CHAPTER 1

THE NATURE AND SCOPE OF ECONOMETRICS

QUESTIONS

1.1. (***a***) Other things remaining the same, the higher the tax rate is, the lower the price of a house will be.

(***b***) Assume that the data are cross-sectional, involving several residential communities with differing tax rates.

(***c***) $Y_i = B_1 + B_2 X_i$

where Y = price of the house and X = tax rate

(***d***) $Y_i = B_1 + B_2 X_i + u_i$

(***e***) Given the sample, one can use OLS to estimate the parameters of the model.

(***f***) Aside from the tax rate, other factors that affect house prices are mortgage interest rates, house size, buyers' family income, the state of the economy, the local crime rate, etc. Such variables may be included in a more detailed multiple regression model.

(g) *A priori*, $B_2 < 0$. Therefore, one can test $H_0 : B_2 \geq 0$ against $H_1 : B_2 < 0$.

(***h***) The estimated regression can be used to predict the average price of a house in a community, given the tax rate in that community. Of course, it is assumed that all other factors stay the same.

1.2. Econometricians are now routinely employed in government and business to estimate and / or forecast (1) price and cost elasticities, (2) production and cost functions, and (3) demand functions for goods and services, etc. Econometric forecasting is a growth industry.

1.3. The economy will be bolstered if the increase in the money supply leads to a reduction in the interest rate which will lead to more investment activity and, therefore, to more output and more employment. If the increase in the money supply, however, leads to inflation, the preceding result may

not occur. The job of the econometrician will be to develop a model to predict the effect of the increase in the money supply on inflation, interest rate, employment, etc.

1.4. As a matter of fact, on October 1, 1993 the Federal Government did increase the gasoline tax by 4 cents. Since gasoline and cars are complementary products, economic theory suggests that an increase in the price of gasoline will not only lead to a decline in the demand for gasoline but also in the demand for cars, *ceteris paribus.* The Ford Motor Company may be advised to produce more fuel-efficient cars to stave off a serious decline in the demand for its cars. An automobile demand function will provide numerical estimates of the effect of gasoline tax on the demand for automobiles.

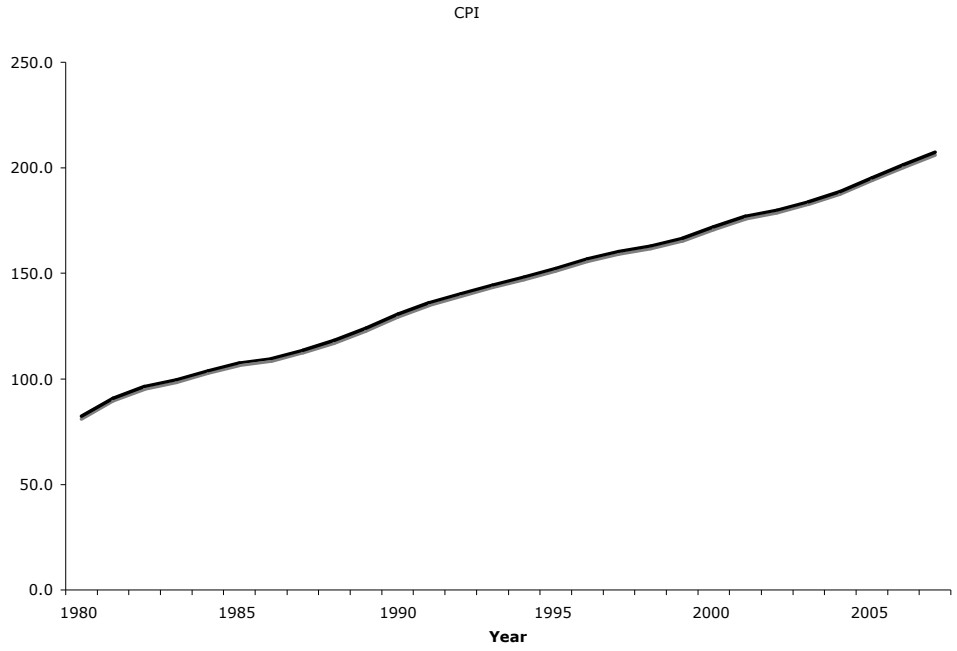
1.5. As a pure economist, you will advise against imposing such a tariff, for it will not only increase the price of imported steel but will also increase the prices of all goods that use imported steel, especially the prices of automobiles. It will also protect inefficient domestic producers of steel.

The best way to set up an econometric model would be to look at past episodes of tariffs and see their impact on various products, pre- and post-the imposition of such tariffs.

