhat more general form $U(A(x, z_1), h, z_2)$, so that the subutility function for goods depends also depends on some subset of household characteristics, then differential commodity taxation is unnecessary only if the elements of z_1 are observable and tax payments made conditional on them.

$Y \equiv wh$, and define the conditional demand functions

$$x(q, Y, B, w) \equiv \arg \max_x [u(x, Y/w) \mid \sum_k q_k x_k = B] \quad (\text{B.1})$$

and associated indirect utility function $v(q, Y, B, w) \equiv u(x(q, Y, B, w), Y/w)$; for brevity, write

$v^i(q, Y, B) \equiv u(x(q, Y, B, w^i), Y/w^i)$ for that of the type i individual. The final ingredient in the government's optimization problem is the incentive compatibility requirement that the bundle it intends for each type is chosen only by that type. Assuming that redistribution is intended to be from the type with the higher wage rate, and that $w^2 > w^1$, the Lagrangean for the choice of a Pareto efficient tax structure can thus be written as

$$\begin{aligned} \Omega \equiv & v^1(q, y^1, b^1) + \delta v^2(q, Y^2, B^2) + \lambda \{v^2(q, y^2, b^2) - v^2(q, y^1, b^1)\} \\ & + \gamma \sum_{i=1}^2 (y^i - \sum_k P_k x_k^i(q, y^k, b^k) - R) \end{aligned} \quad (\text{B.2})$$

where δ , λ and γ are multipliers, respectively, in the constraint defining the Pareto problem, the self-selection constraint, and the requirement to raise some fixed amount of revenue R .

Differentiating with respect to the indirect tax rate on some good j , routine manipulations spelt out in Edwards, Keen and Tuomala (___) give

$$\frac{\partial \Omega}{\partial t_j} = \lambda \left(\frac{\partial \hat{V}^2}{\partial B_2} \right) (\hat{X}_j^2 - X_j^1) + \sum_{i=1}^2 \sum_{k=1}^n t_k \frac{\partial X_j^i}{\partial t_j} \quad (\text{B.3})$$

where the hat indicates a type 2 mimicking a type 1 and compensated conditional demands are denoted $X(q, Y, u, w)$. Since weakening the self-selection constraint eases the governments' problem, $\lambda > 0$, and the marginal utility of spending is of course also positive, starting from a situation in which the non-linear income tax is optimally chosen but commodity taxes are not deployed, a small tax on commodity j thus raises welfare if and only if $\hat{X}_j^2 > X_j^1$, so that a mimicking type 2 consumes more j than does a type 1 earning the same income. And since the only difference between these two is that the higher ability type 2 works fewer hours, taxing j will be desirable only if j is in this sense a complement for leisure.

If preferences are weakly separable, then the solution to (B.1) is independent of Y/w , and hence conditional demands of the form $\chi(q, B, h)$ estimated in the text are independent of h : there is then no gain from differentiating commodity taxes. More generally, if $\partial \chi / \partial h < 0$, then welfare is improved by a small tax on j .

Setting $\partial \Omega / \partial t_j = 0$, the optimal commodity tax structure is characterised by

$$\sum_{i=1}^2 \sum_{k=1}^n t_k \frac{\partial X_j^i}{\partial q_j} = \lambda \left(\frac{\partial \hat{V}^2}{\partial B_2} \right) (X_j^1 - \hat{X}_j^2) \quad (\text{B.4})$$

There is thus in general no simple relationship between the optimal tax on some commodity and its (compensated conditional) own price elasticity. If there are no cross-price effects, and taking a linear

approximation to $X_j^1 - \hat{X}_j^2$, (B.4) gives the simple rule

$$\frac{t_j}{q_j} = \theta \frac{(\partial \hat{\chi}_j / \partial h)}{\sum_i \varepsilon_j^i \chi_j^i} \quad (\text{B.5})$$

where $\theta \equiv -\lambda(h^1 - \hat{h}^2) > 0$ and ε_j^i denotes the compensated own price elasticity of demand for j , defined to be a positive number. Only in this very special case is the optimal rate on a commodity that ought to bear a heavy tax (in that $\partial \chi_j / \partial h > 0$) higher the less elastic is its own price elasticity.

It should be noted too that the condition which emerges from these results as identifying commodities as appropriate targets for differentially high commodity taxation in this framework—relative complementarity with leisure—is not the same as that commonly cited as one of the reasons for heavy taxation of the traditional excisable goods: a low own price elasticity. As shown in Box 2, it is only if all cross price effects vanish that this is the case; and even then it is not the simple Marshallian price elasticity, on which much of our intuition is trained, that is relevant, but that of compensated demands conditioned on consumer prices and total spending.

Further perspectives on the structure of optimal commodity tax structures is cast by recent contributions which have stressed that what is regarded simply as leisure in the standard framework—meaning time not sold in the labor market—may also be put to productive use in household production. In such settings, Kleven, Richter and Sorensen (____) and Piggott and Whalley (____) show, a case emerges for relatively low taxation of commodities that are close substitutes for such self-supply—which generally means such services as home improvement and repair—as a means of mitigating the unavoidable discouragement of market labor. Thus Piggott and Whalley (____) for example, report calculations suggesting that extension of the Canadian VAT to include such services may have been welfare-reducing. In somewhat similar spirit, Kleven (____) shows that in a Becker-type household production model—in which market goods are combined with household time to undertake activities upon which preferences are defined—optimal commodity tax rates are liable to be sensitive to patterns of time-intensity. Broadly speaking, the more time-intensive is the activity to which some commodity serves as input, the higher is the rate at which it should be attached—again pointing to relatively light taxation of services that can more readily be replicated at home than can, say, cigarettes. These models, it should be noted, are perfectly consistent with the standard framework that simply takes the enjoyment of time not in paid work and the consumption of marketed commodities to be the objects of choice, since this can be regarded as a reduced form of these (and other) more structured approaches. Their interest to some degree (most explicitly so in Kleven (____)) reflects doubt that the key quantities to which the standard theory points as being critical can be estimated with any confidence, so that sharper

if less general insights may ultimately be more instructive. Nevertheless, if the effects which these approach stress are empirically important, one would expect them to leave some trace in the data. In any event, the two approaches are better viewed as complementary rather than competing.

Supposing, in any event, a theoretical case for rate differentiation to have been established, further issues arise in its implementation. Applying the very large number of distinct rates to which theory might point clearly runs into implementation difficulties through the need to ensure that commodities are not misrepresented as liable to a lower rate than intended. One set of issues thus concerns the number of distinct rates to apply, and how to group commodities for this purpose.¹⁶ Further and distinct practical difficulties arise under the VAT, since multiple rates increase the reporting burden on traders (there being evidence that this effect is substantial)¹⁷ and, even if honestly applied in themselves, exacerbate control problems by increasing the likelihood that some traders (producing lightly taxed outputs from highly taxed inputs) will be entitled to refunds, an aspect of VAT implementation that all tax administrations have difficulty with. This is especially likely to be the case when—as with domestic zero-rating in the U.K.—the reduced rate is applied largely to final products.

C. Evidence

Although central in thinking about the design of indirect tax structures, the weak separability condition has rarely been tested empirically and nor, more generally, has there been much investigation of the structure of conditional demands which the theory suggests to be critical in designing indirect tax differentiation.¹⁸ The only study of which we are aware is that of Browning and Meghir (1991), who are able to reject weak separability with great confidence. This section revisits these issues by estimating a microeconomic demand system for the U.K., using the approach developed by Pollak (1969, 1971), Deaton (1981) and Browning and Meghir (1991) to estimate a conditional demand system of the form $\mathbf{q}(\mathbf{p}, h, \mathbf{z}, x)$ discussed above, the focus of interest being the sign of the derivatives $\partial q_j / \partial h$.

As an approach to the estimation of demand systems, the conditional approach has many econometric advantages (compared to full joint modeling of commodity demands and labour supply) are well known: it requires, for example, no specification of labor supply behaviour, is robust to ‘corners’ in the hours decision, and does not require the specification of the

¹⁶ The optimal partitioning of commodities into a fixed number of rate categories is analyzed by Gordon (___),

¹⁷ Cnossen (2003) reports that firms in the U.K. subject to more than one output VAT rate have more than twice the compliance costs of those subject only to one.

¹⁸

highly nonlinear budget set for hours (see Browning and Meghir (1991) for further discussion). The key attraction for present purposes, however, is that it speaks directly to the central relationships shaping optimal commodity tax structures. It is important to note, however—both in econometric terms and in drawing implications for tax design—that this conditional demand framework is embedded in a static model of household demand. We are not modeling intertemporal consumption or labour supply decisions (merely looking at the within period relationships). It is possible therefore that within period correlations between demands and labour supply are an expression of intertemporal decisions. A change in the employment risk facing individuals might, for example, cause precautionary saving and precautionary labour supply and this might give rise to within period correlations between hours and demands.

Implementing this general approach requires a suitable specification for the conditional cost function $c(\mathbf{p}, h, \mathbf{z}, u)$, and it is important that this be as flexible as possible. Initial attempts aimed at modelling consumer data based on economic theory, such as the linear expenditure system, tended to impose strong and hard-to-justify restrictions on the key elasticities (see, for example, Deaton (1974) and Creedy and Sleeman (2005)). One of the key developments in this literature has been the recognition that the variation in household incomes, in particular, is so great that it is especially important to capture income effects for households at different points in the income distribution in order to model demand responses properly. Work on demand models has therefore centered on the specification of theory-consistent Engel curves (the budget share/total expenditure relationship), with recent nonparametric and semiparametric evidence (such as that of Blundell, Chen and Kristensen (2003)) pointed out the strong nonlinearities of Engel curves displayed in consumer data. To allow for this, we estimate the Quadratic Almost Ideal Demand System (QAIDS) proposed by Banks, Blundell and Lewbel (1999), a rank 3 demand system which allows for quadratic Engel curves. Details of functional form and identification assumptions are spelt out in Box 3.

Box 3 Estimation method

The log conditional cost function for this demand system is given by:

$$\ln c(\mathbf{p}, h, u) = \left[\frac{b(\mathbf{p})}{\ln u^{-1} - \lambda(\mathbf{p})} \right] + \ln a(\mathbf{p}, h)$$

(the dependence on \mathbf{z} being dropped to avoid clutter). Note that the conditional variables relating to labour supply enter the price index $a(\mathbf{p}, h)$. The conditional budget share equation system for the QAIDS model is:

$$w_i^n = \alpha_i(h) + \sum_{j=1}^n \lambda_{ij} \ln p_j + \beta_i \ln \left[\frac{x^n}{a(\mathbf{p})} \right] + \frac{\lambda_i}{b(\mathbf{p})} \left\{ \ln \left[\frac{x^n}{a(\mathbf{p})} \right] \right\}^2$$

where w_i^n , x^n , p_j and \mathbf{p} denote, respectively, household n 's budget share for the i 'th good, household n 's available budget, the price of the j 'th good and the price vector of all goods (excluding leisure). The price indices are given by

$$\ln a(\mathbf{p}, h) = \alpha_0 + \sum_{i=1}^n \alpha_i(h) \ln p_i + \frac{1}{2} \sum_{i=1}^n \sum_{j=1}^n \gamma_{ij} \ln p_i \ln p_j$$

$$\ln b(\mathbf{p}) = \sum_{i=1}^n \beta_i \ln p_i$$

$$\lambda(\mathbf{p}) = \sum_{i=1}^n \lambda_i \ln p_i$$

In the estimation we imposed that $\sum_{j=1}^n \gamma_{ij} = 0$, $\sum_{i=1}^n \alpha_i = 1$, $\sum_{i=1}^n \beta_i = 0$, $\sum_{i=1}^n \lambda_i = 0$ and $\gamma_{ij} = \gamma_{ji}$ to ensure homogeneity, adding-up and Slutsky symmetry. The corresponding indirect utility function is

$$\ln V(x, \mathbf{p}, h) = \left\{ \left[\frac{\ln x - \ln a(\mathbf{p}, h)}{b(\mathbf{p})} \right]^{-1} + \lambda(\mathbf{p}) \right\}^{-1}$$

And, using the parameter estimates from the estimated share equations, the welfare effects of a change in prices arising from a hypothetical indirect tax reform can be calculated as $V(x, \mathbf{p} + \Delta \mathbf{p}, h) - V(x, \mathbf{p}, h)$, and, abstracting from government revenue considerations, the effect on social welfare of the price change is then

$$\Omega(V(x^1, \mathbf{p} + \Delta \mathbf{p}, h), \dots, V(x^N, \mathbf{p} + \Delta \mathbf{p})) - \Omega(V(x^1, \mathbf{p}), \dots, V(x^N, \mathbf{p}))$$

for some social welfare function $\Omega(\cdot)$.

Following Browning and Meghir (1981), we condition the demand system on hours of work and a variable reflecting household labour-force participation (the use of a participation variable is designed to proxy the fixed costs associated with work). Browning and Meghir (1991) use data only on couples and conditional separately on the hours and participation of each partner. We in contrast are using household data pooled over a number of different structures. As a result the hours variable reflects household level labour supply (total hours divided by the number of adults) and our participation variable is a count-variable for the number of workers in the household. Our model therefore has three potential endogenous variables: hours of work, the participation variable and total expenditure. Thus we need at least three identifying assumptions. Wages would seem to be a good instrument for hours, but since these are only observed for workers we follow Browning and Meghir (1991) instead use an education variable (average years of formal education in the household) since this is observed for all households in our data (after 1978). We use total household income to instrument total expenditure (as in Banks, Blundell and Lewbel (1999)). We also use an age variable (mean age of the adults in the household) and the number and mean ages of any children in the household. The full set of instruments are education, age, squared values of these, an interaction between education and age, total income and the number and mean ages of any children in the household: these are essentially the same instruments used in Browning and Meghir (1991) adapted somewhat to reflect our used of households other than couples. In what follows we use a GMM instrumental variables estimation procedure to account for endogeneity (see Blundell and Robin

(1999)) and also impose adding-up, homogeneity and Slutsky symmetry by means of minimum distance estimation. The other controls in the estimating equations (other than log prices, and log real expenditure and log real expenditure squared) are a full set of regional dummy variables, three quarterly dummy variables, variables reflecting the ownership of a number of durable goods, a dummy variable for household in receipt of old age pensions, and various measures of housing tenure. Since there are 20 equations with 46 variables in each, the results are quite extensive and we do not present them all here. Instead we consider two main areas: the effects of the labour supply variables and the price estimated elasticities. A full set of results is available from the authors.

The dataset used is a pooled sample of 22 years of the U.K. Family Expenditure Survey (FES) from 1978 to 1999. The FES is an annual cross-section survey of around 7,000 household. The commodity expenditure data in the FES are organised into 20 spending categories (listed after Table 1) broadly reflecting the differing tax-treatment of different goods and services. In all we have 154,565 observations spread over 22 years. The price data are compiled from monthly section indices of the RPI aggregated to correspond to the commodity groupings.

