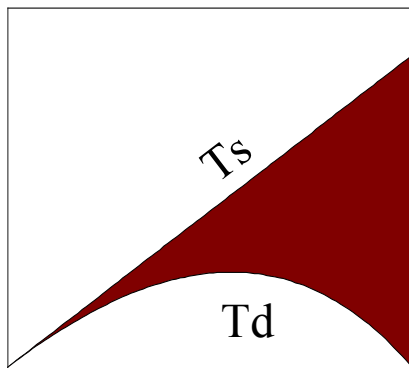


Dynamic Scoring

Increasing Prosperity Through GDP Growth



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Dynamic Scoring

Increasing Prosperity Through GDP Growth

Background

Why do I care about Dynamic Scoring? If you pay taxes and care about long term economic growth, you should become familiar with the concept of Dynamic Scoring. Today, Congress projects funding increases from a tax rate change without regard to impacts on incentives and economic behavior. The costs associated with lost incentives can be 17% of lifetime consumption as will be seen in the social security case study. The process of static scoring opaquely measures the impact of tax rate changes. While Static versus Dynamic Scoring may sound arcane at first, they boil down to accurately and transparently measuring tax collections. Just like the Annual Percentage Rate (APR) brings transparency to the true costs of borrowing money, Dynamic Scoring brings transparency to the true costs of government extracting resources from a market economy to fund its functions, operations and transfer payments.

If GDP does not grow or even recedes, resources allocated to public needs will be ultimately constrained. This implies a shift in how a federal budget should be constructed from spending driven to growth driven. One could think of this shift in budget creation in a manner that a typical household constructs its budget. First a level of income is established. Next, allowable long-term (mortgage, retirement) and short-term (entertainment, food etc) expenses are deducted from this income constraint. The remaining funds will be invested, increasing future consumption. Similarly, the federal government should set its income constraint each budget cycle based on a reasonable level of resources extracted from the economy as defined below.

Dynamic scoring transparently determines the level of government funding derived from the economy based on tax rates compatible with good GDP growth. Spending must then be constrained to this limit. Moving tax rates beyond these levels will collect little or no additional income. In fact, should rates be set significantly higher, a Tax Gap will emerge between the tax rate set on *static* assumptions on a GDP impact and *dynamic* assumptions on GDP impact. The Tax Gap is the difference between what should apparently be collected based on static rules and actual collections.

Anyone who pays taxes and wants to lower their tax burden should care about Dynamic Scoring

- Government spending has been ballooning with funds going to:
 - Questionable projects such as the 'bridge to nowhere' in the highway bill
 - Unsustainable, Soaring Social Security and Medicare entitlements due to the baby bust generational shift
- Ultimate government spending will be constrained by GDP size, because there is a limit to funds that can be extracted from an economy from high tax rates....

Tax Speed
Limit
15%*
Capital Gains

Tax Speed
Limit
34%**
Labor Income

Tax rate increases beyond these rates do NOT significantly increase funds to the US Treasury. Decreased economic activity creates a 'Tax Gap' between expected and collected tax dollars

Dynamic scoring seeks to bring more transparency to the budgeting process by accurately predicting revenue collections. Currently the budgeting process effectively works in the opposite fashion as events unfold in the reverse order as described above. Spending drives the current process, especially ‘must pass’ bills, earmarks and entitlement transfer payments that generally grow based on constituent demand. Next, the level of funding is determined by summing spending requests. Finally, tax rates are mechanically set, assuming no impact on GDP growth, allowing for a proportional increase in expected revenues to the treasury. Contrast this spending driven budgeting process based on static models, with GDP growth driven process based on dynamic scoring models.

What?

Dynamic Scoring

Definition: Political/economic forecasting technique that assumes budget reductions stimulate economic activity thereby further reducing budget deficits

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Why?

Lower tax rates imposed on citizens to maximize overall well being of society through higher economic growth and abundant, high quality employment opportunities

How?

Allow Congress to most accurately model the impact that changes in tax rates have on economic growth and well being of society. Capture feedback effects that tax rates have on incentives that affect growth

The current static models assume an infinite economy and tax rate increases will always be met with revenue increases. The Joint Committee on Taxation (JCT) currently determines the above revenue collection assumptions based on a stable GDP, insensitive to changes in tax rates. The process of estimating expected revenue collections based on the tax code is known as scoring. The Council of Economic Advisors (CEA) has increasingly proposed Dynamic Scores for tax impacts in the annual budget proposed by The President. Many lawmakers have thought of Dynamic Scores as a more accurate benchmark to make policy decisions.

