（For JSPS Fellow）

Form B-5

Date（日付）
16/06/26 （Date/Month/Year:日/月/年）

Activity Report -Science Dialogue Program-
（サイエンス・ダイアログ事業 実施報告書）

- Fellow's name（講師氏名）: Wali Ullah （ID No. P 13309 ）

- Participating school（学校名）: Namiki Secondary School, Tsukuba, Ibaraki

- Date （実施日時）: 13/06/26 （Date/Month/Year:日/月/年）

- Lecture title（講演題目）: （in English）Term Structure of Interest Rate in Japan

（in Japanese） 日本国債 金利の期間構造

- Lecture summary（講演概要）: Please summary your lecture 200-500 words.

See next page

- Language used（使用言語）: English

- Lecture format（講演形式）:

◆Lecture time（講演時間） 70 min（分）, Q&A time（質疑応答時間） 20 min（分）

◆Lecture style（ex.: used projector, conducted experiments）
（講演方法（例:プロジェクター使用による講演、実験・実習の有無など））
Projector and Black Board

◆Interpretation（ex.: assistance by accompanied person, provided Japanese explanation by yourself）（通訳（例:同行者によるサポート、講師本人による日本語説明））
The school teacher helped to explain the materials in Japanese

◆Name and title of accompanied person（同行者 職・氏名）
Non

◆Other note worthy information（その他特筆すべき事項）:
It was an interesting experience to interact with the Japanese school students.

- Impressions and opinions from accompanied person（同行者の方から、本事業に対する意見・感想等がありましたら、お願いいたします。）:

Non

Lecture summary

The lecture was divided in two parts. In the first part, I gave a brief introduction of my home country (Pakistan) and discussed that how it is different from Japan. It includes the information about national dress, education system, culture, festivals, sports, architecture, wild life and mountains etc.

In the second part of the lecture, I discussed that why I became a researcher, why did I choose economics and why did I come to Japan to carry out my research. Next, I presented about my research, which is term structuring of interest rate in Japanese bond market. The main points of presentation about the research were:

1. Japanese Bonds and Bond Market characteristics
2. Why did Japanese government issue bond and who purchase these bonds?
3. Term structure of interest rate

The term structure of interest rates is a static function that relates the time-to-maturity to the zero rates at a given point in time. The conventional way of measuring the term structure is by means of the spot rate curve on zero-coupon bonds. However, the entire term structure is not directly observable, which gives rise to the need to estimate it using some approximation technique. There are a wide variety of diverse yield models, with objective to accurately model and describe the future yield curve structure as much possible. In recent years, the Nelson-Siegel (1987) model and its extended versions have been credited for its high efficacy in the in-sample fitting and out-of-sample forecasting of the term structures of interest rates. However, when we estimate the Japanese government bonds (JGBs) yield curve, selecting a method without careful consideration might result in the estimation of a curve that does not grasp the characteristics of the JGBs yield curve and the use of such a zero curve could lead to wrong conclusions. For JGBs since 1999, yield curves under the zero interest rate policy (ZIRP) and the quantitative easing monetary policy (QEMP) have distinctive features. During this periods, the yield curve has a flat shape near zero at the short-term maturities. The second feature frequently seen in the JGBs interest rate term structure is that it has a complex shape with multiple inflection points.

In order to avoid such difficulties and select a better candidate model to accurately grasp the characteristics of the JGBs yield curve, in this study, we consider the generalized version of the Nelson-Siegel model. We add second slope and also second curvature to the standard Nelson-Siegel model and introduce a dynamic version of this model, called as generalized dynamic Nelson-Siegel (GDNS) model, which corresponds to a modern five-factor term structure model.

More specifically, we extend the standard DNS three-factor model to the five-factor model. We estimate the models and compare the results in terms of in-sample fitting and out-of-sample forecasting using the JGBs yield data. We find remarkably good in-sample fit and out-of-sample for the GDNS model.