A COMMENT ON THE LAFFER MODEL

Max Moszer

One feels constrained to step lightly in an examination of the Laffer curve. Laffer contends that higher tax rates, by removing incentive, will discourage work, lead to less output, and thereby reduce government's total tax revenue. Surely the contention that lower tax rates will yield greater tax revenue is appealing. It should come as no surprise that it is as popular as apple pie and as holy as motherhood. I am painfully aware that, entering the arena with Professor Laffer, I can only lose—if not directly at his hands, and because of the power of his theories, then because winning the debate would be just a Pyrrhic victory. Even the man on the anti-Laffer side still must continue to pay the present, unacceptably high, taxes; the reward of his position will be no further hope for, nor progress toward, tax relief. But the validity of the Laffer curve is indeed open to question, as I hope to demonstrate.

Professor Laffer is both the creator and the catalyst of the taxpayers' revolt that is sweeping America. The rapidly accelerating burden of taxation and the growth of the government sector that it has supported have generated a reaction that is still swelling. Doctor Laffer is in the forefront of this movement; he is its intellectual leader. He has provided the theoretical framework, by an accepted, orthodox application of economic theory, to support the demand for lower tax rates. No serious examination of America's current economic problems, and no significant proposal for tax cuts or tax reform, can fail to include an analysis of the Laffer curve. The Kemp-Roth tax bill is the most persuasive evidence of the public acceptance, the political influence, and the power of this doctrine.

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The author is Professor of Economics at Virginia Commonwealth University, Richmond 23220. He wishes to thank Jang H. Yoo for his comments and suggestions.

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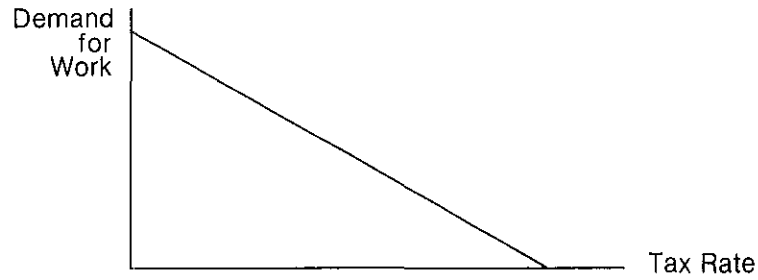
FIGURE 1a
DEMAND FOR WORK DEPENDS ON THE TAX RATE.



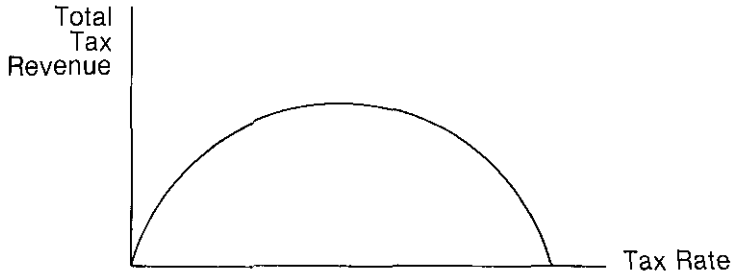
The Laffer curve is just an upside-down or sidewise U. It shows that increases in the tax rate cannot increase government tax receipts indefinitely and without limits. After a critical point, the rising tax rates will yield lower tax collections. These results are based on a simple but fundamental human response to higher tax rates. Yet this is the same reaction economists predict to any higher price. The Laffer curve generalizes this behavior to the demand for work. As the tax rate, the government's price for work, increases, the quantity of work desired falls. This is illustrated in the demand curve of figure 1a. From this the Laffer curve is derived. The curve itself is found in all elementary texts on economics. It demonstrates how a firm with constant unit costs and a linear demand curve can maximize its profits. This is shown in figure 1b. As price increases, the quantity demanded declines. At first, the higher price applied to the fewer units results in greater total revenue. However, before too long, quantity falls in greater proportion than the rise in price. Therefore, the revenues, or the tax receipts, also fall, despite, or because of, the higher price.

It is immaterial whether this process works through the demand mechanism (whereby higher tax rates for the privilege of working reduce the quantity demanded of work) or through the incentive mechanism (whereby higher tax rates require a greater remuneration to bring forth the same amount of effort). The result is similar: Higher tax rates reduce the desire for work; this reduces total output, and total tax collections decline, since taxes are based on output.

The Underground Economy

This supply-side approach to fiscal policy is based on the reasonable proposition that the higher the marginal tax rate the greater is the inducement to substitute leisure for work. The high tax rate

FIGURE 1b
GOVERNMENT REVENUES DEPEND ON THE TAX RATE.



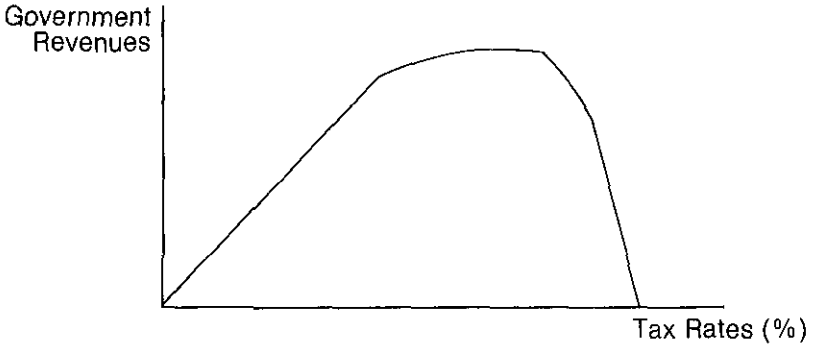
reduces the rewards of work, and at the same time it cuts the cost of leisure. Moreover, the progressive structure of income taxes accelerates this disincentive effect. This becomes especially significant when it is considered in light of the fact that each net-of-tax dollar yields the taxpayer less incremental satisfaction.

