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Budget Model

Dynamic Distributional Analysis

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Summary: PWBM introduces a new measure of distribution that corrects numerous deficiencies in existing distributional measures that are commonly used to evaluate policy analysis.

Distributional analysis indicates "winners" and "losers" of a change in government policy, including the rise in after-tax incomes received by higher-income and lower-income households after a change in tax rates. Distributional analysis, therefore, is often at the heart of many policy discussions. But traditional distributional analyses,[1] which are commonly used to evaluate actual policy proposals, suffer from several deficiencies.

First, traditional distributional measures are calculated on a cross-sectional basis instead of a lifetime basis. In other words, traditional measures only look at tax or spending policies by income, regardless of whether that income is earned by younger or older people. So, for example, a consumption tax that is used to finance higher education could look quite regressive using traditional measures since those measures fail to capture how such a policy change might encourage more educational attainment and raise future lifetime earnings.

Second, traditional measures ignore macroeconomic effects. For example, an increase in the tax expensing (deduction) of new capital investments generally looks regressive using traditional measures because most capital income is earned by higher-income households. However, an increase in capital expensing, if financed by other budget changes, could increase wages earned by lower-income households, which would not be captured with traditional measures.

Third, traditional measures ignore the "insurance" value of a policy. As emphasized in Nishiyama and Smetters (2005)[2], a flattening of the tax code, for example, could increase the size of the capital stock, labor income and GDP in the short run and long run while actually reducing human welfare. Personal wages are subject to two sources of risk factors: (i) general macroeconomic factors that impact almost all workers as well as (ii) "idiosyncratic" shocks that are worker specific. Empirically, the idiosyncratic component represents the larger of the two risks faced by workers, and wage risk is also challenging to insure in the private insurance market. To be sure, public unemployment insurance provides some risk reduction, but it also falls short of full insurance. A progressive tax code, therefore, provides another layer of insurance: the tax rate falls as a person's wages fall. Reducing tax code progressivity, therefore, reduces risk sharing, thereby causing households to increase their "precautionary saving." That higher household saving, in turn, raises the capital stock, wages and GDP. But that additional saving also undermines consumption smoothing over the lifetime. The net effect is that households can actually be worse off.

Fourth, traditional distributional analyses only consider "explicit" debt while ignoring "implicit" debt. Intergenerational transfer programs like Social Security and Medicare, which tax younger households to finance benefits received by retirees, produce implicit debt obligations. In fact, implicit debt emerges even if these programs are fully pay-as-you-go financed and, therefore, produce no official debt. For example, the Social Security Trustees estimate that past and current participants in the Social Security program will receive more than $35.2 trillion more in benefits in present value than they paid or are projected to pay into the system.[3] PWBM recently analyzed The Social Security 2100 Act and projected that it would reduce GDP by two percent by 2049, despite almost eliminating the Social Security system's explicit long-run debt ("actuarial shortfall").[4] GDP falls because the Act increases implicit debt by expanding after-tax benefits even for higher-income households. These additional benefits are financed on a pay-as-you-go basis with higher taxes on the young.

Fifth, and related, traditional measures mostly ignore younger people alive today and those born in the future. That is, traditional measures only look at the *intra*-generational income distribution while ignoring the *inter*-generational impact on future generations.

Today, PWBM introduces its use of a new distributional measure based on the "equivalent variation" measure found in Nishiyama and Smetters (2005, 2014).[5] This measure corrects each deficiency noted above.[6]

The equivalent variation measure calculates the value associated with the following question: how much money could be given to (or taken from) an individual at a specific *age* (potentially negative ages if born in the future) and *income* under current policy that makes them indifferent to the policy change. So, for example, our recent distributional analysis of The Social Security 2100 Act shows that a 35-year-old with taxable income between the 50th and 80th percentiles has an equivalent variation of -$3,788. In other words, a 35-year-old today, earning between the 50th and 80th income percentiles, would be indifferent between being charged $3,788 and passage of the Social Security 2100 Act. While retirees alive today generally gain "equivalent variation" under the Act, younger workers and the unborn generally face losses.

In future briefs and blogs, PWBM will produce distributional analysis of many more policies using this new approach, and it will become a standard tool in PWBM analysis going forward.

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1. See footnote 1 in the companion document for a list of entities and applications using traditional distributional analysis. ↵

2. Nishiyama, Shinichi and Kent Smetters. "Consumption Taxes, Risk Sharing and Economic Efficiency." Journal of Political Economy 113, 5 (October 2005): 1088 – 1115. ↵

3. See "Table VI.F2.—Present Values Through the Infinite Horizon for Various Categories of Program Participants, Based on Intermediate Assumptions" in 2019 OASDI Trustees Report. ↵

4. This calculation assumed that future shortfalls would be financed by general revenue transfers. Hence, eliminating the shortfall would reduce official debt. ↵

5. Nishiyama, Shinichi and Kent Smetters. "Consumption Taxes, Risk Sharing and Economic Efficiency." Journal of Political Economy 113, 5 (October 2005): 1088 – 1115. Nishiyama, Shinichi, and Kent Smetters. "Analyzing fiscal policies in a heterogeneous-agent overlapping-generations economy." In *Handbook of Computational Economics*, vol. 3, pp. 117-160. Elsevier, 2014. ↵

6. When making the lifetime calculation, the new measure also respects borrowing constraints that are faced by some younger, poorer households who face upward-sloping wage profiles. ↩

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