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Summary of work done during the IES- UK GES exchange programme at OBR

The main task of OBR is forecasting- on economy and fiscal side. I was attached with the economy team of OBR which does forecasting on various aspects of the economy- including GDP, Inflation, Labour market variables etc. I was in the team which does short term and long term GDP forecasting.

I. The first purpose was to learn the various short term/long term models being used by OBR for GDP forecasts. OBR has about 5-6 short term GDP forecasting models which they use individually and then along with the forecasts from the models, some judgments are used to come up with the final forecast. For the long term GDP forecast, they use the potential output and output gap approach.

II. After a basic understanding of the forecasting models, I was assigned 2 projects:

Task 1: Construct a new GDP forecasting model using Expectation variables of the industry and services sector from the various surveys conducted in UK by the Statistics Ministry of UK (called as Office of National Statistics) and other indicators like PMI index and surveys from private organisations, like Survey from British Chamber of Commerce (BCC) Confederation of British Industry (CBI).

OBR forecasts GDP for the current quarter or current year using short term GDP models and various indicators. Forecasts beyond the current horizon are done using an approach of calculating the potential output and then finding out the output gap. Until now, the forward looking variables like expectations about economic activity or new orders were not being used by OBR. I was assigned the task of working on constructing a new model for short term GDP forecasting using these variables.

UK has a range of surveys which had data on expectation about economic activity, new orders etc for all sectors- construction, Manufacturing and Services. Since Agriculture is a very small share of the economy, the remaining sectors were used to forecast the GDP.

I found that these forward looking variables had a strong correlation with the forward lagged output growth. Accordingly, the model was constructed, which is as follows:

Step 1: Forecasting Construction, manufacturing and services sector GVA separately, using the expectation related indices from the surveys.

Construction growth (t+1) = f(PMI Construction expectations index (t), other surveys expectations index (t))
Manufacturing growth (t+1) = f(PMI Manufacturing expectations index(t), other surveys expectations index (t))
Services growth (t+1) = f(PMI Construction expectations index (t)), other surveys expectations index (t))

Note: There are some surveys for separate sectors of services also, which I used to forecast individual sectors and add them up to calculate service sector GVA growth. Since services are the largest component of total economy, I tried to forecast services at a sub-sectoral level as well.

Step 2: GDP growth (t+1) = Construction sector as a share of GDP * (Construction GVA growth (t+1)) + Manufacturing sector as a share of GDP * (Manufacturing GVA growth (t+1)) + Services sector as a share of GDP * (Services GVA growth (t+1))

I tried many variations of the model with indicators from all the available surveys from CBI and BCC. There were about 15 forward looking variables available from the various surveys. To run the model, I had used the data from 1997 onwards. I used rolling regressions in this model for estimating the forecast equation.

