

**Bank Indonesia - Bank for International Settlements Workshop on  
"Structural Dynamic Macroeconomic Models in Asia-Pacific  
Economies"**

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*Closing Remarks*

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It is my absolute pleasure to congratulate all speakers and participants for their excellent presentations and fruitful discussions during this one-and-a-half-day workshop. I sincerely believe that the constructive exchange of knowledge, skills, views and experiences among central bankers and academics have enhanced our understanding of the structural dynamic macroeconomic models that have become instrumental in shaping today's monetary policy formulation. On the one hand, the dominant approach of the inflation targeting framework adopted by an increasingly larger number of central banks has surely placed Dynamic Stochastic General Equilibrium (DSGE) modeling center stage. On the other hand, the absolute reliance of the inflation targeting framework on forecasting has encouraged both academics and central bank researchers alike to build many kinds of forecasting machinery around DSGE models. Such forecasting capability, in addition to its policy analysis function, has been playing its greatest role in Asia Pacific economies, where disinflation is still the top agenda of most central banks.

Now that we have come to the conclusion of the workshop, allow me to close with several salient ideas, points and comments made by the speakers at this forum. Eli M Remolona opened the workshop with a noteworthy remark; that this

kind of forum is effective for sharing issues, structures, techniques and experiences in using DSGE models, because at this event, central banks from different countries can share their real-life policy experiences in using DSGE models, while at the same time, several academics can disseminate a number of great techniques and outline the progress made relating to a few pending issues in forecasting with DSGE models.

Volker Wieland highlighted that the DSGE model for monetary policy promises major benefits for policymaking as it serves as an essential tool for a rational policy-making process. Under this notion, the DSGE model enforces logical arguments that are consistent with economic principles, confronts theory with macroeconomic data, is useful for projecting forecasts, allows for rational discussion of alternative policy scenarios and is required for ex-post evaluation of policy performance. To reap these benefits, central banks' sets of macroeconomic models should incorporate short-run and long-run policy tradeoffs that are consistent with empirical evidence and consider the implications of market participant rationality as well as fit the macroeconomic data. Volker also stressed some pitfalls, including avoiding overconfidence and not assuming exclusive reliance on a narrow consensus approach. Central banks should not take the easy way in the sense that they should pursue serious endeavors to understand and model those factors that are specific to their economies and not neglect important risks for policymakers.

Emerging economies pose specific characteristics that may violate ideal assumptions. Among others are that regime change may be recent and not fully credible, the informal sector may be large, selected sectors may dominate the economy and certain institutions may be changing. The case of EMU and ECB provides a good example of how a model is constructed under the condition of a

regime change where there is lack of comparable and cross-country data series. Moreover, as highlighted by Budi Mulya in his opening remarks, there is an increasing need for central banks to have robust macroeconomic models in the ever increasing challenges and turmoil in the global economy to ensure the credibility and effectiveness of monetary policy.

Ladies and Gentlemen,

Moving on to a more methodological discussion, Sungbae An applied a nonlinear approach known as a particle filter in constructing the second-order approximations on U.S. data and investigating its effect on welfare evaluations, then compared its performance with the more widely used estimation techniques; log-linearization. The results seem to be that (1) parameters neglected using the pervious method can be identified, (2) the estimated welfare differentials are more accurate, and (3) different dynamics which are not detected in a log-linearized economy, can be unveiled.

Surach Tanboon from the Bank of Thailand elaborated the use of Thailand's DSGE model that consists of four main agents, namely Households, Firms, Banks and Government. The model is currently still in Phase One. Among the interesting features of this model are capital, investment, wage rigidity and consumption basket. For example, capital is used by exporters only, and bank loans are used to finance labor costs. Future work is expected to include capital expansion used not only by exporters but also by non-tradable firms. This future version of Thailand's DSGE model will also assume the role of bank loans to finance capital costs instead of labor costs, and to determine parameters involved using estimation instead of calibration.

Wijoyo Santoso, while presenting the Indonesian model, GEMBI, emphasized the need to consider the specific characteristics of emerging markets in developing a DSGE model. These features specific to the Indonesian economy, such as less data accuracy, specific but dominant economic sectors, low credibility of monetary and fiscal policies, and imperfect markets, significantly add to the complexity of the model. Consideration of the trade-off between a parsimonious model and a complex model has led to the simplification of the Indonesian model which still accommodates those key features.

Ladies and Gentlemen,

Jaromir Benes comprehensively acknowledged that the experience and accumulated knowledge of policymakers are often not interpreted directly into the structure of a DSGE model. He then proposed several approaches to incorporate judgment on the parameters and shocks to DSGE forecasts. He added a sequence of shocks to the future path of variables that policymakers wish and expanded it by searching the entire set of structural shocks within the DSGE model. He used an algorithm to select a set of future structural shocks with minimal variance that returns the policymakers' judgment. Certainly, incorporating all off-model policymakers' judgments in formal modeling remains a daunting task.