PROBLEMS

1.6. **(*a*)** The plot will show that both the CPI and the S&P 500 stock index generally show an upward trend, whereas the three-month Treasury bill rate is generally downward trending.

(Graphs appear in the following pages)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1995
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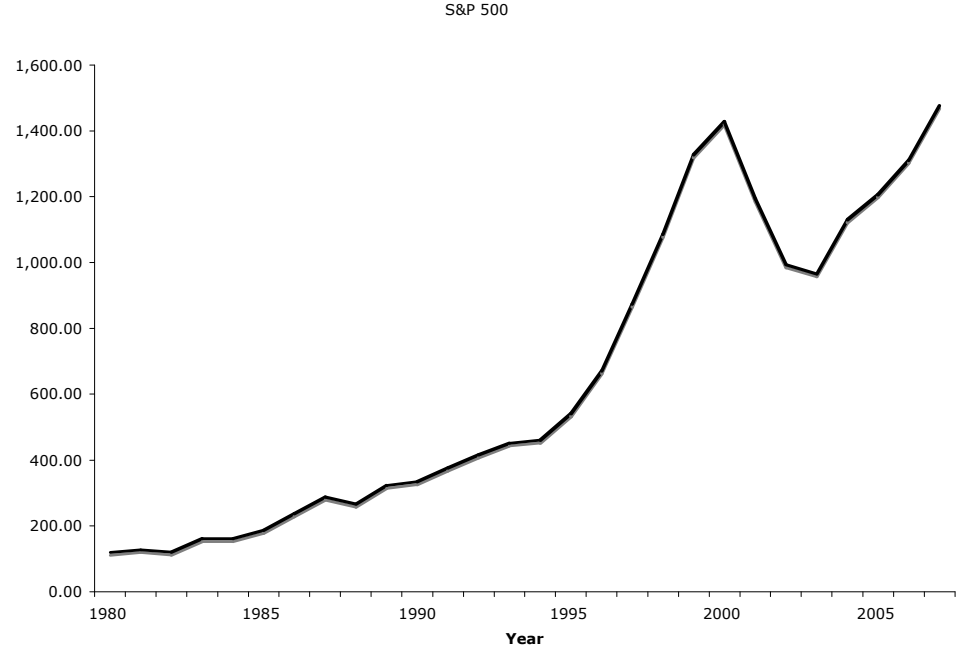
2005
Year