Table 1 reports the coefficients and standard errors on hours worked. The magnitudes of the effects of the labour supply variables on budget shares are generally modest, and are for the most part plausible. Food taken outside the home increases with hours worked, for example, while spending on domestic energy increases. More surprisingly, increased hours of work reduce public transport usage (though participation in itself increases it) whilst increasing private transport (petrol and diesel) And leisure good demand seems to increase with hours worked, perhaps because less time available for leisure increases the value of commodities that enhance it. Nevertheless, despite the fact that the effects seem to be small, they are all statistically significant (except for adult clothing). It is apparent—and confirmed by Wald tests—that weak separability is rejected in these data. But the empirical significance of conditioning on labour supply variables seems to be small, and our preliminary calculations suggest that, as a consequence, the welfare gains from differential commodity taxation are likely to be small.

Table 1: The effects of labour supply variables on commodity demands¹⁹

	Coefficient	T value
B&C	-0.00024	-64.43779
M&F	-0.00060	-49.38312
D	-0.00045	-66.57852
T&C	-0.00008	-29.35359

F&V	-0.00037	-53.05946
NVF	-0.00020	-28.12921
SVF	-0.00027	-40.26964
FO	0.00054	38.67790
B	0.00020	13.26873
W&S	0.00020	21.23016
T	-0.00026	-16.65799
DF	-0.00049	-30.11802
HG&S	0.00064	24.00745
AC	0.00000	-0.05394
CC	-0.00006	-8.75850
P&D	0.00046	35.74982
PT	-0.00006	-6.08257
LG	0.00018	9.22750
B&N	-0.00001	-1.95689

Key: B&C: Bread & Cereals; M&F: Meat & Fish; D: Dairy; T&C: Tea & Coffee; F&V: Fruit and Vegetables; NVF: Other Non-VAT foods; SVF: Standard VAT Foods; FO: Food out; B: Beer; W&S: Wine & Spirits; T: Tobacco; DF: Domestic Fuels; HG&S: Household Goods and Services; AC: Adult clothing; CC: Children's clothing; P&D: Petrol and Diesel; PT: Public Transport; LG: Leisure Goods; B&N: Books & Newspapers; LS: :Leisure Services.

Table 2 reports the mean uncompensated price elasticities (note that the estimated elasticities vary across households in the QAIDS model and that we have, here, reported the unweighted mean elasticities over the sample). We note that the estimates and hence the predicted behavioural responses to price changes are generally fairly inelastic with only six elasticities of greater absolute value than minus one.

Table 2: Uncompensated average price elasticities – conditional system²⁰

	B&C	M&F	D	T&C	F&V	NVF	SVF	FO	B	W&S	T	DF	HG&S	AC	CC	P&D	PT	LG	B&N
B&C	-0.9827	-0.0367	-0.0594	0.0924	-0.0597	-0.2262	-0.1753	-0.0621	0.167	-0.3047	0.0758	0	-0.028	0.0699	0.1295	-0.0058	-0.162		
M&F	-0.1184	-0.6191	-0.1186	0.0468	-0.069	0.3188	-0.6523	-0.2511	0.0795	1.0159	-0.1315	-0.0735	0.1131	0.31	-0.21	-0.1455	-1.0643		
D	-0.1274	-0.079	-0.9097	-0.0576	-0.1151	-0.1809	-0.0883	-0.3571	-0.0477	0.3349	-0.012	-0.1342	-0.0014	0.1903	0.4936	-0.0618	0.3643		
T&C	0.041	0.0065	-0.0119	-1.1956	-0.0217	-0.006	0.0031	-0.0366	-0.0742	-0.0746	0.0299	0.0766	0.0056	0.0691	-0.1184	0.0468	-0.2968		
F&V	-0.1182	-0.0425	-0.1063	-0.097	-0.9374	-0.0596	0.3217	0.0091	0.1401	-0.0277	0.0046	-0.0706	-0.0299	-0.0257	-0.5411	-0.1502	0.2961		
NVF	-0.3018	0.1321	-0.1124	-0.018	-0.0401	-0.1427	-0.0623	0.1439	-0.1601	-0.3014	-0.1111	-0.1613	0.1065	-0.5393	1.6479	0.0017	0.3944		
SVF	-0.2608	-0.3013	-0.0612	0.0104	0.2415	-0.0695	-0.8434	-0.0646	-0.0311	-1.0432	0.1947	-0.2868	0.2091	0.3669	0.4736	-0.0707	0.2465		
FO	-0.1493	-0.1874	-0.3999	-0.1983	0.0111	0.2593	-0.1043	-0.4277	-0.1566	1.3171	0.3025	0.0296	0.0604	-0.4987	-1.1548	0.3195	0.4714		
B	0.2801	0.0414	-0.0373	-0.2804	0.1186	-0.2014	-0.035	-0.1093	-1.5389	-1.2725	1.0116	0.0535	0.2173	0.2684	1.4264	0.3168	0.4103		
W&S	-0.2717	0.2813	0.1391	-0.1498	-0.0125	-0.2015	-0.6352	0.4886	-0.6764	-0.5272	0.6206	-0.1229	0.1068	0.0549	0.9522	0.3292	-0.2386		
T	0.1352	-0.0729	-0.01	0.1202	0.0042	-0.1486	0.2334	0.2245	1.0757	1.2415	-1.6868	-0.4403	-0.0558	-0.3789	-0.4929	0.1641	0.7389		
DF	0.0001	-0.1008	-0.2762	0.7619	-0.1574	-0.534	-0.8515	0.0544	0.1408	-0.6089	-1.0902	-0.4313	-0.0593	-0.3811	-0.6402	-0.1508	0.5366		
HG&S	-0.2287	0.2872	-0.0052	0.1026	-0.1234	0.6526	1.1493	0.2056	1.0591	0.9792	-0.256	-0.1097	-1.0144	-0.8788	0.4863	-0.9552	-0.9878		
AC	0.2198	0.3026	0.2788	0.4894	-0.0408	-1.2712	0.7753	-0.6524	0.503	0.1937	-0.6679	-0.2713	-0.3379	-1.1624	0.0102	0.4084	0.6363		
CC	0.0519	-0.0261	0.0921	-0.1068	-0.1094	0.495	0.1275	-0.1925	0.3407	0.4279	-0.1107	-0.0581	0.0238	0.0013	-0.4332	-0.0967	0.0773		
P&D	-0.0119	-0.0935	-0.0596	0.218	-0.1568	0.0026	-0.0984	0.2751	0.3908	0.7641	0.1903	-0.0706	-0.2418	0.2688	-0.4992	-1.2555	0.343		
PT	-0.1303	-0.266	0.1366	-0.5379	0.1202	0.2379	0.1333	0.1578	0.1968	-0.2154	0.3334	0.0978	-0.0972	0.1629	0.1553	0.1334	-0.9088		
LG	0.2859	-0.2866	0.0855	-0.7778	0.098	0.3441	-0.5802	0.762	-0.6812	-0.531	0.6117	0.1442	-0.2377	0.7019	-1.0063	-0.2268	0.2536		
B&N	0.333	-0.0753	0.0629	-0.0817	-0.0143	-0.053	0.8796	-0.2034	-0.3004	-0.2404	0.1718	0.1076	0.0643	-0.2411	-0.5393	-0.0883	-0.2907		

²⁰ Key: B&C: Bread & Cereals; M&F: Meat & Fish; D: Dairy; T&C: Tea & Coffee; F&V: Fruit and Vegetables; NVF: Other Non-VAT foods; SVF: Standard (17.5%) VAT Foods; FO: Food out; B: Beer; W&S: Wine & Spirits; T: Tobacco; DF: Domestic Fuels; HG&S: Household Goods and Services; AC: Adult clothing; CC: Children's clothing; P&D: Petrol and Diesel; PT: Public Transport; LG: Leisure Goods; B&N: Books & Newspapers; LS: :Leisure Services.

LG	0.1396	-0.4508	0.0897	-0.1687	0.0949	0.2242	-0.4216	0.8946	-0.5581	-0.2312	0.5329	0.311	-0.949	1.0779	-0.197	-0.2292	0.0997	-0.954	0.1701
B&N	0.3071	-0.2237	0.1245	-0.0335	-0.0262	-0.0652	1.2069	-0.4509	-0.4647	-0.1977	0.2826	0.4385	0.4848	-0.699	-0.1993	-0.1685	-0.2157	0.3211	-0.8845

We have also calculated (but for brevity do not report) the estimated price elasticities for a demand system which does not condition on the labour supply variables. The difference—and here the results differ from those of Browning and Meghir (1991)—is small,²¹ again suggesting little gain from differentiation.

D. Assessing key parameters of the VAT

Table 2 provides a comparative perspective on the U.K. VAT, providing comparative information on key design characteristics for all OECD countries (other than the U.S., which of course does not have a VAT).

²¹ The average absolute difference is 0.042, which is not significant at 95 percent.

Table 2. VAT Rates, Revenues and C-Efficiency in the OECD, 2005

	Standard Rate	Reduced Rates	Threshold /12	C-Efficiency -2003
Australia	10.0	Zero 1/	36,496	53.0
Austria	20.0	10.0; 12.0 2/	24,229	52.9
Belgium	21.0	6.0; 12.0; Zero 1/	None	42.9
Canada	7.0	Zero 1/ 3/	23,622	66.5
Czech Republic	19.0	5.0	68,493	38.9
Denmark	25.0	Zero 1/	5,910	51.6
Finland	22.0	8.0; 17.0; Zero 1/	9,081	52.9
France	19.6	2.0; 5.5 4/ 5/	85,061	45.3
Germany	16.0	7.0	18,637	50.5
Greece	18.0	4.0; 8.0 6/	12,912	51.5
Hungary	25.0	5.0; 15.0	None	41.3
Iceland	24.5	14.0; Zero 1/	2,442	49.2
Ireland	21.0	4.8; 13.5; Zero 1/	50,495	55.5
Italy	20.0	4.0; 10.0; Zero 1/	None	38.2
Japan 7/	5.0	-	75,188	65.3
Korea	10.0	Zero 1/	None	68.9
Luxembourg	15.0	3.0; 6.0; 12.0	10,163	68.2
Mexico	15.0	Zero 1/ 8/	None	30.4
Netherlands	19.0	6.0	None	51.9
New Zealand	12.5	Zero 1/	26,846	96.4
Norway	25.0	7.0; 11.0; Zero 1/	5,274	52.5
Poland	22.0	3.0; 7.0; Zero 1/	10,580	40.2
Portugal	19.0	5.0; 12.0 9/	None	53.7
Slovak Republic	19.0	-	87,209	44.6
Spain	16.0	4.0; 7.0 10/ 11/	None	50.1
Sweden	25.0	6.0; 12.0; Zero 1/	None	47.3
Switzerland	7.6	2.4; 3.6; Zero 1/	42,373	71.7
Turkey	18.0	1.0; 8.0	None	56.5
United Kingdom	17.5	5.0; Zero 1/	93,700	46.4
Average	17.7			52.9

Source: OECD, *Consumption Tax Trends* 2006 edition.

1/ 'Domestic zero rate' means tax is applied at a rate of zero to certain domestic sales.

2/ Applies in Jungholz and Mittelberg.

3/ The provinces of Newfoundland and Labrador, New Brunswick, and Nova Scotia have harmonized their provincial sales taxes with the federal Goods and Services Tax and levy a rate of 15 percent. Other Canadian

provinces, with the exception of Alberta, apply a provincial tax to certain goods and services. These provincial taxes apply in addition of GST.

4/ Applies in Corsica.

5/ Applies to overseas departments excluding French Guyana.

6/ Applies in the regions Lesbos, Chios, Samos, Dodecanese, Cycladen, Thassos, Northern Sporades, Samothrace and Skiros.

7/ Central government taxes only.

8/ Applies in the border regions.

9/ Applies in Azores and Madeira.

10/ Applies in the Canary Islands.

11/ Applies in Ceuta and Melilla axes on specific goods and services.

12/This is the general threshold. Some OECD members apply a lower threshold to services.

Rate structure and exemptions

The U.K. VAT is marked by extensive domestic zero-rating, including notably of foodstuffs, childrens' clothing and residential construction. A reduced rate of 5 percent is also applied to domestic power and energy, and a range of other items (such as contraceptives, certain energy-saving products, and children's car seats). All this removes about 14 percent of consumer expenditure from the VAT base (12 points of this though zero-rating).²² The effect of this, combined with the exclusion of another 31 percent as a consequence of exemptions,²³ is that C-efficiency in the U.K.—the ratio of VAT revenues to the product of the standard rate and private consumption, which would be 100 percent for a textbook VAT levied at a uniform rate on all consumption (and comes close to that in New Zealand)—is very low by OECD standards.

It has been recognized for more than twenty years that the policy rationale for domestic zero-rating in the U.K. is extremely weak: and theoretical and empirical developments since, as reviewed above, have only confirmed this. The survival of zero-rating of food and childrens' clothing appears simply to reflect politicians' doubts of their ability to explain why a package involving its removal need not have a regressive impact. The zero-rating of residential construction is less often commented on, and is not reflected in the empirics above, but is a potentially significant distortion towards investment in housing of a kind that the U.K., to its credit, has counteracted by eliminating mortgage interest deductibility. Here the fear may be of increasing house prices to new buyers (owners of existing property would receive a

²² Adam, Browne and Heady (2006).

²³ VAT exemptions earlier in the production chain tend to increase revenue rather than reduce it, of course, to the extent that later stages are fully taxed (since the input tax into the exempted production enters unrecovered into the tax base at the next production stage).

windfall gain). This might be addressed, however, by providing some form of grant to first-time buyers, as Australia did when introducing its VAT in 2000.

The rationale for the reduced rate is also far from clear: to the extent that its original purpose is to mitigate ‘fuel poverty,’ such measures as the additional winter allowance or pensions provide reasonably well-targeted relief (though a strong case could be made for an element of income-relation). Indeed, there is some perversity in applying the reduced rate to both energy use and purchases of some energy-saving materials. The deeper issue here is the proper design of energy taxes, and similar mechanisms, such as cap-and trade systems along the lines of the EU Emissions Trading Scheme, to address environmental and other non-revenue concerns (such as supply security). With these in place, there would be little case for differential treatment of final energy use; and without them, as at present, it is hard to make a case for rates on final use that are actually lower. Experience with this lower rate, into which an increasing and diverse number of items have been moved, also illustrates the further general experience that preferential treatment, once granted, tends to spread, and that in doing so the wider coherence of the tax system suffers. Quite why parents should pay no VAT percent when they buy their children clothes but 5 percent when they buy them a car seat is by no means clear.

Indeed in a broader sense the extensive rate differentiation still found in the VATs of EU members is coming to look increasingly quaint. Most new VATs adopted in recent years have a single rate: not only in Australia and New Zealand, but also in developing countries, where the policy case for a single rate is weaker. Others, it seems, have learnt lessons from the EU experience that EU members themselves have not.

