

PROBLEM SET 1
Due Wednesday, September 30

A. Book problems

Market equilibrium: Problems 4-4 and 4-6 in Chapter 4 of Borjas.

Labor supply: Problems 2-3, 2-6, 2-8, and 2-14 in Chapter 2 of Borjas.

B. Data analysis

High rates of overall economic growth are generally believed to be associated with strong real wage growth: a rising tide lifts all boats. Some observers have suggested that this relationship changed around 1980, however, perhaps because labor unions became weaker or because of increased international trade.

1. Collect relevant data from the *Economic Report of the President* or another similar source and assess the claim of a changed relationship between wage growth and overall economic growth since around 1960. To do this, you will need to
 - (i) Plot real the time series of real wage growth and real GDP growth
 - (ii) Plot annual real wage growth against annual real GDP growth separately for the periods before and after 1980.
 - (iii) Perform regressions of real wage growth on real GDP growth separately for the two time periods.
 - (iv) Pool the data from both time periods and regress real wage growth on real GDP growth, a post-1979 dummy, and the interaction of real GDP growth and the post-1979 dummy.
 - (v) Discuss your results from (i) – (iv) and use these to assess the claim that the relationship between wage growth and overall economic growth changed since 1980.
2. Does the relationship between economic growth and wage growth have a clear theoretical interpretation in a supply-and-demand framework? How should your answer here affect the interpretation of the results from part 1?

C. Analytical problems

1. Show that if labor supply is elastic, we might be able to raise tax revenue by lowering taxes.
2. In recent years, many immigrants have come to Silicon Valley to work in the software industry. Assume there are two types of programmers: natives (Type 1) and immigrants (Type 2). Initially, assume that there are n_1 native programmers in the labor force and no immigrants.

The aggregate labor supply function of native programmers is $n_1 S_1(w_1)$, where $S_1(w_1)$ is the labor supply function of an individual programmer.

- (i) Suppose that immigrant programmers have labor supply functions identical to native labor supply functions. Further, assume that firms treat immigrant and native programmers as perfect substitutes. Using a graph, show the effect on native programmers of an influx of $n_2 = n_1$ immigrants. Compare this with the effect of immigration if immigrant labor supply is perfectly inelastic.
- (ii) Extra Credit: Using the mathematical methods in the Johnson (1980)¹ paper, find the effect of dn_2 on native employment in the two immigrant-elasticity scenarios described in (i), above.

¹ Johnson, George E. "The Labor Market Effects of Immigrants." *Industrial and Labor Relations Review* 33, no. 3 (April 1980): 331-341.

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