

The Unobserved Economy

and the UK Laffer Curve

It has been argued that higher tax rates would yield larger tax revenue. From a model of the British Laffer Curve Professors Feige and McGee argue that higher revenue could be derived only at the cost of lower productivity and increased tax rejection.

The Laffer curve, which relates tax rates to tax revenue, has generated much controversy among economists. Most would agree there is some effective tax rate below 100% which obtains maximum government revenues. The real controversy is over what it is, and how it can be determined.

There is an additional issue: what are the costs of setting tax rates to obtain maximum revenues? Without a well-defined model of the relevant structural characteristics of the economy it is difficult to answer these questions. Economists without such a model are left to argue more from intuition than fact, some maintaining that taxes are nowhere near the revenue-maximising rate 'in Britain or any other country' (Hemming and Kay, 'The Laffer Curve', *Fiscal Studies*, Vol. 1, No. 2, March 1980, p. 85), others that taxes have long since passed it. We here apply the model described in our *JEA* article (April 1982) to the UK.

In the October 1979 *Lloyd's Bank Review*, Professor Michael Beenstock presented an estimate of the UK Laffer curve which suggested that maximum revenues occur at an aggregate average tax rate of 60%. The UK's rate is at present well below 60% (it is well to the 'left' of its Laffer curve peak).

In response to Beenstock's article,

The authors gratefully acknowledge the facilities of the Netherlands Institute for Advanced Studies, the support of the A.P. Sloan Foundation and the assistance of Patty Schvey. Copyright 1982 Robert T. McGee and Edgar L. Feige. All rights reserved.

several economists criticised the limitations of his methodology. Primary among their targets was the absence of a fully specified structural model of the economy (Atkinson & Stern and Hutton & Lambert, *Lloyd's Bank Review*, April 1980). By using a reduced form rather than a structural model, Beenstock was unable to show how changes in various structural 'specifications' (such as the progressivity of the tax system, the elasticity of supply, the preference for untaxed output, and so on) altered or shifted the Laffer curve. In essence he had approximated a single Laffer curve relating tax revenues to tax rates and a time trend. The correct functional form of the Laffer curve is determined by the structure of the economy. As such, it will shift with differing specifications of the economy as they reflect its structure.

The responses to Beenstock's article enumerated some of the structural factors which should be accounted for in a more complete model of the Laffer curve. Professor Peter Grinyer (*Lloyd's Bank Review*, January 1980) suggested that, in addition to normal supply-side effects, tax evasion and avoidance might also affect the Laffer curve. The Feige-McGee model described in the April 1982 *JEA* incorporates this distinction between true supply-side (both labour and capital supply) effects and unobserved economy (i.e., tax evasion) effects, and thus permits an examination of the relative role of each of these reactions to the disincentives created by higher taxes.

Another factor which affects the Laffer curve is the progressivity of the

tax system. According to Professors Hemming and Kay (*loc. cit.*, p. 83): 'It should also be clear that the more progressive is the distribution of the tax burden the lower is the amount of revenue which can be raised.' Since marginal tax rates are the relevant supply-side and observed economy disincentives, and since a more progressive tax system means higher marginal rates to obtain the same average tax rate, it follows that progressivity lowers the Laffer curve revenues at every average tax rate and shifts the revenue peak to a lower tax rate as well.

Government expenditure affects the black economy

Another aspect of the total progressivity of fiscal policy is the distribution of government expenditure benefits. Supply-side incentive effects depend upon the manner in which benefits are related to work and investment effort. This is the source of the so-called 'poverty trap' whereby low-income families find themselves facing larger marginal losses from additional work than middle-income families. Hemming and Kay (*loc. cit.*) and Professor Carl Shoup ('Economic Limits to Taxation', *Atlantic Economic Journal*, March 1981) have drawn attention to the importance for the shape of the Laffer curve of the way government spends revenues. For example, Shoup raises the extreme possibility in which government simply subsidises all relative prices by a fixed percent based on its total tax revenues. Incentives would then remain the same regardless of the tax rate. Individuals' incomes would buy the same basket of goods and services because higher tax rates would be used for a higher percentage of overall price subsidy. Obviously the example is unrealistic because it precludes redistribution and re-allocation as motives for public expenditure policy. But it serves to high-

light the importance of the expenditure mix for the shape of the Laffer curve.

Shoup's extreme example would make it possible to collect all of GDP in tax revenues, (i.e., 100% tax rate), but in the real world benefits are more likely to be inversely related to income due to redistributive policy intended to equalise incomes. Therefore, the likely effect of government spending is to make the revenue-maximising tax rate lower rather than higher (as Shoup's example suggests). On this issue our model is neutral. We assume that government expenditures are based on factors other than supply-side effort. To the extent that benefits are inversely related to supply-side effort our model overstates the maximising tax rate. This is an area where more research is required to ascertain benefit designs which encourage, or at least do less to discourage, low-income people (e.g., a negative income tax) from entering the observed labour force.