The VAT exemptions in the U.K. are less contentious, being largely standard by international norms.²⁴ Or, more precisely, they are standard by EU norms. For, as Cnossen (2003) notes, another respect in which the EU VAT design is now showing its age is in the range of exemptions for such items as government services, health and education. The newer VATs, of Australia and New Zealand, for instance, bring these more fully into tax and so mitigate the distortions—the incentive for public bodies to self-supply rather than contract out, for example—that exemption, which is intrinsically abhorrent to the logic of the VAT, creates.

One central outstanding issue—for the EU as a whole—is the VAT treatment of financial services charged for other than as a fee. These are generally exempt (except those provided outside the union, which are zero-rated), reflecting the conceptual difficulty of allocating the value added to the two ultimate sides of the transaction (as is needed if the crediting mechanism is to work properly). This is not necessarily a source of revenue loss—VAT collected on inputs could exceed that corresponding to the revenue of financial services

²⁴ OECD ().

enjoyed by final consumers. But exemption leads to structural difficulties: cascading, as unrecoverable VAT is embedded in the purchases by registered taxpayers; a bias towards self-supply by financial institutions; and administrative and compliance burdens from the need to allocate input VAT between exempt and taxable activities. It seems likely that better systems can be found. Conceptually, recent work has shown that cash-flow forms of VAT—bring gross financial flows into and out of financial institutions—achieve an allocation of value added consistent with the invoice-credit method, a possibility that the European Commission has shown interest in. In practice, some of the more modern VATs, notably those of Australia and Singapore, experiment with forms of extended zero-rating that ease some of the key inefficiencies.²⁵ This is an area in which there is evidently scope for improvement.

The U.K., notably, has not taken up the temporary option under current EU rules to apply reduced rates to specified labour-intensive activities. Such rate reductions can be defended in principle on optimal tax grounds in terms of the arguments cited above for relatively low taxation of services readily self-supplied by consumers [___Sorensen] . Against this, of course, they carry the administration and compliance burden associated with increasing the extent of rate differentiation. And a recent assessment by the European Commission (___) is skeptical as to the effectiveness of such provisions in increasing formal sector employment. It is difficult to make a compelling case that the U.K. has made a mistake in not taking up this option.

The threshold

At £61,000, the VAT threshold in the U.K.—the level of turnover at which registration for the VAT becomes compulsory—can be seen from Table 3 to be the highest in the OECD. Moreover, there is also evidently massive variation in VAT thresholds, some countries having none at all. The natural question then being whether it is too high.

Since any threshold distorts competition between those above and below it, the only rationale for excluding smaller businesses from the tax is to save administration costs to the authorities and compliance costs to the taxpayer. For a benchmark case in which these costs, A and C respectively, are independent of firm size, Keen and Mintz (2004) show that trading off the implementation costs saved and the revenue foregone by excluding some from the VAT implies an optimal VAT threshold of:²⁶

²⁵ For an account of the issues, and of recent theoretical and practical advances, see Zee (___) and Boadway and Keen (___).

²⁶ The underlying intuition is simple [___]

$$z^* = \frac{\delta A + C}{(\delta - 1)\tau v} \quad (1)$$

where δ denotes the marginal cost of public funds, τ the rate of VAT and v the ratio of value added to turnover. Supposing, for illustrative purposes, that the marginal cost of public funds is 1.2, administration and compliance costs £120 and £600 respectively,²⁷ then with a VAT rate of 17.5 percent and a ratio of value added to sales of 30 percent, the implied VAT threshold is about £57,000—less than at present, but a similar order of magnitude. Lower values of the marginal cost of public funds, of implementation costs, or of the ratio of value added to sales, would give figures closer to the actual. And it is quite sensitive to the parameter choices: changing the marginal cost of public funds to 1.5, for example, the optimal threshold falls to around £30,000. What does emerge, however, is that it is not difficult to rationalize VAT thresholds at the relatively high level found in the U.K.

The simple rule in (1) is not only subject to considerable parameter uncertainty, but also ignores, of course, many potentially important considerations. Implementation costs are likely to vary with firm size, for example, and account must also be taken of the inefficiencies created by distorting competition between firms of different size and potentially inducing artificial splitting to remain below, or simply discouraging expanding firm size above, the threshold.²⁸ These significantly complicate the analysis, with the distribution of firm size, for example, playing an important (and theoretically ambiguous) role. Simulations by Keen and Mintz (___), however, tend to point to thresholds optimally higher than that implied by (___); the somewhat different model of the determinants of firm size in Zee (___), on the other hand, points in the opposite direction.²⁹ Further considerations, awaiting closer analysis—such as the propagation of beneficial VAT chains of the kind described above—may point to lower thresholds. But others, such as the need to control registration as a defence against carousel and other fraud (as discussed below) point to

²⁷ A recent study of tax compliance costs in the UK by KPMG (___) implies an average VAT compliance burden per registrant of £562 (combining figures in tables 3 and in section 3.3.4). Another for New Zealand (___) implies a cost in terms of internal time alone (so neglecting bought-in advice and equipment) of around £660 (though varying fairly substantially, if not entirely systematically, with firm size). It seems unlikely that it is cheaper to comply with the relatively complex U.K. than with the simpler one in New Zealand, so that £600 seems a reasonable order of magnitude. Earlier estimates by Cnossen (___) suggest administrative costs of around 20 percent of compliance costs: hence the £120 figure.

²⁸ KPMG (___, Annex C p.4) report that some firms interviewed indicated a deliberate decision to keep their size below the VAT threshold.

²⁹ Both Keen and Mintz (___) and Zee (___) have firms differing in underlying productivity, the former have them producing a homogeneous product whereas the latter has them producing Dixit-Stiglitz substitutes. Dhaarmapala and Slemrod (2006) explore the same issue in a model with endogenous entry and exit; the likely quantitative implications for the optimal threshold, however, remain to be analysed.

higher. The relatively high threshold, it seems, should be counted as a strength of the U.K. VAT.

The role of the EU

Common EU rules, summarized in Box 2, impose constraints on VAT design in the U.K., in terms of both broad design and rate structure. Originating in the desire to ensure transparently tax-free treatment of trade, the extent of VAT coordination is in some respects hard to explain. No doubt it reflects in part the decision to use a common notional VAT base as the basis for one of the own resources by which the union itself is financed, since this requires a commonality of definition. The minimum tax rates have some rationale in principle as a defence against mutually damaging tax competition, with member states facing some incentive to steal tax base by attracting cross-border shopping and/or the provision of international services to final consumers taxable by the suppliers' place of location. Such concerns generally more pressing in relation to easily transported and heavily taxed excisable products, however, as discussed below. And indeed only one member state—Luxembourg—currently sets its standard rate at the minimum of 15 percent, suggesting that if this tax competition in relation to VAT is a problem within the EU then the current rules do little to address it.

Box 4. EU rules on the value added tax

The common VAT rules, with the 1977 Sixth VAT Directive at their core and recently consolidated in directive 2006/112/EC, establish broad commonality in definitions on such core matters as taxable person, taxable event, and place of supply, and requires various exemptions.

With the adoption of the internal market in 1992, and fear that the removal of internal fiscal controls would out downward pressure on VAT rates, member states agreed not to set their standard VAT rate lower than 15 percent (a provision recently extended to 2010). Member states may set no more than two reduced rates: at no less than 5 percent on a positive listing of (annex III) items and, on condition that competition is not distorted—in effect restricting the application to final sales, on use of electricity, natural gas and district heating..

As transitional provisions—until the adoption of a definitive regime for the taxation of intracommunity trade, for which no date is set—member states are allowed to retain a variety of otherwise prohibited measures that were in place at the start of 1991: ‘super-reduced’ (including zero) rates applied for social reasons—by which means the domestic zero-rating in the U.K. survives—rates of less than 5 percent on Annex III items, and a reduced rate of no less than 12 percent (the ‘parking rate’) on non-annex III items. Many of the new EU members, of course, did not have a VAT in place at this date, and so are unable to benefit from this provision: they are required to be fully compliant by 2100 at the latest: Malta, for example, must by then remove its zero-rating of foodstuffs and pharmaceuticals, though there is no similarly unconditional obligation on the U.K.

Member states may also apply (until the end of 2010) a reduced to no more than three specified labour-intensive services (such as hairdressing, domestic service and the renovation and repair of private dwellings).

Indeed EU rules may appear in practice to have imposed few effective constraints on VAT policy in the U.K. There are evident exceptions, such as the recent rejection of proposals to extend reverse-charging. But the central features of extensive zero-rating and the reduced rate have not been prevented, and the minimum standard rate does not bind. It may be, however, that these rules have provided a useful check on further deterioration of the VAT base: in their absence, zero-rating might have expanded, the reduced rate might have been set below 5 percent, and exemptions might have multiplied. And it could be that the evident asymmetry in the treatment of new and old members noted in Box 4, likely to become more pronounced towards 2010, will facilitate action on zero-rating and the reduced rate. But EU rules may also have prevented some improvements in the U.K. VAT, not least in relation to the exemptions. For one implication of commonality is a restriction on the scope for experimentation, on reverse charging, for example, and the taxation of financial services.

III. INDIRECT TAX SYSTEMS

A. VAT versus Retail Sales tax

Levied at the same rate, a perfectly functioning VAT collects the same revenue, and imposes the same charge on final sales, as does a perfectly functioning retail sales tax (RST), albeit with different timing. Implementation costs aside, they are then economically equivalent, as the stylized example in Box 2 illustrates. What then is the particular merit of the VAT?

Box 2: Equivalence of VAT and RST—when they both function perfectly

Consider the application of VAT and RST to a simplified chain of production, with one intermediate goods producer, selling all its £10m output to a single producer of final consumption goods, which in turn sells all its £15m output direct to the public. With a 20 percent rate of VAT, total revenues collected are £3m—the same as would be collected from a 20 percent RST rate applying to final sales. The one difference revealed by the example is in the timing, some of the VAT revenue being collected at an earlier stage in the chain of production, with a potential cash flow gain for the government.

	Intermediate goods producer	Final goods producer
Value of sales to final consumers	0	£15m
Value of sales of intermediate goods	£10m	0
Value of purchased inputs	0	£10m
<i>VAT at 20 percent:</i>		
VAT on sales ("output VAT")	£2m	£3m
Input VAT credit	0	£2m
Net VAT due	£2m	£1m
<i>RST at 20 percent:</i>		
RST on retail sales	0	£3m

The answer must lie in the differential challenges for administration and compliance that they imply, and in the opportunities and incentives for evasion that they create. In administrative terms, the number of firms to be controlled may be greater or less than under an RST: it will be greater in that all types of businesses, not just retailers, are brought into the tax, but less to

the extent that VAT systems are typically able to exclude many small firms from the system, by means of a registration threshold, without major revenue losses. The key feature of the VAT that allows it to exempt smaller firms from the tax is that, as stressed above, revenue is protected under the VAT by being levied at each stage of production: if the final seller is not taxed, all revenue is lost under an RST, but under a VAT only the tax on that trader's own value added is lost (so long as VAT has been properly collected throughout the preceding production chain).

Some enthusiastic advocates of the VAT go further, suggesting that the VAT is 'self-enforcing' in the sense that each trader has an incentive to ensure that its suppliers have themselves properly paid VAT, in order that they themselves can then claim an appropriate credit.³⁰ There is an element of truth in this. Certainly businesses registered for VAT can gain nothing by purchasing inputs on an untaxed, undocumented basis, since they are in any event able to claim credit or refund for tax so paid. Moreover, there is an important sense in which the VAT is self-correcting, if not self-enforcing: if for some reason a supply to some registered trader escapes VAT, the missing VAT will be recovered in the VAT charged on the sales by that trader, since there will in that case be no credit to offset against their liability. For all these reasons, traders selling to other businesses may indeed wish to register to charge the VAT even if their annual turnover is below the threshold at which VAT registration is mandatory, and indeed arrangements for such voluntary registration are a key part of any well-designed VAT. But the strength of these intrinsic features of the VAT should not be over-stated. It remains the case that sellers of final goods to private individuals and businesses not registered for VAT have similar incentives to sell without tax as under an RST, or in other sales tax systems, albeit muted to the extent that they bear VAT on their own purchases. And, as noted earlier, enterprises selling to others determined not to register for that themselves have an incentive not to register. Moreover, while traders do indeed have an incentive to ensure that their suppliers provide them with an invoice that the authorities will accept as establishing their right to refund or credit, they have no incentive—unless specific requirements to this end are imposed—to ensure that tax has actually been paid, a point to which we return later. Furthermore, the credit and refund mechanism of the VAT creates its own opportunities for fraud, as we discuss later.

³⁰ At the opposite extreme, it is also sometimes claimed that the ability to cross-check invoices—verifying that every credit claim is matched by some payment of output tax—can make the VAT especially abuse-proof. While there is again an element of truth in this—invoices do indeed provide a useful trail for VAT auditors—this too can be overstated. Even with the developments in information technology in recent years, systematic massive cross-checking of invoices remains, at least for the present, effectively impossible.

B. Enforcement and compliance aspects

Like all taxes, VAT is subject to evasion. For example, traders may fail to register for the tax, they may under-report sales or, where different goods are subject to tax at different rates, they may reduce their tax payments by misclassifying sales into the category subject to a lower rate (or zero rate) of tax. In some respects, the particular structure of VAT may reduce its exposure compared with other systems of sales taxation. In particular, the gradual cumulation of the tax at each stage of the chain of production and distribution may reduce the amount of tax at stake at each stage, and hence the gains to be made from making untaxed sales. This does not make the VAT ‘self-enforcing’, as some have claimed, but it does reduce its exposure to evasion compared with alternative single-stage sales taxes levied at a comparable rate, such as the retail sales taxes common in the US.

In other respects, however, VAT offers distinctive opportunities for evasion and fraud, especially through abuse of the credit and refund mechanism. Revenue may be lost through exaggerated claims for credit for VAT paid on inputs to production. Moreover, the opportunity exists for outright fraud through the construction of business activities with the sole purpose of defrauding the exchequer, because some categories of business can be entitled to net refunds of VAT from the revenue authorities. These include firms selling predominantly zero-rated goods while claiming credit for significant amounts of VAT paid on standard-rated production inputs. While zero-rated domestic sales can create opportunities of this sort, the main point of vulnerability in the current system arises because of the VAT zero-rating of exports. The level of VAT refunds can be a high proportion of gross VAT receipts, refunds amount to about 40% of gross VAT receipts (Harrison and Krellove, 2005).

