Replication of Bond et al 2001

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```
library(plm)
library(here)
library(tidyverse)
library(pder)
```

```
data(Solow, package = "pder")
```

R Markdown

The growth equation estimated is given by:

$$\Delta y_{it} = \gamma_t + (\alpha - 1) y_{i,t-1} + x'_{it}\beta + \eta_i + v_{it} \tag{1}$$

or in levels

$$y_{it} = \gamma_t + \alpha y_{i,t-1} + x'_{it}\beta + \eta_i + v_{it} \tag{2}$$

where Δy_{it} is the log difference of per capita GDP over a five year period. $y_{i,t-1}$ is the starting value of GDP per capita in this five year period in logs. $x_{i,t}$ contains further explanatory variables that are measured during or at the start of the period. Common choices in the growth context include the investment rate or population growth.[1]

Taking equation (2) in first differences we have:

$$\begin{aligned} y_{it} - y_{i,t-1} &= \gamma_t - \gamma_{t-1} + \alpha y_{i,t-1} - \alpha y_{i,t-2} + x'_{it}\beta - x'_{i,t-1}\beta + \eta_i - \eta_i + v_{it} - v_{i,t-1} \\ \Delta y_{it} &= \gamma_t - \gamma_{t-1} + \alpha \Delta y_{i,t-1} + \Delta x'_{it}\beta + \Delta v_{it} \end{aligned} \tag{3}$$

(Discussion of Blundell-Bond requirement in **?**).

[1] According to **?**, one often includes population growth plus 0.05, "where 0.05 represents the sum of a common exogenous rate of technical change (g) and a common depreciation rate (δ)".