Jude Wanniski[1] has added to this strictly legal and ethical economic motivation the claim that "people will not work in the money economy if all the fruits of their labor are confiscated by the government." An underground economy, built on cash and barter, is created instead as individuals attempt to increase their economic gains without paying taxes. High rates thus, in addition to their explicit undesirability, also encourage criminal behavior. This reduces *total* output, since productivity is not as great in the covert market because the optimal specialization and market exchange activities will not be attained. Peter M. Gutmann[2] even introduces the Gutmann curve, as his contribution to the growing belief that the subterranean economy, flourishing as inflation increases the effective real tax rate, is siphoning off an increasing share of the nation's output. Gutmann believes that the pure incentive effect alone – his interpretation of the Laffer curve – is not sufficiently large to replace the revenues lost from rate cuts. Only if the Gutmann effect – the shift from the underground to the legal economy as tax rates are reduced – is combined with the Laffer effect will increased market transactions and legal national output yield an increment in the tax base large enough to more than offset the cut in the tax rate. "The Gutmann curve is very similar to the Laffer curve but purposely skewed to the right [see figure 2] to indicate my belief that

[1]Jude Wanniski, "Taxes, Revenues and the Laffer Curve," *Public Interest*, Winter 1978.

[2]Peter M. Gutmann, "Taxes and the Supply of National Output," *Financial Analysts Journal*, November/December 1979.

FIGURE 2
THE GUTMANN CURVE



government revenues are maximized at tax rates higher than 50 per cent."

Once it is recognized that these illegal economic activities go on, it becomes necessary to distinguish between the tax effect (1) on government revenue and (2) on total output. The switch to the underground market suggests that the impact of higher tax rates is greater on government revenue collections than it is on total output. At first it might seem that the total output effect would be close to zero. Yet it is more reasonable to assume that some, if not most, people's ethics prevent them from participating in an illegal market. Even when they engage in illegal activity, moreover, they find their ability to specialize and to exchange is more limited than in the open, and legal, marketplace. This immediately entails a less than optimum allocation, and a less efficient use, of society's resources. Also, costs are incurred in hiding economic activity and income from the tax collector. These costs necessarily exceed those of legal business—or there would be little incentive to report one's income.

It would be unrealistic to assume that people, in response to higher tax rates, move from the open to the covert economy without a significant transition phase. The intermediate stage is tax avoidance and tax shelter—devices familiar to most of us. There is a shift of resources and demand fulfillment as tax-deductible goods become operationally cheaper relative to non-tax-deductible goods. This means that prices paid by the users—after tax savings are deducted—are less than the cost to society of producing these tax-deductible commodities and services. This greatly encourages tax-deductible consumption. Excessive consumption, greater than it would be if the price were equal to the incremental cost to society,

yields a less than optimal allocation of resources. This is reflected in a smaller bundle of total output. In addition, it must be recognized that the entire tax shelter industry is a distortion from, and results in a reduction of, the output that could be achieved with lower tax rates. Cattle feed programs and tax-avoidance commodity straddles are just some of the schemes that would have no counterpart in a tax-free world.

In summary, higher tax rates initially reduce output less than tax revenues. After a point, tax avoidance and tax evasion increase, so output decreases. However, there is not a smooth transition to zero output as the tax rate increases to 1.0. Some economic activities will be carried on aboveboard regardless of the tax rate. Government services, and the income derived therefrom, are just the most obvious examples. These will be abandoned completely when the tax rate hits unity, but they will never go underground. (To be sure, they too will decline as the tax rate increases; however, this is the result of the disincentive effect on the workers rather than the subterranean-economy effect of higher tax rates.)

The final output function, with the tax rate as the argument, would have three phases. The first segment would have legal output and some minimum illegal output occurring regardless of the tax rate. In phase two, total output declines. Illegal activity is less efficient than open market transactions, and, also in this stage, tax avoidance increases. As the tax rate rises here, illegal activity increases and the total output achieved by society decreases. The total output, however, declines only slightly. Eventually, the limit of underground activity is reached: Increases in the tax rate cannot shift more production into the illegal sphere. This is shown in figure 3a.

FIGURE 3a
OUTPUT REACTIONS TO CHANGES IN THE TAX RATE

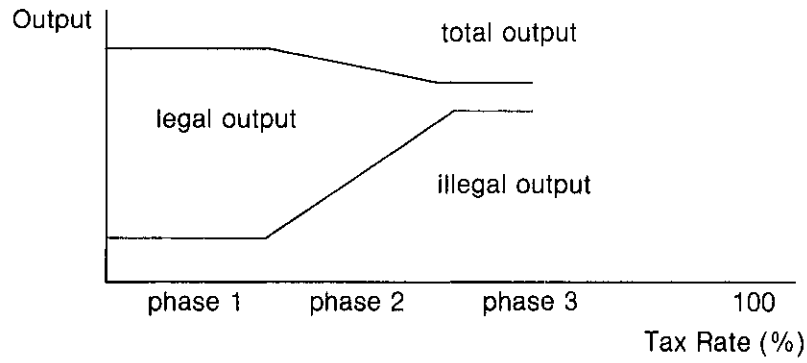
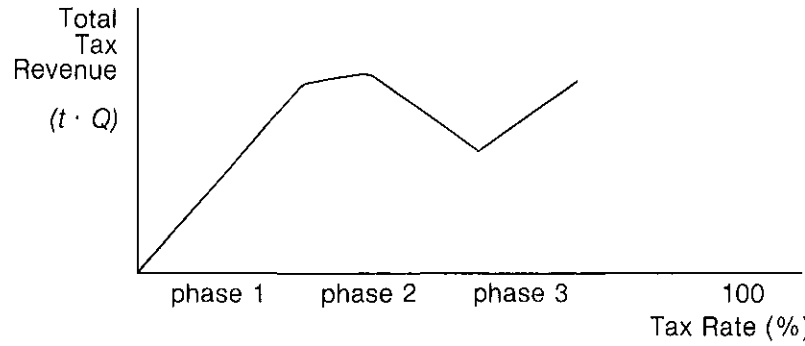