‘Missing trader intra-community’ (MTIC) frauds, of which ‘carousel frauds’ are the best-known example, exploit the refunding of VAT to exporters by means of a series of contrived transactions. Figure 3.2 provides a simple example; in practice, many layers of additional complexity are commonly added in order to obscure the fraud. The two key features of the VAT that are exploited in the carousel fraud in Figure 3.2 are the zero-rating of exports and the system of ‘deferred payment’ for VAT on imports, adopted in the EU since the removal of fiscal frontiers in 1992.³¹ Under deferred payment, VAT on imports from one member state into another is levied not at the border but at the time of the importer’s next periodic VAT return. As a result, there may be a considerable time lag between the date at which the importing firm (Company B in the example) brings the goods into the U.K. and the time at which the VAT authorities seek payment of the VAT due. In the meantime, the goods are sold on, via complicit—or perhaps unwitting—‘buffer’ companies in the UK, to Company D,

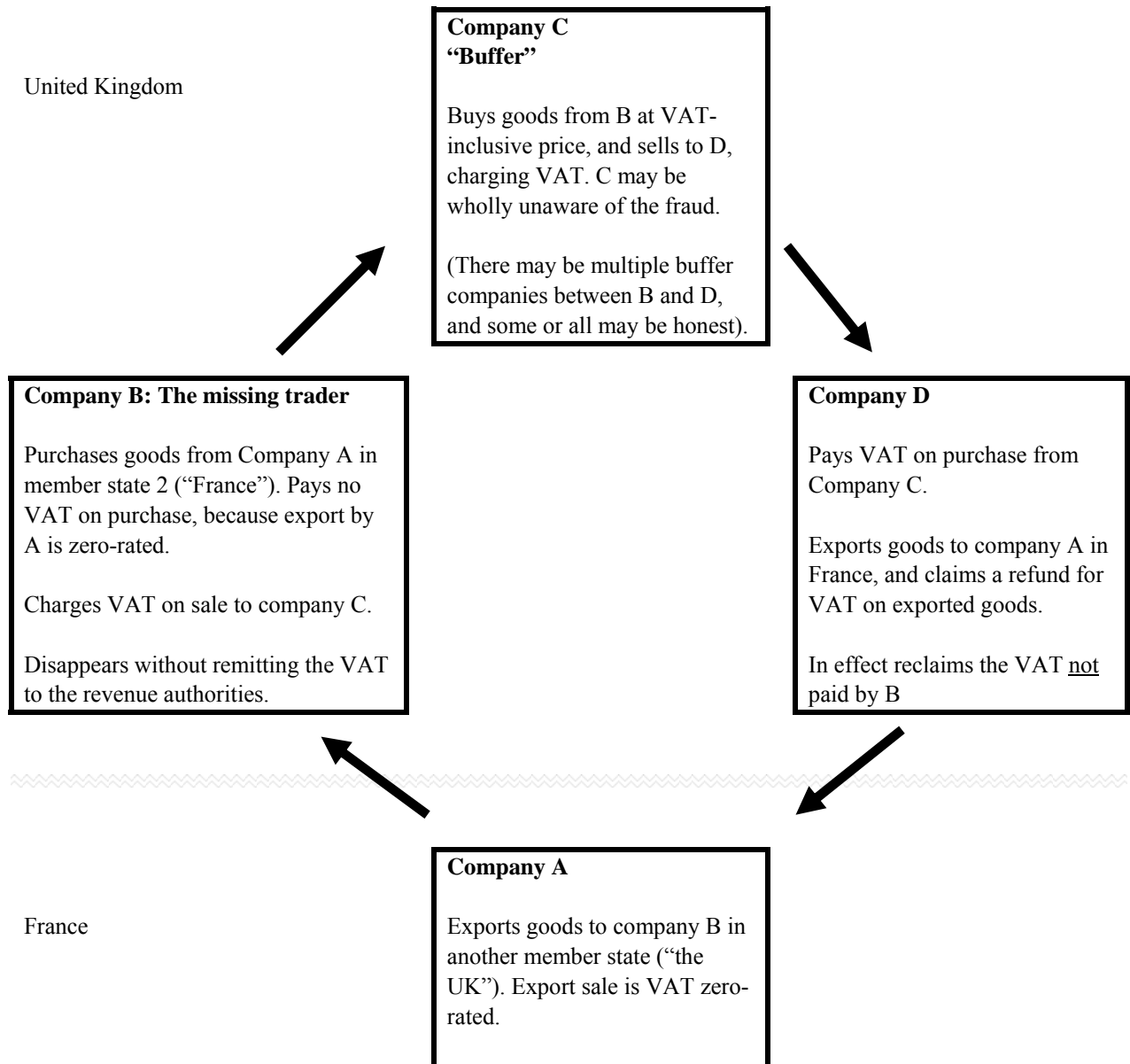
³¹ There are indications that the general level of VAT revenue losses rose by about one-third by the mid-1990s compared with pre-1992 levels (see Table 2.1 of HM Customs and Excise, *Measuring Indirect Tax Losses*, 2002, <http://www.hm-treasury.gov.uk/media/389/E5/admeas02-297kb.pdf>). It is unclear what has sparked the recent sharp growth in organised, large-scale fraud.

which exports the goods, claiming a refund of the VAT that it paid when it purchased the goods from Company C. In the basic carousel illustrated, the exported goods are then re-imported by Company B—or more likely a new firm, B having gone missing—and so on, following a cycle in which VAT refunds are claimed repeatedly whenever the goods are exported, while the corresponding import tax liability accumulates but is never paid.

As noted above, the basic structure of the fraud may be concealed by further complications. Indeed, innovation has been a constant feature of these forms of fraud, as those perpetrating them seek to stay one step ahead of the authorities' ability to detect fraudulent transactions.

The problems for enforcement are compounded by the difficulty of identifying which of the traders are actively and knowingly involved. With the exception of the key player, the eventual missing trader, and the exporter, to whom the financial benefit of the fraud accrues in the form of VAT refunds, the other participants need not be knowingly involved in the process. Some may have their suspicions, and some may be more actively engaged, for example, in adjusting prices so as to transfer the benefit of the VAT refunds to other players in the carousel.

Figure 1. Carousel fraud - a simple illustration



Key design features of the VAT system influence the extent to which it is exposed to systematic missing trader frauds. Many of these, such as the stylised carousel fraud illustrated in Figure 3.2, exploit opportunities provided by the VAT zero-rating of exports to

claim fraudulent refunds for contrived transactions, while at the same time failing to pay VAT due on imports. Aspects of the VAT system that affect the scope for profitable carousel fraud include the extent to which the system allows intending missing traders (such as Company B in Figure 3.2) to register for VAT, and the relative timing of VAT payments and receipts. These design features play a critical role in allowing or preventing revenue loss through carousel fraud. *Ex post* audit and investigation, while important, is unlikely to forestall considerable loss of revenue, because the essence of the fraud is that money is made quickly, in the time gap before the missing trader is required to remit the VAT it has supposedly charged on its sales. Once the money has disappeared into the complex web of transactions, tracing and recovering unjustified VAT refunds becomes time-consuming and costly.

Other than more vigorous investigation, two broad approaches may be taken to designing-out the opportunities for carousel fraud within the VAT system. One is essentially administrative, in the sense that it retains the zero-rating of intra-community supplies. The other, more fundamental to the structure of the tax itself, removes export zero-rating altogether.

Measures that could be taken within the context of the existing system include, for example: tighter checks on firms seeking to register for VAT (for example, with an on-site visit) and requiring guarantees in dubious cases; slowing down the payment of VAT refunds relative to the collection of VAT due (although this can impose severe cash-flow burdens on legitimate businesses); adopting or strengthening joint and several liability rules by which traders can be held responsible for fraud elsewhere in the chain that they might reasonably have been expected to be aware of; and establishing better and quicker information exchange between national tax authorities (so that the country of import can become promptly aware that exports to it that have been reported in another member state have not shown up in its own VAT system). However, while measures of this sort may reduce the risk of VAT fraud, they clearly have undesirable side-effects. More bureaucratic VAT registration procedures and slower payment of VAT refunds might harm legitimate businesses as well as discouraging fraud, for example, and these effects may outweigh the enforcement gains. The authorities have a difficult balance to strike, between ensuring that VAT administration does not impose excessive burdens on business in general and ensuring that it is not unduly exposed to fraud. Some level of VAT evasion has to be tolerated in the wider business interest.

More radical measures within the context of a system that preserves zero-rating include:

- i) The use of ‘reverse charging’, by which liability in a business-to-business (B2B) transaction is placed on the buyer rather than the seller. This would deal effectively with the carousel fraud in Figure 3.2, because the VAT due on the sale by B (the missing trader) would become the responsibility of the buyer, C. In turn, the tax due on the sale from C to D would be the responsibility of D. The zero-rating of the subsequent export sale would then offset D’s tax liability on its purchases from C, reducing the tax payment by D but not requiring outright refunds. The opportunity to


make fraudulent gains by claiming refunds of tax that have not in fact been paid would thereby be eliminated. Last year, the UK proposed applying reverse charging for mobile phones, computer chips and other particular goods that have proved popular instruments for carousel fraud, but member states have yet to agree on whether this should be permitted. More radically still, Austria and Germany have proposed allowing reverse charging for all B2B transactions above a certain size (€10,000 in the case of the Austrian proposal and €5,000 in the German proposal). The proposals differ in terms of the scale of the reporting obligations placed on firms and their customers: the German proposal would require both parties to a B2B transaction to report it to the tax authorities, and electronic cross-checking of this information, while the Austrian proposal would place fewer reporting burdens on firms.

The difficulty of reverse charging limited to certain products—as proposed by the UK—is that MTIC frauds may simply move on to other goods, not covered by reverse charging. There would also be new enforcement issues, at the ‘boundary’ between commodities subject to reverse charging and those subject to ‘normal’ VAT. Universal reverse charging, as proposed by Austria and Germany, avoids these difficulties—but it also, in effect, turns the VAT into something closely akin to a single-stage retail sales tax, with tax payments suspended until goods are sold to final consumers (albeit with the possibility of cumbersome reporting procedures for B2B transactions). The danger of this is obvious: by ending the gradual cumulation of VAT payments through various stages of production and distribution and instead collecting all VAT revenue at the final sale, the system is exposed to substantially greater risks of revenue loss through unreported sales to final consumers. In effect, the VAT would be converted into an RST. Extensive reverse charging might help to stem losses from MTIC frauds, but might expose the VAT to other risks of revenue loss through more mundane forms of evasion.

- ii) ‘Reverse withholding’ schemes would tackle VAT frauds in a broadly similar way to reverse charging, by requiring the purchaser in a B2B transaction to make a direct payment to the authorities of part or all of the VAT due on its purchase. The difference is that the seller would remain liable for output VAT, receiving a credit for the amount withheld by the purchaser. Depending on the proportion of the VAT that the purchaser is required to withhold, this would diminish or even eliminate the scope to generate revenues through fraudulent refund claims, since exporting firms will themselves have paid part or all of the VAT on their purchases that they subsequently reclaim on export. The principal drawback of reverse withholding (which is quite common in Latin America but untried in Europe) would be its administrative complexity, which arises because of the need to ensure that the seller is given credit for withholding only when this has actually taken place and the increased likelihood that traders will find themselves due a refund (as a consequence of the reduced output tax they pay).

- iii) Adoption of a system of ‘VAT accounts’, under which traders would be required to open a distinct bank account into which they would transfer the amount of VAT charged to their customers. VAT refunds would only be paid if the authorities were able to verify that the corresponding VAT payment had been made. This has been proposed by Germany’s CESifo research institute³² as a solution to the problem of VAT fraud, and a system of this sort has been running in Bulgaria. The key feature is that it requires the VAT payment to be made *earlier* than in the present system, so that when refunds are paid, they can be checked against past payments made. Apart from this matter of timing, however, it does not fundamentally alter the situation. It is not clear that cross-checking refund claims against past payments to a bank account would be any easier, or more reliable, than checking that past payments have been made to the revenue authorities themselves. The scheme also eliminates the cash flow benefit that firms’ enjoy by retaining VAT collected until the next periodic payment becomes due. Reflecting these difficulties, Bulgaria has decided to remove its VAT account system.
- iv) The compulsory use of a third party to guarantee VAT payments, either in general or for particular sectors, as set out by Ainsworth (2006).³³ In the example set out in Figure 3.2, Company B, the future missing trader, would be required to obtain a guarantee that its VAT payments would be made. The principal difficulty with this is the cost involved; it is far from clear that banks or other potential guarantors would be any better placed than the revenue authorities to prevent firms disappearing with outstanding VAT liabilities, and the premium required to cover this risk would place substantial burdens on honest firms operating in the sectors most subject to VAT fraud.

These various administrative solutions all have weaknesses, either in creating other opportunities for fraud and/or in increasing taxpayers’ compliance costs. A more durable solution to the problem of missing trader fraud requires a fundamental redesign of the VAT treatment of international transactions. The opportunity to claim fraudulent VAT refunds arises principally because of the break in the VAT chain that occurs as a result of the zero-rating of exports; and the break occurs at an especially vulnerable point in the chain, where control passes from one national tax administration to another. Export zero-rating requires substantial amounts of VAT receipts to be paid back as refunds, and a system that requires refunds on such a large scale creates opportunities for correspondingly large-scale revenue fraud. Ending VAT zero-rating for trade between EU member states would sharply reduce the scale of refunds and eliminate some of the most tempting opportunities for missing trader frauds. We discuss alternatives to export zero-rating in Section 4.2 below.

³²  H-W. Sinn, A. Gebauer and R. Parsche, ‘The Ifo Institute’s model for reducing VAT fraud: payment first, refund later’, *CESifo Forum*, 2, 30–4, 2004.

³³  R.T. Ainsworth, ‘Carousel fraud in the EU: a digital VAT solution’, *Tax Notes International*, 1 May, 443–8, 2006.

IV. INTERNATIONAL ASPECTS OF INDIRECT TAXATION

As with other taxes, there are issues of increasing importance about the relationship between the domestic VAT system and international economic activity: How should the VAT system treat trade transactions and internationally-organised business?

Such issues are far from new. Indeed a large part of the motivation for EU-wide adoption of a VAT in the early 1970s, compulsory for all members, was to avoid the potential international distortions and economic conflict that could have arisen within the EU if member states had continued to operate a variety of different sales taxes, including in some countries cascade-type turnover taxes. Because the VAT content in the price of a good at any stage in the chain of production is generally straightforward to calculate, based on the price and applicable VAT rate alone, exports can be readily relieved of tax, and imports taxed on a basis wholly-equivalent to that of domestic production.

This section considers four key international issues in VAT policy. First, in section 4.A we ask whether—in principle—we *should* be seeking to relieve exports of VAT and to impose VAT on imports on exactly the same basis as if the same goods had been produced domestically. We do not seek to do the same with other taxes that might be reflected in the price of traded goods, such as payroll taxes or corporation tax. Instead, these taxes are treated simply as part of the cost of doing business in a particular location. In reviewing the principles of the sales tax system, it is at least worthwhile to pause and consider whether we should have a similar attitude to the VAT levied at intermediate stages of production. Second, we ask whether, given that we do relieve exports of VAT, this is done in the most desirable way. As observed in Section 3.C, VAT refunds to exporters have been exploited by large-scale criminal frauds. We discuss in section 4.3 some alternatives that can achieve the same economic outcome as exporting VAT-free, but with less exposure to these particular risks—and, perhaps, with other advantages too. We argue that one of the merits of alternative VAT treatments of international trade is that they may be more appropriate for a world in which the *location* of transactions is increasingly hard to define. The development of e-commerce has highlighted the over-dependence of the existing VAT on geographically-defined notions of the place of transactions and the location of economic activity. While e-commerce in goods may be limited in quantitative significance, and can be accommodated with relatively simple modifications of the VAT system, similar, but much more intractable issues are involved in defining an appropriate VAT regime for international trade in services (section 4.3). The VAT system has been slow to respond to the development of international trade in services, and we suspect that the next decade will highlight more clearly the deficiencies of the current model of VAT within the EU.