However, Congress approves the final spending measure and determines the ‘official’ score to be used. A static score intuitively seems less ephemeral and a more conservative estimate, in the sense of fewer assumptions and reconciliation requirements. To avoid the duplication of effort, the Senate and House have set up a Joint Committee on Taxation (JCT) to officially score expected revenue impacts on all tax code changes. Code changes entail not only tax rate impacts on revenue, but also other rules, including income exclusion changes (eg IRA and 401k) and deduction level changes. The vast list of code rules to translate make creating revenue projections difficult, even with static scoring assumptions. But these apparently safe and conservative estimates often turn out to be otherwise as shown in the following stark case study.

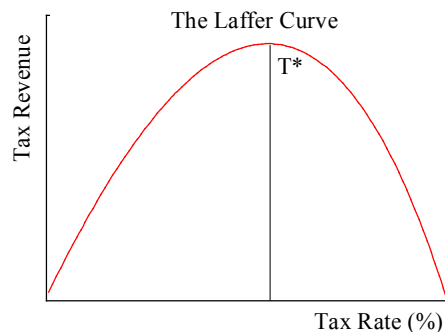
Case Study

“In 1990, Sen. Bob Packwood (R-Ore.) asked the Joint Committee on Taxation (JCT) staff to provide an official revenue estimate of a 100 percent tax on incomes over \$100,000. The JCT dutifully complied, providing him with an estimate that showed that this confiscatory tax rate would raise two trillion dollars over five years. That estimate, of course, was *ludicrous* since people would simply stop earning income above \$100,000 if it was all to be confiscated by the government. Clearly, purely static revenue estimates do not reflect economic reality.”

The Laffer Curve

Clearly the previous case study illustrates to us intuitively that at a certain point workers will simply stop providing their labor to the economy if the price of doing so becomes too high. We also observe anecdotally that certain mechanisms exist for workers to leave the labor market. For example, workers leave the labor force to return to school, achieve early retirement or secure more leisure time as the secondary earner in a two-income household. But is there a systematic, mathematical way to describe these observations? Art Laffer famously proposed a relationship between tax rates and level of tax collections as shown below.

The Laffer Curve



Tax revenues will be maximized at point T^*

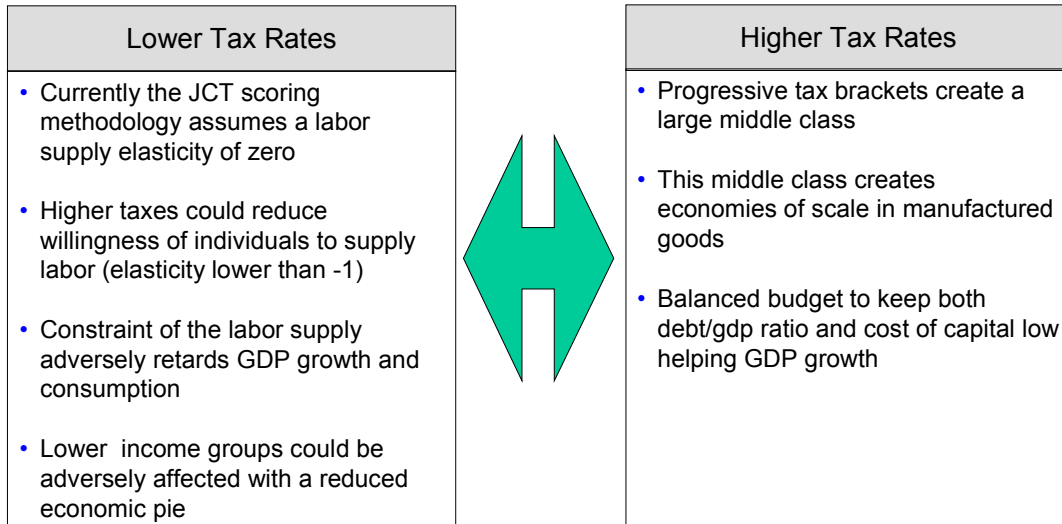
- Incremental labor and capital supplied slow down, then decrease as the tax rate T^* increases

Limitations

- The shape of the curve has always been intuitive in nature as no exact econometric model has been developed to verify it
- We observe anecdotally, workers who work fewer hours or households that forgo a second income due to 'bracket creep'
- *Real world data to verify and calibrate this curve has been scant*

Even if lower taxes result in more economic output for a country as a whole, are there equity considerations that require the establishment of a relatively large middle class or at least an income floor for the vast majority of citizens? A minimum level of economic achievement alleviates social ills, crime and poverty according to many commentators. These ills are often thought of as costs that society has avoided. In addition, a large middle class creates demand for a large manufacturing and industrial sector. Henry Ford understood this intuitively as he paid his workers enough to afford a Ford manufactured car. Finally, higher taxes have been seen as a way to limit government deficits and debt to ultimately keep the cost of capital and interest expenses low.

