**Chapter 12 Summary**

In this chapter we discussed the Poisson regression model which is often used to model count data. The PRM is based on the Poisson probability distribution. A unique feature of the PPD is that the mean of a Poisson variable is the same as its variance. This is also a restrictive feature of PPD.

We used patent data for 181 manufacturing firms for 1990 on the number of patents each firm received along with information on the R&D expenditure incurred by these firms, the industry in which these firms operate (represented by dummy variables) and dummies for two major countries, Japan and USA.

Being a nonlinear model, we estimated PRM by the method of maximum likelihood. Except for the Japan dummy, all the other variables were statistically significant.

But these results may not be reliable because of the restrictive assumption of the PPD that its mean and variance are the same. In most practical applications of PRM the variance tends to be greater than the mean. This is the case of overdispersion. We used a test suggested by Cameron and Trivedi to test for overdispersion and found that for our data there indeed was overdispersion.

Since our results showed overdispersion, we used an alternative model, the Negative Binomial Regression Model (NBRM). An advantage of NBRM model is that it allows for overdispersion and also provides a direct estimation of the extent of overestimation of the variance. The NBRM results also showed that the original PRM standard errors were underestimated in several cases.