S&P 500
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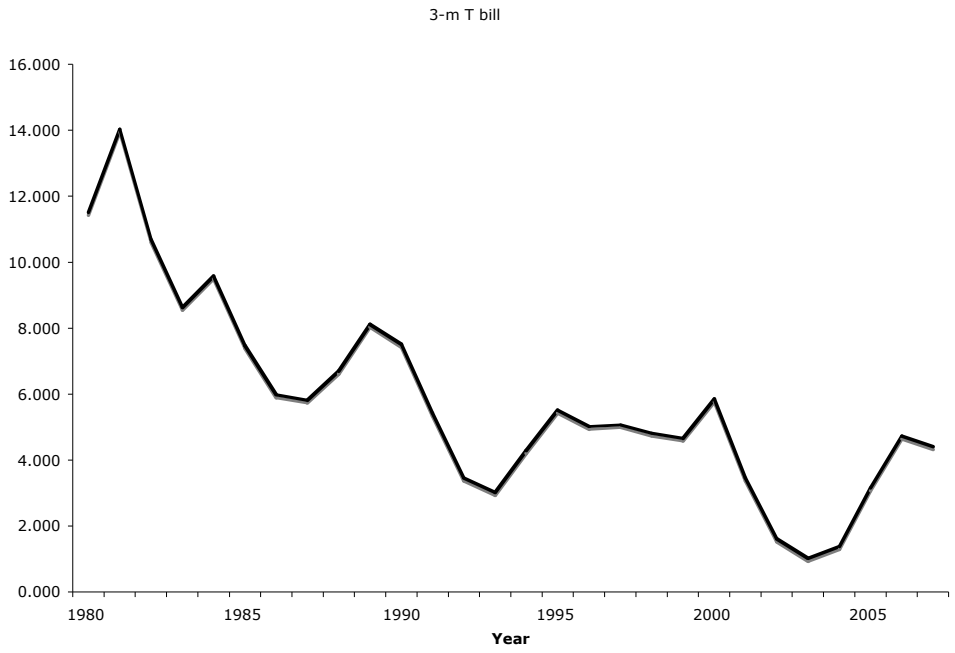
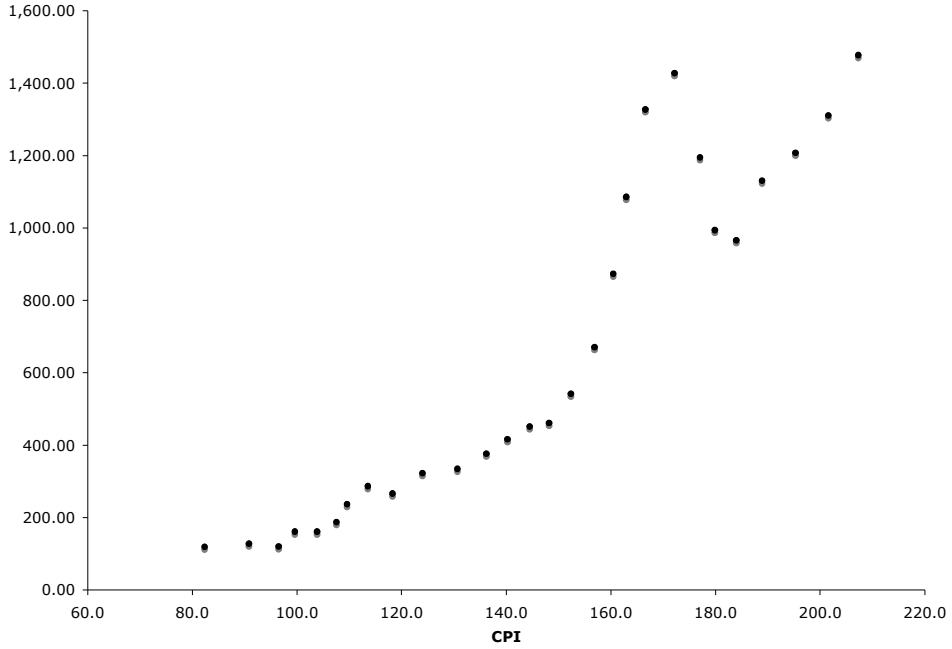
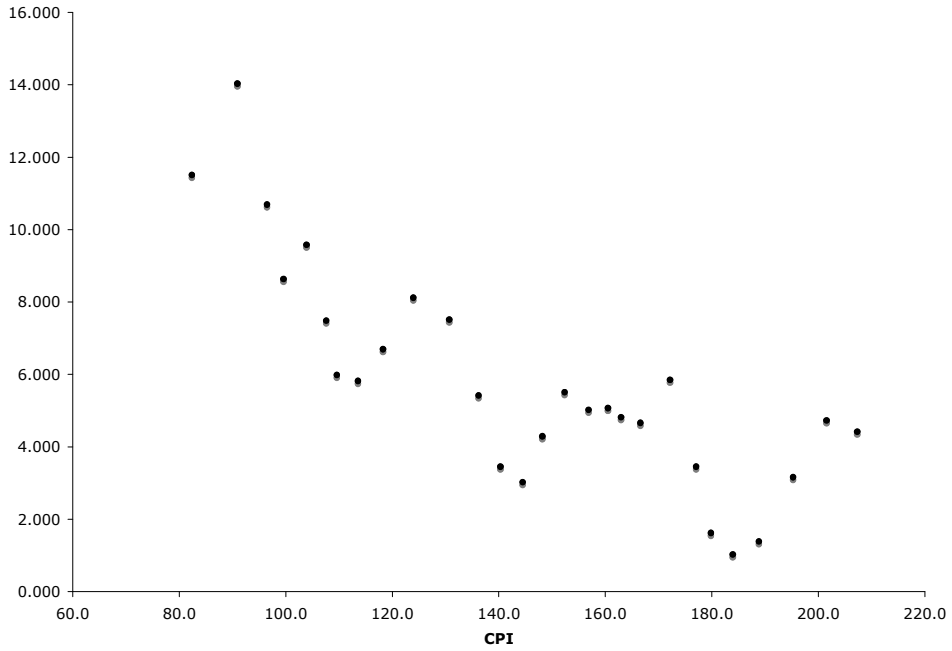


(*b*) If investment in the stock market is a hedge against inflation, the S&P 500 stock index and the CPI are expected to be positively related. The three-month Treasury bill rate is expected to be positively related to the inflation rate according the *Fisher effect*, because the higher the inflation rate, the higher the nominal rate of interest that the investor will expect. In the problem, the price variable is the CPI and not the inflation rate (which is the percentage change in the CPI): So the appropriate comparison is between the inflation rate and the three-month Treasury bill.