Labor Tax Rate Tension



Key Question: Do payroll tax rate increases adversely impact willingness of workers to supply incremental labor, GDP growth and consumption?

Even with the many pressures to raise tax rates, should countervailing concerns place a limit on tax rates? Higher taxes could reduce willingness of individuals to supply labor to the economy. This constraint of a key input retards GDP growth, which affects all economic groups, since capital formation means investment often associated with job creation. Regardless of how larger goals are weighed, an accurate score of tax rates and code provisions will allow policy makers to make fully informed choices.

Given the benefits of measuring tax rates, why have they not been measured up this point? Even though Edward Prescott and others have shown the broad macroeconomic effects of *marginal* tax rates, wider adoption of a dynamic scoring methodology has run into practical implementation issues. The key insight to understanding this difficulty has been the challenge in translating specific micro tax rules and provisions to measurable macroeconomic effects. The complexity of the tax code has often made even the simpler static scoring difficult. Dynamic Scoring adds another layer to this complexity and illustrates that a complex tax code comes at a cost. Not only are 6 billion hours¹ spent filling in forms and complying with the code, but also complexity makes measuring impacts of code provisions difficult to measure. These measurement difficulties persist with both static and dynamic scoring.

These problems should not mean that policy makers give up on dynamic scoring. To the contrary, complexity of new provisions should be evaluated on a cost/benefit basis as well. On the other hand, it is unreasonable to expect an elegant flat tax or retail tax merely for purposes of easy scoring. Obtaining accurate information is worth building detailed models to deal with the complexity. Over time, a dynamic model can be calibrated to reflect actual *measured* economic effects. Modern statistical tests, decomposition analytics and multi-factor models allow more accurate separation of real effects from noise.

The benefits of dynamic scoring not only show the GDP impacts of tax policy, but can also point to gaps in tax collection compliance. For example, since 10%² or \$1.2 trillion of the economy is underground, unreported income is a major source of lost tax revenues. Fairtax proponents like to point out that free rider problems with tax collections are eliminated with a retail tax, making taxation more equitable. Dynamic scoring will expose both structural tax code differences and also localized collection dynamics as well.

Dynamic Scoring and The Laffer Curve – The Macroeconomic Evidence

To test the robustness of the Prescott Theory, tax rate data and labor supplied from 1974 was compared. Prescott combined the concept of marginal product of labor and capital through the Cobb Douglas equation, leisure time/work time tradeoff and household income constraint. Horizontal tax data across all G7 countries were compared to test his equations across a broad cross section of economies. In addition, vertical testing compared the same G7 tax from 1974 and 1996. Testing data horizontally and vertically avoids ‘curve fitting’ the model parameters to a particular data set and makes the results more robust.

Overcoming Implementation Obstacles

Issue	Resolution
<ul style="list-style-type: none"> • Difficulty in reconciling macro GDP and labor metrics with tax data • The tax code is too complex to model • The complexity of the tax code makes dynamic scoring results wrong or too high 	<ul style="list-style-type: none"> • Calibrate model with tax collection slippage between the visible tax base and underground economy. Identified gaps could lead to better collection compliance from tax avoiders • Refine JCT models* based on granular tax form data to capture macro-economic feedback effects in a robust way. Simplify models to illustrate cost/benefits of tax code complexity • Continually improve predicted scores with back tested, maturing data. Never overstate results or ignore feedback effects
<p>Traditional issues can be overcome with correct model calibration and conservative use</p>	

* The Role of Dynamic Scoring in the Federal Budget Process: Closing the Gap between Theory and Practice By Rosanne Altshuler, Nicholas Bull et al.