A. Origin and destination principles

It has been a fundamental principle of the European Community's internal market policies that competition between businesses in different member states should reflect their underlying efficiency and natural advantages, and not influenced by government policies, whether in the form of tariffs, non-tariff barriers, subsidy, or discriminatory taxation. The concept of the 'level playing field,' which has been a regular theme in discussion of internal market policy, has its economic justification not as a matter of sporting fairness, but a statement of the conditions required for neutral taxation, and neutral, non-distortionary, policies more generally.

In the current VAT systems of the UK and other EU member states, neutrality in business purchasing decisions with respect to national VAT differences has, to date, been assured by the operation of a VAT system consistent with the destination principle.³⁴ This outcome is achieved by zero-rating exports, and by levying VAT on the full value of imported goods at the relevant rate. The result is that VAT-registered businesses producing outputs subject to VAT are indifferent to the VAT rate on goods and services purchased from other member states.

Purchasing by individuals and by entities which are not registered for VAT is treated differently from purchasing by VAT-registered businesses. The freedom to purchase abroad gives individuals an opportunity not open to businesses: to gain genuine benefit from purchasing in lower-tax member states. Such cross-border shopping by individuals is generally an issue of lesser importance than the VAT treatment of transactions between businesses, although there are a few intra-EU borders where VAT differentials may give rise to an appreciable level of cross-border shopping.

The terms 'destination' and 'origin' principle are being defined here, it should be noted, in terms of the conventional usage in the economics literature on sales taxation. As Messere (1994) has pointed out, three aspects of the tax treatment of an international transaction are potentially of interest:

- Which country's tax rates determine the final tax burden and the total revenue raised from production and sale of a good?
- Which country benefits from the revenues?
- Which country collects the tax?

³⁴ A second-order issue is the possible cash flow advantage which may arise as a result of the tax treatment of intra-Community transactions. In the present system this favours importing goods from a supplier in another member state over purchases from a domestic supplier, although the effect is small, and depends on the timing of VAT payments and recovery. Vanistendael (1995) gives greater weight to this issue.

In the current EU VAT system—and indeed in all international VAT relations³⁵—all three coincide. The tax rate of the importing country determines the final tax burden levied on a good traded between member states, and the total revenue raised; this revenue accrues to the importing country; and the importing country levies the tax. In some of the alternatives to the current system, the three criteria diverge. Where this happens, the destination principle is defined here by the first criterion: in other words, it holds if the final burden of tax on an international transaction, and consequently the aggregate revenue, is governed solely by the tax rates ruling in the importing country. This corresponds to long-standing usage in the economics literature.

Symmetrically, the economics literature on indirect taxation uses the term ‘origin principle’ to refer to a situation in which the final burden of tax on an international transaction, and consequently the aggregate revenue, is governed solely by the tax rates ruling in the *exporting* country.³⁶ It will be noted, however, that in recent years there has been an increasing tendency outside the economics literature to use the terms “destination” and “origin” to reflect the country collecting the tax; this has led to extensive confusion about the economic attributes of different systems.

The case for replacing the current EU VAT system, based on the destination principle, with a genuine system of origin-based commodity taxation has been elegantly advanced by Genser and Haufler (1995), amongst others. This would be a drastic change, involving economic substance rather than mere administrative procedure; what is involved in origin-based commodity taxation in this sense is considerably more than an alternative, but equivalent, mechanism for making tax adjustments to goods traded across the EU's internal frontiers. Under origin-based VAT of the form discussed by Genser and Haufler intra-EU exports would *not* be wholly relieved of taxation, either directly (as with the current export zero-rating) or indirectly (as under the ‘exporter rating’ system originally envisaged for the EU after 1992, under which exported goods bear VAT, which importing firms can then fully offset against the VAT to be paid on their own sales). Instead, some (or all) of the tax paid in other member states would ‘stick’ on an imported good right through to sale to final consumers.

It is possible to conceive of a range of possible origin-based VATs in this (economists') sense, differing in the rate at which traders are able to credit taxes paid on their imports. The

³⁵ In the first decade or so of the transition, a number of members of the Commonwealth of Independent States applied the origin principle in some of the bilateral trades.

³⁶ EU legislation, it should be noted, uses the term ‘origin’ taxation’ somewhat idiosyncratically, to mean a situation in which tax is charged by the exporting country. As will be seen, there are a variety of arrangements that would amount to origin taxation in this sense but would be means of implementing destination taxation in the more normal sense used here.

most obvious candidate, illustrated in Figure 4.1), is called the *stage of processing method* by Grossman (1980) and the *notional credit method* by Genser et al (1995). This gives an importer credit as if the tax-inclusive price paid by the importer reflected tax at the home rate,³⁷ the effect of this being that the value added in each country, and embedded in the value of the final sale, is taxed at the rate of the country in which it is added.³⁸


Origin and destination based VATs: conditions for equivalence

At first sight, origin taxation seems to run counter to the whole thrust of EU policy to eliminate impediments and distortions to intra-EU trade, including both tariff and non-tariff barriers. An origin system would mean that a British firm purchasing goods from other member states would no longer treat the VAT rates of other member states as a matter of indifference; in comparing possible suppliers in Denmark and Germany, for example, the British firm would no longer be interested only in the pre-VAT prices of the goods on offer, but would also need to take into account the respective VAT rates, currently 25 per cent and 17.5 per cent respectively. It might seem that such a system would involve massive, and costly, tax-induced distortions of business purchasing decisions, unless severe restrictions were placed on member states' powers to determine their own VAT rates.

It is certainly likely that the system would be *perceived* as one in which tax differences between member states are much more likely to distort business purchases than under the 'level playing field' provided by the destination principle. Cnossen and Shoup (1987), in reviewing the relative merits of origin and destination principles for VAT, see the perception of such 'inequity' under an origin-based VAT as a key obstacle to its adoption, and it is hard to argue with this. Nevertheless, they and many others have noted that there are circumstances in which an origin and destination principles are equivalent in the sense that they lead to exactly the same patterns of trade and economic welfare. Despite appearances, the playing field is then no more level under one principle than under the other.

The most general statement of such results is given in Lockwood, de Meza and Myles (1994a), but the gist is easily stated. Start with the simple case of a world lasting for a single period and comprising two countries, each of which taxes all commodities at a uniform proportionate rate (which may differ between the two countries). It is then easily seen that the shift from destination to origin principles need have no effect on the real allocation of resources, with no need even for compensating international transfers; the shift, that is, need have neither substitution effects through relative prices nor income effects through tax revenues. All that is required to restore the initial allocation of resources is either a

³⁷ The particular merit of the notional credit method, as shown in Figure 4.1, is its potential equivalence with destination taxation.

³⁸ An example 

devaluation by, or a reduction in the general price level of, the country with the higher tax rate. The intuition is straightforward. A flat rate tax levied on a destination basis is a tax on the value of aggregate consumption, while a flat rate tax levied on an origin basis is a tax on the value of aggregate production; and with balanced trade, these are the same thing.

Recent work has shown equivalence to hold in rather more general circumstances than previously thought: it continues to hold, for example, under imperfect competition, and in intertemporal trade models which have the feature that trade must be balanced in present value).³⁹ Striking as these results are, however, it is important to recognise that the practical relevance of equivalence results is likely to be severely limited, for at least four main reasons:

- i) *Problems with partial application.* A ‘restricted origin’ regime, in which the origin principle applies to trade between EU member states while trade with the rest of the world remains subject to the destination principle, raises two sets of difficulties (Shibata, 1967). First, it opens up the possibility of trade deflection: traders operating in a high tax member state, for example, would have an incentive to export to a low tax member via the rest of the world (so incurring the lower tax rate of the country of final consumption)⁴⁰ rather than directly (incurring the high rate of their own jurisdiction). Second, since trade flows between the countries adopting the origin system need not be balanced, a change in tax basis generally redistributes revenue between them (net exporters being the winners on this score). As Lockwood, de Meza and Myles (1994b) observe, both problems can be avoided if member states adopt the origin principle not only with regard to one another but also with regard to the rest of the world: what they call a ‘non-reciprocal restricted origin system.’ This provides a clear analytical solution, but it is equally clear that there are likely to be difficulties in persuading practitioners and policy-makers of the neutrality of a scheme in which exports from the EU are taxed twice (once in the EU, once in the country of destination) while imports into it are not taxed at all.
- ii) *Intergenerational redistribution.* The change of tax basis will have complex and potentially powerful intergenerational effects (Bovenberg, 1994). A shift from destination to origin taxation will tend, for example, to benefit the relatively wealthy and old (financing high consumption levels from past earnings) at the expense of the relatively young and poor (saving a high proportion of their factor incomes), with potentially adverse effects on capital accumulation.
- iii) *Production inefficiency with non-uniform taxes.* Unless all countries tax all commodities at a uniform rate, shifting from destination to origin taxes will tend to cause each country to expand the production of those good where it has a

³⁹ Genser, Haufler and Sorensen

⁴⁰ The story is complicated, but, not fundamentally overturned, by the possible existence of tariffs

‘comparative tax advantage’ (Sinn, 1990). With producer prices diverging across countries under the origin principle, and perfect competition, the consequence is production inefficiency, violating the guiding Diamond-Mirrlees principle discussed above.

- iv) *Tax rate endogeneity*. The established equivalence results presume that a change from destination to origin taxation would not affect tax rates. In practice, the strategic incentives for tax-setting are entirely different under the two regimes. A country that has sufficient power in world markets to influence the prices at which it trades, and so for terms of trade reasons has an incentive to reduce both its demand for importables and its supply of exportables, will choose to tax most heavily the goods that it imports under a destination system, and those that it exports under an origin system. Also, for all countries, the origin basis creates opportunities for stealing tax-base—undercutting the taxes charged by other jurisdictions—that do not arise under destination taxation.

Comparing origin and destination principles

Since origin and destination bases are thus not in general equivalent, the question arises: which is to be preferred? Three groups of issues are relevant.

First, if we consider the two approaches in the context of co-operative tax-setting, the key difference between two principles is in the different arbitrage conditions they imply. Under the destination principle, residents in any country pay the same tax on both imports and domestically-produced items, and are thus led to equate producer prices across countries. With perfect competition, this in turn implies that relative marginal costs prices are equated across countries: which means an efficient pattern of production. Under the origin principle in contrast, consumer prices will tend to be equalised across countries, leading to exchange efficiency (that is, an efficient allocation of consumption across countries). Fundamentally, the choice resolves to one between production and exchange efficiency. Under perfect competition the Diamond-Mirrlees (1971) theorem indicates that an efficient tax structure should aim at production efficiency, and while the original result is not strictly applicable to this context (where different countries have separate revenue constraints), the prescription of production efficiency seems to be broadly supported in this case too. With imperfect competition, however, the issues are more complicated. The destination principle no longer implies production efficiency, because equalising after-tax prices across producers does not necessarily equalise marginal costs (Keen and Lahiri, 1998); in addition, taxing intermediate transactions may play a role in offsetting monopolistic output distortions.

Second, as noted above, the incentives for strategic tax-setting are fundamentally dissimilar between the two: base-stealing and (pushing in the opposite direction) tax exportation under the origin principle; taxation of importables (moving the terms of trade and shifting rents) under the destination principle. It is thus perhaps not surprising to find that the two regimes cannot in general be unambiguously ranked (Lockwood, 1993; Keen and Lahiri, 1998).

A further difficulty of origin-based VAT is that it would create incentives to transfer price value-added into jurisdictions characterised by relatively low effective rates on value added (Genser and Schulze, 1997). Given the considerable difficulties faced in monitoring transfer pricing devices driven by corporate taxation, it hardly seems desirable to extend similar problems into the area of VAT.

What should we conclude from this complex literature about the merits of a fully-fledged origin system compared with current arrangements, in which export zero-rating is used to implement destination-based taxation of commercial transactions? One advantage of an origin based system is that it would resolve the present asymmetry between the tax treatment of cross-frontier purchases of goods by individuals and by businesses. Under the current VAT system, differences in tax rates between countries are sustainable only to the extent that there are significant transport costs or other impediments to individual purchasing. If the pressure on the current system from individual cross-border shopping intensifies greatly, it may be that movement to origin taxation becomes the best option available.

Aside from this, however, our view is that the balance of arguments continues to favour the destination principle for EU VAT. Recent results have certainly tended to place origin taxation in a less-unfavourable light, but it remains hard to make a strong case that origin taxation is superior to destination taxation. Origin taxation throws away the potentially useful ability to tailor national tax systems to national preferences and runs the risk of inducing production inefficiencies. It would imply fundamentally different strategic incentives in tax-setting, with unclear consequences. Moreover, it would open up potentially powerful possibilities for transfer pricing. Abandoning the destination principle in favour of a full-blown origin system seems unlikely to offer sufficient gains to offset these various costs and risks.

B. Alternative VAT mechanisms for cross-border trade

While there are therefore good reasons to want to retain the destination principle as the underlying basis for the VAT treatment of international trade, there remain a range of important issues about the practical mechanism, export zero-rating, which achieves this condition. For it is important to recognize that although both the zero-rating of exports and the adherence to the destination principle are effectively universal, the former is not a necessary condition for the latter. Indeed export zero-rating has two significant drawbacks.

One, already noted in the discussion of VAT evasion and fraud in section III.3 above, is that export zero-rating creates problems for VAT enforcement. It breaks the chain of VAT revenue cumulation whenever the chain of production and distribution crosses national boundaries, a point of particular enforcement vulnerability. Goods supposedly exported, and

therefore zero-rated, may be diverted to the domestic market bearing no tax. Even more seriously, the refund of VAT to exporters coupled with the deferred payment of VAT on imports gives scope for profitable criminal exploitation through large-scale ‘carousel frauds’ and other similar schemes.

The second drawback of export zero-rating, highlighted in the European Commission's 1987 proposals for an alternative VAT mechanism to accompany the elimination of intra-EU border formalities at the end of 1992, is the sharp difference in VAT procedures applied to domestic sales and exports when exports are zero-rated. As a consequence, VAT compliance costs to business—the form-filling burden and other administrative costs which businesses incur as a result of the operation of the tax system—may differ between domestic sales and exports. These differences in compliance costs, if severe enough, have the potential to distort the patterns of economic activity and trade.

Much of the ‘1992’ programme of measures to complete the internal market of the Community was motivated by a concern that border formalities could increase the costs to a firm of doing business in other member states in the European market. Indeed, there was a concern that on occasions member states may have employed frontier bureaucracy as a form of trade protection against products from other member states. In order to remove the opportunities for such non-tariff barriers to arise, the 1992 programme abolished internal EC frontier formalities (including the VAT formalities previously undertaken at frontiers). In addition, in its original proposals for the VAT mechanism to operate after 1992, the Commission sought to put in place a VAT mechanism for cross-frontier transactions which was as close as possible to that applying to domestic sales, in order to minimise the possibilities that any significant difference in compliance costs could arise between the two types of transaction. In practice, however, the measures adopted for the post-1992 VAT regime apply very different procedures to trade within, and trade between, member states, and the new procedures then introduced to prevent VAT evasion on international transactions in the absence of frontier controls may well have magnified tax compliance costs on export transactions.

