



Technical Assistance Consultants' Report

Project Number: TA – 4431 (KAZ)
Financial Sector Governance

Progress Report #4
December, 2007

Kazakhstan: Implementing Inflation Forecast Targeting

Prepared by
David Kemme

This consultant report does not necessarily reflect the views of ADB or the Government concerned, and ADB and the Government cannot be held liable for its contents.

Table of Contents

Preface.....	3
Executive Summary	4
I. Introduction	5
II. The Status of Modeling and Forecasting Efforts	5
III. Schedule of Activities	8

PREFACE

The Asian Development Bank is conducting a technical assistance program for the National Bank of Kazakhstan (NBK) to strengthen its foreign exchange reserve management capabilities (including as administrator of the National Fund) and its implementation of an inflation forecast targeting (IFT) monetary policy. In order to develop a program of assistance for the IFT aspect, Warren Coats visited Almaty from February 11 – 20, 2007. The planned assistance proposed by Dr. Coats and agreed to by NBK management builds on the foundation laid by earlier recommendations from the International Monetary Fund and in reports by Drs. Coats and David Kemme in 2005 and 2006 under USAID/BearingPoint auspices.

In accordance with the above plan of assistance Drs. Coats and Kemme have visited the NBK and conducted a program with the Czech National Bank in 2007. Visits to the NBK to enhance the development of economic models for implementation of inflation forecast targeting are ongoing and this report summarizes the activity of Dr. Kemme's visit December 2 – 14, 2007.

Dr. Coats is the USAID/BearingPoint Senior Monetary Policy Advisor to the Central Bank of Iraq and an International Monetary Fund (IMF) consultant to the central bank of Afghanistan. Before retiring from the IMF after 26 years service in May 2003 to join the Board of Directors of the Cayman Islands Monetary Authority, he led IMF technical assistance missions to the central banks of a number of post conflict countries (Bosnia and Herzegovina, Croatia, Kosovo, Serbia) and to other countries (Bangladesh, Bulgaria, China, Czech Republic, Egypt, Hungary, Israel, Kazakhstan, Kyrgyzstan, Macedonia, Moldova, Nigeria, Slovakia, Slovenia, Turkey, and the West Bank and Gaza Strip). Dr. Coats led the IMF's technical assistance missions to the NBK in 1992 and 1993.

Dr. Kemme currently holds the William N. Morris Chair of Excellence in International Economics at the University of Memphis and now serves as an ADB Consultant on monetary economics and econometric modeling. He has over twenty five years of professional experience working in Eastern Europe and the countries of the former Soviet Union with training, research or technical assistance projects in Armenia, Bulgaria, the Czech Republic, Hungary, Kazakhstan, Poland, Russia, Slovakia, and Ukraine. He has published extensively on economic issues of transition economies in scholarly and professional journals. Dr. Kemme would like to thank the NBK staff and management for their cooperation and dedication to the modeling efforts during this stressful period.

EXECUTIVE SUMMARY

This update report should be read in conjunction with the earlier reports it is updating.

Dr. Kemme visited the NBK December 2-14, 2007 to provide workshops on modeling and to assist the modeling team with their efforts to develop both single equation inflation forecast models and a small macro-econometric model, KMOD. Initially he met with Toty Kaliaskarova, interim Director of the Department of Research and Statistics, to discuss specific issues to be addressed in the workshops for this and upcoming visits. He agreed to assist in helping the staff outline a report on their visit to the Czech National Bank and then proceeded with workshops and assistance in their modeling efforts. KMOD consists of six modules, or sets of equations, each of which is being specified and estimated by a small group of researchers. During this visit he met extensively with each module team leader (Saida Agambayeva, Head of Monetary Research Division, Research and Statistics Department, Vitaly Tutushkin, Indira Talkhanbayeva and Nurgaisha Turekhanova, Research and Statistics Department, Aliya Algozhina, Financial Stability Department and Rufina Shagiakhmetova, Balance of Payments Department) as well as Sabit Khakimzhanov the ADB local consultant. In each case the module equations had been re-specified and re-estimated. During Dr. Kemme's consultations the equations were again re-estimated and progress toward a reasonable final specification was made. However, at this time the individual researchers were extremely pressed for time as other demands, due to the on-going financial system crisis, took precedent. As a result extensive forecasting exercises and the description and documentation of the model have been postponed. In addition, presenting the results to the MPTC was also postponed. A new target date for the first draft of the full write up of the model has been set for March of 2008.

