Exercise 1

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1. (a) Open the file `maunaloa.wf1`; this is a famous data set used in machine learning. Make a time series plot.
   (b) Estimate a linear trend by regressing the `co2` series on an intercept and the variable `time`.
   (c) Plot the data, together with the estimated linear trend.
   (d) Produce a forecast for 2005M1, first manually using the fitted model

   $$\widehat{Y}_t = \widehat{\beta}_0 + \widehat{\beta}_1 t,$$

   then using Eviews.
   (e) Repeat Questions 1b through 1d, but using a quadratic trend.
   (f) Repeat Questions 1b through 1d, but using an exponential trend.
2. (a) Compute the 3rd order moving average of the `co2` series for 1964M6 by hand.
   (b) Estimate the trend with a 12 month moving average (12 months are necessary to cover a full cycle). Then plot the resulting trend estimate and the data together in a time series plot.
3. (a) Estimate a model with a linear trend and 12 monthly dummies (and no intercept) for the `co2` series. Then, produce an (in-sample) forecast for 2004M12, both by hand and using EViews. Also create an actual-fitted-residual plot.
   (b) Same, but include an intercept and remove the last dummy.