FIGURE 3b
TAX RECEIPTS AS OUTPUT SHIFTS WITH TAX RATES



The government tax receipt function, however, is not the same as the total output function. As is shown in figure 3b, during phase 1, as output stays constant with rising tax rates, total tax receipts rise. During phase 2, with output declining and tax rates increasing, tax receipts initially increase, but after a point they decline. Once illegal output reaches a maximum, and economic activity in total reaches its minimum level, tax receipts *rise*. The last phase is not described in this section, because it does not depend on the shift into illegal activities.

Gutmann, in the cited quotation, expresses the often stated belief that the Laffer curve peaks at the 50 percent tax rate. Furthermore, he feels that current tax rates in the United States are not high enough to make the Laffer curve effect operational. Since the horizontal axis measures *average* tax rates, and a 50 percent average tax indicates a significantly steeper marginal tax on the highest income bracket, this comment is puzzling. Exactly how high need tax rates be for the total receipts function to turn down?

The average federal income tax rate, as a proportion of personal income, was only 13 percent in 1978; state and local income taxes were about 2.5 percent of personal income. Moreover, only 20 percent of income was taxed at marginal rates of 28 percent and higher in 1978. Thus the 50 percent tax rate, the rate at which higher tax rates become self-defeating, is still quite far away.

The maximum point on the tax collection function, however, need not occur at the 50 percent average tax rate point. Referring to figure 1, it is only when the demand curve is linear that the inflection point of the revenue function is located halfway between the maximum price and the zero mark. There is no logical nor economic reason for the Laffer curve, just because it is drawn symmetrical

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to the two endpoints, to have its maximum located at the 50 percent tax rate. In fact, the relationship between tax rates and tax receipts, the relationship summarized by the Laffer curve, is not exactly the same as the demand and total revenue curves of figure 1. There, the revenue function is

$$R = PQ \tag{1}$$

where $Q = f(P)$;
thus $R = Pf(P)$
and $O = Pf'(P) + f(P).$ (2a)
Or $O = 1 + [P/f(P)]f'(P),$ (2b)

which is the necessary condition for a maximum. This means that the elasticity of demand, the second term in equation (2b), must equal one to reach the revenue maximum. By contrast, the tax revenue formulation, in its simplest form, is

$$T = twL \tag{3}$$

where T = total tax receipts,
t = the average tax rate,
w = the rate of factor remuneration, and
L = the quantity of the factor.

In this case,

$$w = h(t),$$
$$L = g(w),$$

and thus $T = t[h(t) \cdot g(w)].$ (4)

The first order condition for the maximum is

$$O = 1 + E_{w \cdot t} + E_{L \cdot t}. \tag{5}$$

This inflection point depends on the elasticity of remuneration relative to the tax rate, $E_{w \cdot t}$, and the elasticity of factor supply, $E_{L \cdot t}$, responding to the tax rate which, in turn, causes a change in the remuneration rate. Even the stripped-down form of the tax function in equation (3) yields a complex relationship. Moreover, at least two constraints on the maximizing process are required. First, it is necessary that wL, the total family income, not be permitted to fall below a minimum subsistence level. Secondly, the factor supply function, especially when it refers to the bulk of income that is earned from providing labor services, is subject to arbitrary, institutional restraints on both the maximum and the minimum number of hours and/or days that can, or need, be marketed.

Furthermore, the revenue function requires disaggregation. It becomes

$$T = \Sigma_j \Sigma_i t_j W_{ji} L_{ji}. \quad (6)$$

The elasticities of remuneration differ since market conditions in professions and occupations permit participants various degrees of latitude in passing forward cost increases, such as the change in the rate of taxation. Similar considerations are also valid for the elasticities of resource supply. Finally, several tax rates must be introduced: ordinary labor income, dividend income, capital gains income, and corporate income.

These complicating factors demonstrate that, at the very least, the Laffer curve does not have its maximum at the 50 percent average tax rate. In fact, it is likely that it may not be a smooth, well-behaved function at all. Thus, while it is appropriate to claim that tax rates are excessive if government revenues are to be maximized, it is an oversimplification to expect to find this point of no return by examining the Laffer curve.

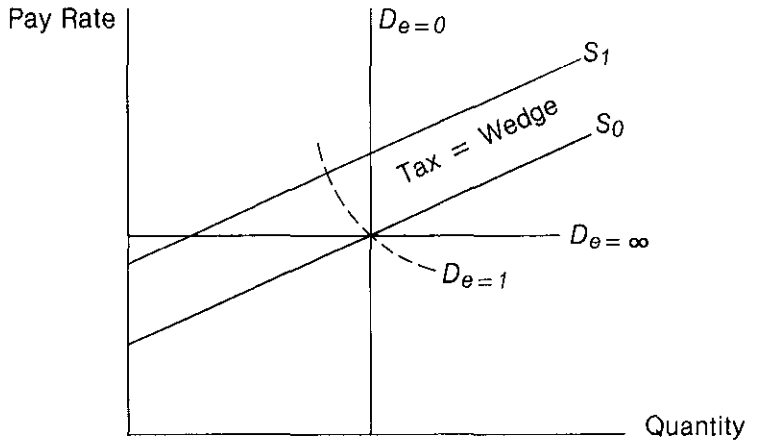
The Micro Market Aspects

Laffer[3] considers the income tax as a wedge between the price received by the factor owner and the cost paid by the firm. The wedge is the amount of the tax; it shifts the supply curve upward, or to the left if prices are plotted vertically. After the tax is imposed, resource owners will reduce the amount of work they are willing to supply – unless their response is completely inelastic to price. The wedge, then, also represents the additional amount needed by the resource to offer the identical level of services as before the tax. The actual effect of the tax depends on the elasticity of the supply curve.

