PROJECT TEMPLATE ON ARIMA MODELING OF UNEMPLOYMENT RATES

Unemployment rates are a good time series for a student project because

- They vary by age, sex, region, and ethnic group.
- The relative unemployment rates by group have varied over the past decades.
- Each group's unemployment rate series has its own seasonality.
- Each group's unemployment rate depends on different macroeconomic factors.

The Excel file on the discussion forum shows unemployment rates

- seasonally adjusted and not seasonally adjusted
- for male vs female and teenager vs adult.

You can find unemployment rates by state, by other age groups, and by ethnic group on the internet. Demographers and social scientists study numerous unemployment rate relations that are suitable for student projects, such as

- Effects of state minimum wage laws on teen-age unemployment rates.
- Effects of Hispanic immigration on African-American unemployment rates.
- Effects of GDP changes on male vs female unemployment rates.

The unemployment rates are by month, so you can examine seasonality.

Illustration: School lets out in June for summer vacation.

- Adult male unemployment rates do not change much from May to June.
- Teen-age unemployment rates may double from May to June, as young people look for summer jobs.
- Female adult unemployment rates may reflect school-age children with vacation in the summer.

Your student project may examine seasonally adjusted and non-seasonally adjusted rates for adults vs teen-agers and male vs female.

Compare the seasonal adjustment actually used vs a simple seasonal adjustment using the procedure in the textbook. The actual adjustment should give a smoother series and a better ARIMA fit, but you can test these relations.

Retail firms have more job positions in December, with a slight seasonal effect on the unemployment rate.

Economists presume that unemployment rates are correlated with other macroeconomic indices, such as GDP and (perhaps) inflation.

Unemployment rates should be inversely correlated with GDP. Regress unemployment rates on GDP and fit an ARIMA process to the residuals. The regression may differ for males vs females and adults vs teen-agers.

The relation of unemployment rates and inflation is debated.

- The macroeconomics on-line course assumes no relation.
- A previous generation of economists assumed a Phillips curve and a strong relation.

You can regress the unemployment rate on a lagged inflation rate. Use seasonally adjusted figures for both rates, or you will get a spurious relation.

Take heed: Some economists regress unemployment on unexpected inflation. One month LIBOR minus the CPI change is a measure of unexpected inflation. But don't feel bound by the economics. Any structural model is fine for the student project; we do not grade you on the economic reasoning. We examine if you properly regress one index on another and fit an ARIMA process to the residuals.

The teen unemployment rate is sometimes assumed to reflect minimum wage laws. The U.S. pattern in the minimum wage laws is

- Periods of no change in the nominal minimum wage law ⇛ a steady decrease in the real minimum wage.
- Federal minimum wage law legislation ⇛ a sudden jump in the real minimum wage.

Find the dates of minimum wage law changes by using the internet search engines (look for "minimum wage law"). See if the revised law causes a change in the teen-ager vs adult seasonally adjusted unemployment rate pattern.

Take heed: The data on the NEAS discussion forum are countrywide figures, with labor force participation combined with job finding and separation rates. Actual unemployment rates differ by industry, and careful econometric studies examine numerous influences on employment in each state, industry, age group, ethnic group, and other class dimension. You won't see clear effects, such as a rise in the unemployment rate when the minimum wage increases. We grade the student project by your use of the ARIMA techniques, not the validity of your conclusions.

Recommendations: Candidates who want a student project on unemployment rates that is particularly relevant to modern issues may compare unemployment rates in Ireland and Germany from 1946 to now.

- The Post-WW2 "German Miracle" rebuild the country in the 1950's – 1970's, with low unemployment and high GDP growth. By the 1980s's, the German welfare state was beginning to stifle the economy. The pressure of unification caused high unemployment and slow growth. Compare German macroeconomic indices before and after the fall of the Berlin Wall.

- Ireland had a poor economy with high unemployment and a low standard of living for three decades after World War 2. Liberalization of the economy in the 1980s's made Ireland the fastest growing European economy for the past 20 years, with low unemployment. Examine Ireland's macroeconomic indices, choose two periods that differ sharply, and fit an ARIMA process to each one.