Simulating the UK Laffer curve

Since changes in tax rates affect total output and its allocation between the taxed and untaxed sector, there is a complex relationship between tax rates and tax revenues implicit in the model. This relationship depends on the basic specifications of the model: the elasticity of supply, the progressivity of the tax system, the preference for untaxed output and the legislated (as opposed to endogenous) component of aggregate tax rates. There is for every combination of these four influences a different Laffer curve showing the relationship between tax revenues and aggregate tax rates. Here we look at how changes in these various components of the Laffer curve influence it, focussing on one particular aspect: the aggregate tax rate which maximises tax revenues under each set of conditions.

A legislated 'across-the-board' cut in

tax rates, say 10%, for every income bracket, will expand total output by an amount that depends on the elasticity of supply. This change in output will affect

both the tax base and the average tax rate. It affects the tax base by raising income. It affects the aggregate tax rate because higher income will be taxed at higher tax rates when the tax system is progressive. The expansion of output will prevent the aggregate tax rate from falling by as much as the 10% cut in individual rates. Thus, to the extent that output expands and the tax system is progressive, there will be a counteracting endogenous rise in the aggregate tax rate. This induced rise in the tax rate will further produce some supply-side contraction, which will partially offset a portion of the initial expansion set in motion by the tax cut.

As if this were not complicated enough, there is an additional interaction that results from the unobserved economy. Besides depending on the progressivity of the tax system and the elasticity of supply, the expansion of the tax base and consequent reaction of the aggregate tax rate to tax cuts will depend on the proportion of expanding

income that leaks into the unobserved untaxed sector. Only the income which remains to be taxed will contribute to the tax base and the offsetting rise in the tax rate caused by the progressivity of the tax system.

In short, there are two direct effects of a tax cut on the tax base: a supply-side effect which expands or contracts total output when taxes are lowered or raised; and an unobserved-economy effect which expands or contracts the proportion of total output in the observed sector as taxes are lowered and raised. These direct effects in turn create an offsetting indirect effect: the change in the tax base induces a partially offsetting response in the aggregate tax rate when taxes are progressive.

How much tax could be raised?

In Table I, we present our estimates of the average tax rate which would maximise tax revenues in the UK under alternative assumptions concerning supply-side effects, progressivity effects and the unobserved-economy effects. Under what we regard to be the most

Table I
Alternative estimates of revenue-maximising average tax rates (%) for the UK (1979)

		SUPPLY SIDE EFFECT								
		INELASTIC			PLAUSIBLY ELASTIC			HIGHLY ELASTIC		
		Unobserved Economy			Unobserved Economy			Unobserved Economy		
		5%	13%	20%	5%	13%	20%	5%	13%	20%
PROGRESSIVITY EFFECT	Proportional Tax System	85.	78.	73.	81.	73.	69.	49.	46.	45.
	Plausibly Progressive	65.	60.	57.	62.	57.	55.	38.	36.	35.
	Highly Progressive	50.	46.	43.	47.	44.	41.	28.	27.	26.

plausible conditions for the UK, we estimate that the Laffer Curve reaches a peak of tax revenues at an average tax rate of 57%. This estimate is based on the same parameters used to estimate the tax revenue loss in our April *JEA* article. The supply-side elasticity, unobserved income as a percent of total income and the progressivity factor are .1; 13%; and 1.3 respectively.

Table I also displays the tax-maximising tax rates for the UK which are derived under different assumptions concerning each of the relevant structural specifications for the UK. The sensitivity analysis reveals that the tax rate at which the Laffer curve reaches a maximum varies from 26% to 85% depending on the extremity of our assumptions of the strength of the effects of supply, unobserved income and progressivity. In general, we see that the revenue-maximising tax rate will be lower: 1) the more elastic is supply; 2) the more progressive the tax system; and 3) the bigger is the unobserved economy.

Table II shows the estimated value of the maximum tax revenue which the authorities could collect by setting the tax rate at its revenue-maximising level. As before, the peak of the Laffer curve depends upon the assumptions believed best to characterise the UK economy. Under the most plausible assumptions, the maximum tax revenue attainable in 1979 was £86 billion. Table II also shows the extent to which this estimate is affected by changing each of the critical assumptions, one at a time, while retaining the most plausible estimates for the others.

In 1979, the actual average tax rate in the UK was 33% as compared to our estimated tax-revenue maximising rate of 57%. Actual tax revenues amounted to £63 billion as compared with the maximum revenues of £86 billion which might have been attained had the economy been pushed to the peak of the Laffer curve. Thus it appears that the UK's economy is presently still below

TABLE II
Estimated maximum tax revenues under alternative assumptions of supply elasticities, progressivity and the unobserved economy*

(£ billions)

Supply Elasticity Assumption (A)

Inelastic	Plausibly Elastic	Highly Elastic
94	86	63

Progressivity Assumption (B)

Proportional	Plausibly Progressive	Highly Progressive
107	86	72

Unobserved Economy Assumption (C)

5%	13%	20%
95	86	83

* In each simulation, all specifications other than that being varied are set at their 'most plausible' value.

the revenue-maximising tax rate.