The visit concluded with additional meetings with Toty Kaliaskarova, and a meeting with Deputy Governor Daniyar Akishev to discuss next year's activities. In each case progress on the existing models and the need for additional staff resources for modeling was discussed. They fully understand the need for greater staff resources and believe that the overall staff work load will decrease as the financial system stabilizes.

I. INTRODUCTION

As mentioned previously the NBK has developed much of the infrastructure needed for inflation targeting. However, the full implementation of a forecasting system including the necessary on-going dialog between the modeling and forecasting team and the policy makers has been limited. Recommendations in previous reports regarding information typically prepared quarterly by the modelers are still valid. Significant progress in constructing forecasting models has been made, but their full implementation has not yet been realized. This brief report summarizes the activities of the forecasting team within the framework of the previously proposed work plan.

II. THE STATUS OF MODELING AND FORECASTING EFFORTS

Significant progress has been made in the training of researchers and the development of econometric capabilities of the NBK staff. Currently we may identify three distinct (although informal) programs of activity. First is the ongoing work on the department's first small, medium term monetary channels model, developed by Beibit Konurbaeva. Konurbaeva still maintains this model and is also occasionally estimating other single equation inflation forecasting models and Taylor rules for historical analysis. Second is KMOD the small macroeconomic model that is currently being developed for medium term forecasting. This model is being developed with our assistance and is more comprehensive and more firmly grounded in macroeconomic theory than previous efforts. It includes six modules (described previously and again below) which are being estimated by individual teams. The model includes a monetary outcomes module with inflation equations that are linked to the real sector and monetary policy instruments. The inflation equations are of particular interest since they are critical to the inflation forecast and monetary policy formation. The module for the external sector is also of interest since it ties the real sector, capital flows and external factors to the determination of the exchange rate, also of interest to policy makers. This module is being developed by researchers in the Balance of Payments Department and the local consultant, Sabit Khakimzhanov. Although KMOD itself only employs aggregate BOP data, because of the importance and interest of the BOP department, this module has been disaggregated much further to examine and forecast individual BOP accounts. And third, we intend to simultaneously estimate a slightly smaller version of KMOD and calibrate it for simulation and forecasting purposes. In addition, unrelated to these efforts individual researchers in the Research Department and other departments are now employing EViews and basic modeling techniques to address other questions that arise that may require more sophisticated data analysis.

During this visit Dr. Kemme met with the team leader for each module and reviewed and re-estimated equations in each module of KMOD. At this time essentially all of the equations of the model have been estimated. Efforts going forward will be devoted to documenting and writing up a comprehensive description of the model, updating and re-

estimating, calibrating the individual equations and forecasting. As forecasts are prepared they must be tracked and evaluated over time in order to refine the model. A brief description of the status of each module follows.

Module 1: Aggregate Supply

This module consists of five equations, two dealing with factor inputs, capital and labor, an aggregate production function which determines output, then potential output and the output gap. Data series for each variable have been compiled and Indira Talkhanbayeva, the team leader for this module, has estimated all of the equations. We discussed each in detail. The estimated labor equation does not provide reasonable forecasts for employment. However, when it is calibrated identical to ECMOD, the Polish model, the forecasts are quite reasonable. The issue then is exactly how the equation should be calibrated. The process of calibrating this equation will take some time as forecasts and simulations are evaluated both in historical and forward looking exercises. The estimation of this module may be considered complete or nearly so. A major remaining task is documentation and then additional forecasting exercises.

Module 2: Aggregate Demand

This module consists of four equations: the GDP identity and three estimated equations relating to consumption and investment expenditures. Government expenditures and the current account balance are estimated in other modules and feed into this one. The equations estimated are consumption, the net operating income of sole proprietorships (as one component of disposable income -- a variable in the consumption equation) and fixed capital formation (investment expenditures in the GDP identity). Each of these equations has been estimated by Aliya Algoshina, the team leader, and initial forecasts have been made. We spent much time on re-specifying and re-estimating the equations, focusing mainly on the fixed investment equation. The last components of the GDP identity are government expenditures from module 5 and the current account balance from module 4. Capital flows shocks may also affect domestic interest rates and then investment expenditures in this module. The estimation of this module is essentially complete and it is partially documented.