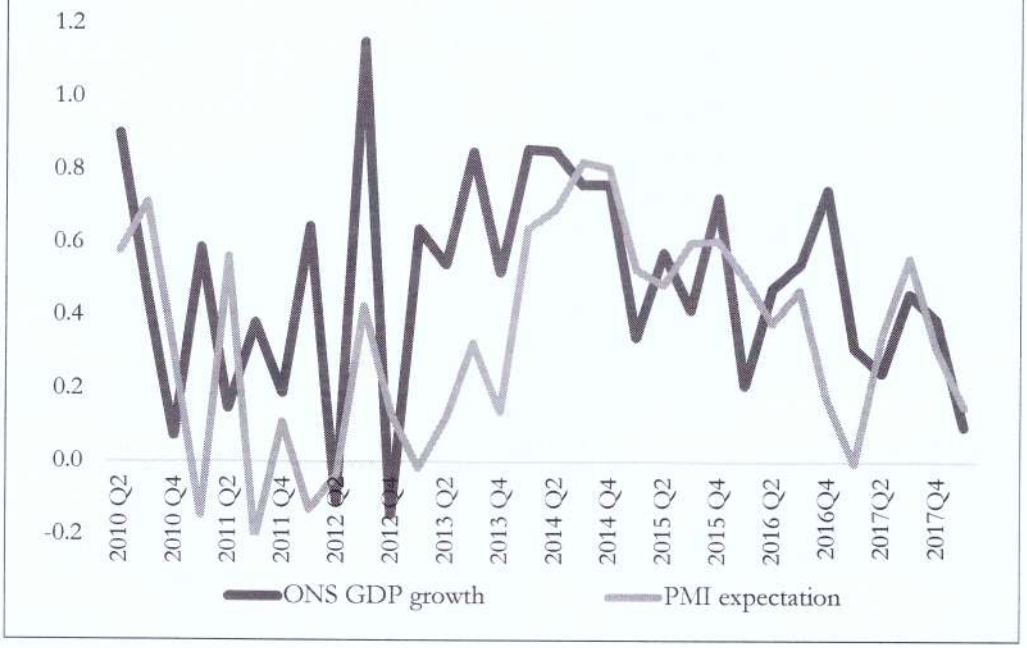
The next step was to check the forecasting ability of the model, by checking its forecast errors (using Root mean squared errors/average absolute errors). OBR was formed in 2010 and they started doing their forecasts from June 2010 and they do quarterly forecasts twice in a year. To assess the feasibility of the model, I tested the model against various parameters.

1) OBR's forecasts
2) Actual GDP growth numbers
3) Model using just the current quarter indicators from these surveys.

I checked various variations of the model and settled on a one with the lowest forecast error and the highest predictive power. The forecast error of the best fit model turned out to be lower than the ones using only the current quarter survey variables and almost equal to OBR current forecasts. To find out the source of error, I calculated the sectoral forecast error and found that the errors are the highest in Construction sector, which was the most volatile and hardest to predict. Various models that were tried before firming up of the model also included using the current quarter variables, to capture the trend of growth and current situation of the economy. However, that did not add much more predictive power to the model.

One such illustration plotting the forecast the best fit of the model from June 2010 onwards (this is done to ensure comparability with forecast already being done by OBR) along with the actual GDP growth outturn is placed below (Figure1).

Figure 1: GDP forecasts using this model vs ONS outturn



I had presented the final results of the various versions of the model to the Budget Responsibility Committee at the end of the project and submitted the detailed report to OBR. They planned to test this model in their next forecast round, along with their other models.

Task 2: Forecast evaluation of saving rate forecasts done since 2010

Saving ratio is used as a diagnostic for the demand side forecasts by OBR. They come up with an annual Forecast Evaluation Report, where they assess the forecasts done last year. For some variables, there is an in-depth analysis for the forecasts. This year, it was decided their committee to do an analysis of the saving ratio forecast, as the saving rate for the economy was falling and the forecast were not that accurate.

The idea behind the exercise is that the errors in saving rate could either be due to errors in forecasting Personal disposable income or in the household consumption. Hence, the purpose is to find out what explains the forecast errors. This analysis was done at an annual level. In each round, saving rate is forecasted for 5 years ahead by OBR. The first step of the analysis is to find out what were the forecasts and the errors in forecasts (comparing them

with the latest saving data), and also to see if they are in a particular director, i.e. is the saving rate being mostly overestimated. The figure 2 (below) plots the same.

At the first glance, it was evident that saving rate was higher than what was predicted for most of the forecasts. After analyzing the trends in saving rate, the forecasts of private disposable income and household consumption forecasts were compiled and compared to the outturns. The errors in saving forecasts can be due to either errors in income forecasts or due to errors in the private consumption forecast. In the initial forecasts, both consumption and income were weaker than was predicted in the first three OBR forecasts, which had offsetting effects on our forecast differences for the saving ratio. In the subsequent eight EFOs from November 2011, household disposable income growth was stronger than forecast in the first year, which was largely responsible for the positive surprises on the saving ratio in that period.

Figure 2: Saving rate : Forecasts and outturns