Juan-Pablo Medina underscored that, as a backdrop to the inflation targeting framework, Chile is motivated to improve upon the existing medium-size, semi-structural macroeconomic model by developing a DSGE model better equipped to deal with counterfactual analysis. The model, which is called MAS, features five agents (households, firms, fiscal authority, monetary authority, and foreign agents) and explicitly models sticky prices and wages, stochastic trends in productivity as well as oil price. Bayesian techniques are employed to estimate

some parameters, while a calibration of other parameters are conducted to match the steady state of the model with long-run data of the Chilean economy. Further issues in forecasting with MAS concern risk analysis scenarios where the Impulse Response Function is used to construct alternative scenarios and the model is modified to include elements that are part of the policy discussions, such as the transmission of oil price shocks. Forecasting using MAS turns out to offer better forecasting results and a coherent framework to perform policy analysis. Further, the DSGE structure provides benefits for an analysis of alternative risk scenarios of macroeconomic forecasts. Challenges lie in the structure of the model involving the role of relative price adjustments, and in the disconnection between the labor market and exchange rate.

Stefan Laséen from Sveriges Riksbank explained the RAMSES (Riksbank Aggregate Macromodel for Studies of the Economy in Sweden), BVARs and DSGE-VAR based model, which have been used for forecasting and policy analysis since 2005. RAMSES is tailored to describe the development of a number of central macroeconomic time series with some support from the best available econometric methods. The model aims to explain the entire economy, not just a particular component such as private consumption or the labor market.

There are three reasons why the Riksbank uses formal models in monetary policy analysis. First, with models, a consistent framework can be constructed to obtain a comprehensive picture of the economy's components, instead of having to rely on fragmentary analysis that may not be entirely compatible. Second, models can serve as a tool for understanding the current economic situation and its future development. And third, using models capable of obtaining structured analyses make explaining forecasts easier while, concomitantly, models can serve as a communication tool enabling internal analyses and discussions to be held

simultaneously. RAMSES consists of numerous different households and firms that interact in the markets of goods, capital and labor. The model also includes the central bank, government and foreign economy.

Shaun Vahey underscores that model uncertainty now receives substantial attention in macroeconomic modeling. There is renewed emphasis on model comparison as well as evaluation of policy in the presence of model uncertainty. The research agenda now focuses on forecast accuracy with uncertain instabilities. The literature suggests the need for model diversity. One cannot expect DSGE to forecast well over short horizons. This is where nowcasting should be taken into account seriously. The aim is not to replace DSGE projections but to supplement them with nowcasting. Among the benefits of nowcasting include mitigating the risk of focusing too much attention on short-term forecasting performance. An example of nowcasting is the BATMAN system pursued by the Norges Bank. Many central banks find that nowcasting projections provide an avenue to explore DSGE and uncertain instabilities.

Ladies and Gentlemen,

Moving on, Douglas Laxton underlined that the IMF has developed micro-founded DSGE models to study monetary and fiscal policy issues, however, models with stronger macro-financial linkages are still needed. Among the different types of model, smaller semi-structural, multi-country global projection models (GPM) may be an alternative worth considering. Moreover, GPM will be useful for the development of DSGE models as it allows for forecast accuracy comparison between the two types of model.

Recently, Bank of Japan has implemented the Zero Interest Rate Policy related to the deflation of Japan's Yen. Using a DSGE model, Tsutomu Watanabe

has tried to analyze the optimal monetary policy under the zero bound constraint. As a result, the Bank of Japan decided to switch its policy instrument from interest rate to monetary aggregates. However, there is no strong theoretical foundation for this since the marginal utility of money has already reached zero. Instead, Bank of Japan should have raised its inflation target so as to guide the market expectation about the future path of monetary policy. Nonetheless, the zero interest rate policy probably will continue until the economy recover.

Camilo E. Tavor described the usefulness of a stylized structural DSGE model to investigate the effect of currency devaluations on output. The model shows that the negative correlations between exchange rate changes and output does not support the claim that devaluations are contractionary. Such negative correlation could occur if the economy is hit by adverse capital outflow shocks, but not from a devaluatory policy shock.

Joong Shik Lee shared his experience in developing the Bank of Korea's DSGE model, BOKDSGE, especially in overcoming the problem of a lack theoretical consistency that may arise in the process of economic forecasting and policy implementation. Some possible modifications of the model to accommodate the specific features of the South Korean economy, such as the characteristics of the stock market, real estate market and price of oil, are now being considered. Nonetheless, the model is expected to complement BOK04, the current core forecasting model at the central bank.

In the last presentation, Nobuyuki Oda presented Bank of Japan model based on the IMF's Global Economy Model. The aim of this model is to provide a fully optimizing framework capable of addressing basic policy questions involving international transmission of policy and structural shocks, reproducing key

elements of economic interdependence among countries. Bank of Japan gives more focus on the Chinese economy. The model consists of five regional blocks: China, Japan, United States, European Union, and the rest of the world. The model can simulate the effect of an event in one country or block on the other countries or blocks, for example when China changes its exchange rate regime from fixed to flexible.

Ladies and Gentlemen,

In closing, I would like to thank the Bank for International Settlements for their staunch cooperation in organizing this workshop. Furthermore, I would also like to extend my heartfelt appreciation to the organizing committee both at BIS and BI, and all support staff who have ensured the success of this workshop. For our guests attending from abroad, please beware. People say that the drinking water in Bali is highly addictive. Once you have tasted it, you always want to come back. Last but not least, may I wish you all a safe trip home. For those joining the excursion this afternoon, I know you will have a thoroughly enjoyable time.

Terima kasih. Thank you.