Chapter Summaries
Chapter 19: Tax Incidence – Applications

Chapter 19 begins with the applications of tax incidence with Harberger's general equilibrium model of the incidence of the corporation income tax. The general equilibrium model is the 2-good (X and Y), 2-factor (labor, L, and capital, K), perfectly competitive model of Chapter 3. Labor and capital are in absolutely fixed supply. Good Y is assumed to be relatively capital intensive – it has a higher capital labor ratio than good X at given prices P_K and P_L. The individuals have identical tastes.

1. The workings of the model:
   a. Perfectly competitive factor markets assure that L and K are both fully employed in equilibrium and that the returns to labor and capital are the same whether they work for the Y or X firms.
   b. Because Y is relatively capital intensive, as the economy moves from Y to X along the production possibilities frontier, the Y firms release more capital and less labor than the X firms want. The excess supply of capital lowers P_K and the excess demand for labor increases P_L. Therefore, MC_X and P_X increase because the price of the factor the X firms use more intensively is increasing, and MC_Y and P_Y fall because the price of the factor the Y firms use more intensively is decreasing. Both firms become more capital intensive as the ratio P_K/P_L decreases to maintain full employment.
2. The model produces a number of immediate tax incidence equivalences for general taxes because of the fixed supplies of K and L and the principle that the side of the market taxed is irrelevant. All the following taxes are non-distorting (lump-sum) and can therefore be designed to have the same incidence, which is just the revenue raised by the tax: income taxes on the supply of K or L or on total income, levied on the individuals; taxes on the returns to K or to L in both industries or a value added tax on the returns to both K and L levied on all firms; a personal

expenditures (consumption) tax levied on the individuals or a general sales tax on both X and Y levied on the firms.

3. Only specific taxes in this model allow Harberger to employ his method of collecting the tax and returning it lump-sum, because they are the only distorting taxes. He chose the corporation income tax, which taxes the returns to capital only in the corporate sector. He assumed that the corporate sector is represented by the relatively capital intensive Y firms and the unincorporated sector by the relatively labor intensive X firms.

4. *Workings of the model* with a tax on the return to capital in the Y firms:

   a. The tax increases the MC_Y and therefore P_Y, which decreases the quantity of Y demanded and increases the individuals' demand for X, which also increases P_X. Harberger assumed that there was no change in the price ratio P_Y/P_X, which is possible since the corporation income tax drives the economy below the production possibilities frontier.

   b. As capital and labor are released from the relatively capital-intensive Y firms, the ratio P_K/P_L decreases.

   c. The net-of-tax price of capital in the Y firms must equal the untaxed price of capital in the X firms for capital to be supplied to both firms. Therefore, the decrease in P_K burdens capital no matter where K is used. *Principle*: The legislature cannot isolate the incidence of a tax on the returns to a factor to one sector of the economy by taxing the returns only in that sector. The market spreads the burden throughout the economy.

   d. The amount that P_K decreases relative to P_L depends on four parameters in the model:

      1. The tax rate on capital in Y;
      2. The importance of K to the Y firms (1 and 2 determine the response of the Y firms to the tax.)
      3. The demand elasticities for Y and X (determines the amount of capital and labor that are released by the Y sector).
      4. The elasticity of the demand for capital in both industries (determines how much P_K has to decrease to restore equilibrium in the market for capital).

   Harberger chose what he believed were reasonable values for these four parameters for the U.S. economy and concluded that capital bore the full burden of the corporation income tax. This implies that the tax is highly progressive, since the ownership of capital is highly skewed towards high-income households in the U.S.

The chapter then considered a number of variations in the baseline model that matter for tax incidence.

5. Variable factor supplies. Implications:
   a. All taxes are distorting, so that Harberger's method can be applied to analyze all of them.
   b. In a long-run context, the reduction of the return to capital in response to the corporation income tax lowers the supply of saving, which lowers investment and consequently the future stock of capital. A lower capital stock reduces the marginal product of labor, which reduces wages (P_L). Therefore, a tax on capital may ultimately place a burden on labor in the long run, and perhaps even the entire burden.
6. Non-identical individuals. Implications:
   a. Changes in the prices of goods and services have a direct effect on tax incidence, depending on which goods are consumed relatively more by high or low-income households.
   b. In a long-run context, with overlapping generations, general income and consumption taxes are no longer equivalent because of their different effects on the working and the retired generations.
7. Mobile vs. immobile factors. Implications:
   a. The immobile factors tend to bear the burden of any taxes that affect both sets of factors. This is a geographic variation of the principle from Chapter 18 that the side of the market that is relatively inelastic (unresponsive) tends to bear the burden of a tax in that market.
   b. The side of the market that is taxed matters in this context. For example, if the supply of (mobile) capital is perfectly elastic to a local community or even a nation, then a tax on the demand for capital raises the gross-of-tax return to capital by the full amount of the tax, reduces capital and production, and places the entire burden of the tax on immobile labor or consumers. In contrast, a tax on the suppliers of capital, the residents of the locality or country, has no effect on the market for capital or production, and places the entire burden of the tax on the residents who supply the capital.
8. Non-competitive markets. Implications:
   a. If oligopolists with market power maximize sales rather than profit, then they can respond to a tax on their factors or output by increasing price of their good closer to the profit-maximizing price. This might allow them to earn the same profit as before the tax and place the entire burden of the tax on consumers.

