Abstract: We introduce the panel smooth transition regression model, which characterizes heterogeneous panels, allowing the regression coefficients to vary both across individuals and over time. Heterogeneity is allowed for by assuming that these coefficients are bounded continuous functions of an observable variable and switch between a limited number of "extreme regimes". We devise the modelling strategy in the panel context. The strategy consists of model specification based on homogeneity tests, parameter estimation, and model evaluation, including tests of parameter constancy and no remaining heterogeneity. The model is applied to describing firms' investment decisions in the presence of capital market imperfections.