Since this income tax is just another cost of working, it could be treated just like an indirect business tax imposed on a seller. The tax shifts up the supply curve; it is simply added to the offering price. Surely the supplier would like to recoup the entire tax payment. Yet this does not mean that the post-tax price will be greater by the full amount of the tax. The impact of the tax depends also on the elasticity of demand. As is shown in figure 4, for a given supply curve, the tax has both a price effect and a quantity effect. Only when the demand is completely inelastic, and then regardless of

[3]V. A. Canto, A. B. Laffer, and O. Odogwu, "The Output and Employment Effects of Fiscal Policy in a Classical Model," mimeographed (Los Angeles, Calif.: University of Southern California, 1977).

FIGURE 4
THE IMPACT OF DEMAND ELASTICITIES ON THE SUPPLY OF RESOURCES



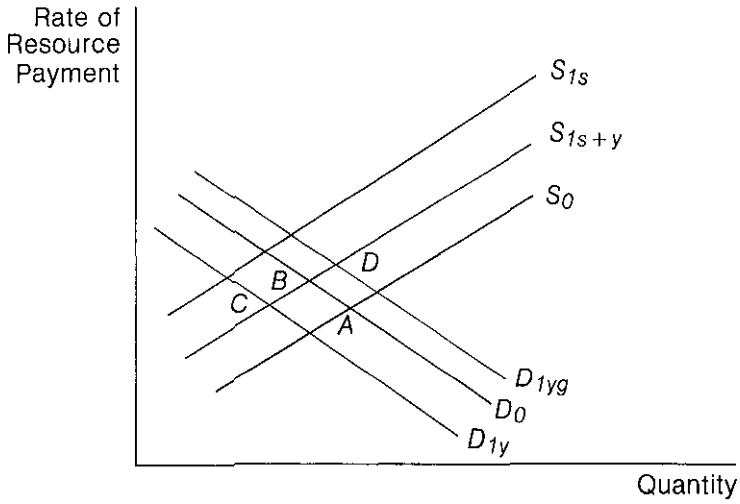
the elasticity of the supply curve, is the tax in its entirety passed on to the buyer. Obviously when the quantity demanded is not at all responsive to price, the amount offered, produced, and exchanged is unaltered by the tax.

As the elasticity of demand increases, the supplier's ability to pass on the tax weakens. The quantity adjustment becomes more important. Eventually the other extreme is reached: Infinite demand elasticity means that the tax cannot alter price; the entire impact of the tax is evidenced by a reduction in the quantity. The disincentive effect of the tax, brought to our attention by Professor Laffer, is clear. At any demand elasticity greater than zero, the tax results in a reduction of economic activity. Similarly, elimination or reduction of the tax increases output.

The household supply curve, however, is not motivated, as is the firm's, by profit objectives. The family has alternative uses for its resources of labor *and* capital. This substitution effect causes the leisure uses of labor and capital to become more valuable, or less costly, in terms of market receipts, as the tax rate rises. This is offset by the income effect: the desire for, and the need of, income to maximize total satisfaction. As the tax rate rises, there is a need to offer greater quantities of resources to maintain the previous standard of satisfaction. The shift of the supply curve in response to a tax rate change then depends on the interaction and the net value of the substitution and income effects.

The magnitudes of these factors, unfortunately, are not at hand. Yet some inferences can be made about their relative size. Assume

FIGURE 5
IMPACTS OF TAXES ON SUPPLY, DEMAND, AND QUANTITY



that taxes were to increase by $10. At the very most, moved by the substitution effect, the supply curve would shift up by $10. However, the chances are that the shift would be less than the full amount of the tax. The income effect would offset this shift. As taxes increase, the need to earn greater gross income increases. The upward shift would then be mitigated as the income effect holds the curve to a shift less than the jump in taxes. This is shown in figure 5, where the original supply curve, S_0, first shifts up to S_{1s}, the substitution effect, and then down to its final position of S_{1s+y} as the income effect is added.

The total work and output impact of the tax increase can now be evaluated. The tax will reduce the incentive to work. This shifts up the supply curve by a wedge no greater than the tax. The income effect now comes into play; greater quantities of resources need to be sold to earn the same take-home income. The supply curve shifts down. The net effect is indeterminate. However, the total shift in the supply curve would be less than the tax increment. With a stable demand curve, total resources used and market output might decline after the tax increase. However, the stronger the desire to maintain standards of satisfaction, the greater will be the tendency for the supply curve shifts to offset each other.

If there is a net decrease in the supply function *and* in the net income of the selling households, the aggregate demand curve will shift down. This decline, however, since the marginal propensity to

consume is smaller than one, will be less than the decline in income. The tax receipts of government, on the other hand, will be spent in their entirety, either by the government itself or by those households that receive transfers. Thus the increase in spending will exceed the decrease in spending caused by the tax inducement. The demand for total output, therefore, will shift up. These movements are shown in figure 5.

On balance, there is no conclusive reason to believe the after-tax position will result in less output than the pre-tax-change equilibrium. Originally, the intersection of S_0 and D_0 at A describes the pretax position. Considering only the supply shifts, with the substitution effect greater than the income effect, the new position at B as S_{1sy} and D_0 cross, indicates that output has declined with tax increases. Once the demand shifts are introduced, the demand curve shifts *up* to D_{1yg} and the new intersection with the S_{1sy} curve is at D. This may be to the left or the right of A, indicating that less or more factor resources have been hired.