The chapter next discusses the sources and uses approach to tax incidence for the major broad-based taxes, a method whose pioneers were Joseph Pechman and Bernard Okner of the Brookings Institution. The method makes ad hoc assumptions about how markets respond to a tax, and uses these assumptions to allocate the tax burden to a sample of individuals or households based on their sources and uses of income. In an annual

context, the sources of income are earned income and transfer payments and the uses of income are consumption and saving. The goal is to determine whether taxes are progressive, proportional, or regressive in terms of the average tax burden, T/Y, described in Chapter 13.

9. *Federal and state (and some local) personal income tax* – The supply of labor and capital is assumed to be perfectly inelastic so that the tax is effectively a lump-sum tax, with the burden equal to the taxes paid. The incidence is highly progressive at low incomes because of the personal exemption, and then only mildly progressive as incomes rise because of all the exclusions and deductions from the tax base.

10. *Social Security payroll tax* – With the supply of labor perfectly inelastic, labor bears the entire burden of the tax, both the part levied on the employers (who offset the tax by lowering wages) and the part levied on the employees. The tax is highly regressive because no income is taxed above a cut-off level for the portions of the tax that are earmarked to the Social Security pensions and disability payments.

11. *Corporation income tax* – Adopts Harberger's conclusion that the tax is borne by the capitalists and is therefore highly progressive.

12. *General sales tax* – Prices are assumed to rise by the full amount of the tax in the long run. Since the ratio of consumption to income declines as income rises, the tax is regressive.

13. *Local property tax* – The portion of the tax on land is borne by the landowners because the supply of land is perfectly inelastic, and is therefore progressive. The portion of the tax on capital is borne in part by capitalists and is passed on in part to labor and consumers. Capital bears the burden on the average value of the property tax rate throughout the U.S., so that portion is progressive. In localities whose tax rates differ from the average, consumers and labor bear a tax burden in the localities with above average rates and receive a subsidy in localities with below average tax rates. Overall the tax is progressive.

14. The tax incidence of the entire set of U.S. broad-based taxes is mildly progressive, the net effect of the mildly progressive personal income tax, the highly progressive corporation income tax, the progressive local property tax, offset somewhat by the highly regressive payroll tax and the regressive general sales tax.

15. John Whalley cautioned that the sources and uses approach can lead to almost any conclusion about the overall incidence of a tax system depending on the assumptions employed about each tax, which he demonstrated with the Canadian tax system. For example, to make a tax system more progressive, remove the regressive taxes and make the progressive taxes more progressive. In terms of the U.S., to remove the two regressive taxes consider the burden of the sales tax in a lifetime context in which it is essentially proportional, and assume that the payroll tax is a benefits-received tax in payment for future pensions and therefore not part of an incidence analysis. To

make the personal income taxes and corporation income taxes more progressive, note that both are not indexed for inflation and therefore place real tax burdens on capitalists far above their nominal tax burdens.

16. Whalley argues, as do many economists, that tax burdens should be allocated on a lifetime basis. The lifetime sources of income are the stream of public and private transfers received and labor income. The lifetime uses of income are the annual consumption stream and the final bequest. Income from capital is now on the uses side, because its only effect, on average, is to allow taxpayers to alter the stream of lifetime consumption.

17. Assumptions about how to allocate the burden of the various taxes matter less in a lifetime basis because the inequality of labor incomes is only one-third to one-half of its annual inequality and most transfers are received during years when people are poor even though they are not poor in a lifetime context.

The chapter concludes with some comments on the use of *general equilibrium modeling* in tax incidence analysis, which economists tend to prefer to the sources and uses approach. General equilibrium modeling techniques have evolved to admit much more complexity than Harberger's original model and to account for large, discrete tax changes.

18. General equilibrium models have a big advantage over the sources and uses approach because they can account for the deadweight loss of distorting taxes that are part of the tax burden. Their disadvantage is that they require many assumptions about utility and production parameters that have not been well established by empirical analysis. Also, lifetime general equilibrium models require assumptions about how people form expectations about future prices and interest rates, a process that is not well understood.

19. Both the general equilibrium models and the sources and uses approach find the U.S. tax system to be somewhere between proportional to mildly progressive.

CRS, UNEQUAL FACTOR INTENSITIES, AND THE PRODUCTION POSSIBILITES FRONTIER

The *Appendix to Chapter 19* shows why the assumption of unequal factor intensities is required to generate a bowed-out production possibilities frontier when the production of both goods is assumed to be constant returns to scale. Without the assumption, the frontier would be linear, relative goods and factor prices would never change, and tax incidence analysis would be uninteresting.