CHAPTER 5

Conclusion

5.1 Conclusion and discussion

Growth in public rail transportation use is modelled using a stochastic exponential model. The model can capture the uncertainty in the growth. The uncertainty is represented by a standard Brownian motion. Bayesian inference is applied for the parameter identification of the model. Based on the data of BTS, the mean growth rate is determined using the proposed methodology.

The inference applies the inverse gamma priors in this model. Total number of realizations is 1,000,000 with the 10,000-realization burn-in. When the mean is taken as the estimate, the values are obtained $\hat{\mu} = 0.6381$, and $\hat{\sigma} = 1.0539$ where $\hat{\mu}$ signifies the growth rate of ridership whereas $\hat{\sigma}$ implies the degree of fluctuation in the model. When applying MCMC, the trace plot, running mean plot, and autocorrelation plot of respective inferred parameters are performed for the purpose of the convergence diagnostic. The trace plot and running mean plot in all cases indicate the good-mixing behaviour of the simulated chain. The autocorrelation associated with each parameter is considerably reducing for higher values of lag. This indicates a low degree of correlation among samples. The independence of sample-size can be thus accepted. For forecasting the ridership based on the estimates of model parameters, Monte Carlo simulation is applied to obtain the five sample paths which are applied to simulate a probability apace by taking independent samples from the space regarding the probability distribution. Moreover, the mean of annual ridership from 10 years after 2016 indicates that if the design capacity is at $5.0\text{x}10^9$, then BTS should increase the service capacity or the infrastructure to accommodate the increasing number of ridership before year 9 after 2016 or in 2025.

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5.2 Policy implication and suggestions for future research

5.2.1. Policy implication

Growth in ridership is an exponential trend, but there is still uncertainty in the growth. Assessment of capacity improvement and planning for future route requires ridership growth rate. The decision maker can use the prediction for planning an investment. For example, if the design capacity is at 5.0×10^9, then BTS should increase the service capacity before year 9 after 2016 or in 2025. Suppose that number of ridership increase as a linear, there is ridership at 250 million and have 98 trains, then, if ridership is 5 billion, the BTS should increase trains to 1,960 in 2025.

Moreover, access to the area that can be developed as new cities .It will increase capacity in that areas with rail systems, such as in Hong Kong or Japan, where mass transit and residential development will grow together (Thandettakij Multimedia, 2017).

The ridership growth rate can be used to assess the service capacity of the existing rail systems. In other words, it informs whether the existing service capacity is adequate for the number of users in the future or not. For the planning of new rail systems, such a user growth rate can be used as a guideline to determine the service capacity or guidelines for decision making and planning of new route initiation. In addition, public rail transportation can develop the city and increase economic value added.

5.2.2 Suggestions for future research

Although the present study is focused on the BTS ridership, the proposed methodology could be employed for prediction of growth in other quantities that are of interest in economics. It is interesting to apply the proposed methodology for other economic quantities as well.

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