# DSGE Modeling at the Bank of Thailand

by
Surach Tanboon
Monetary Policy Department
Bank of Thailand

Presented at the Conference on

STRUCTURAL DYNAMIC MACROECONOMIC MODELS
IN ASIA PACIFIC EMERGING MARKET ECONOMIES

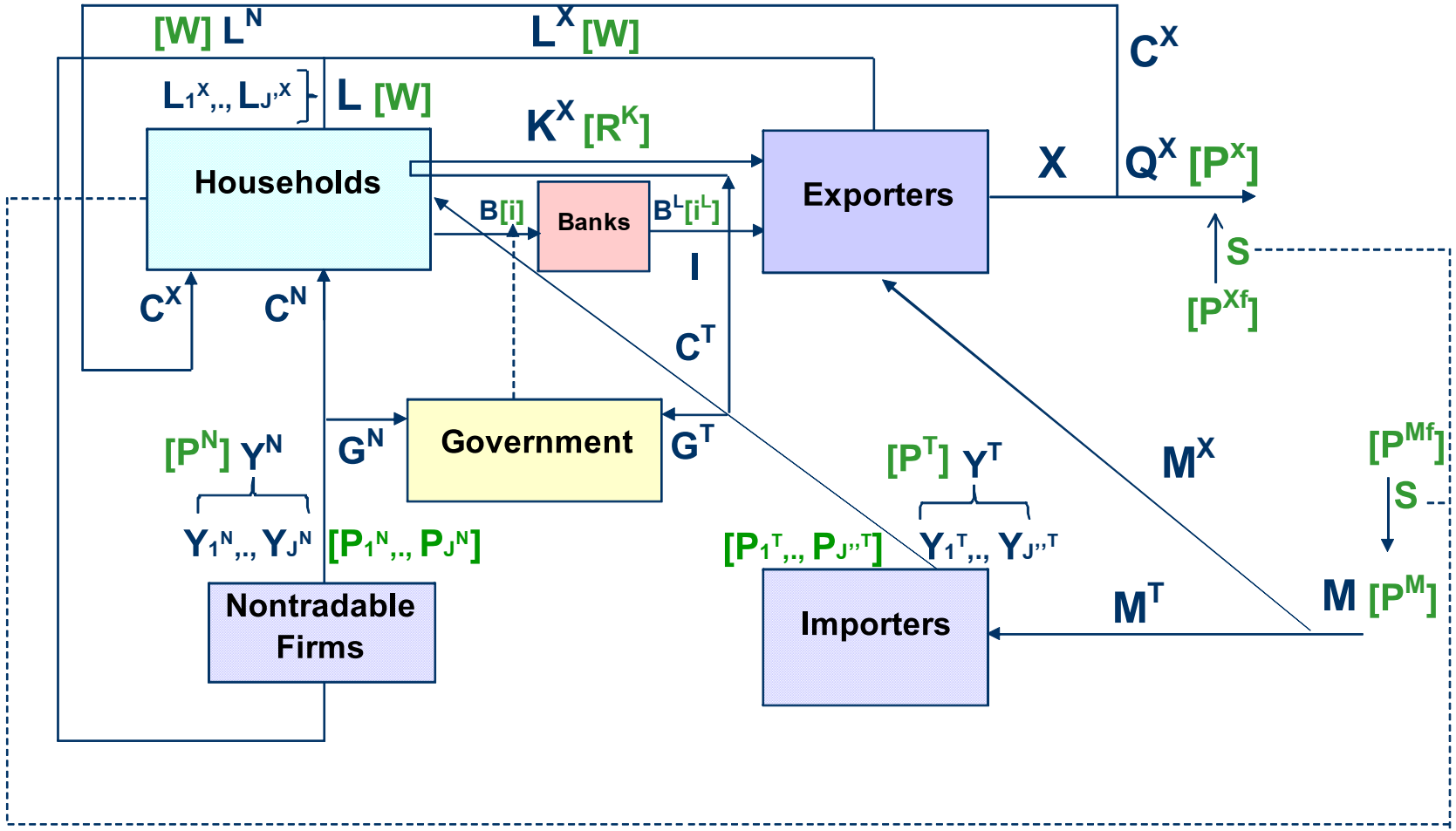
Organized by Bank Indonesia and the Bank for International Settlements
Bali, Indonesia
June 3, 2008