A number of alternative VAT mechanisms can be envisaged which would achieve economic outcomes conforming to the destination principle, without making use of export zero-rating. Some, in addition, would apply identical procedures to exports and purely-domestic transactions, to avoid the risk that trade transactions are deterred by unfamiliar or onerous VAT procedures. There are a range of possibilities, including:

“*exporter rating*” - the system proposed by the Commission in 1987 would have taxed intra-EU exports at the rate of the country from which the goods were exported. [__explain clearing house] Exports and domestic sales would thus be taxed identically, which may be an advantage, since it reduces the danger that firms may be deterred from exporting by the need to deal with an unfamiliar export tax regime. The problem, in the 1987 version of the

scheme, is that the exporting state can determine the rate of tax, and hence the scale of the additional tax revenue gained from exports, and the size of the VAT credit that other countries must give on imports. In some circumstances, Keen and Smith (1996) note that this can create incentives for member states to set higher VAT rates on goods that they predominantly export (in order to benefit from a shift of total revenues), without paying any penalty in terms of competitiveness from so doing.

“uniform rating” - intra-EU exports would be subject to a uniform VAT rate, determined by the Community, regardless of the tax rate that would be applied to corresponding domestic sales in the member state concerned.⁴¹ Exports and domestic sales are subject to different tax treatments, and there is a danger that firms might perceive the compliance costs involved in operating the export tax regime as a deterrent to exporting. In the **CVAT** regime advocated by Varsano (), who focuses on analogous issues that arise within Brazil, and McLure (), this special tax rate for exports is operated as a separate tax, by a single tax authority operating across all the jurisdictions concerned. Since the additional tax on intra-EU exports (the ‘compensating VAT’) is collected by the same authority that then gives credit for the input tax paid on imported goods, and since these amounts in principle cancel out, this system avoids any revenue redistribution between member states. But it does so by establishing a parallel VAT operation (for the taxation of intra-EU trade) that generates zero net revenues. Quite how large the administrative and compliance costs would be in this parallel VAT administration is unclear, and it may be able to draw heavily on VAT information already gathered in national systems. But unlike exporter rating there is a clear danger of asymmetry in VAT compliance costs between exports and domestic sales.

A variant of the CVAT mechanism is the **“Dual VAT”** regime proposed by Bird and Gendron (), who draw on the Canadian experience from the combination of a federal VAT and the provincial VAT levied in Quebec. This scheme envisages that member states would operate VAT systems which do not extend beyond national boundaries, and which effectively zero-rate intra-EU exports as in the current system. These national VATs would however run in parallel with a Community VAT, set at a uniform rate EU-wide, and operated without regard to national boundaries. This Community VAT generates revenues for the Community, and at the same time ensures that intra-EU exports, although zero-rated by the member state VATs, do move between member states bearing at least some burden of tax. This reduces the risk that export zero rating would create scope for tax evasion through diversion of goods zero-rated for export into the untaxed shadow economy. Such goods, with the dual VAT, would still bear the Community VAT, and the gain from evasion would thereby be reduced.

⁴¹ The current regime might be seen as a limiting case of this mechanism, in which the applicable uniform tax rate is set at zero.

VIVAT—the main feature of this scheme, proposed by Keen and Smith (1996), is that a uniform Community-wide rate of VAT would be applied to transactions between VAT-registered traders, while member states would retain the power to determine the rate of VAT on sales by traders to final consumers. The uniform rate of VAT on transactions between VAT-registered traders would apply to all such "intermediate" transactions, both between traders in the same member state, and between traders in different member states.

The scheme would thus satisfy one of the primary objectives for the VAT regime, set out in the 1985 White Paper, of applying uniform procedures to transactions within and between member states, achieving symmetry in the VAT treatment of domestic and intra-EU sales, and, at the same time, solving some of the 'incentive' defects of the other main schemes, in terms of both enforcement incentives and rate-setting incentives for member states. It aims to avoid some of the major enforcement and rate-setting problems which would be encountered under other schemes, such as the Commission's 1987 'Clearing House' scheme, without altering in any way the current ability of member states to choose to increase or reduce the burden of VAT, and consequent VAT revenues.

- VIVAT would also have the attraction, as compared with the current transitional regime, that it would maintain the cumulation of VAT revenues across intra-Community frontiers. A key disadvantage of the transitional regime, in contrast, is that the chain of cumulation is broken when sales are made across intra-Community frontiers.
- Also, the VIVAT scheme would not require any further restrictions on the ability of member states to vary the VAT rates applying to domestic consumption, and consequently to increase or reduce the revenues they derive from VAT. Whilst the scheme requires a uniform Community-wide rate of VAT to be applied to intermediate transactions, this does not in any way affect the revenues which a member state ultimately derives from VAT; the rate of VAT applying to intermediate transactions only affects the rate at which revenues cumulate, and not—at least in so far as the crediting mechanism works properly—the total of revenues finally collected. The revenues are determined solely by the rates of tax applying to sales at the retail stage. Since these rates of tax are under the control of member states in the VIVAT scheme, there would be no change to their ability to vary revenues by varying their rates of VAT—and hence, in that sense, no real loss of national sovereignty.

These attractions of VIVAT were also features of the Commission's 1987 proposals. In comparison with this system, the attractions of VIVAT have to do with enforcement and rate-setting difficulties, as noted above. Some of these arise through compensating member states for the change in their revenues, compared with the existing regime of export zero-rating, due to the extra VAT they would collect on their intra-Community exports and the VAT credit they would have to give on intra-Community business purchases. Under the Commission's 1987 'Clearing House' proposals, this compensation would need to be given on an exact basis, related to the exact aggregate value of individual transactions,

necessitating complicated (and permanent) arrangements for measuring the required clearing flows. This would suffer from the fundamental flaw that it would undermine the incentive for member states to enforce the validity of claims for VAT credit on imported goods; the cost of giving this credit would be underwritten by the Clearing House, and there would be little incentive for member states to spend resources in reducing fraudulent claims (Lee, Pearson and Smith (___)).

A one-off compensation settlement (perhaps involving agreed annual revenue flows), reflecting the scale of the anticipated revenue changes, would restore the incentive for member states to detect fraudulent claims for VAT credit on imports, but would introduce a new problem, in that it would give rise to undesirable incentives for member states to raise their VAT rates, in order to increase their revenues from the taxation of exports. Since the importing member states would be required to give credit for whatever rate of tax was applied to exports, there would be no competitive restraint on this; the only limit would be the willingness of domestic customers to accept the higher VAT rates that would also apply to domestic sales. For smaller member states, with a high ratio of exports to domestic sales, the revenue gain from higher taxes on exports could be particularly attractive. VIVAT could operate with revenue-redistribution which was based on an agreed settlement, without introducing this incentive for escalation of member state VAT rates.

A further attraction of VIVAT is that it may be possible to be more relaxed about certain types of transaction than in the current system. Thus, for example, the case of sales to non-registered entities, such as public sector organisations (hospitals, universities, local governments...) poses great difficulties in the present system, and it is necessary for the system to operate rules (which are almost unworkable) requiring them to declare their purchases in other member states, in order to ensure that the appropriate VAT adjustments are made (by the revenue authorities of the importing country). With VIVAT it would be possible, for example, to provide them with the power to purchase at the intermediate goods rate; since this would not vary between member states, it would be possible to envisage the VAT that they would then pay on inputs might not be refunded, without it providing them with any incentive to select a low-VAT member state for their purchases.

The principal disadvantage of VIVAT, by comparison with the alternative systems, is that it would require an 'end user' distinction to be made—and enforced—between the sales which a business makes to other VAT-registered businesses, and the sales it makes to final consumers. These would be taxed differently under VIVAT, and there would be additional compliance costs to businesses and extra administration costs for the tax authorities in accounting separately for these two categories of sales, and in handling difficult borderline cases. Assuming that the VAT rate on intermediate sales was never higher than the rate on final sales (the uniform Community-wide rate on intermediate sales might be 15 per cent, for instance, and the rates on final sales as at present ranging from 15 per cent to 25 per cent), the issue would be one of firms justifying claims to apply the intermediate goods rate. This

might involve use of VAT registration numbers as at present to identify VAT status. But it would be possible to apply the rules rather more stringently than at present, without serious damage to the firms concerned. If a firm failed to substantiate a claim to be allowed to apply the intermediate rate, it would have to apply the final goods rate, which in some countries would be very little higher. It might also be possible to credit input VAT claims at that rate where it could be shown that the final consumer rate had been wrongly applied to an intermediate goods transaction. More fundamentally, however, the fundamental distinction—between B2B and B2C transactions—is one that is in any event likely to become increasingly important in the operation of the VAT, notably in connection with the VAT treatment of international services.

C. VAT and internationally-traded services [__to be written]

V. EXCISE TAXES ON ALCOHOL, TOBACCO AND MOTOR FUELS

The UK, in common with all EU countries, applies excise taxes, in addition to value added tax (VAT), to three groups of goods: motor fuels, tobacco products and alcoholic drinks. The scale of these taxes varies widely across the EU (Table 5.1). In the case of all three commodities, UK excise duty rates are at the top end of the range, and the revenue contribution of these taxes to the UK exchequer is significant: some £40 billion in 2006-07 (8.2% of total revenues), of which more than half (some £24 billion) was from motor fuel taxes, with £8 billion each from tobacco and alcoholic drinks.

The special excise duties on these products have their origins in a period when general commodity taxation was less well-developed than it is now, and less capable of contributing substantial revenues. Excises on alcohol, tobacco and mineral oils contributed significant revenues, at low administration and enforcement cost. What arguments--other than simple pragmatism and policy inertia—can justify the retention of these excises within the modern tax system, and tax differentials between these and other commodities as large as those in the UK?

The taxation of motor fuels has become one of the key issues in environmental taxation, and we leave that to the separate chapter on this topic. Here we confine attention to the excises on alcohol and tobacco. We begin by reviewing what the revenue-raising efficiency and distributional analyses in section II would imply for these commodities. Section V.B considers the use of alcohol and tobacco taxes to reflect the external costs associated with smoking and drinking. We then turn to consider two further issues in excise tax policy. In section V.C we discuss the appropriate tax base for these excises, and in particular the choice between taxes based on the price of goods and taxes based on physical dimensions such as volume, quantity, weight of tobacco, etc. Then, in Section V.D we turn to the implications

for excise tax policy of tax competition between countries, arising through individual cross-border shopping for alcohol and tobacco. The flows are substantial. Nevertheless, are they on a scale which should significantly constrain UK excise duty rates, or which should make action to harmonise EU duty rates a pressing priority?

A. The role of excises within the tax system

As discussed in section II, arguments for differential taxation of commodities fall into three broad groups: revenue-raising efficiency arguments, equity arguments, and efficiency arguments relating to the use of taxes in correcting externality problems.

Revenue-Raising Efficiency

What evidence is there that motor fuels, tobacco products and alcoholic drinks might be a commodity for which above-average taxation might be appropriate under the standard optimal tax rules discussed in section II?

For alcoholic drinks, the available evidence on elasticities is mostly based on work using US data, including a number of studies estimating price elasticities from the cross-section variation in alcohol prices between US states, resulting from different state-level tax policies. The widely cited study by Leung and Phelps (1993) reviewed the results of studies estimating the price elasticity of alcohol demand. Although these show considerable variation, the broad pattern of results would be consistent with elasticities of -0.3 for beer, -1.0 for wine, and -1.5 for spirits. The price elasticity of demand for an addictive commodity would be expected to be higher over the long run than in the short run (Becker and Murphy, 1988), and Grossman, Chaloupka, and Sirtalan (1998) find that the long-run elasticity in a model with addiction is some 50 per cent higher than the short-run elasticity. Differences of some significance for policy are found in the price elasticity of different subgroups in the population. Young people are substantially more price-responsive than older drinkers. Also, estimated price elasticities appear to vary with consumption levels. Manning, Blumberg, and Moulton (1995) find a greater price elasticity among moderate drinkers than among light drinkers and heavy drinkers; the consumption of heavy drinkers was found to have little sensitivity to price. On the other hand, Kenkel (1993) found a high price elasticity for the number of 'heavy-drinking days' reported by individuals, of around -0.9 over all age groups and -2.24 for youths aged 18–21. While the overall picture is clearly complex, it is unlikely that the price elasticity of alcohol demand is sufficiently low to warrant significantly higher-than-average taxation of alcohol than other goods on 'inverse-elasticity' grounds.

It is unclear, a priori, whether alcohol would be a complement with or a substitute for leisure. More leisure means more time to consume alcohol and also reduces the risk that the consequences of over-consumption (hangovers and so on) will negatively affect work

performance. On the other hand, some level of alcohol consumption may be complementary with time spent working (and hence a leisure substitute), either because drinking helps workers unwind after a stressful day or because of social drinking with colleagues. The balance between these two effects may vary with individual alcohol consumption. At low consumption levels, alcohol may be complementary with work, but at higher levels of individual consumption, alcohol may be complementary with leisure. No clear implications can be drawn for taxation policy.

Equity arguments

The efficiency case for higher-than average taxation of tobacco and alcohol is weakened by equity considerations.

The distributional incidence of taxes on cigarettes in the UK has become increasingly regressive as the number of smokers in low-income groups has fallen much less than in the population overall (Fry and Pashardes, 19__ + more recent estimates).

Some of the US literature has observed that alcohol taxes are regressively distributed with respect to current household income and significantly less regressive from a lifetime perspective. Further evidence is also needed on this for European countries. At least, however, alcohol taxation does not appear to be so regressively distributed as tobacco taxes, and therefore distributional concerns may not be a major constraint on European alcohol tax policies.

Externality-Correcting Taxes

The excises on alcohol and tobacco might also be justified in terms of their role in discouraging harmful consumption activities. The consumption of these goods involves various consequences that extend beyond the immediate pleasure of consumption to the individual consumer.

Some of the harmful consequences of alcohol and tobacco consumption include costs borne by society collectively, or by individuals other than the individual consumer. Even if we regard individual consumers as best placed to judge the costs and benefits of consumption to the individual concerned, externality-correcting taxes may be needed if we are to ensure that costs imposed on others are properly considered. The case for using taxes to discourage *socially* harmful activities was set out by Pigou (1920) and has been developed subsequently in the context, primarily, of environmental policy. In an otherwise first-best context—with prices undistorted by taxation, imperfections of competition or other factors—the tax should be set equal to the marginal external cost of each unit consumed. In more realistic contexts this conceptually simple policy prescription becomes nuanced. When taxes also serve a revenue-raising purpose, for instance, Sandmo (__) and Pirtilla and Tuomala (__), dealing

with the cases in which direct taxes may and may not be imposed, show that optimal commodity tax rules take an additive form in which a Ramsey-type component is supplemented by one related to the marginal external damage, but potentially somewhat lower to reflect the potential intensification of the distortions from pre-existing taxes. In any event, understanding the nature and extent of external damage is key to proper tax design,

The external costs of tobacco and alcohol consumption include direct externalities experienced by other individuals, such as the harm that drunken drivers cause to others, and collectively-borne resource costs such as the cost of publicly funded medical treatment for smoking- and alcohol-related conditions. In both cases, individual consumption decisions will not reflect the full social costs of consumption, because the individual consumer does not bear the marginal costs of medical treatment or of direct externalities that follow from their smoking or alcohol consumption decisions. Excise taxes may provide a way of confronting the consumer with these costs.