It should be noted, however, that under plausible assumptions concerning the size of the unobserved sector and the progressivity of the tax system, a highly elastic supply could have produced an estimate of maximum tax revenues of exactly the amount equal to actual tax revenues. This finding indicates the degree to which the Laffer curve flattens as it nears its peak.

We must emphasise that these estimates are offered for comparison of the effects of alternative assumptions on estimates of tax revenues, *not as reliable estimates to be used as a basis for the formulation of policy*. It is clear that reliable revenue estimates depend critically on the precision of specification of the UK economy. Among these is the

size of the unobserved economy. Including this effect in our model helps

to dispel a common misconception, namely that the inelastic supply of factors of production is sufficient to prevent the Laffer curve turning down before 100% tax rates. Since the tax base shrinks as higher tax rates drive a larger proportion of income into the unobserved sector, the Laffer curve will turn down even when total income is unaffected by rising tax rates.

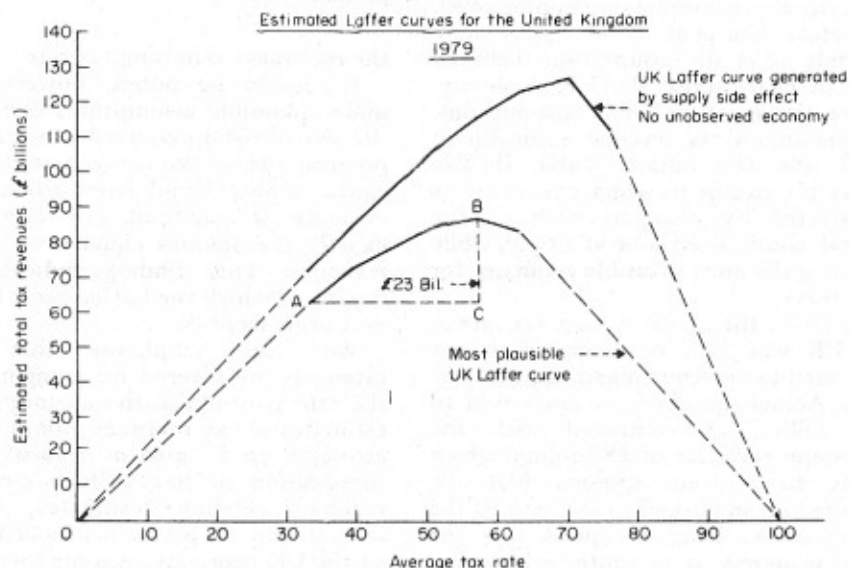
In Figure I we display two alternative Laffer curves which are estimated from our model. The upper curve shows the Laffer curve which would apply to the UK economy if plausible supply-side effects were operating exclusively. In this case, the revenue-maximising tax rate would be 70%; and had the rate been set at this level in 1979, the model predicts that total revenues would have been £127 billion. The lower curve represents our best estimate of the Laffer curve for the UK when progressivity and unobserved-economy effects are accounted for. As we said earlier, this

most plausible Laffer curve peaks at a tax rate of 57% where the revenue yield

would be £80 billion, as compared with the 1979 rate of 33% yielding a revenue of £63 billion. Given the current deficits in the UK economy, some observers might be erroneously tempted to conclude that the additional £23 billion in revenue should have been captured by simply increasing tax rates to their revenue-maximising levels.

In Figure II we therefore present the corresponding decline in GDP we predict will occur if tax rates are indeed pushed to the revenue-maximising level. The lower curve, representing the forecast decline in observed GDP from increasing tax rates, reveals that it will decline sharply as a result of higher taxes. The 1979 position of the economy is represented at point C with a tax rate at 33%. If taxes were raised to the revenue-maximising rate of 57%, this would cause a decline of £40 billion (CD) in observed GDP. The upper curve representing the fall in total GDP reveals that the £40 billion observed fall will

Figure I



consist of a £17 billion actual decline in GDP with the remaining output of £23 billion disappearing into the unobserved economy. The model therefore predicts that on average, every pound of additional revenue raised by increasing tax rates to the revenue-maximising tax rate of 57% will cause a £1 shift into the unobserved sector and a 74 pence shrinkage in the total output of the economy. These economic disincentive effects measure the direct cost in lost output of raising tax rates to their revenue-maximising level. The dramatic shift toward the unobserved economy induced by such increases in tax rates, calls into question the political and sociological consequences to a society which provides significant incentives for anti-social behaviour from its citizens.

Consideration of these costs makes it clear that *the revenue-maximising tax rate is in no sense an 'optimal' rate.*

Before any political decision can be made about an 'optimal' tax rate, citizens and policy makers must be clearly informed about the costs in lost output of increases in tax rates. Moreover, as our analysis demonstrates, higher rates will not only have disincentive effects on supply, but will also induce a substantial shift of economic activity into the unobserved economy. In our example, an increase in rates to the revenue-maximising level will almost double the percentage of total economic activity which takes place in the unobserved sector.

A similar analysis for the United States and Sweden reveals that the US, like the UK, is still well below the revenue-maximising tax rate, but that Sweden has surpassed that rate and is therefore already on the declining portion of the Laffer curve.

Figure II

