# Predicting Cycles in Economic Activity
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# Overview

- Purpose: Prediction of cycles in economic activity
- Using binary probit model (individual and panel regressions)
  - Recession period 1
  - Expansion period 0
- Explanatory variables:
  - Oil price
  - Leading indicator
  - Yield spread
  - Stock market index
  - Real activity
  - Exchange rate (nominal, real)
- Country sample: USA, Canada, Japan, Germany, Mexico, South Korea, Taiwan, UK
- Model evaluation:
  - In-sample: (1970s-2008)
  - Out-of-sample: (2000-2008)
  - Predicting the current recession

# Comments

- The use of panel regression
  - Assumption of homogeneity across countries
    - Very unlikely to hold in practice
  - "[The panel regression] has the advantage of having many more observations relative to the number of parameters being estimated"
    - Sample in Table 7: 1973M8 to 2006M12
    - 400 Obs. vs 6 parameters
  - Literature on advantages of pooled vs heterogeneous models for forecasting
    - Baltagi et al. (2000,2002,2003,2004)
    - Brücker/Siliverstovs (2006, EE)

# Comments

- Asymmetry between errors of Type I and Type II
    - Type I – not predicting a recession that actually occurs
    - Type II – predicting a recession that does not occur
    - Implications for the magnitude of a threshold above which a predicted probability signals a recession
    - The paper imposes equal probability for both types of errors when choosing the threshold of 0.2
    - Asymmetry of the loss function of a forecaster
        - Elliot, Kommunjer, Timmermann (2005, REStud; 2008, JEEA)
    - For Germany, a tendency to produce too optimistic GDP growth forecasts
        - Döpke, Fritsche, Siliverstovs (2009), sample 1970-2007; 14 institutions that issue forecasts for Germany
        - Kholodilin/Siliverstovs (2009), sample 1995-2008, GDP and its subcomponents; Joint Forecast for Germany
    - Loss associated with Type I error seems to be smaller than that associated with Type II error
    - Higher threshold value is likely to be used in practice

# Comments

- Out-of-sample evaluation is not that informative
  - Use of the full sample model specification
    - which is not feasible in practice
  - Preferably it should be carried out using the real-time data vintages
    - Measures of economic activity often undergo subsequent revisions
  - Forecast horizon is not defined

# Comments

- The paper uses the **static** probit regression
  - $Prob(y_t = 1) = \Phi(\pi_t)$, where $\pi_t = c + x_{t-k}'\beta$
  - Similarly as in Estrella/Mishkin (1998 , REStat), Bernard/Gerlach (1998, IJFE)
- Duecker (1997) suggests a dynamic probit model
  - $\pi_t = c + x_{t-k}'\beta + \theta y_{t-1}$
  - Incorporate the autocorrelation structure of the binary response variable
  - Valckx et al. (2002), Moneta (2003)
- Kauppi and Saikkonen (2008, REStat) "Predicting U.S. recessions with dynamic binary response models"
  - $\pi_t = c + x_{t-k}'\beta + \theta y_{t-1} + \alpha \pi_{t-1}$
  - Nyberg (2008) "Dynamic probit models and financial variables in recession forecasting"
  - S. Chib "Bayesian methods for correlated binary data" (Ch. 7) in Generalized linear models: a Bayesian perspective, eds. Dipak D., S. K. Ghosh, and B. K. Mallick