Estimation of the Expected Value of Construction Completed

Kyung Sam Min
National Statistical Office, Industrial Current Trends Division
920 Dunsan-dong, Seo-gu
Daejeon, Korea
ksmin@nso.go.kr

Woon-Sun Eo
National Statistical Office, Industrial Current Trends Division
920 Dunsan-dong, Seo-gu
Daejeon, Korea
Sun2@nso.go.kr

Man Young Seo
National Statistical Office, Industrial Current Trends Division
920 Dunsan-dong, Seo-gu
Daejeon, Korea
myseo@nso.go.kr

1. Introduction

The purpose of this paper is to estimate the expected value of construction completed from data of Construction Orders Received Survey(CORS). Sample period for estimation is from January 1990 to December 2000.

CORS covers value of order for domestic construction, type of work, construction period, etc. Therefore, if the construction progress were known, we could estimate the expected value of construction completed from survey data.

2. Standard Construction Progress

We collect 557 cases of actual construction project in order to estimate the standard construction progress, and classify 17 categories by type of work. The process for estimation is as follows :

1. to expand the construction progress by percent from actual period to maximum period T.

$$\hat{CP}_t = \sum_{j=1}^{k} r_j + r_{k+1} \times \left(\frac{m \times t}{T} - k \right)$$

where T stands for maximum period, r_j monthly construction progress in jth-month among actual work period m, k integer $\left[\frac{m \times t}{T} \right]$.

2. to calculate monthly construction progress by percent and its mean by category.

$$\hat{R}_t = \hat{CP}_t - \hat{CP}_{t-1}$$

$$\overline{R}_t = \left(\sum_{i=1}^{N} \hat{R}_t^i \right) \Big/ N$$

where N is the number of cases in category.

3. to estimate the standard construction progress by category through a regression model.

$$\overline{R}_t = \beta_1 x_t + \beta_2 x_t^2 + \beta_3 x_t^3 + \Lambda + \beta_8 x_t^8 + \varepsilon_t$$

where x_t is stochastic variable $\left[\frac{1}{T}, \frac{2}{T}, \frac{3}{T}, \Lambda, \frac{T}{T} \right]$ which stands for work period T.

3. Estimation of the Expected Value of Construction Completed

We can estimate the expected value of construction completed through multiplying the value of construction order received by the monthly standard construction progress. The proceeding for estimation is as follows :

1. to forecast the monthly standard construction progress with the stochastic variable which stands for work period s in construction order received.

$$\hat{SR}_t = \hat{\beta}_1 x'_t + \hat{\beta}_2 x'^2_t + \hat{\beta}_3 x'^3_t + \Lambda + \hat{\beta}_8 x'^8_t$$

where x'_t is stochastic variable $\left[\frac{1}{s}, \frac{2}{s}, \frac{3}{s}, \Lambda, \frac{s}{s} \right]$.

2. to adjust the forecasted standard construction progress so that sum of them be 1.

$$R_t = \hat{SR}_t \Big/ \left(\sum_{t=1}^{s} \hat{SR}_t \right)$$

3. to estimate the expected value of construction completed as follows :

$$EVCC_t = \sum_{i=0}^{n} COR_t^i \times R_t^i$$

where $EVCC_t$ stands for the expected value of construction completed in period t, n the number of constructions which are working in period t, COR_t^i the value of order received for i construction, R_t^i the monthly standard construction progress of period t for i construction.

4. Conclusion