If the income effect of the resource sellers plus the spending effect of the government and the transfer recipients is greater than the substitution and the spending effects of the households that are selling resources, then the posttax output will be greater than the pretax equilibrium. D will be located to the right of A. There may exist a paradox of taxation. For if the supply curve shift is less than the tax rate, and the demand curve shift exceeds that, then higher tax rates mean more output – not less – even if the incentive to work and to save has been reduced.[4]

The net impact of the tax change on the quantity of resources hired and the total output depends on the elasticities of demand and of supply. The greater these elasticities, the greater will be the increase in price and the smaller the reduction in output. What values seem reasonable? Over the near and the intermediate terms, the demand for labor and for machinery is free of substantial responsiveness to price change; substitution is limited by the embedded production process. Major shifts in factor use would seem almost impossible despite managements' desires to minimize costs.

The supply of labor, even in the short run, is probably more responsive to price opportunities in *specific* industries, occupations, and locations than it is in the aggregate. While some price elasticity in the total supply of labor exists, it would not seem reasonable to expect it to be large. Though the supply of labor is not static, its

[4]There may be a tax illusion at work. This would mean that harder and longer work for more pretax income but less net-of-tax income is preferred to less work and lower gross pay but greater net pay.

TABLE 1

SELECTED INCOME, TAX, SPENDING, AND LABOR FORCE DATA

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
1. Personal Income	537	585	627	685	746	801	859	943	1,052	1,155	1,256	1,382	1,532	1,717	1,924
2. Transfers	40	45	53	60	67	80	94	104	119	141	178	194	208	224	252
3a. Earned Personal Income[1]	497	540	574	625	679	721	765	839	933	1,014	1,078	1,188	1,324	1,493	1,672
3b. Personal Taxes[2]	65	75	82	97	115	115	116	141	151	170	169	197	226	259	300
4. Disposable Earned Income	432	465	492	528	564	606	649	697	782	844	909	991	1,098	1,234	1,372
5. Effective Tax Rate	13.1	13.9	14.3	15.5	16.9	16.0	15.2	16.8	16.2	16.8	15.7	16.6	17.7	17.3	17.9
6. Consumption Less Transfers	390	420	437	476	513	539	574	629	691	749	801	896	1,002	1,127	1,258
7. Earned Propensity to Consume[3]	90.3	90.3	88.8	90.2	91.0	88.9	88.4	90.2	88.4	88.7	88.1	90.4	91.3	91.3	91.7
8. Real Weekly Wage All Industries	139	147	151	155	158	160	163	168	172	168	167	171	176	177	
9. Growth Rate (%)	3.1	5.8	2.7	2.6	1.9	1.3	1.9	3.1	2.4	−2.3	−0.1	2.4	2.9	0.6	

TABLE 1 continued

SELECTED INCOME, TAX, SPENDING, AND LABOR FORCE DATA

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Labor Force Participation Rates (%)															
10. Total	58.9	59.2	59.6	59.6	60.1	60.4	60.2	60.4	60.8	61.3	61.2	61.6	62.3	63.2	63.7
11. Male	80.7	80.4	80.4	80.1	79.9	79.7	79.1	79.0	78.9	78.7	77.9	77.5	77.7	77.9	77.9
12. Female	39.2	40.3	41.1	41.6	42.8	43.3	43.3	43.9	44.7	45.6	46.3	47.3	48.5	50.0	51.0
13. Growth Rate	1.3	2.8	1.2	1.2	2.9	1.2	–	1.4	1.8	2.0	1.5	2.2	2.5	3.1	2.0

SOURCE: Wharton Econometric Associates Data Bank

1. Wages and salaries, interest, rent, dividends, and proprietor income.
2. Federal, state, and local government tax and nontax payments.
3. Assumes that the propensity to consume of transfers equal to 1.0.

movements are likely to be the result of, and restrained by, institutional and technological shifts. The current recession-inflation can provide some insights into the responsiveness of labor to changes in the real wage. The last two years have seen a continuous decline in the real wage. There is little indication that the labor force participation rate—the indicator of the supply of labor—has declined. Surely no one should be suffering from a money illusion, since the acceleration of prices has received ample publicity. Workers are evidently not very responsive to changes in the real wage. Since it is unlikely that households are not aware of the rate of inflation, it also seems that the income effect is substantially stronger than the substitution effect.

Consider the rise in the labor force participation rate of women. Over the past sixty years this has occurred against a background of increasing social welfare programs and a rising effective tax rate. Both these factors decrease the relative price of remunerative work relative to leisure. It is hard to accept the hypothesis of substantial elasticity even in the long run in the supply curve of labor given the persistent increase in the number of women in the labor force. Moreover, since 1965, the rise in the effective tax rate has been accompanied by a decline in the rate of growth of real wages. This can be seen in table 1. The effective tax rate on earned personal income—that is, personal income minus transfers—has increased over the entire period covered (see line 5 in the table). In 1979 it was almost half again as large as in 1965. Moreover, the effective tax rate is an average; thus it tends to understate systematically the marginal tax rate as the average rate rises. Since most married women are not the prime earners in their household, then with progressive income taxes, the appropriate tax rates allocated to their incomes are much larger than for their male counterparts. Even if the women were to earn more, given the chronology of family formation and the resultant entry into the labor force, their incomes would still be charged the marginal rate of the higher tax bracket. Yet the entry rate of women into the labor force has continued unabated. In fact, it increased in the very years that the tax rate was reaching new highs. In the nine years between 1965 and 1973, the growth rate of female labor-force participation exceeded 2 percent only twice. In the five years since then, the growth rate was greater than that five times. The growth rate in the real weekly wage (line 9) was greater in the early period, when the female entry rate was not as large, than in the last five years. Yet this latter period shows the labor force participation rate growing more rapidly. None of these associations of data can be used to substantiate the contention

that there is a substantial elasticity of labor supply with respect to effective tax rates nor with respect to real wages.

