

Subject: Public finance

Course code: ECON4009

Topic: **Genereal Equilibrium Analysis Efficiency**

M.A. Economics (2nd Semester)

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General Equilibrium Incidence

- ▶ GE analysis: trace out full incidence of taxes back to original owners of factors; not interested in .producer.vs. consumer but rather capital owners vs. labor vs. landlords, etc.
- ▶ Harberger (1962): who bears the burden of the corporate income tax?
 - ▶ 2 sector and 2 factors of production, static model
- ▶ Many sectors, many factors of production model (Computational General Equilibrium)
- ▶ Dynamic Models

General Equilibrium Incidence (Harberger JPE 1962)

- ▶ In the partial equilibrium analysis, we did not consider any impacts on the rest of the economy. This might make sense if the sector is small. In general, however, the impacts on one sector will affect others.
- ▶ Standard GE approach with taxes is to consider a factor tax in one sector.
- ▶ 2 sector model
 - ▶ fixed total supply of labour L and capital K (short-run, closed economy).
 - ▶ CRS scale in both production sectors
 - ▶ Full employment of L and K
 - ▶ Firms are perfectly competitive
 - ▶ costless mobility of factors across sectors.
- ▶ $X_1 = F_1(K_1, L_1)$ production in sector 1.
- ▶ $X_2 = F_2(K_2, L_2)$ production in sector 2.
- ▶ resource constraints:
 - ▶ $K_1 + K_2 = K$
 - ▶ $L_1 + L_2 = L$

General Equilibrium Incidence (Harberger JPE 1962)

- ▶ Factors K and L are fully mobile across sectors so returns must be the same over the two sectors:
 - ▶ $w = p_1 F_{1L} = p_2 F_{2L}$
 - ▶ $r = p_1 F_{1K} = p_2 F_{2K}$
- ▶ To close the model, need to specify demand functions for goods 1 and 2.
- ▶ Simple specification:
 - ▶ $X_1 = X_1(p_1/p_2)$ and $X_2 = X_2(p_1/p_2)$
 - ▶ Important assumption: all consumers homogenous, so redistribution of incomes by tax does not affect demand through a feedback effect
- ▶ This is a system of ten equations and ten unknowns: K_i, L_i, p_i, X_i, w, r .

General Equilibrium Incidence (Harberger JPE 1962)

- ▶ Introduce a small tax dt on K_2 (in sector 2). [Corporate Tax]
- ▶ This tax has small effects on all ten variables. Using expansion of the 10 equations around initial equilibrium (exactly as in partial eq. analysis), obtain a linear system of 10 equations in 10 unknowns (dp , ..).
- ▶ Can compute the effect of this small tax of all 10 variables dw , dr , dL_1 ,
- ▶ As labour income is wL with L fixed, and rK capital income with K fixed, change in prices dw/dt and dr/dt describes how tax is shifted from capital to labour.
- ▶ Changes in prices dp_1/dt , dp_2/dt describes how tax is shifted from sector 2 to sector 1.
- ▶ Model is fairly rich and embodies many effects (which is why computations are fairly complicated).
- ▶ Kotlikoff and Summers state equations in terms of large number of elasticities (which are functions of substitution parameters in production and consumption).

General Equilibrium Incidence (Harberger JPE 1962)

- ▶ Intuitive description of main effects:
- ▶ 1. Substitution Effects: capital bears incidence
 - ▶ Tax on K_2 implies production in Sector 2 shifts away from K so aggregate demand for K goes down. Because total K is fixed, the net of tax price of K must go down. So K bears some of the burden.
- ▶ 2. Output effects: capital may not bear incidence
 - ▶ Tax on K_2 implies that sector 2 output becomes more expensive relative to sector one therefore this shifts demand toward sector 1.
- ▶ Case 1: $K_1/L_1 < K_2/L_2$ Untaxed sector (1) is less capital intensive so aggregate demand for K goes down:
 - ▶ substitution and output effect go in the same direction and K bears some burden of the tax.
- ▶ Case 2: $K_1/L_1 > K_2/L_2$ Untaxed sector (1) is more capital intensive, aggregate demand for K increases
 - ▶ substitution and output effects have opposite signs so labour may bear some or all the tax.

General Equilibrium Incidence (Harberger JPE 1962)

- ▶ Over shifting: bearing more than 100% of tax
- ▶ In case 1 ($K1/L1 < K2/L2$), can get over shifting of tax: $dr < -dt$ and $dw > 0$.
 - ▶ Capital bears more than 100% of the burden if output effect sufficiently strong.
- ▶ Intuition: suppose sector 1 is food (labour intensive), sector 2 is cars (capital intensive). Then taxing capital in sector 2 raises prices of cars, leading to more demand for food and less demand for cars. If consumer demand is very elastic (two goods are highly substitutable), then demand for labour rises sharply and demand for capital falls sharply .> capital loses more than direct tax effect and labour suppliers gain.
- ▶ In case 2 ($K1/L1 > K2/L2$), possible that capital is made better off by capital tax:
 - ▶ labour forced to bear more than 100% of incidence of capital tax in sector 2!
- ▶ Effects are very complicated “anything goes”

Thank You

