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**Reinventing the Community Spirit: Some Reflections on
Modeling at Central Banks**

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Reinventing the Community Spirit:

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Abstract

Economic research is a central component of the policy function at a central bank. The paper argues that the traditional boundaries relating to economic intelligence need to be widened to make research a key component of all aspects of central banking. Further, an effective research programme needs to integrate methodology, analysis, emotion, resources, and dissemination. In the DREAM concept, Methodology provides the foundation for good research design; Analysis focusses on the need to explain a sequence of events and research results; Emotion is the driving force that generates a progressive work ethic; Resources are a reflection of institutional commitment to the research ideal; and Dissemination offers the means of sharing resources and results with different populations. A function-based notion of institutional organization is also proposed to augment the DREAM concept.

DRAFT: NOT TO BE QUOTED WITHOUT PRIOR PERMISSION OF AUTHOR

This is a draft of a working paper and the authors would welcome any comments on the content of the present text. The views expressed are those of the authors and do not necessarily represent those of the Fund or the University of the West Indies.

I. INTRODUCTION

Objectives and functions of central banks

Main objective of a central bank is to maintain the internal and external stability of the domestic currency.

That objective is carried out through the following functions:

Issue of domestic currency

Assist government in design and implementation of monetary policy

Provide banking services to Government

Provide banking services to banks

Oversee payments and settlements system

Regulate and supervise banks

Monetary policy function has been implemented through the Research and Monetary Operations Departments of central banks.

Research Departments

Collect and process data

Analyze data

Make policy recommendations

Design

Implement

Review

The focus has tended to be on macroeconomic analysis aspect of monetary policy to the exclusion of research on the other central banking functions.

While this may reflect priorities and available resources, there is need to establish a broader research function that will examine issues on

Currency patterns

Credit to government and public debt

Asset-liability behavior of banks

Payments and settlements system efficiency

Financial sector soundness

External vulnerability

Economic statistics

II. METHODOLOGY

Economic models are typically used for:

Testing economic theory

Formulating economic policy

Forecasting

Forecasting of aggregates is a normal prerequisite to policy recommendation, design, and implementation. Our focus is model building and its use in forecasting

How do we model?

All models are abstraction of reality

Data generation process (DGP)

Models are approximations to DGP

Objective is to discover signals embedded in the noise observed.

Process of discovery

Theory

Estimation

Validation

It is clear we need to incorporate

**Past, present, and future to mimic the
process generating data**

Simplify to approximate process

Condition on certain variables as given

**Criteria for choosing one model over
another (encompassing)**

Recognize dynamic process of change

Static representations are restricted versions of less restricted dynamic representations

Principle:

Theoretical models have characteristics that can be catalogued

Observed data have characteristics that can be measured or estimated

If the characteristics of observed data match those of the theoretical models, it is likely that the process generating the observations is at least similar to the theoretical model

In general, there will not be an exact match:

Observed characteristics will not match theoretical model characteristics.

Given uncertainty, we need evaluation criteria for models (diagnostic tests, in and out of sample tests)

Need knowledge of institutional and legal framework, economic theory, sampling theory, theory of functions, mathematical statistics, and probability theory

Of critical importance is the quality of data we use to model the economic process

Measurement errors

Unobserved variables

Adequacy of proxy variables

III. ANALYSIS

Relates to methods of discovery and interpretation of results

Models: deterministic, stochastic

Functions: linear, nonlinear

Estimation methods:

univariate, multivariate

parametric, nonparametric

IV. EMOTION

Discovery is laborious

Patience is required

Test, test, and test again (Hendry)

**Must generate passion, desire to conquer,
thirst for knowledge of the unknown**

**Ability to pick up the pieces when proven
wrong**

Ability to withstand negative criticism

**Ability to look outside the boundary of
common accepted knowledge of processes**

**Ability to see implications of change, how it
unfolds and how change impacts future
observations**

**Ability to decipher social dimension of causes
of change and reaction to observations**

Ability to feel

**Wedded to the process of modeling, but
not to the model**

**Wedded to intuition and judgement, but
not to impulse**

**Wedded to discovery as a process, but not
to the triumph of a result**

V. RESOURCES

**Are resources (time, money, staff, support)
sufficient to facilitate model**

Building

Use

Evaluation

Improvement

**One suggested means is to make the research
function pivotal to the operations of the
central bank**

**Organize the central bank along
functional lines, with a decision-making
focus**

Provide direction and support

Provide training

Methods of analysis

Time series

Panel data

Design and analysis of Surveys

**Other methods of multivariate
analysis**

Provide incentive structure

VI. DISSEMINATION

Dissemination

Effecting operations

Publishing data

Timeliness

Integrity

Quality

Implementing Policy

Macro

Micro

Techniques and experiences

External assignments and exchange

**programs with central banks and other
institutions**

Involvement of research associates

VII. Future directions

**Exploratory Data Analysis (Tukey,
Anscombe, Cleveland)**

**Exponential smoothing, Seasonality, Box-
Jenkins methods**

Nonlinear models

Neural networks

Regime switching

Transition models (Markov processes)

Time varying parameter models

Simulation

Bootstrap methods (small sample issues)

Evaluation of forecasts

**Conditional on the information set,
optimal forecasts should be:**

Unforecastable

Unbiased

1-step ahead should be white noise

h-step ahead should be at most (h-1)

MA

Turning points

Out-of-sample performance

Extending models

Combining forecasts

Regression

Linear, nonlinear

Time varying weights

Shrinkage weights (combining simple average and regression forecasts)

Extending the information set

Conjunctural analysis

Use of concurrent themes

Implementation of current efforts

Further discovery

Communication (KISMIG)

To whom do forecasters report?

How should forecasts be communicated

Improvement of data standards

Recognize need for quantitative forecasts, judgmental forecasts, combination of forecasts, use of judgement in finalizing forecasts

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