The trend of men's participation rates is down over the entire period. Most of this reflects a shift in the age brackets of male workers. The older groups' participation rates have declined while those of the two youngest groups have increased. One might argue that the mature workers have a greater opportunity to shift out since the income effect is not as urgent, given the accumulation of pension rights and other assets over their lifetimes. Yet it would be possible to sustain the claim that the younger groups have fewer resources and that therefore their responsiveness to the economic choices is smaller. The data, then, for male participation are inconclusive. There seems to be little evidence that the supply of labor is elastic. This means that the quantity effect of a tax rate change would be small.

Even if the substitution effect is greater than the income effects and if the supply curve shifts up in response to higher taxes, the decline in output need not lead to lower government tax receipts. If the demand for resources is inelastic, then, at the higher supply price and with fewer units hired, the total wage bill and income earned will be greater. After taxes have risen, total labor income will also rise. Since government tax collections are related to resource income, tax receipts, too, will increase. This result, based on the inelasticity of the demand curve, will occur despite the disincentive effect of the higher tax burden. Thus the Laffer curve forecast would not prove to be correct.[5]

The demand for investment capital, the other resource in the labor-capital production function, is not very responsive to price. The long literature on monetary policy[6] and the ineffectiveness of reducing interest rates indicate this. The supply side is more difficult to characterize. One complicating factor is the role of corporate savings and the way that individuals use this vehicle to increase their personal asset balance. The past two years have seen a drastic change in the level of nominal interest rates and in the personal savings ratio. Given the decline in the savings ratio and in the real rate of interest, it would be appropriate to infer that the personal savings function is quite interest-elastic. Yet the falloff might be attributable to the strengthening of inflationary expectations, the shift into commodities, and the decline in real income.

[5]If the production function is Cobb-Douglas, the elasticity of demand for resources is unitary. Income will be uniform regardless of the tax rate.

[6]See, for example, Michael K. Evans, *Macroeconomic Activity* (New York: Harper & Row, 1969).

Even if the supply of savings were interest-elastic, reductions in taxes would increase only the quantity saved, and with an inelastic demand for investment, would not lead to an increase in government revenue. It seems unproductive to explore the income tax rate elasticity of the personal savings function when Congress has created, and permits the continuation of, substantial imperfections for the bulk of savers. These small savers are faced with 6 percent ceilings on passbook savings, minimum requirements on longer certificates, and Treasury issues in astronomical denominations. Just recently, new restrictions were placed on money-market funds. Yet these have done more to evade the arbitrary legal restrictions on the money market, and encourage saving, than any other measure that comes to mind. It is ill advised to consider whether tax cuts, or exemptions of interest income, would call forth greater personal saving. Government could achieve this goal easily by constraining its extravagant growth, which prevents most households from entering the money market and earning the going rate of return on their savings.

It is clear that the tax imposes a wedge between the marginal revenue product of the resource and its market remuneration. It is questionable, though, whether it is appropriate to construct this wedge as a constant as is done by Laffer. His figures 1 and 2 in "The Output and Employment Effects of Fiscal Policy in a Classical Model" show constant shifts even though the text treats the tax as proportional. The diagram is reproduced here as figure 6. It shows a lump-sum tax, rather than a tax related to the level of income. The lump-sum tax shifts up the supply curve without changing its slope. Thus the magnitude of the disincentive effect is the same regardless of the wage rate. This causes the relative burden of the tax, and its associated discouraging effect, to decrease as income rises. Moreover, the income tax structure in the United States is progressive: It yields a greater effective tax rate as income rises. This means that the wedge becomes larger as the wage rate increases. This is shown in figure 7. The supply curve shifts up to S_c since the tax is unchanged at all income levels. The supply curve that reflects the progressive tax structures is S_p. At a minimum its relative burden and monetary disincentive is equal for all wage rates. The wedge is relatively greater for the high-income earner than for those at the lower end of the wage gamut.

For any demand curve, a tax cut will lead to a much greater response in the quantity when the shift is from the proportional or progressive tax, S_p, than when it is from the lump-sum tax, S_c. Yet to assess the economic and the revenue impact of a tax change, the

FIGURE 6
THE TAX EFFECT ON QUANTITY, LUMP SUM

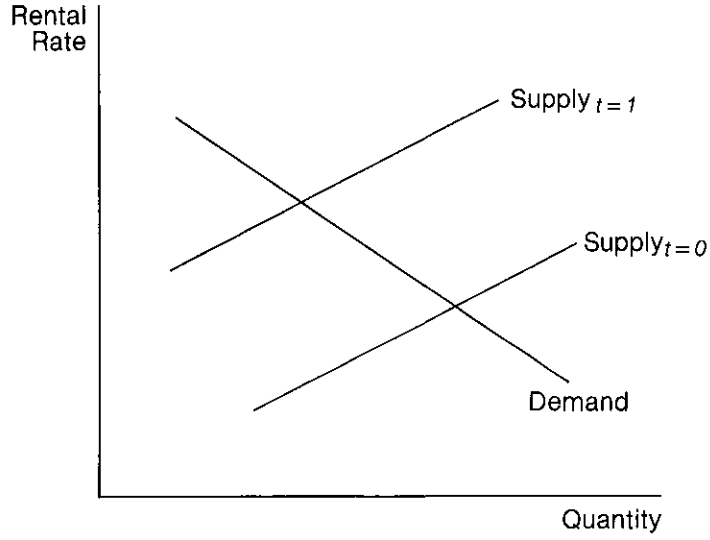
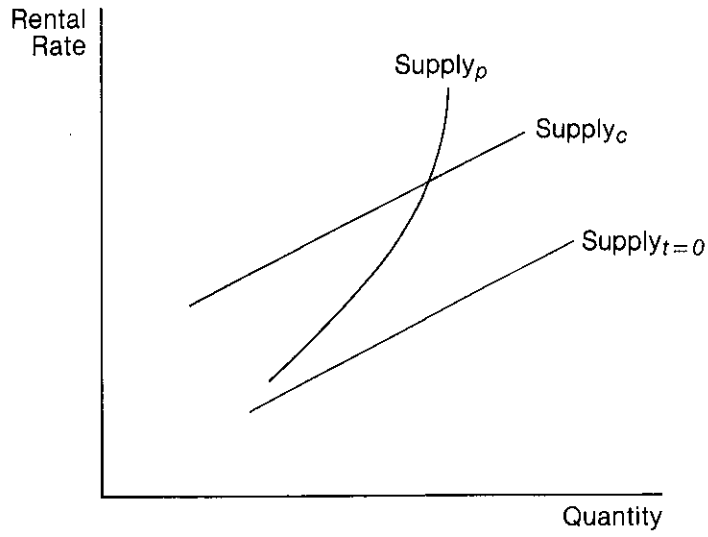


