Public Policy 558: Economic Analysis in the Practice of Public Policy
Winter 2025, Professor Kevin Stange
Problem Set 1

Instructions

Hand in an electronic PFF copy via Canvas. Please write your full name and the names of any collaborators (people you worked with) on the top of the assignment. No late assignments will be accepted. Answers should be typed, though graphs can be drawn by hand and pasted in if that is easier.

Topics covered:

- Basic concepts and principles of welfare analysis
- Calculating equilibrium price and quantity
- Changes in consumer and producer surplus, total surplus
- Indifference curves, budget constraints, and willingness-to-pay

Question 1

State whether each statement below is True or False and briefly explain your answer in a short paragraph.

a) "Suppose a consumer experiences a price increase due to a policy change. If you were to provide this consumer with additional income equal to their compensating variation for this price change, they will return to their original consumption bundle."

b) Payroll taxes in the U.S. are split equally by firms and workers (they are taken directly out of your paycheck). This means that workers and firms equally split the incidence of these taxes.

c) "Compensating variation can be approximated by the change in total surplus."

Question 2

Recall the DC paid family leave policy. Suppose the inverse labor demand curve by DC firms is given by: $W = 70 - 30H$ and the inverse labor supply curve by DC workers is given by $W = 5 + 35H$, where W is the wage and H is the quantity of hours worked (measured in billions). Suppose the labor market is competitive and there are no distortions.

a. What is the equilibrium price (wage) and quantity (hours)? What is the total payroll (wage x hours)

b. What is the consumer surplus, producer surplus, total surplus, and DWL at this equilibrium?

c. What is the elasticity of labor supply, computed at the equilibrium?

To fund the Paid Family and Medical Leave program, the district imposes a $1 tax on each hour of work by DC employees. Note that this tax is different than the actual tax imposed for the program, which was 0.62% of payroll. This actual tax was also an ad velorum (rather than unit)

tax and also much smaller in magnitude than a $1 per hour tax. The tax must be paid by DC employers.

d. Assuming no change in behavior (hours worked), how much revenue would the tax raise? This is the approach of the Fiscal Impact Statement.

e. Calculate the new equilibrium quantity (hours) with this tax.

f. What is the new equilibrium wage that workers receive? What is the wage that employers must pay, inclusive of the tax they pay to the government?

g. Accounting for any change in behavior, how much did the tax actually raise?

h. What is the incidence of the tax on workers?

i. What is the incidence of the tax on employers?

j. What is the new consumer surplus? Producer surplus? Deadweight loss?

k. Assuming that a job is 2000 hours per year, how many jobs are lost (if any) from the tax?

l. Now suppose that labor supply is fixed at the quantity you found in part a. How would your answers to questions h and i change?

Question 3

In this question, you will assess how the effects of the tax depend on the elasticity of supply, which is something about which there is considerable uncertainty. The spreadsheet Assignment1.xlsx contains a (very!) simple simulation model of the market described in Question 2. For each given hourly wage rate, the columns give the labor demand, labor supply, and the difference between the two. Equilibrium is the wage at which supply equals demand. Note that since the wage is given in discrete increments, there may not actually be a wage listed where supply exactly equals demand. In this case, pick the wage that comes closest to clearing the market and the corresponding quantity that is the lowest (demand or supply).

The simulation model has two key inputs: the per-unit tax rate and the elasticity of supply. If you enter in different values for these inputs, the quantities will change, resulting in a new equilibrium.

Use this model to determine the range of effects on employment, incidence of the tax on workers (e.g. the change in after tax wages), and incidence of the tax on firms (e.g. the change in wages + amount of the tax). The key thing is to show how these quantities vary by the elasticity of supply and the amount of the tax. Use a tax of $0 and elasticity of 1.14 as your baseline.

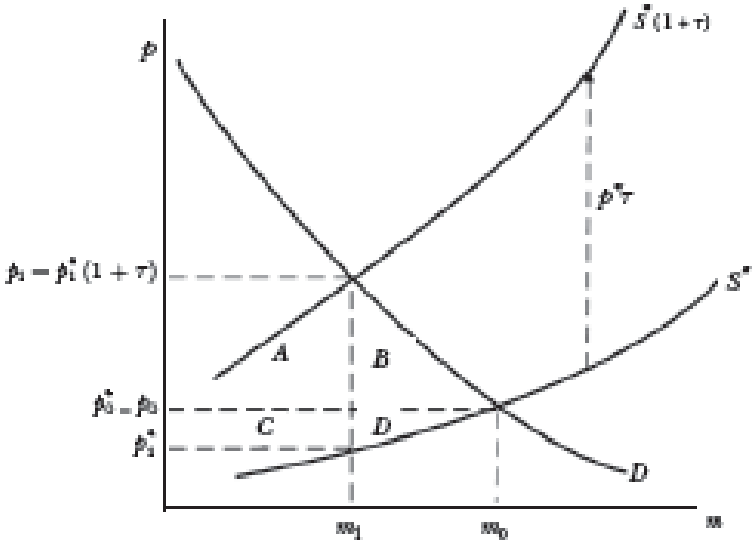
You should turn in a short 2 paragraph summary of what you find as well as a table that summarizes your results. Think of this as an analysis that could be directly slotted into the Economic Analysis report we read, so it should be clear, well-written, and the table should be understandable. Turn in something that you would be proud to turn into your boss in the Office of the Budget Director. You should examine at least two tax levels (including $1 and $2) and at least three different elasticities (including 1.14) beyond the baseline. When describing the elasticity values you chose, be sure to describe what they *mean* – e.g. “very elastic” “inelastic” etc. For “inelastic” you should use a number greater than zero (that is, don’t use *perfectly*

inelastic). When assessing the impact on employment, assume that each job is 2000 hours per year. Be sure to give some interpretation of the numbers you find.

Question 4

The figure below is from Amiti, Mary, Stephen J. Redding, and David E. Weinstein. 2019. "The Impact of the 2018 Tariffs on Prices and Welfare." *Journal of Economic Perspectives*, 33 (4): 187-210, illustrating the welfare consequences of import tariffs.

Figure 1
Impact of a Tariff on Prices



Source: Authors.
Note: Horizontal axis shows the quantity of imports; vertical axis displays the price of the good; D corresponds to the import demand curve; S^* represents the export supply curve.

a. Briefly explain what the areas A, B, C, and D correspond to.
b. Under what conditions does the tariff benefit the home country (the one imposing the tariffs) as a whole? Refer to the areas indicated on the curve above.
c. Describe a scenario where the tariffs are unambiguously bad for the home country. What conditions might give rise to this scenario?
d. What variables do you need to be able to measure in order to measure the effect of the tariffs on welfare in the home country, assuming the demand curve is linear?