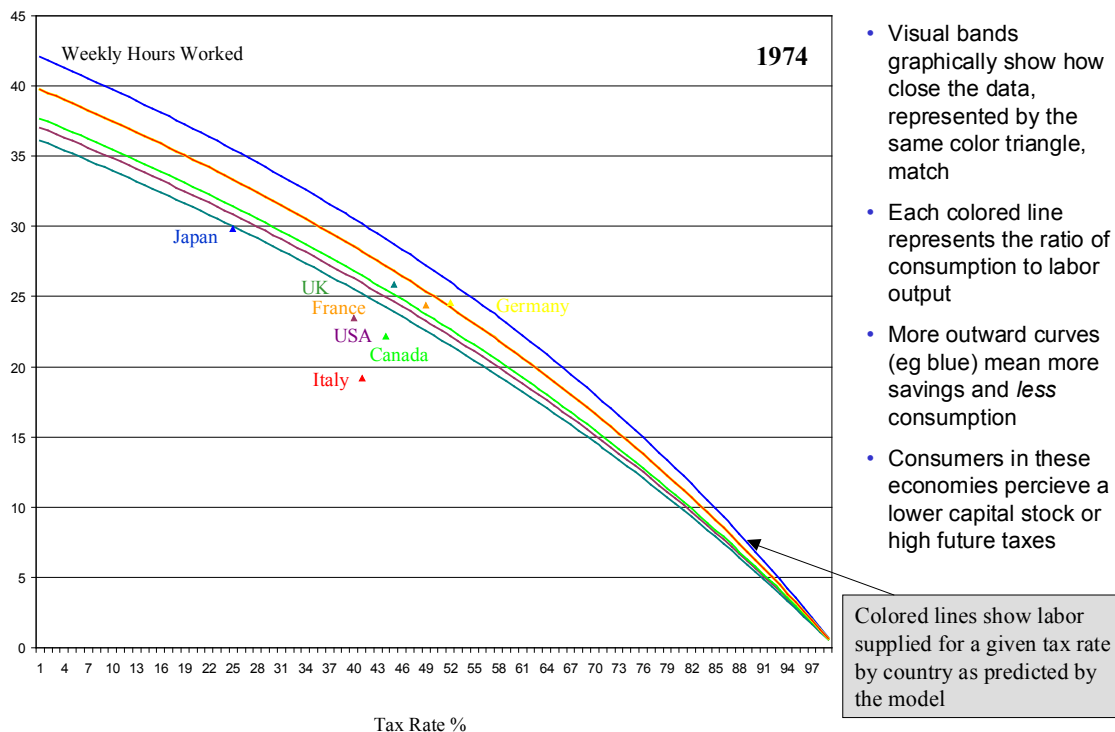
Limiting the degrees of freedom in number and possible model settings also contribute to its robustness. The key parameters are the capital share parameter from the Cobb-Douglas equation and the leisure/work time parameter from the leisure/work equation. Of course, measurement of some of the data elements was difficult in the 1970s causing two outliers that will be addressed.

Country	Tax Rates	Consumption/Output	Actual	Predicted
Germany	52%	0.66	24.6	24.2
France	49%	0.66	24.4	25.4
Italy	41%	0.66	19.2	28.2
Canada	44%	0.72	22.2	25.5
UK	45%	0.77	25.9	23.9
Japan	25%	0.60	29.8	35.5

- Intertemporal testing validates the model over different eras, avoiding 'curve fitting' based on specific countries or times
- Model compares predicted labor hours supplied by the labor force with hours actually supplied
- Some issue exists as to how true tax rates should be measured due to the historical nature of this era

Key finding: The tax data from 1974 confirms the Prescott theory

As shown in the next figure, the combination of the Cobb Douglas, leisure time/work tradeoff and household income constraint equations predicts a convex, downward sloping labor supply. Note the negative accelerating elasticity to the tax rate. Each colored curve directly corresponds to the consumption/GDP ratio shown in the chart above. The inner curves represent higher consumption/GDP. Prescott convincingly believes that higher consumption per GDP illustrates a belief that *future* taxes will be lower. This insight can be thought of as a substitution effect for saving, since fewer savings are needed to accumulate a sufficient store of value if the tax load on future consumption is lower. Finally, each colored triangle corresponds to its colored curve predicted by the model and text color of the named G7 country.



The model accurately predicts average weekly hours worked by an individual over a wide range of tax rates along the downward sloping labor supply curve. Even with the element of noise in the measurements of hours worked, the model works over the 1974 time period. As mentioned before, two outliers in this period clearly do not fit the data. The 1974 Japan outlier in hours worked³ likely results from lack of household survey data from that era. The 1974 Italy outlier in hours worked⁴ comes from labor constraints created by cartels, syndicates and other systemic restraints on the labor supply.

The sensitivity or rate of change in hours worked at a given tax rate accelerates as the tax rate increases. For example, the labor sensitivity for Japan at a tax rate of 1% is -.24 Hrs/% and accelerates to -.39 Hrs/% at a tax rate of 60%⁵. This acceleration of sensitivity means less labor supplied, lower wealth creation and consumption over a lifetime. According to Prescott, well being as measured by lifetime consumption equivalents can increase dramatically by lowering tax rates. For example, lowering the tax rate in France from 60% to 40% would increase lifetime consumption by 19%.