FIGURE 7
THE TAX EFFECT ON SUPPLY, LUMP SUM AND PROGRESSIVE



elasticity of demand for the resource must be considered. If the wage rate structure reflects the occupational distribution and the scarcity of skills, then it would be reasonable to assume that the elasticity of demand for the low-wage workers is far greater than that for high-wage employees. This is the result of relative ease of substitution. Managers and professional workers have more protection from alternative production processes; machines may be incapable of the work managers do. Other people may not have the training or the opportunities to fill these jobs.

On the supply side, given the differential wedge, the elasticity falls as the wage rate rises. The low-income worker has a less elastic supply than the high-income worker. Yet the low-income worker faces a more elastic demand curve than the high-income worker. In both cases, therefore, the quantity effect is offset by the price effect. For the low-income worker it is the result of the inelasticity of the supply curve; for the high-income worker this is achieved by the inelasticity of the demand curve. Therefore the tax rate change would seem to have the same relative impact on the quantity of work regardless of the wage rate.

It would seem reasonable to conclude that supply responses to tax rate changes are likely to be of small order. However, even if the elasticity of supply were substantial, it is doubtful that the institutional rigidities of the labor market would permit the realization of the additional desire for work. While allocative efficiency and Pareto optimality are useful devices, unfortunately the real world offers restricted, noncontinuous choices. Nowhere is this imperfection more in evidence than in the labor market. The number of hours in a workday and the length of vacations cannot be negotiated by individuals. Either one works the regular shift in its entirety or one does not get, or keep, the job. Overtime cannot be had at will and must be worked when offered. Moonlighting is discouraged; even this name for a second job suggests cheating at worst and inability to meet bills at best. Every so often one reads of a professor, with two or even three teaching appointments, who turns in astounding performances at each institution, has tenure and all... and who, when found out, is forced to quit the other jobs. It is difficult to imagine executives holding similar jobs in two different firms. Moreover, given the primary eight-to-five business day, second jobs mean less desirable hours; besides, the duties of some managers and professionals are limited to the prime shift. It would require substantial tax rate changes to shift the supply curve enough to make more people want to work a full eight-hour shift at a less desirable time.

The Laffer curve cannot be justified by claiming that the rigidities and distortions from optimality exist now as well. Substantial incentives would be required to move individuals over the discontinuities. "Reasonable" tax cuts would not be capable of achieving this result. Alternatively, restructuring the workday and removing obstacles to free flows of labor and capital in response to small price changes would yield far greater results—more output and more government revenues—at a much smaller cost.

The Macro Aspects

The essence of Laffer's supply-side economics is that rewards are required to entice work effort. Increasing the rewards encourages production. Since taxes reduce the effective pay, all government actions reduce output. The traditional theory holds that it is impossible to know a priori whether a cut in rates will reduce or increase the desire to work.[7] The income effect, indicative of the need to work more at lower recompense, may or may not outweigh the substitution effect, now that the cost of leisure, relative to work, has fallen. Laffer[8] aggregates over all taxpayers and transfer recipients. Since the former's loss becomes the latter's gain, he claims that their combined income effects add up to zero. All that is left is the negative substitution effect of *both* parties. This causes income and output decline.

There is no reason to believe that the two income effects are equal in absolute terms. This depends on the taste structure of each member of the society. It is unlikely, in fact, that these would be uniform over people selected at random. Here the requirement is much more stringent. They need to be the same for individuals separated by wide gulfs in earnings, occupations, education, and social positions. Indeed, the burden of proof of this assertion rests with Professor Laffer.

It is true, of course, that a dollar taken away by government yields a dollar of income to the transfer recipient. With taxes on income, the taxpayer, however, needs to earn more than a dollar to return to the previous net income position. With the progressivity of income taxes, redistributions from those in the upper levels must lead to a greater positive income effect than the negative impacts

[7] Richard A. Musgrave and Peggy B. Musgrave, *Public Finance in Theory and Practice,* 2nd ed. (New York: McGraw-Hill, 1973), p. 407.

[8] Arthur B. Laffer, "An Equilibrium Rational Macroeconomic Framework," in *Economic Issues of the Eighties,* ed. Nake M. Kamrani and Richard Day (Baltimore, Md.: Johns Hopkins University Press, 1980).

felt by the receivers of these funds, who are clustered in much lower, if any, marginal tax brackets.