# Outline of Presentation

I. Model

II. Preliminary simulation results

# I. Model


[W] L^N
L^X [W]
C^X
L_1^X,., L_J'^X
L [W]
K^X [R^K]
Households
B[i]
Banks
B^L[i^L]
Exporters
X
Q^X [P^x]
S
[P^Xf]
I
C^X
C^N
C^T
[P^N] Y^N
G^N
Government
G^T
[P^T] Y^T
M^X
[P^Mf]
S
Y_1^N,., Y_J^N
[P_1^N,., P_J^N]
[P_1^T,., P_J''^T]
Y_1^T,., Y_J''^T
Nontradable Firms
Importers
M^T
M [P^M]

- Model features: Phase I Model (Benes, 2006) augmented with
  - Capital and investment; wage rigidity (undertaken by modelers)
  - Consumption basket, previously consisting of domestically produced and imported goods, expands to include part of exports (suggested by senior staff)
- Parameterization: calibration
- Model solution and simulation: IRIS

# 1 Households

The representative household maximizes

$$\mathsf{E}_0 \sum_{t=0}^{\infty} \beta^t \left\{ (1-\chi) \log \left[ \begin{array}{c} \frac{1}{1-\chi} (C_t^T - \chi H_t^T)^{\omega^T} (C_t^X - \chi H_t^X)^{\omega^X} \\ \times (C_t^N - \chi H_t^N)^{1-\omega^T-\omega^X} \end{array} \right] - \zeta \frac{L_t^{1+\eta}}{1+\eta} \right\} \tag{1}$$

subject to

$$\begin{aligned} & \frac{1}{P_t}(P_t^T C_t^T + P_t^X C_t^X + P_t^N C_t^N) + \frac{P_t^T}{P_t} I_t + \frac{B_t}{P_t} \\ \leq \; & \frac{B_{t-1}}{P_t}(1+i_{t-1}) + \frac{W_t}{P_t} L_t + \frac{R_t^K}{P_t} K_t + \textstyle\sum_j \Phi_j \qquad (2) \\ K_{t+1} \; \leq \; & (1-\delta) K_t + F(I_t, I_{t-1}) \qquad (3) \end{aligned}$$

where

$$F(I_t, I_{t-1}) = \left[ 1 - \Phi_I \left( \frac{I_t}{I_{t-1}} \right) \right] I_t = \left[ 1 - \frac{\phi_I}{2} \left( \frac{I_t}{I_{t-1}} - \breve{\alpha}^X \right)^2 \right] I_t \tag{4}$$

## Wage determination

- The labor aggregator solves

$$\min_{W_{jt}} \mathsf{E}_0 \sum_{t=0}^{\infty} \beta^t \left[ \xi^W (W_{jt} - W_{jt}^*)^2 + (\Delta W_{jt} - \Delta W_{t-1})^2 \right] \qquad (5)$$

  where $W_t^*$ is the flexible–price optimal nominal wage

- The FOC and symmetric equilibrium yield

$$\Delta W_t - \Delta W_{t-1} = \beta \mathsf{E}_t (\Delta W_{t+1} - \Delta W_t) + \xi^W (W_t^* - W_t) \qquad (6)$$

# 2 Firms

## 2.1. Exporters

$$\begin{aligned}\mathcal{L}^X &= (1+i_t^L)W_t L_t^X + P_t^T M_t^X + R_t^K K_t^X \\ &\quad +\phi_t^X \left[ X_t - \left(A_t^X L_t^X\right)^{\gamma_1^X} \left(M_t^X\right)^{\gamma_2^X} \left(K_t^X\right)^{1-\gamma_1^X-\gamma_2^X} \right] \end{aligned} \quad (7)$$

Exporters have to borrow from banks to pay for labor

Senior staff: To finance capital?

