

The Fiscal Analyzer provides the first real picture of our fiscal system.

A New and Better Way to Analyze Tax and Spending Policies

This is a unique, first-of-its-kind model developed by Boston University Professor Laurence Kotlikoff and his colleagues. It can be used to evaluate major tax and spending proposals. It is the principal alternative to the Tax Policy Center model – which was developed by the Brookings Institution and the Urban Institute and which is defective in a number of ways.

The model is not only the most comprehensive model ever developed, it is also quite complex. To simulate a single policy change requires three and sometimes four computers running simultaneously for 16 hours. The following is a brief description of the key components.

The Auerbach-Kotlikoff Life-cycle Model.

The standard economic model of fiscal policy, including demographics, saving and economic growth is the life-cycle model. It was developed in a two-period framework in the 1920s by Yale University's Irving Fisher. Two periods means that people are young for one period and old for another. When they are young they tend to accumulate assets and when they are old they tend to divest them. The assumption of two periods was used for expositional purposes. A realistic model would, of course, need to have people living up to 100 years, distinguish childhood, and incorporate age-specific fertility as well as age-specific mortality. Prior to the 1980s, the two-period model reigned supreme, because assuming more than two periods produced what in mathematical terms are high order non-linear difference equations. Mathematicians have no analytical means of solving these equations.

Laurence Kotlikoff and Alan Auerbach cut the Gordian knot of life-cycle modeling in the late 70s by using what is known as the Gauss-Seidel iteration technique, named after two

famous German mathematicians. The method permits the study of the dynamic transition paths of large-scale, life-cycle behavior. Kotlikoff and Auerbach described the model in their book, *Dynamic Fiscal Policy*, published by Cambridge University Press in 1987. Their breakthrough permitted economists all over the world to produce their own versions of what is now known as the Auerbach-Kotlikoff model.

Versions of the model are used by the Joint Committee on Taxation and the Congressional Budget Office in their dynamic analysis and scoring of fiscal policies. However, this is not a feature of private-sector models we are aware of, including the Brookings/Urban Institute Tax Policy Center model and the Tax Foundation model. Failure to incorporate the changing age structure of the population when making long-range estimates leads to serious forecasting errors.

Dr. Kotlikoff is currently engaged with two graduate students and some Russian economists in developing a global Auerbach-Kotlikoff model, which will be used, in part, to study the economic effects of climate change, sanctions, and the impact of moving to free trade.



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Kotlikoff Model of International Capital Flows.

It is well known that capital moves around the world both electronically and physically and it tends to go where it is best treated, other things remaining the same. Kotlikoff and his colleagues have recently developed a highly detailed 6-sector international model (the U.S., the E.U., China, India, Japan, and Russia) to study the interdependent dynamic fiscal and demographic transitions of these countries. This model, which serves as the foundation for an even more expansive global model, is marked by careful attention to country-specific demographic and fiscal details.

Using Kotlikoff's International Model to Study Corporate Income Taxation.

Economists have long suspected that the burden of the corporate income tax mainly falls on workers rather than owners of capital or consumers. But the main effect of corporate income taxes, both here and abroad, is to affect the flow of capital. And without a model of international capital flows, there could be no reliable way to analyze the impact of the US corporate income tax. Kotlikoff and his colleges have solved that problem. As a result, we now know that the burden of the corporate income tax mainly falls on workers and the elimination of the tax or the substitution of a "corporate flat tax" will result in a substantial increase in wages.

The Fiscal Analyzer.

This is a new, extremely powerful tool just developed by Auerbach and Kotlikoff. It marries data from the Federal Reserve's Survey of Consumer Finances and a life-cycle financial planning program (ESPlanner, developed by Kotlikoff through his company) to understand how much households will spend over their lifetime given their wealth, future labor earnings, future taxes, and future government benefits. The Fiscal Analyzer incorporates every major federal and state fiscal program. It provides the first real picture of our fiscal system – including its true average and marginal tax rates, which represent government-imposed disincentives to work.

Inequality Studies.

Although inequality of income and wealth was the single most popular topic at the last meeting of the American Economic Association there is no way to properly evaluate wealth differences without a life-cycle model. Otherwise, you end up comparing the economic status of people at the beginning of their work lives with people at the peak of their careers and the status of people of working age with people who are retired. Also, you cannot properly evaluate people's economic wellbeing without including entitlement programs. A 60 year-old couple – both having paid the maximum FICA tax over their work lives – for example, has more than \$1.5 million in Social Security wealth.

Kotlikoff and Auerbach have used The Fiscal Analyzer to produce the first well-grounded study of wealth inequality, using the model components escribed above. They discovered far less inequality than what we are generally led to believe exists. Among people in their 40s, there is a wealth difference of almost 14 to 1 between the top fifth and the bottom fifth of the income distribution. But after government transfer programs, the gap is cut in half: the difference in lifetime consumption drops to 7 to 1.



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