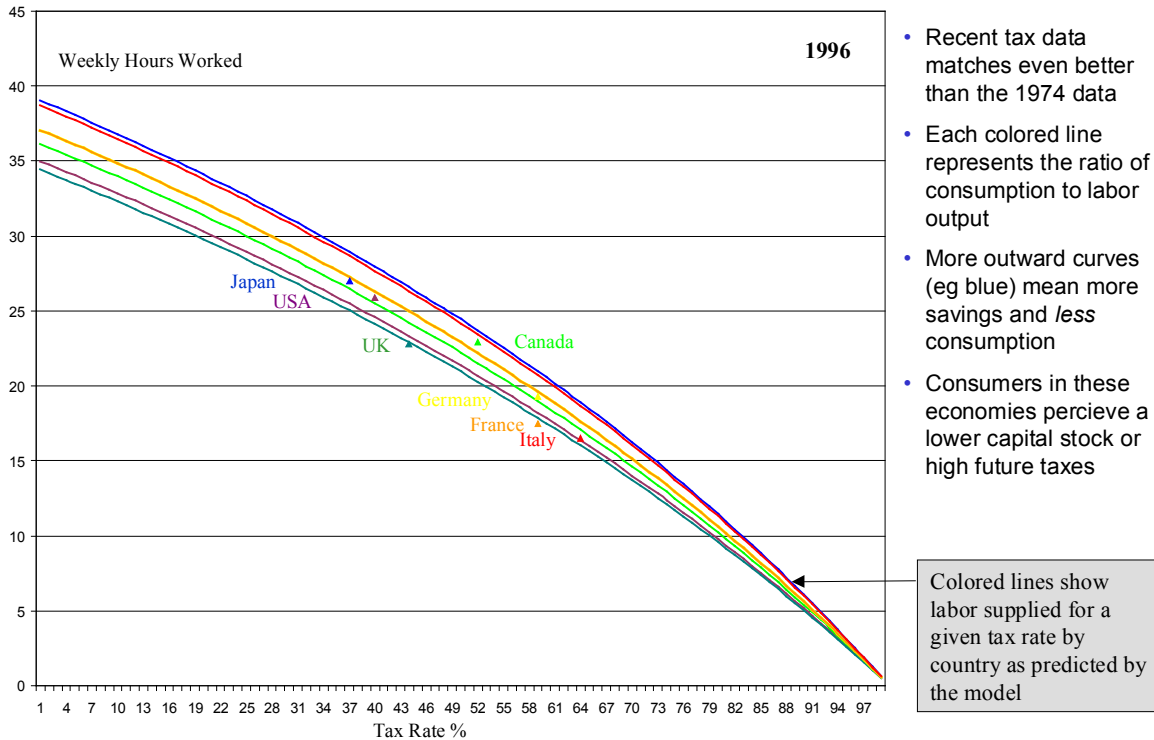
Next we see that the model comparisons were made for the same G7 countries in 1996. As the following chart shows, the 1996 data fit even better than the 1970s data.

Country	Tax Rates	Consumption/Output	Actual	Predicted
Germany	59%	0.74	19.3	19.5
France	59%	0.74	17.5	19.5
Italy	64%	0.69	16.5	18.8
Canada	52%	0.77	22.9	21.3
UK	44%	0.83	22.8	22.8
Japan	37%	0.68	27.0	29.0
USA	40%	0.81	25.9	24.6

- Model compares predicted labor hours supplied by the labor force with hours actually supplied
- The data fits even better than the 1970s data
- Better measurement of tax rates and macro-economic outputs are assumed

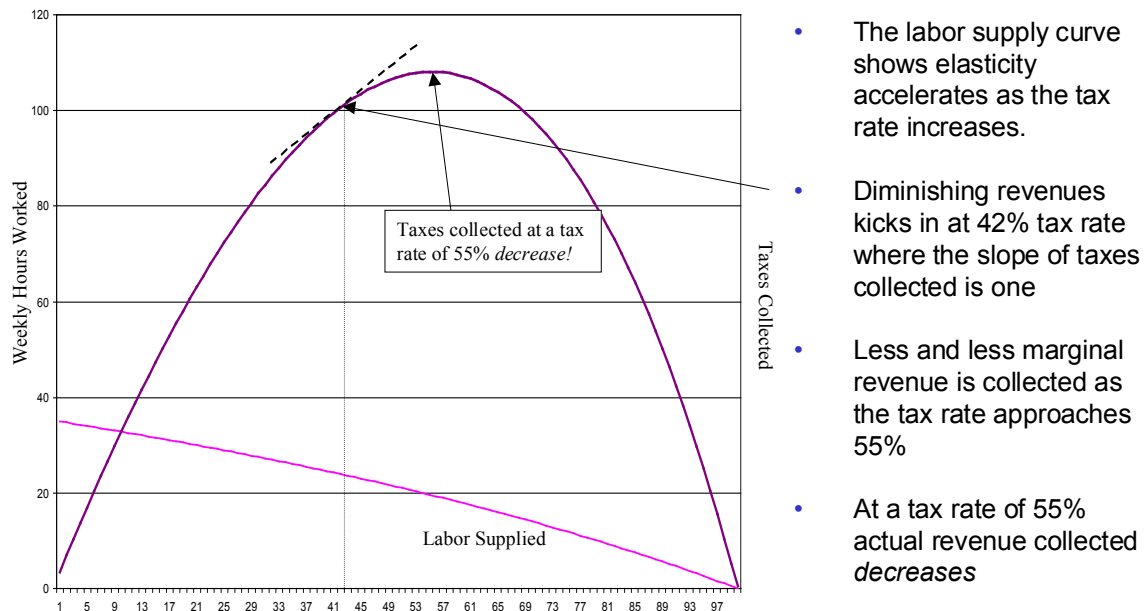
Key finding: Current 1996 tax data confirms the Prescott theory