## 2.2. Importers

## 2.3. Nontradable firms

# 3 Banks

- The representative bank lends exporters to finance wage bills

$$B_t^L = W_t L_t^X \tag{8}$$

- Assume loans are proportional to deposits ($B_t^L = \zeta_t^L B_t$), with factor of proportionality depending on export growth relative to its steady state growth

$$\zeta_t^L = \left( \frac{X_t}{\breve{\alpha}^X X_{t-1}} \right)^{\tau} \tag{9}$$

# 4 Government

- The monetary authority solves

$$\min_{i_t} \mathsf{E}_0 \sum_{t=0}^{\infty} \beta^t \left[ \xi^i (i_t - i_t^*)^2 + (i_t - i_{t-1})^2 \right] \tag{10}$$

where

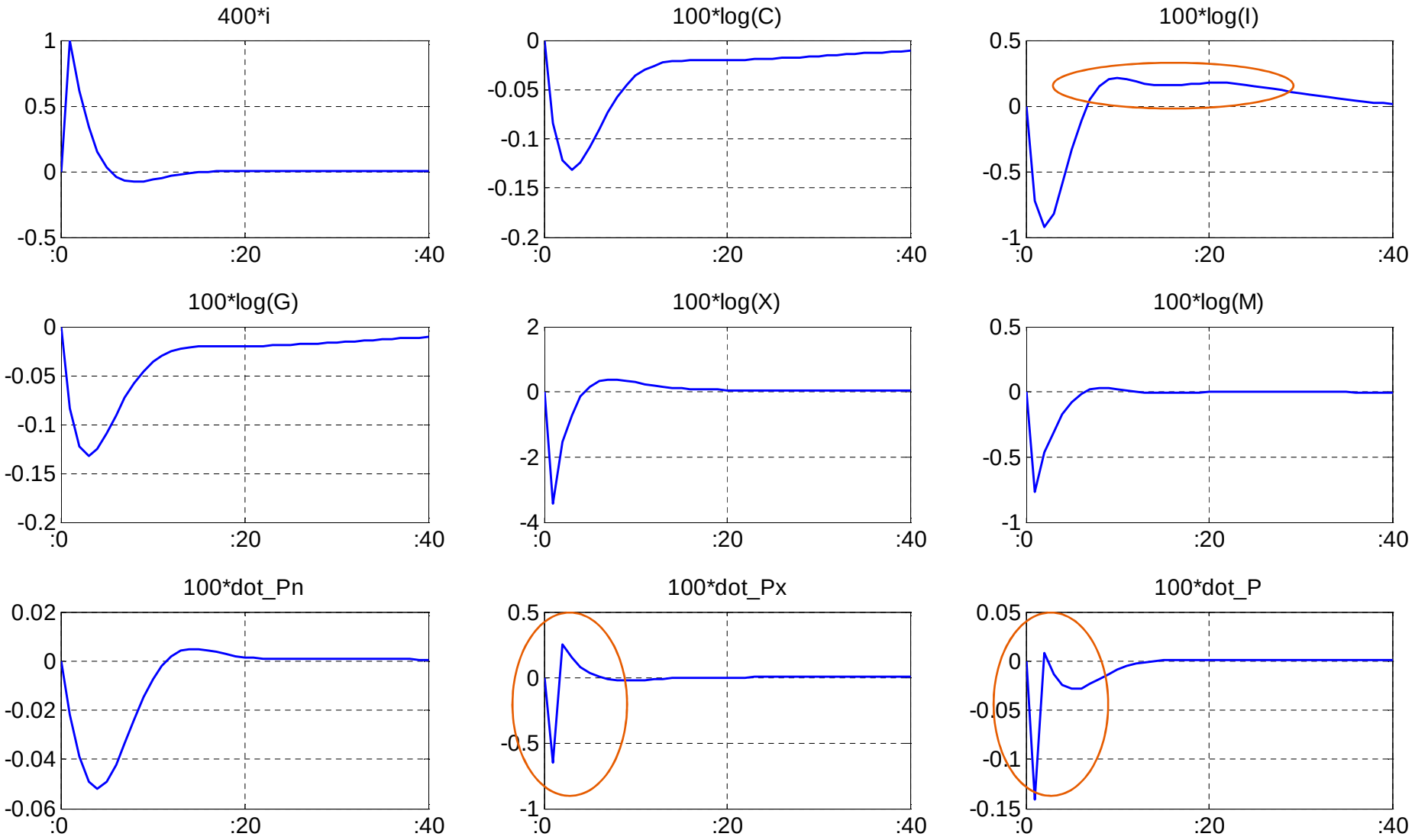
$$i_t^* = \bar{\imath} + \kappa(\pi_t - \bar{\pi}) \tag{11}$$