Frequently, the discussion of whether alcohol consumption and smoking are socially harmful also includes discussion of the consequences for the individual consumer's own health, employment prospects, accident risks, and so on. Such costs to the individual consumer are not, however, externalities. Arguments that they might warrant higher taxation to discourage consumption involve an element of paternalism, perhaps reflecting a concern that individuals may be poorly informed about some of the consequences for themselves of consumption. Viscusi (1995), for example, discusses whether individuals accurately perceive the health risks of cigarette smoking. Unless there are grounds to believe that consumers are poorly informed about some of the consequences of consumption, there are no reasons to overrule their consumption choices in their own interests; and where people are poorly informed, a better first response might be to provide better information rather than to dictate consumption decisions. For these reasons, paternalist arguments for taxation often meet with scepticism among economists.

Nevertheless, with tobacco and alcohol, the case for discouraging consumption, in the individual's own interest, should not be dismissed too lightly. Some of the individual costs of smoking and drinking arise as a result of the addictive nature of consumption, and this adds a further dimension to the problem. Current consumption may increase the risk of future addiction. A well-informed and rational consumer would presumably be less willing to start smoking than if there were no risk of future addiction. However, it is unrealistic to assume that all individual users of tobacco and alcohol are fully informed about the addictive risks associated with each unit of consumption. In addition (except in an empty and tautological

sense), it is unrealistic to assume that all alcohol consumption decisions are based on a rational calculus of the costs and benefits of each unit consumed.⁴²

B. Quantifying alcohol and tobacco externalities

What is the evidence on the scale of the marginal external costs of smoking and alcohol consumption?

Tobacco [__ to be written]

The consequences of alcohol consumption that are felt by individuals other than the consumer, and are unlikely to have been taken into account by the consumer when choosing how much alcohol to consume, fall into three broad categories. The first consists of direct externalities experienced by other individuals, including the victims of accidents, property damage, and violence caused by other people's drinking. The second comprises collectively borne costs, such as the cost of publicly funded medical treatment for alcohol-related conditions, and other public expenditure costs. The third category of externalities arise through the tax system. Alcohol consumption may have consequences for the individual consumer's income and expenditure. While these effects would be wholly internal in a 'first-best' world without distortionary taxes, the presence of income taxes and spending taxes means that the government partly shares in the benefits of additional income or spending. This gives rise to what is, in effect, a tax revenue externality, and, given the efficiency cost of raising public revenues through distortionary taxation, induced changes in revenues have a clear social value.

A considerable proportion of the literature on the social costs of alcohol consumption is not directly relevant to the estimation of externality taxes, because an insufficiently clear distinction is drawn between costs experienced and internalized by the individual consumer and external costs experienced by others. This is true, in particular, of studies using the 'cost-of-illness' (COI) approach, which is directed at a social cost-benefit analysis of measures to prevent illness. Such studies typically draw a clear distinction between resource costs and transfer payments, but include resource costs experienced by the individual consumer as well as those experienced by others.

The most widely quoted US estimates of alcohol consumption externalities, appropriately defined, are those of Manning et al. (1989), who estimate that net external costs are equivalent in value to about 35 per cent of the producer price of alcohol. A very large

⁴² This is not to deny the argument that certain categories of action which may appear irrational when viewed alone—such as crimes committed while drunk—may be regarded as the outcome of a rational decision whether or not to put oneself in the state of drunkenness.

proportion of the net external cost is accounted for by the valuation of alcohol-related traffic fatalities. Since alcohol-related traffic fatalities seem to vary quite widely across countries, this would suggest that these US estimates may not be a good indication of alcohol externalities in other countries. Parry (2001) notes that there are fewer serious alcohol-related road traffic accidents in the UK than in the USA, and that marginal external costs are consequently also likely to be lower in the UK.

Table .

Social Costs of Alcohol: England and Wales (1992 prices)

	<i>£ million (1992 prices)</i>	<i>Percentage of pre-tax alcohol expenditure</i>
1. The social cost to industry		14.2
Sickness absence	1,059	
Housework services	71	
Unemployment	244	
Premature deaths	956	
2. The social cost to the NHS		1.0
In-patient costs – direct alcohol diagnosis	41	
In-patient costs – other alcohol-related diagnosis	120	
General Practice costs	3	
3. Society's response to alcohol-related problems		0.01
Expenditure by national bodies	0.5	
Research	0.9	
4. Social cost of material damage		0.9
Road traffic accidents (damage)	152	
5. Social cost of criminal activities		0.3
Police involvement in traffic offences (excluding road accidents)	7	
Police involvement in traffic accidents (including judiciary and insurance administration)	21	
Drink-related court cases	27	
Total (excluding unemployment and premature death)	1,503	9.2
Total (including unemployment and premature death)	2,703	16.5

Source: Maynard, Godfrey, and Hardman, 1994, table 1. Calculations in final column from Smith (2005).

Estimates of external costs of alcohol consumption for the UK by Maynard, Godfrey, and Hardman (1994) are shown in Table __. The estimates include various categories of direct externality (such as the damage caused in road traffic accidents) and also the cost of defensive measures (such as policing costs and the costs of research on alcohol problems).

The costs of collectively funded medical treatment in the UK National Health Service of alcohol-related illnesses are also included. However, the largest items appear under the heading 'costs to industry', including the substantial costs of sickness absence and unemployment. Quite how far these should count as external costs depends on what is assumed about the effects of alcohol-induced productivity effects on individual wages, an issue discussed in more detail below. Overall, Maynard et al. calculate the total externalities associated with alcohol consumption in the UK to be around £2.7 billion, equivalent to some 17 per cent of pre-tax alcohol expenditure.

The externality case for taxing alcohol at higher rates than other goods requires clear identification and measurement of the external costs of alcohol consumption. Nevertheless, attempts to draw a clear boundary between internalized and external costs are not straightforward, and a number of areas of conceptual and practical difficulty can be identified.

One controversial area is the treatment of costs borne by family members. Family members of an abusive alcohol user may experience considerable costs, including costs of violence, costs of injury, and pain and distress as a result of the alcohol-related illness and premature death of the alcohol abuser. Many of the consequences of alcohol abuse during pregnancy, including damage to the lifetime health and happiness of the child, also come under this heading (although there are, in addition, further important costs for the healthcare system). Whether, and to what extent, costs experienced by other family members should count as externalities has been controversial. As Viscusi (1995) notes, it turns, in principle, on whether the welfare of other members enters into the utility function of the alcohol consumer, and, in other areas of policy, it is often assumed that family members are assumed to care for each other's welfare to the extent that the welfare of the household can be considered as a single entity. In the case of alcohol abuse, however, this seems implausible, and the costs of domestic violence and the injuries inflicted on unborn children would seem best treated as externalities.

Effects on Wages and Productivity

A large part of the total social cost of alcohol estimated by Maynard, Godfrey, and Hardman (1994) consists of effects on industrial output. Whether the income or output loss from sickness absence and other alcohol-related productivity effects should be counted as an externality depends primarily on how far the effects of alcohol on worker productivity are reflected in wages. There are a number of cases of interest:

- If workers are paid their actual marginal product, and if there is no income taxation, then there is no externality: alcohol abusers who are less productive receive correspondingly lower wages.

- When there are taxes on wages, or on consumption out of wages, then the loss in wages experienced by an alcohol abuser is partly shared by the rest of society, through the reduction in tax revenues, and is no longer a matter of social indifference.
- However, employers may not always be able to differentiate the wages paid to alcohol abusers and non-abusers, to reflect their different individual marginal products of their workforce. In this case, the lower productivity of alcohol abusers generates externalities of two forms. First, the employer paying an alcohol abuser wages that exceed the worker's marginal product will experience a real income externality. Secondly, since the overall marginal product has fallen and the employer is unable to differentiate the wages paid to different workers, both abusers and non-abusers will receive lower wages as a result of the lower productivity of abusers.

Quite how far the productivity effect of individual alcohol abuse is reflected in individual wages, and how far it is collectively borne, is unclear. Even where there is no immediate impact on the abusers' wage (because of contractual provisions or collective bargaining), it is likely that abusers with poor sickness records will be less frequently promoted, and thereby suffer longer-term income losses.

Healthcare Finance and External Costs

How far are the costs of medical treatment and healthcare internalized when alcohol consumption decisions are made, and how far should they be counted as an externality? In the case of publicly funded, tax-financed systems such as the UK National Health Service, the answer is straightforward: the treatment costs of illnesses resulting from individual consumption decisions are collectively financed. The same may largely be true of other collectively financed systems, such as employer-financed healthcare. By contrast, a system of private insurance capable of appropriate differentiation of insurance premiums (for example, through experience rating at the individual level) might be able to internalize a large part of the healthcare costs associated with alcohol abuse.

This suggests that the classification of healthcare costs into internal and external is institution-dependent and will vary between countries depending on the institutional arrangements. In European welfare states, where healthcare costs are substantially funded out of direct taxation or quasi-tax social contributions, healthcare costs are an important part of the externality calculation, and, other things being equal, alcohol externalities (and hence the optimal rate of alcohol taxation) may be higher in such countries than in countries where healthcare costs are largely individually borne. Nevertheless, it is clear that defining the precise boundary between collectively financed and individually borne healthcare costs will often be difficult, especially in systems that are neither wholly tax-financed nor individually financed.

Implications of Externality Estimates for Tax Rates

Translating the externality estimates into appropriate rates of Pigovian taxation on alcoholic drinks is complicated by the fact that most of the available estimates of social costs of alcohol consumption concern total social costs. While the average external cost can be straightforwardly derived, the marginal external cost of consumption may well differ sharply from the average. Unlike the case of the externalities from tobacco consumption, which may well be almost constant across each unit consumed, the externalities from alcohol consumption largely relate to abusive consumption. Excessive consumption, leading to serious drunkenness in individual episodes, or alcoholism over time, is the source of the externalities, and the external costs associated with moderate consumption may be close to zero. While Table __ suggests that the average external cost from alcohol consumption in the UK might be of the order of 17 per cent of the pre-tax price of alcohol, the marginal external cost may be different.

Diamond (1973) discusses externality taxation in a context where all individuals causing externalities must be taxed at the same rate, but where the externalities from some are more damaging than those from others. He shows that in the case where there is separability between the externality and consumption, the tax should simply be the weighted average of the marginal contributions to the externality, across different individuals, where the weights are given by the sensitivities of demand for the good that generates the externality. If the primary reason for differences in the external costs of alcohol arises from differences between individuals, rather than between units of drink consumed by a particular individual, then this result may provide some support for regarding the average external costs as a rough-and-ready indicator of the optimal externality tax. However, if the external damage caused by alcohol consumption varies across units consumed by each individual (for example, if it is ‘the one drink that makes you drunk’ that causes all the problems), then the appropriate externality tax would be considerably higher.

Pogue and Sgontz (1989) investigate further the implications for optimal alcohol taxation of the requirement that the alcohol sold to abusive and non-abusive drinkers must be taxed at the same rate. Their analysis is directed at quantifying the trade-off between the reduction in welfare of non-abusive drinkers and the social benefits from the reduction in consumption by abusive drinkers. The balance will depend on the size of marginal social costs from abusive consumption, the size of the welfare loss from distorted non-abusive consumption, the relative numbers of abusive and non-abusive consumers, and the price elasticities of the two groups. (There is also the difficult issue of principle of whether alcohol-dependent consumers of alcohol should be treated as deriving utility from their abusive consumption, or not.) Overall, Pogue and Sgontz estimate that US alcohol taxes in 1983 were at about half the socially optimal level.

A broadly similar difference between actual and optimal taxes in the USA is estimated by Manning et al. (1989). Kenkel (1996) estimates a higher optimal tax: about equal to the pre-tax alcohol price. Saffer and Chaloupka (1994) reckon that the weighted average optimal US tax on alcohol (allowing separately for taxes on beer, wine, and spirits) is 2.3 times the 1991 level.

C. Specific versus ad valorem taxes

Unlike VAT, where all commodities subject to the tax are taxed simply in proportion to their selling price at one of a limited number of percentage tax rates, the separate excises for alcohol and tobacco offer—in principle at least—a wider menu of possibilities for the precise specification of the tax base. Currently, the UK tobacco excise (in conformity with EU rules) includes both ad valorem and specific components: cigarettes bear a specific excise of £105.10 per 1000 cigarettes, and an ad valorem excise of 22% of the retail selling price. The UK alcohol excises, by contrast, are wholly specific taxes, based on product volume and/or alcohol content. The excise duty base for both alcohol and tobacco is governed by EU rules, while there is considerably less constraint on the rates of excises set by member states. The scope for change to the definition of the tax base is therefore limited, although it is nonetheless worth considering whether the current definition of the base is optimal.

Keen (1998) surveys the issues in the choice between specific and ad valorem taxes. The latter have a distinctive multiplier effect, in the sense that actions that increase, or reduce, the producer price by a given amount will have a larger effect on the price charged to the consumer. As a result, ad valorem taxes will tend to discourage costly improvements in product quality and to promote more vigorous price competition between producers. Specific taxes, on the other hand, will tend to have an upgrading effect on product quality. The overall implications for consumer welfare and tax revenue of the choice between specific and ad valorem taxation will vary, depending on the structure of preferences and on market structure.⁴³ Ad valorem taxation of goods will tend to be more attractive where producers exert a degree of monopoly power and where there is little product differentiation. Specific taxes would be preferred where there are reasons to want to maintain product quality or where taxation is partly intended to affect an externality that is broadly related to the quantity of the product rather than to its value. Other considerations include the potential distributional advantage of ad valorem taxation of retaining relatively low price variants (though again this is unlikely to be a powerful concern, given the range of instruments available in the U.K.), perhaps greater ease of administering specific taxes (which require

⁴³ Delipalla and Keen (2006) show that, in competitive circumstances, the mix should be such as to have minimal effects on product quality, in the sense that, at an optimum, uniform intensification of both taxes would leave quality unchanged. Recognition that ad valorem taxation leads to a lower consumer price than does ad valorem, for a given level of revenue, in circumstances imperfect competition, dates back to Musgrave and ___, and is explored further in Delipalla and Keen (___)

physical checks rather than valuation) and the differing responsiveness of revenues to variations in the underlying producer price (being more stable under specific taxation, for example, when the demand elasticity is low—but not a concern if tax rates can be adjusted frequently relative to these underlying price movements).