As shown in the next figure, the data fits the model extraordinarily well with no outliers. The following graph shows the tight fit with the data as the color-coded country triangles fit on their respective colored line representing the predicted output/GDP.

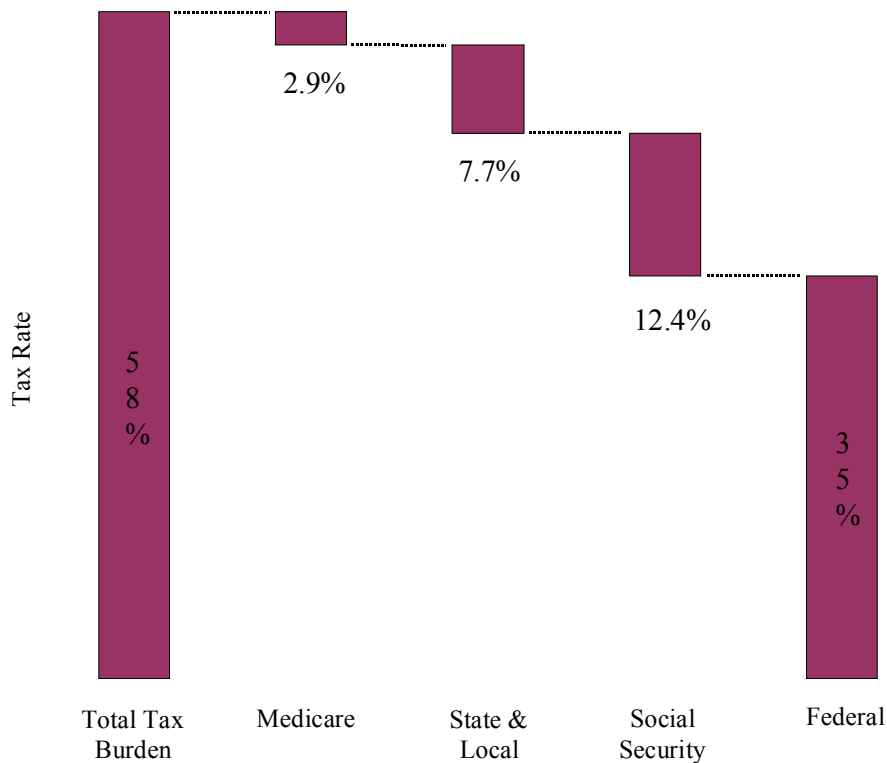


The most likely explanation for this data fit is more precise and accurate data measurements than the reconstructed proxies used to measure the 1970s data. Prescott mentions that increasing the value of leisure time parameter in the work/leisure time tradeoff equation would add more curvature to the model and lower the predicted number of hours worked for Japan in 1974. Changing the tradeoff parameter for one outlier for Japan in 1974 would not likely explain the discrepancy in Italy during the same era. More importantly, if the work/leisure parameter is changed for a specific country or era, then the model loses explanatory power. Since uncommon circumstances existed in Italy and Japan to explain the two outliers it is reasonable to adopt the model rather than substantially modify it.

