Is Exchange Rate Stabilization an Appropriate Cure for the Dutch Disease?

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* The views expressed in this presentation are those of the author and should not be attributed to the International Monetary Fund, its Executive Board, or its management.
What are the effects of a boom in commodity prices?
Real Effective Exchange Rate and Terms of Trade in Canada (1981 - 2008)

Source: Haver Analytics
Real Effective Exchange Rate and Share of Tradable Production in Canada (1981 - 2008)

Source: Haver Analytics
Is there a rationale for exchange rate stabilization during a Dutch disease episode?
MAIN RESULTS

This paper evaluates in a DSGE model if there is a role for monetary policy to prevent an exchange rate appreciation during a Dutch disease episode.
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Considering a learning-by-doing (LBD) externality in the home goods sector (manufacturing), we find that:

1. Stabilizing the nominal exchange rate mitigates the learning-by-doing externality in the tradable sector but at the cost of generating greater macroeconomic volatility.

2. Welfare is a decreasing function of exchange rate intervention.
OUTLINE

1. Literature Review

2. A Small Open Economy Model with Nominal and Real Rigidities

3. Calibration and Simulation

4. Concluding Remarks
1. LITERATURE REVIEW

- **DSGE Models with Nominal and Real Rigidities**

  Closed Economy: Christiano, Eichenbaum and Evans (2005) and Smets and Wouters (2007)

  Open Economy: Lubik and Schorfheide (2005), Adolfson et al. (2007, 2008), and Justiniano and Preston (2008)

- **Estimation of Learning by Doing Models**

  Chang, Gomes, and Schorfheide (2002)

  Cooper and Johri (2002).
2. A Small Open Economy Model with Nominal and Real Rigidities

Nominal Rigidity:

- Sticky prices in the home and non-tradable goods sectors.
- Sticky wages
- Incomplete pass-through

Real Rigidity:

- Habit formation
- Investment adjustment costs
Introducing learning-by-doing

A. Inefficient case

- Firms in the home goods sector take as given the level of organizational capital $D_{h,t}$

\[ Y_{h,t} = A_{h,t} [T_{t}l_{h,t}]^{\eta} [D_{h,t}K_{h,t-1}]^{1-\eta} \]

- Organizational capital increases with use of stock of capital and depreciates at a rate $1 - \phi_{d,h}$

\[ D_{h,t} = D_{h,t-1}^{\phi_{d,h}} \bar{K}_{h,t-2}^{\mu_{d,h}} \]
B. Efficient case

- Capital producers decide investment taking into account the effect on organizational capital

$$V_t(h) = \max_{K_{h,t+i}, I_{t+i}(h), D_{h,t+i}}$$

$$E_t \left\{ \sum_{i=0}^{\infty} \Lambda_{t,t+i} \left( 1 - \tau K_{h_i} \right) Z_{t+i}(h) \frac{D_{h,t+i} K_{h,t+i-1} - P_{I_{h,t+i} I_{t+i}(h)}}{P_{C_{t+i}}} \right\}$$

subject to

$$K_{h,t+1} = [1 - \delta] K_{h,t} + S \left( \frac{I_t(h)}{I_{t-1}(h)} \right) I_t(h)$$

$$D_{h,t+1} = D_{h,t} K_{h,t-1}^{\mu_d,h}$$
Price of Organizational Capital \( (VD_{h,t}) \)

\[
\frac{VD_{h,t}}{PC,t} = E_t \left\{ \Lambda_{t,t+1} \left[ \frac{(1 - \tau K_h) Z_{t+1} (h) K_{H,t+1}}{PC,t+1} + \frac{VD_{h,t+1}}{PC,t+1} \phi_{d,h} \frac{D_{h,t+2}}{D_{h,t}} \right] \right\},
\]

Monetary Policy Rule

\[
\frac{1 + i_t}{1 + i} = \left( \frac{1 + i_{t-1}}{1 + i} \right)^{\psi_i} \left( \frac{Y_t}{\bar{Y}_t} \right)^{(1 - \psi_i) \psi_y} \left( \frac{\pi_{C,t}}{\bar{\pi}} \right)^{(1 - \psi_i) \psi_\pi} \left( \frac{S_t}{S_{t-1}} \right)^{(1 - \psi_i) \psi_s}
\]
3. CALIBRATION AND SIMULATION

- Benchmark Small Open Economy: Canada.
- Calibration of learning-by-doing mechanism based on Chang et al. (2002).

<table>
<thead>
<tr>
<th>Description</th>
<th>Symbol</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Capital Depreciation Rate</td>
<td>$1 - \phi_{d,h}$</td>
<td>0.2</td>
</tr>
<tr>
<td>Learning rate</td>
<td>$\mu_{d,h}$</td>
<td>0.2</td>
</tr>
</tbody>
</table>
1 S.D. Increase in Oil Prices

- **GDP**: The graph shows the effect of a 1 S.D. increase in oil prices on GDP. The blue line represents the LBD Externality, and the green dashed line represents Organizational Capital.

- **Consumption**: The graph illustrates the change in consumption due to a 1 S.D. increase in oil prices.

- **Employment**: The graph depicts the impact on employment.

- **Investment**: The graph shows the effect on investment.
1 S.D. Increase in Oil Prices

Home Goods Production

Non-tradable Output

Imports

Real Exchange Rate

Efficient LBD
Flexible
Intermediate
Fixed

1 S.D. Increase in Oil Prices

Efficient LBD
Flexible
Intermediate
Fixed
1 S.D. Increase in Oil Prices

GDP

- Efficient LBD
- Flexible
- Intermediate
- Fixed

Consumption

Employment

Investment
Relative Welfare Loss and Exchange Rate Intervention
4. CONCLUDING REMARKS
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- LBD is a mechanism that amplifies shocks in the economy.
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- LBD is a mechanism that amplifies shocks in the economy.
- Correcting the LBD externality with exchange rate intervention reduces welfare and increases volatility.
EXTENSIONS

- Detailed structure of the commodity exports sector.
- LBD externality in the non-tradable sector.
- Optimal monetary policy to counteract a Dutch disease episode?