Module 3: Monetary outcomes: prices wages and interest rates

Four equations are being estimated in this module: CPI, GDP deflator, wages and interest rates. (The real exchange rate is an explanatory variable in this module, but its value is estimated in the BOP module—module 4). Each equation is being estimated as an error correction model. Nurgaisha Turekhanova has estimated the CPI equation and the GDP deflator equation. All of these had been estimated last summer for the Astana workshop. They have been re-specified many times and the current specifications are producing reasonable forecasts. At first glance the CPI forecasts appear to be better than forecasts using the older monetary channels model. I recommended that forecasts from these specifications, the monetary channels model and other models, such as the P-star model, be prepared and

presented side-by-side with a direct comparison of measures of forecast accuracy and further discussion among staff.

Saida Agambayeva has updated the estimates of the wage and interest rate equations from her work earlier this summer. Reasonable estimates of these equations had already been made and this section was well documented. For this module the focus now is simply on updating and improving the documentation and description.

Module 4: External Sector

The original specification of the external sector module consisted of the balance of payments identity, and equations to be estimated for exports and imports, export and import prices, an import and an export price deflator, the capital account and the real exchange rate. These equations are the basis of the external sector for KMOD and several tie back to other modules. Rufina Shagiakhmetova and the local consultant Sabit Khakimzhanov had estimated the goods equations for the workshop in Astana. This group has gone much further and disaggregated this module further. Now there is an essentially free standing balance of payments model with foreign assets and liabilities modeled explicitly. The essential equations are still those necessary for KMOD and they have been re-specified and re-estimated. Capital flows are now included in the real exchange rate equation. Forecasting exercises are under way and the module may be simulated in a partial equilibrium framework. Estimation of this module is essentially complete (it should be routinely updated re-specified and re-estimated of course) but documentation and a full write up still needs to be completed.

Module 5: General Government and Module 6: Policy Rules

These modules consist of national income accounting identities and rules for fiscal and monetary policy. None of the variables from these modules will be forecasted from a structural equation. For forecasting purposes future values of the variables in this module will be forecasted with a simple autoregressive model or assumed as exogenously set policy variables. The fiscal and monetary rules will be determined using historical estimates as a guide but calibrated to more appropriately reflect policy makers likely behavior (or desired behavior). In particular, if there is a change in policy, toward a more well-defined policy of inflation targeting, e.g., historical values of the parameters of the policy reaction function would not be appropriate. In addition, parameters should incorporate the outcome of the annual macroeconomic review, the actual budget adopted by the government, and the monetary policy guidelines all of which may vary from year to year. These modules need only documentation and an expanded description.

In summary all of the equations in each of the individual modules have been estimated independently. In some cases the module equations have been estimated simultaneously rather than using single equation estimation techniques. Numerous forecasts have been prepared, but there has been little evaluation of the forecasts at this point. There is much additional work on forecasting to be done: creating common baseline assumptions and

scenarios, evaluating the forecasting properties of various specifications, and further updating and documentation. Then the next step will be to estimate and simulate the entire model simultaneously. We may proceed on two tracks. One is to start with four core equations and build up. The other is to try to simulate the entire model, or subsets of the model. We will try both approaches.

While significant progress has been made on the technical side of estimating the model and forecasting, we did not discuss in any detail the management and institutionalization of the model(s). At this time a permanent director of the Department of Research and Statistics has not been named. In addition, a new Analytical Center, which may have some modeling capacity, has been created. While the staff have developed the appropriate skills and are proving quite capable, the day to day operations of the modeling team should be formalized and the regular communication among participants and management, discussed in previous TA Reports, should be clearly delineated.

III. SCHEDULE OF ACTIVITIES

The previously proposed schedule of activities for 2008 is still appropriate. While it was hoped that a fully estimated model would be fully documented in December of 2007, this proved to be infeasible. The target date for a fully documented model could still be March of 2008 if the staff are freed from some of their current (crisis oriented) activities. In addition it would be necessary for Dr. Kemme to assist in the further refinement of the model, documentation and write up from the U.S.. Previously proposed workshops and assistance with management and communications issues may proceed as planned.

The specific times of the quarterly visits will be discussed further with the NBK, but are proposed to be approximately:

March 3 - March 14
June 2 - June 13
September 1 – September 12
December 1 – December 12