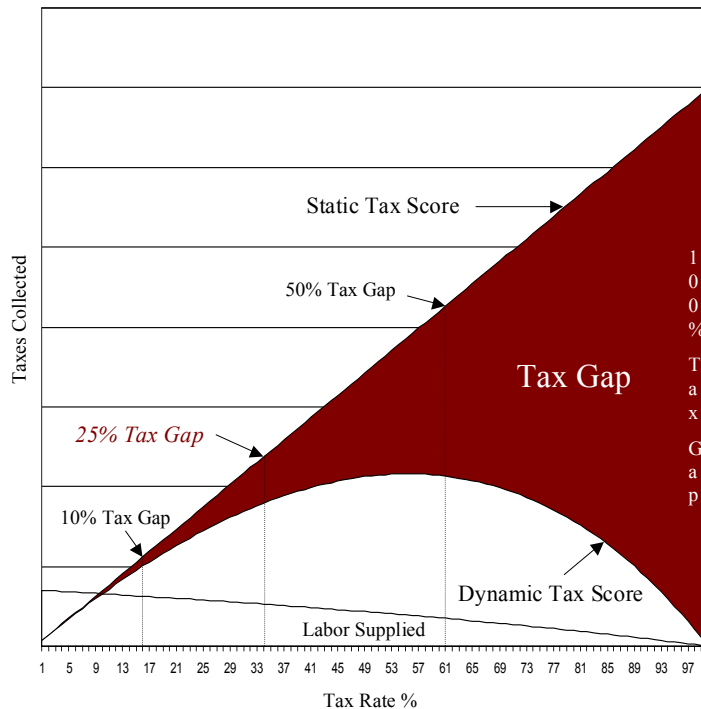
These data prove that the Laffer Curve illustrates the relationship between tax revenues collected and labor supplied as derived from a production function. Edward Prescott uses the Cobb-Douglas production function as defined in the Appendix and household income constraint to derive the labor supply curve. The Laffer curve then follows from the dollar value of labor times the tax rate.



Effective tax rates can be high in many locations. In New York City, the total income tax burden is 58% of earned income. The primary reason why taxes seem lower is withholding. Half of the Medicare and Social Security taxes are not even shown on the W2 form of the wage earner. Some may argue that Social Security taxes can not be seen as a marginal tax, since they are capped. Tax capping is not the total story, since Social Security taxes can be thought of as quasi marginal in that they go up to \$94,200 for 2006⁶. However, this is an increase from \$90,000 in 2005 and shows a continuous increase in cap, resulting in a continuous tax increase. Indeed, some prominent politicians such as Lindsey Graham⁷ of South Carolina have proposed raising the Social Security tax cap to \$200,000 or eliminating it altogether.



The following illustration dramatically shows how quickly a tax gap grows between static tax revenue estimates and dynamic estimates. The static estimates of tax collections follow along the straight line and the dynamic estimates follow The Laffer curve discussed earlier. As tax rates increase, tax scoring becomes dramatically inaccurate and wasteful, suggesting a lower tax 'speed limit'. At a tax rate of 16%, collections will only be 90% of the amount predicted by a static score. At a marginal rate of only 34%, the tax gap increases to 25% and collections will only be 75% of the amount predicted by a static score. The tax gap follows a proportionate gap in production. What is an acceptable level of production loss? If the projected loss were disclosed to policy makers and the public, informed decisions about tax rates can be made.



- Tax Score Accuracy is defined as the dynamic score divided by the static score
- To maintain a Tax Score Accuracy of 75%, marginal rates should not exceed 34%
- At a 34% tax rate, more than 25% of the scored tax will be lost to a 'Tax Gap' in collections

Implications and policy recommendations

There has been mounting pressure to simplify the income tax code. The complexity of the current tax code requires a substantial sacrifice of individual privacy, including the listing of deduction and expenses. Tax code compliance costs run at 2 - 5%⁸ of GDP not including economic impacts of planning projects around tax avoidance. Over 6 billion hours⁹ are spent preparing tax forms and complying with the code each year. One of the proposed fixes for the income tax is the fair tax or national retail sales tax. While appealing, the projections on revenues collected are based on static scoring and do not account for changes in buying behavior.

The revenue projections assume no drop in retail sales, which is unlikely as demand for many goods is more likely to be elastic than labor. An appropriate demand curve for a representative basket of goods, such as those in the CPI, should be applied to a similar economic model as the one used by Prescott. Accurate revenue projections can then be determined. Otherwise, additional rate increases would be needed beyond the often quoted 23% tax inclusive rate.

Application to Social Security

The Prescott Proposal¹⁰ seeks to fully fund retirement for all citizens. Most employees are familiar with fully funding retirement through company pensions. In reality, these pensions are typically funded in advance through fixed income investments built up over the years of an employee's service to a company. In contrast, social security from the outset has funded on a 'pay as you go' basis. 'Pay as you go' is an unfortunate misnomer which conjures up the image of the average household waiting to pay for major purchases with cash on hand or savings to avoid taking on debt.

Rather than avoiding debt, the *opposite* is true in the case of social security, since the current working generation pays for the retirement for the previous one. Contrary to the case of private pensions, 'pay as you go' creates future liabilities for the next working generation. In addition, not having the beneficiary fund her own retirement assumes growing or stable demographics and creates the possibility of free riders. 'Pay as you go' has created an unfunded social security liability of \$11.9 trillion¹¹ over the long-term time horizon.