For tobacco products, the importance of potential differences in product quality—the wide variation in prices across bands suggests that product differentiation in this market is not simply horizontal—point to substantial reliance on specific taxation. The most plausible argument for ad valorem taxation is likely to lie in market dominance concerns, but the objective of maintaining a low price for the final product does not sit easily with the corrective arguments for tobacco taxation, discussed below.

In the case of the alcohol excises, one particular issue frequently raised (and where there is scope for UK reform despite the current EU constraints on the definition of the excise tax base) is the role of alcohol content in defining the tax payable, both within a single category of drink (beer, wine, or spirits) and across the three principal categories of drink.

Spirits are currently taxed much more heavily per unit of alcohol than beer and wine. More uniform taxation of alcohol content across the three principal categories of drink has been advocated persuasively by Crooks (1989) among others. It would avoid distortion between competing drinks. It would also seem a natural way to structure the Pigovian taxation of alcohol, in that it would appear to target the externality tax precisely to the underlying source of the externalities. Nevertheless, the issue is not straightforward, because different drinks may differ in their propensity to generate external costs per unit of alcohol content. Evidence on the current pattern of abuse across different drinks is not necessarily particularly informative in designing optimal alcohol taxes, since there is at least anecdotal evidence that some abusive consumers select drinks with the lowest price per unit of alcohol content, so that the abuse related to different drinks is then endogenous to tax policy decisions. Recognition of this does not, however, automatically lead to uniform taxation of alcohol content, since, in the hands of abusers, different drinks may still generate different levels of externalities. Arguably, spirits offer the greatest potential to get very drunk very quickly, which may exacerbate some of the externality problems. If uniform taxation of alcohol content would make low-cost industrially produced spirits the cheapest form of alcohol, the shift of abusers to spirits consumption might then not be a matter of social indifference.

D. Excise tax competition and cross-border shopping

Tax-induced cross-border shopping and smuggling pose significant policy challenges for the EU. Not only do they cause a direct revenue loss—or perhaps gain to low tax countries—but they are likely to lead to tax rates being set lower than they otherwise would be.

The extent and impact of cross-border shopping

The problem of revenue losses from legal cross-border shopping by individuals has come into particular prominence as a result of the abolition of border controls between EU member states at the end of 1992. Before this, most member states applied restrictive travellers' allowances on personal imports of alcoholic drinks from other EU countries, as well as from the rest of the world, and this kept legal cross-border shopping within tightly constrained bounds. As a result of the abolition of border controls, individuals can purchase goods in another member state and bring them home without restriction or fiscal adjustment, so long as the goods are for their personal use and not for resale.

The scale of revenue losses from both legal and illegal cross-border movements of alcohol is controversial. HM Customs and Excise estimated the UK revenue loss from *legitimate* cross-Channel shopping for alcohol in 1998 at £285 million, about 5 per cent of total UK alcohol duty revenues. Some part of this revenue loss would have arisen as a result of duty-free purchases, rather than tax-paid purchases in other member states, though it is a reasonable guess that a significant part of the alcohol purchased duty-free would have been purchased outside the UK in the absence of the opportunity to make duty-free purchases⁴⁴. HM Customs and Excise estimated that illegal cross-Channel smuggling of alcohol in 1998 involved a revenue loss to the UK of some £230 million, around 4 per cent of total alcohol excise revenue.

For individual member states in this position, alcohol tax policy needs to take account of the potential revenue losses through legal and illegal cross-border activities. Crawford and Tanner (1995) and Crawford, Smith, and Tanner (1999) consider whether the revenue losses through cross-border shopping induced by duty differentials are sufficiently large that UK revenues could be increased by cutting the rates of UK excise duties. They observe that the post-1992 abolition of border controls acts so as to increase the price elasticity of demand for UK-bought alcohol. As the price is increased, some consumers reduce their consumption of alcohol altogether (the normal effect, in the absence of cross-border shopping opportunities), while others may switch to buying abroad. The higher elasticity for UK-bought alcohol might suggest that UK tax rates on alcohol should be reduced (on grounds basically similar to the Ramsey optimal commodity tax argument). Also, if the increase in elasticity is sufficiently large, it is possible that the existing rates of duty might exceed the revenue-maximizing duty rates.

Using data from the UK Family Expenditure Survey for the years spanning completion of the Single Market, Crawford, Smith, and Tanner (1999) find, however, no evidence of a

⁴⁴ In 1999 the EU countries abolished duty-free sales on intra-EU travel. Christiansen and Smith (2001) discuss the tax policy implications.

significant change in elasticities. Whether a reduction in duty rates would increase or reduce UK tax revenues depends on the own-price and cross-price elasticities of demand for the various categories of alcoholic drinks. Crawford et al. find that the UK tax rates on beer and wine are still lower than revenue-maximizing tax rates, meaning that a cut in duty on these drinks would reduce total revenues (even though it would repatriate a certain amount of cross-border shopping). On the other hand, the study is unable to reject the hypothesis that the current UK tax rate on spirits is the revenue-maximizing rate. This suggests that the duty on spirits may be closer to the level at which a cut in duty might reduce cross-border shopping by enough to compensate for the revenue lost on each unit.

Policy responses

The question for policy is what, if anything, should be done about the implications of such potential tax-induced cross-border purchases, legal and otherwise. In assessing this, it is important to remember, the extent of the problem cannot be inferred simply from the extent of observed cross-border shopping. Observing zero cross-border shopping could mean that there is simply no inclination to exploit tax differentials, as would be the case with literally non-tradable goods. But cross-border shopping would also be zero in equilibrium if intense tax competition drives all countries to charge the same excise tax rates, with all standing to benefit from setting a collectively higher rate.⁴⁵

Lee, Pearson, and Smith (1988) argue that fiscal externalities between member states do indeed warrant some level of EU tax coordination to control cross-border shopping. These externalities include revenue losses, the time and travel costs of cross-border shoppers, and a loss of business (perhaps entailing adjustment costs) to retailers on the high-tax side of the border. They note that there is an asymmetry between the effects of increasing and lowering tax rates. A member state that raises its tax rate relative to taxes in neighbouring member states increases cross-border shopping, but the costs are largely internal to the member state concerned. On the other hand, a member state that reduces its tax rate attracts cross-border shopping and revenues, imposing external costs on other member states. Observing that the greatest priority for the Community is to regulate those member state policies that have negative effects on other member states, Lee et al. argue that this implies that the EU should set an EU-wide floor to excise duty (and VAT) levels in member states, to restrict the negative externalities that duty reductions would impose on other member states, but that there are no compelling grounds to place any upper limit on member states' duty rates.

The subsequent formal literature on tax policy in the presence of cross-border shopping has explored in more detail the robustness of these policy rules. Using a highly stylized two-country model with revenue-maximizing governments, Kanbur and Keen (1993) show that

⁴⁵ Keen () elaborates on and illustrates this point.

imposition of a minimum tax rate (a tax floor) in the member states may improve welfare in both—even a low tax country forced to raise its rate may benefit from the enhanced ability of the other country to increase the rate it sets—while a policy imposing uniform rates in both countries is undesirable. Some argue, however, that unrestricted tax competition may be a useful mechanism to control the tendency of governments to excessive growth. The case for the EU imposing some form of duty coordination thus, to a certain extent, turns on fundamental differences of philosophy about the nature and value of governments. Those who view governments as choosing tax and spending policies to maximize social welfare may regard tax coordination as a way to ease what would otherwise be an undesirable constraint on the choice of a socially optimal pattern of taxation, while those who believe that there is a natural tendency towards excessive growth in government spending may view tax coordination in a less-positive light, though even in this case some degree of coordination may be desirable if—as seems plausible—policy-makers are not simply unconstrained leviathans.⁴⁶

These considerations suggest to us a strong case for the agreement of minimum excise tax rates. And this is indeed the strategy that the EU has followed since the advent of the single market. The key issue is not the wisdom of the approach, but the low level—zero, in some cases—at which these minima are set. Raising them to more appropriate rates has however proved difficult.

⁴⁶ On this wider political economy issue, see Edwards and Keen (___) and Besley and Smart (___).

VI. CONCLUSIONS: WHAT FUTURE FOR INDIRECT TAXES?

[__work in progress]

A. General theoretical and empirical conclusions about the rate structure of commodity taxes

The thirty years since the Meade Report have seen a remarkable shift in the balance of taxation towards indirect taxation in the UK. To some extent we still lack theory to assess this, and the case for indirect taxation is less obvious when governments have at their disposal powerful income taxes, and a sophisticated range of instruments for redistribution. However, we have argued that there is value in retaining a broad-based consumption tax in parallel with taxes on income, both because the scope for differentiating taxes on different commodities may improve efficiency, and because of the value in spreading revenue-raising across a number of independently-enforced revenue sources.

Arguments for commodity tax differentiation in terms of commodity demand characteristics have rarely been able to draw on empirical estimates which allow for the kinds of interaction between labour supply and commodity demands that are crucial to the case for tax differentiation. Our estimates, which build on the empirical analysis by Browning and Meghir, show significant non-separability in the demands for a number of commodities.

Conventional distributional arguments about the distributional incidence of the VAT are a poor reason for tax differentiation. Distributional goals (in terms of overall progressivity / regressivity of the tax system) can be achieved much more effectively through income taxes than by differentiating commodity taxes. (There may, however, be arguments for tax differentiation based on differences in need across individuals?)

B. Conclusions about the form and specification of the broad-based commodity tax

The adoption of VAT in the EU has been part of a remarkable worldwide spread of this tax over the past three decades. Now, only the US of the OECD countries does not employ some variant of the VAT. The widespread use of the VAT reflects some of its major strengths in relation to alternative systems of general, broad-based sales taxation. In particular, in comparison with a single stage tax applied at the retail stage, the cumulative nature of VAT allows the exclusion of many small firms from the tax without excessive revenue loss. Practically, the VAT appears to be capable of sustaining tax rates of 20 per cent and more without experiencing excessive evasion. The US experience is commonly held to suggest that RST cannot be levied at rates higher than 10 per cent.

Making best use of the practical advantages of VAT implies setting the registration threshold at a level which excludes a significant number of small firms from the obligations to account for and pay the tax, and which reduces, correspondingly, the burden for the tax authorities in administering and enforcing the system.

C. Conclusions about the international aspects of the VAT system

In recent years there has been concern about the exposure of VAT to evasion and fraud; the UK, for example, seems to lose about one pound in every seven of potential VAT revenue through various forms of fraud and evasion. Carousel frauds, which exploit the zero-rating of exports have become a particular source of concern, especially since the abolition of internal EU frontiers at the end of 1992. Some of the policy "fixes" being advocated for this problem (such as the UK's plan for selective reverse charging) are *ad hoc*, and likely to be easily circumvented. In contrast, the German/Austrian proposals for universal reverse charging for B2B transactions are more fundamental, but basically amount to abolition of VAT in favour of a quasi-RST regime. We have argued that a long-term solution to this problem should be based on a reform of the VAT treatment of inter-EU trade, to end the evasion opportunities offered by export zero-rating.

A number of possible approaches could be taken to ending the zero-rating of intra-EU trade. Some of these maintain the current "destination principle" outcome, in which the taxes borne by goods reflect their country of final sale, rather than their country or countries of production. Others could allow some of the tax imposed in the country of production to "stick" with the good through later stages of the chain of production and distribution - "origin-based" VAT, in a fundamental, economic, sense. Although origin-based VAT has been advocated by some authors (and some important neutrality results suggest that they would distort international trade no more than the current zero-rating regime), we think there is no strong case for taking this road.

Instead, we advocate abolishing export zero rating, while attempting to maintain a tax treatment consistent with the destination principle through other administrative routes, in which goods would be exported bearing taxes imposed in the exporting country, while full credit would be given for these taxes in the importing country. One possible approach is the system of "exporter rating" proposed by the EU for the post-1992 regime. Another, which we believe has appreciable advantages over exporter rating, is VIVAT or CVAT, in which a common EU-wide rate of VAT is applied to all intermediate goods sales, while countries would retain the right to impose their own rate of VAT on sales to final consumers. Although this system reintroduces an end-user distinction into VAT (because it requires goods and services to be taxed differently depending on whether the sale is to another business or to a final consumer, it has appreciable advantages the available alternatives, especially in relation to rate-setting incentives and revenue distribution between member states.

There are wider subsidiarity issues that may be hard to avoid: e.g. why should it matter to rest of EU if Germany and Austria were to do reverse charge? The broader question is whether there are UK VAT reforms that, with no adverse spillover effects, are nevertheless prevented under EU rules. Conversely, there are some areas in which more EU intervention could lead to desirable outcomes. For example, it seems unlikely that the elimination of VAT zero-rating would be considered in the UK without some form of external pressure.

D. Conclusions about excise taxes applied to alcohol and tobacco

Recent ECJ cases have highlighted the contrast between the UK's current high excises on alcohol and tobacco and the much lower levels of taxation in many other EU member states. The externalities associated with consumption of these commodities are appreciable, and can provide a firm economic justification for taxing these goods at higher rates than the general VAT. Nevertheless, policy towards these goods need to be informed by a clearer appreciation of the nature and size of the externalities associated with their consumption.

In the case of tobacco taxes, the evidence is highly controversial. Given that smokers die early, saving the rest of society a significant burden in pension and old-age care costs, it is far from clear that the existing level of tobacco taxes can be justified solely on the basis of smoking externalities. "Behavioural" issues of rationality / addiction etc may be particularly important in this area, and may justify higher taxes than would be warranted if decisions were being made by wholly rational, well-informed consumers.

Using alcohol taxes to reduce the externalities associated with alcohol consumption (and, especially, abusive overconsumption). involves targeting the incentive somewhat imprecisely to the underlying externality, since alcohol externalities are not proportional to alcohol consumption but are largely confined to abusive overconsumption by a subset of all consumers. Externality taxation of alcohol thus involves a compromise between the potential gains from reducing external costs of abusive consumption and the welfare costs of discouraging non-abusive consumption.

The external costs of tobacco and alcohol consumption are likely to be heavily affected both by the institutional arrangements for financing healthcare, pensions, and so on, and by the cultural context in which alcohol is consumed. It is therefore unlikely that US estimates can be carried over without modification to the European context, or that externalities will be uniform throughout Europe. Because of the likely differences across European countries in external costs of smoking and alcohol consumption, it is unlikely that the optimal tax treatment of tobacco products and alcoholic drinks will be identical in all members of the EU. Imposing greater uniformity on the very diverse pattern of EU excises may thus involve some economic inefficiency (as well as some limitations on national fiscal sovereignty).

Nevertheless, narrowing differences in alcohol taxes between EU member states would reduce the economic and fiscal costs associated with legal cross-border shopping and with the various forms of illegal smuggling and tax evasion that are encouraged by significant tax differences. The most appropriate form for such EU fiscal coordination to take would be through significant increases in the agreed EU-wide floors to alcohol taxes. There is no obvious Community-wide reason to prevent member states setting higher duty levels than those elsewhere.

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