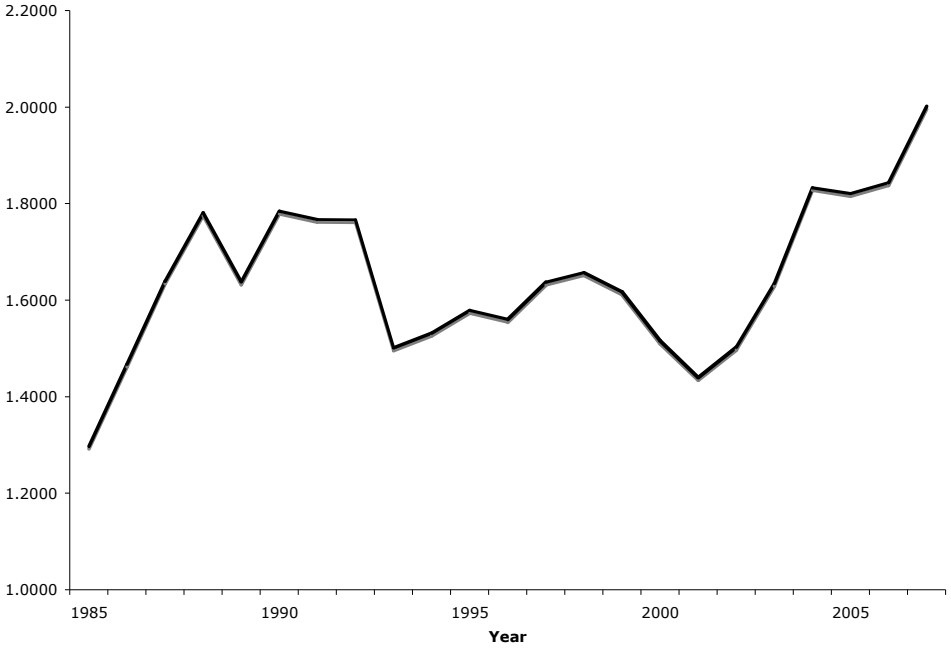
(*c*) The data will show that the regression line between the S&P 500 stock index and the CPI is positively sloped, but that between the three-month Treasury bill rate and the CPI is negatively sloped. Using the inflation rate instead of the CPI, the data will show that the regression line between the inflation rate and the three-month Treasury bill is positively sloped, as the *Fisher effect* is stating.