such that $\bar{\imath}$ is the steady state level of nominal interest rate

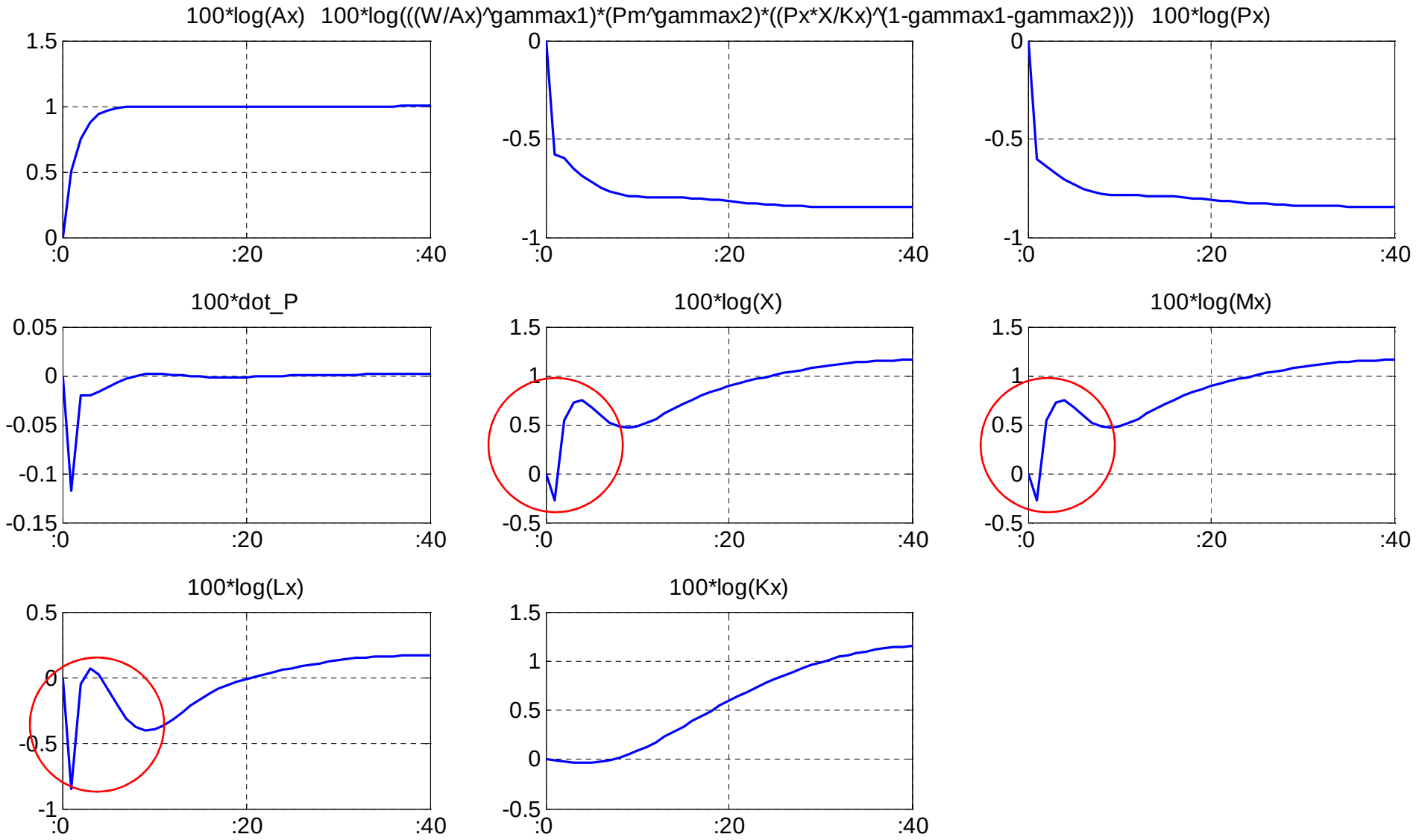
- The FOC is given by

$$i_t - i_{t-1} = \beta \mathsf{E}_t(i_{t+1} - i_t) + \xi^i (i_t^* - i_t) \tag{12}$$

# II. Preliminary simulation results: interest rate shock



# II. Preliminary simulation results: productivity shock in export sector



# Future Works

| | Present model | Future model |
|---|---|---|
| Capital | Used by exporters | Used by exporters and nontradable firms |
| Financial intermediation | Loaned to finance labor costs | Loaned to finance capital costs |
| Parameter specification | Calibration | Estimation |