Following the tradition of Browning (1987), using only those parameters that can be observed at the realized outcome in the economy, we derive an approximate formula for the change in the welfare cost, ΔWC, that by referring to the previous figure is:

$$\Delta WC = efg - abd = \frac{1}{2}(ef \times fg - ab \times db),$$

where
$$fg = m_2 w$$
$$db = m_1 w$$
$$ef = \frac{dl}{dw} m_2 w$$
$$ab = \frac{dl}{dw} m_1 w.$$

Relating $\frac{dl}{dw}$ to η, the compensated labor supply elasticity evaluated at the realized equilibrium (w_2, l_2), we have

$$\frac{dl}{dw} = \frac{\eta l_2}{w_2} = \frac{\eta l_2}{(1 - m_2)w}.$$

Substituting, we arrive at

$$\Delta WC = \frac{m_2^2 - m_1^2}{2(1 - m_2)} \eta w l_2.$$

or, measured as a percentage of wage earnings,

$$\frac{\Delta WC}{wl_2} = \frac{m_2^2 - m_1^2}{2(1 - m_2)} \eta.$$

To calculate the additional welfare cost caused by Social Security, we require estimates of a weighted-average combined marginal tax rate on labor income for all taxes other than the Social Security tax (m_1), a weighted-average combined marginal tax rate on labor income including the Social Security tax (m_2), a weighted-average compensated elasticity of labor supply (η), and the total wage earnings (wl_2). We require weighted-average marginal tax rates and labor supply elasticity because different groups of workers face different marginal tax rates and labor supply elasticities. Unlike the uncompensated labor supply elasticity, the compensated labor supply elasticity is not directly observable. It can only be approximated based on the uncompensated elasticity and income elasticity. Existing estimates of η range from 0.2 to above 0.6. We use a low number 0.3 and a high number 0.5 for our calculations.