Prescott would allow 8.7% of the 12.4% of social security taxes paid be credited to individual accounts for workers under 38. Survivor benefits funding would remain at 2.4% of the 12.4% tax. The other 1.3% of the social security tax would continue to fund 'pay as you go' for workers over 38. Transfer costs of \$2 trillion would be borrowed in treasury bonds to cover the remaining funding needs. As an aside, making this funding liability explicit by allowing participation of the capital markets makes further reduction in retirement benefits less likely.

Reductions in benefits have already come twice in the form of raising the retirement age. Statements sent out by the Social Security Administration routinely state that "...benefit amounts may change because, by 2041, the payroll taxes collected will be enough to pay only about 74% of scheduled benefits"¹². After the transition period, the 'pay as you go' tax of 1.3% could be eliminated, lowering the marginal labor tax rate from 40%, used in the Prescott analysis to lower than 30%-- as low as 27%! After the 45 year transition period, the social security retirement 'tax' of 10% would be reduced to an 8.7% contribution that would be used in a 401k like retirement fund.

The key result of this program is that in 45 years, social security liabilities would be eliminated. Steady state consumption would increase 17% and the labor supply would increase 11%. Capital formation would improve from 2.71 to 3.32 times GDP, assuming a labor marginal tax rate of 40%. Lower paid workers would be allowed to save at a higher rate. This regime allows workers to capture a high 4% real rate of return - significantly higher than the negative rates of return given currently in worker social security. The new social security system through savings and ownership eliminates the tendency for the current generation to make future generations pay in a 'Ponzi Scheme'.

Conclusion and Recommendations for the Joint Committee on Taxation

All forms of taxation should be eventually dynamically scored. Included should be earned income, retail sales, dividends, capital gains and corporate taxes. Dynamic scores for these taxes can be implemented in phases. The JCT can start with earned income, since a reasonable model has already been provided by Prescott. Earned income tax rate changes show changes in behaviors in the first year of enactment, making it easy to measure feedback effects. Additional detailed labor data across countries and time periods should be tested to refine and validate model structure and parameters.

The dynamic model should also be tested for various scenarios, such as the value of leisure time, to determine the robustness of its current structure. The earned income model should also be tested across cities and states as individual tax rates vary widely. The dynamic scoring model should *not* overstate feedback effects. Perspective should be maintained that an imperfect dynamic model will outperform a static model that ignores feedback effects by a wide margin in measuring the behavioral impacts to GDP growth and consumption. As the predictability and accuracy of the labor model improves, additional taxes can be scored in a similar fashion.

This paper has only dealt with immediate feedback effects on labor supply. Longer-term time horizons need to be looked at for behavioral effects in tax cuts in the estate tax and capital gains tax arenas. Modeling needs to decompose effects from other changing variables to properly understand the accumulated tax gap over the longer time frame. Many examples do exist that show dominant behavioral effects over time for cutting capital gains taxes. For example, Dan Clifton has shown the feedback effects from capital gains cuts are 24.2% in the first year and progress up to 32.4%¹³ by three years out. These feedback effects would also likely happen in labor markets as well, since a portion of earned income by employees would be invested.

These investments would increase the capital stock and elevate the marginal product of labor. After capital gains models are validated and incremental investing has been demonstrated, future models can incorporate additional growth from these incremental investments. As mentioned earlier, the precedent for sending information to taxpayers illustrating how taxes are utilized has been set with social security statements. Similar statements that explicitly show the dollar impact of changes in the tax code, especially tax rate changes, should be sent to taxpayers. Understanding the impacts of tax rate changes on an individual taxpayer would allow congressmen to make more informed decisions on tax policy through their constituents.

Appendix

Cobb - Douglas Production Function

$$y_t \leq A_t K_t^\theta h_t^{1-\theta}$$

Where:

y_t = Output

A_t = Constant Technology Coefficient

K_t = Capital

h_t = Hours Worked

θ = Capital Share Parameter

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² Federal Reserve statistical release, National Center for Policy Analysis;
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³ Implications for Policy; Why Do Americans Work So Much More Than Europeans?--Edward Prescott

⁴ Ibid

⁵ Author analysis

⁶ Social Security Administration; http://www.ssa.gov/policy/docs/quickfacts/prog_highlights/index.html

⁷ The Lindsey Graham Plan;

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⁸ GAO; Tax Policy Summary of Estimates of the Costs of the Federal Tax System

⁹ Tax Foundation; <http://www.taxfoundation.org/publications/show/1281.html>

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¹¹ National Center For Policy, <http://www.ncpa.org/pub/ba/ba490/>

¹² Your Social Security Statement, Social Security Administration

¹³ Learning From History: JCT's Static Score Can not Determine the Real Revenue Effect of Repealing the Estate Tax; Dan Clifton; <http://www.nodeathtax.org/default.htm>