The structure that Laffer envisions is of resource owners, highly responsive to net-of-tax rewards, moving in and out of the marketplace. It is cost-biased. Work offers decline as the tax rate rises. The employer will hire fewer workers as the tax wedge increases. Nowhere in this analysis is there a recognition of the role of the sales, price, and profit expectations of business firms. Surely output is produced only in anticipation of final demand, regardless of the cheapness of the resource inputs. Neglecting this factor, Laffer can claim that "countercyclical government spending increases the economy's cyclicality."[9] This result occurs because less real output remains for those who work to support the unemployed. In this formulation, transfers result in less incentive to work. Even during recession, those who are still employed, while the unemployed mill around them, will quit or work fewer hours, because the rewards, in real terms, have declined. It is doubtful that the substitution effect is so great. This sequence, however, overlooks the role of aggregate demand. Unemployment compensation and other transfers that are triggered by the business cycle may have welfare dimensions; for the macroeconomist, however, they are automatic stabilizers. They dampen the cut in employment and output—and in income, and other, tax receipts—by maintaining total demand. This leads to an enhancement of the business climate that encourages production by increasing profitability; it is reasonable to assume that this will outweigh the substitution effect.

The hypothesis that tax increases discourage work has an implicit corollary. Occupations and professions that permit tax evasion would experience an influx of workers when taxes increase; these industries would be expected to expand. Underreporting of tips by waitresses, waiters, and taxi drivers are especially difficult to police. As shown in table 1, the effective tax rate since 1965 has an upward trend. We would anticipate on the tax account an increase in the number of well-served restaurants and available taxis. Yet, during this time, the traditional restaurant has given way to the fast-food operation. Taxis have become increasingly difficult to find. These results are contrary to the theoretical presumption that tax rates are of significant importance in motivating the supply of resources.

The Internal Revenue Service's study on tax evasion[10] estimates

[9]Ibid.

[10]Department of the Treasury, Internal Revenue Service, *Estimates of Income Un-*

that between 6 percent and 8 percent of total personal income in 1976 went unreported. The largest part of this shortfall – almost $100 billion – was attributed to individuals who were self-employed in proprietorships or partnerships. Casual empiricism would not uphold the contention that rising effective tax rates have led to an expansion of small businesses and proprietorships in recent times. To the contrary, there has been an upsurge in franchising. This method of operation has accounting procedures that are oriented to audit schemes that maximize the franchisor's profits; this reduces the ability of the individual businessperson to underreport income to the IRS. Regardless of the reasons for the expansion of franchising, these tax-related features cast doubt on the hypothesis that changes in effective tax rates are important considerations in determining the supply of total output.

Congress has sponsored much research in its attempt to evaluate the advisability of legislating the massive tax cuts specified in the Kemp-Roth bill. Walter Heller, for example, sheds light on the claim that the 1964 Kennedy-Johnson tax cut worked through supply-side, rather than demand-side, stimulation. Heller testified[11] that the success of the tax cut was the result of increased desires and abilities to spend. He notes that if the recovery in output were the result of policy-oriented shifts in supply, substantial jumps in productivity and capacity should have occurred after the tax cut. Yet no significant changes in these measures were discovered. He therefore dismisses the supply-side argument.

The econometric model studies and simulations are inconclusive. The mainline models – such as Wharton and DRI – do not have structural equations that can be used to test the economic effects of tax cuts. They initiate these changes by arbitrary assignment of values to tax-related variables and then let the model run. Professor Laffer and Michael Evans, individually, have developed models whose simulations, it is claimed, uphold the supply-side thesis. They are said to show that substantial output and tax gains are possible by reducing tax rates. Since there have been few, if any, peacetime tax cuts that were supply-side in nature, it is difficult to perceive what data points were used to estimate the parameters of

reported on Individual Income Tax Returns (Washington, D.C.: Government Printing Office, September 1977).

[11]Walter W. Heller, "Tax Cuts, the Kemp-Roth Bill and the Laffer Curve," statement before the Midyear Review Hearing, Joint Economic Committee, June 28, 1978. This, and other viewpoints, can be found in Donald W. Kiefer, "An Economic Analysis of the Kemp-Roth Tax Cut Bill. . ." (Washington, D.C.: Congressional Research Service, Library of Congress, July 31, 1978).

these supply-side models. Accordingly, it is wiser to reserve judgment on the econometrics of supply-side economics.

One thing is certain, though. For the supply effects of the Laffer curve to work, for the tax rate cuts to cause an increase large enough in output to recoup the loss from reducing the rate of taxation, the multiplier effect has to be large. For example, federal income taxes of $224 billion represented 15.6 percent of the 1979 real GNP of $1432 billion. A tax cut to an effective average rate of 10 percent would require a jump in real output to $2240 billion just to make the tax receipts at the new, lower rate equal to last year's actual collections. The required increase in real output is $808 billion; the dollar value of this tax cut is $81 billion (the tax collections of 1979 less the 1979 GNP taxed at 10 percent). This yields a multiplier requirement as large as 10−$808 divided by $81. In contrast, the working econometric models have tax multipliers no greater than 2, and most lie in the range of 1¼ to 2. Surely such divergence in the multiplier is not realistic. It is not consistent with the record of the major models over the past twenty-five years.

Conclusions

The contribution of the Laffer curve is significant. It reminds us that supply-side impacts are important and must be included in economic policy decisions. Surely if the incentive effect has been underestimated, the work of Professor Laffer will help demonstrate its importance. The ability of tax rate cuts from present levels to increase tax receipts, however, remains doubtful. Increases in output that follow tax cuts are principally demand- and multiplier-related. Until substantial productivity changes and capacity increments from tax cuts can be demonstrated, supply-side stimulation will play a secondary role in macro policy. Indeed, the current drive to deregulation, if it were extended to the labor and the small savers' money market, would probably show greater output and tax returns than tax cuts. Moreover, such dismantling of government interferences would be consistent with our traditions of limiting government roles. Their effects and marginal impacts would be more manageable and measurable than a tax cut as huge as that recommended by Professor Laffer and the Kemp-Roth bill.