

# A Comparison between the Linear Regression Model with Autocorrelated Errors and the Partial Adjustment Model

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**Abstract:** In this paper, we consider a linear regression model with a design matrix that fits the periodic structure of a time series. As a consequence, the residuals are very often autocorrelated. The main problem is that residual autocorrelation does not necessarily entail error autocorrelation. To analyse the effects of selecting different formulations to accommodate the autocorrelation in the residuals, we consider two seemingly different ways to deal with this problem: the Linear Regression Model with the error terms following an Autoregressive Stationary Process and the Partial Adjustment Model. We study the equivalence between the two formulations. We go over the problem of estimating the parameters and, especially, of making inferences in this framework. After parameter estimation, we analyse the adequacy of the models. We demonstrate that the issue of selecting the most appropriate model to capture the autocorrelation in the residuals is, in this context, a kind of an artefact since the main results concerning the fitted values and forecasting features are the same.

**Keywords:** Stochastic Regressors; Correlated Errors; Partial Adjustment Model.