Exact Consumer's Surplus and Deadweight Loss: A Correction

Robert H. Haveman, Mary Gabay, James Andreoni

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By Robert H. Haveman, Mary Gabay, and James Andreoni*

Jerry Hausman's 1981 paper in this *Review* is a clear demonstration that Hicksian-based estimates of welfare change can be measured exactly from an empirically estimated demand or supply curve. Presenting such a measure in empirical work is more precise than, and hence superior to, the common procedure of presenting estimates of Marshallian consumer's surplus (Angus Deaton, 1984).

Hausman emphasizes the import of such exact measures by a numerical illustration involving the welfare loss from the taxation of labor income. This case was cited by Hausman as one in which the deviation between the exact and Marshallian measures would be large, as the welfare change induced by the tax is a substantial proportion of the individual's base income. This note corrects an error in Hausman's calculation, and qualitatively alters the implications which can be drawn from it. It hereby demonstrates that while the Hicksian and Marshallian measures do differ in this important case, the Marshallian measure does not provide "a very poor approximation to the exact measure of welfare change" (p. 672).

Using his estimate of the labor supply function of wives, Hausman calculates the exact welfare effects of a 20 percent proportional tax on labor earnings ($W_0 ab W_1$ in Figure 1) and compares it to the Marshallian measure, $W_0 cb W_1$. His calculated compensating variation welfare loss measure for the mean observation is $2,056, which is larger than the change in consumer's surplus, $1,315. The absolute deviation of the two measures is 45 percent. Figure 1 illustrates,
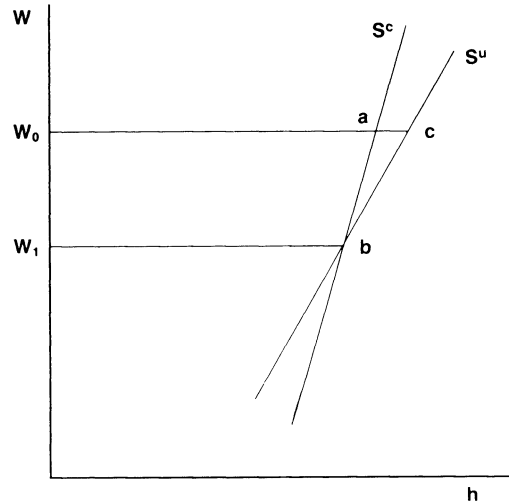

Figure 1

however, that the compensating variation measure should actually be smaller than consumer's surplus. Closer examination reveals that Hausman's calculated Hicksian measure is in error. Using the procedure which he correctly describes in his paper (p. 672), we find the correct value of the exact measure to be $1,247 rather than $2,056. This indicates a deviation between the two welfare measures of 5.2 percent, which corresponds to Robert Willig's formulae (1976) for the relevant income elasticity and share of income.

This 5.2 percent deviation in the welfare loss measures, it should be noted, is far less than that of the corresponding measures of the deadweight loss attributable to the 20 percent tax rate—$170.5 for the Marshallian measure vs. $231 for the Hicksian, for a deviation of 35.5 percent. Moreover, were the tax rate in the range of 30 to 40 percent (including both federal income and payroll taxes), the deviation between the exact and the Marshallian welfare loss measures would rise to 7.9 and 10.6 percent. Conversely,

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were the actual income elasticity to equal .2 —a number consistent with a wide range of other studies of wives labor supply[1]—rather than the .6 value obtained by Hausman, the deviation of the measures of welfare change for tax rates of up to 50 percent would be less than 5 percent.

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[1] These studies do not, however, account for the effect of taxes on wives labor supply.

REFERENCES

Deaton, Angus, "Demand Analysis," in Zvi Griliches and Michael Intrilligator, *Handbook of Econometrics*, Vol. III, Amsterdam: North-Holland 1984.

Hausman, Jerry A., "Exact Consumer's Surplus and Deadweight Loss," *American Economic Review*, September 1981, *71*, 662–74.

Willig, Robert D., "Consumer's Surplus Without Apology," *American Economic Review*, September 1976, *66*, 589–97.