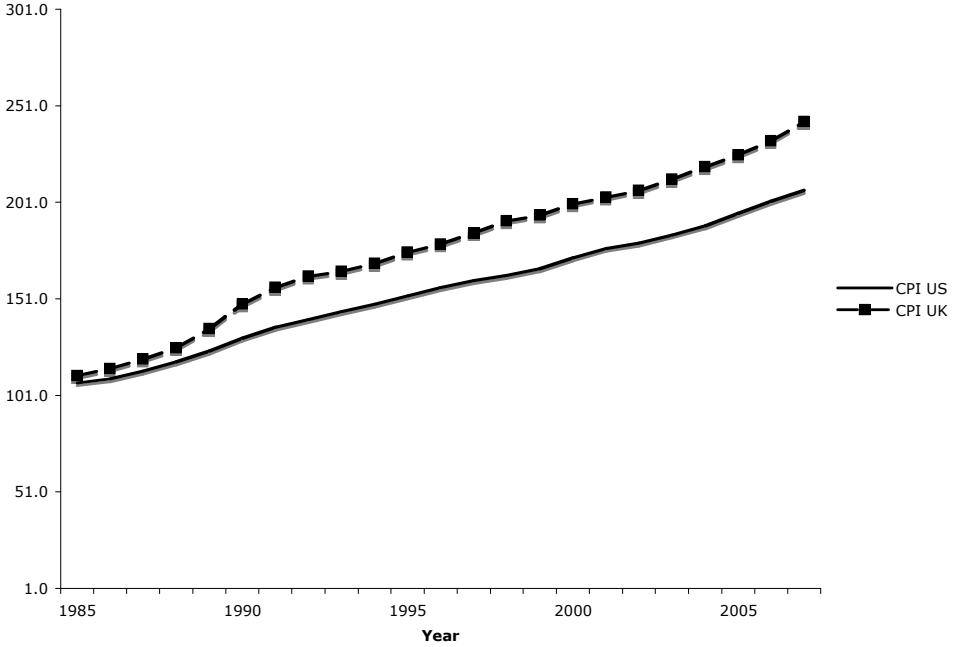




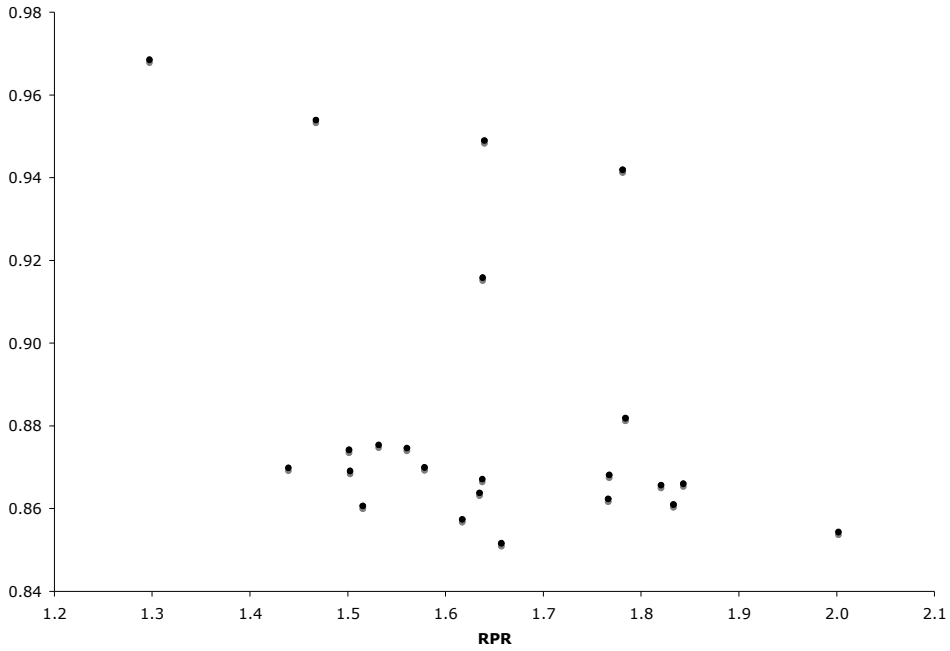
1.7. **(*a*)** The diagrams will show that both consumer price indexes show a positive trend over time, whereas the exchange rate shows positive and negative trends at various periods in the graph. It may be noted that in 1985, under the *Plaza Accord,* the governments of the G-7 countries made

a deliberate attempt to bring down the exchange rate of the dollar vis-à-vis the currencies of the G-7 countries.

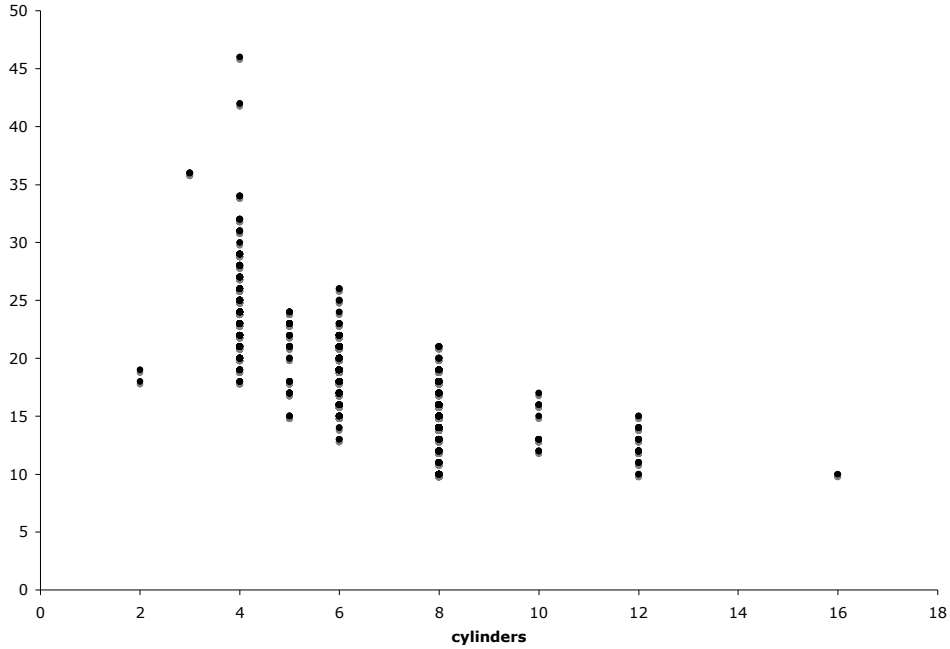




(*b*), **(*c*)**, and **(*d*)**: The plot of the ER (pound/$) against the RPR shows a slightly negative relationship between the two in general.



1.8 (*a*), (*b*), and **(*c*).** The plot shows a relatively negative relationship between the two, which is not entirely surprising: As the number of cylinders goes up, the combined MPG goes down for the cars. It also seems apparent that there is potentially non-linear relationship (somewhat hyperbolic) between the two variables.


50
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8
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12
14
16
18
cylinders