Current Account Dynamics and Monetary Policy

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* The views expressed herein do not necessarily reflect the position of the Federal Reserve Bank of New York, the Federal Reserve System or the Sveriges Riksbank.
Introduction

- Last decade witnessed emergence of large global imbalances
- Most notably, large U.S. current account deficit
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- Last decade witnessed emergence of large global imbalances

- U.S. current account deficit (% of GDP):
  - Trough close to 7% by the end of 2005
  - Today (end of 2007) running at ≈ 5%

- Our question:

**WHAT ARE THE IMPLICATIONS OF CURRENT ACCOUNT DEFICITS FOR MONETARY POLICY?**
Obstfeld and Rogoff (2005):

Close 5% current account deficit $\Rightarrow$ Real $\$$ depreciation $\approx 30\%

Consistent with real $\$$ depreciation $\approx 12\%$ between 2005:Q4 and 2007:Q4
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Key Question:

Will such depreciation be a source of inflationary pressures?
Obstfeld and Rogoff (2005):

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Key Question:

Will such depreciation be a source of inflationary pressures?

Two main channels:

1. Relative price adjustment and short run inflation dynamics

2. Effects on equilibrium real interest rate due to correction in savings
What We Do

- Start from OR’s model of current account and exchange rates
- Add production decisions and nominal rigidities
- Explicitly consider dynamic adjustment
- Two scenarios: Slow vs. Fast Burn
- Several monetary policy regimes under each scenario
What We Find

- **In general:**
  - Domestic variables quite sensitive to monetary policy regime
  - International variables much less so
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Slow burn and good policy:
Modest impact of current account rebalancing on domestic macro variables

Fast burn:
Results very sensitive to policy rule
What We Find

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- **Slow burn and good policy:**
  Modest impact of current account rebalancing on domestic macro variables

- **Fast burn:**
  Results very sensitive to policy rule

- **Imperfect pass-through:**
  - Influences dynamics of international variables
  - Policy prescriptions remain robust
1. The Model: Overview

- Two-country \((H \text{ and } F, \text{ same size})\) monetary DSGE model
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- Two-country (H and F, same size) monetary DSGE model

**HOUSEHOLDS**

- In each country, representative household of measure 1
- Members consume tradable and non-tradable goods
- Individuals work in only one sector
- Perfect consumption insurance within each country
- Only risk-free bond traded across countries
1. The Model: Overview

- Two-country (\(H\) and \(F\), same size) monetary DSGE model

**FIRMS**

- In each country, tradable (\(\gamma\)) and non-tradable (\(1 – \gamma\)) producers
- Monopolistic competition among intermediate goods firms
- Staggered price setting (nominal rigidity)
- Local labor markets (real rigidity)
- Perfect competition among final goods firms
1. The Model: Preferences and Budget Constraint

- Per-period utility:

\[ u_t \equiv \log C_t - \left[ \int_0^{\gamma} \frac{L_{Ht}(f)^{1+\varphi}}{1 + \varphi} df + \int_{\gamma}^{1} \frac{L_{Nt}(f)^{1+\varphi}}{1 + \varphi} df \right] \]

- Endogenous discount factor:

\[ \theta_t = \beta_t \theta_{t-1}, \quad \beta_t \equiv e^{s_t} \left[ 1 + \psi (\log \bar{C}_t - \vartheta) \right]^{-1}, \quad s_t \sim AR(1) \]

- Budget constraint:

\[ P_tC_t + B_t = I_{t-1}B_{t-1} + \int_0^{\gamma} W_{Ht}(f)L_{Ht}(f)df + \int_{\gamma}^{1} W_{Nt}(f)L_{Nt}(f)df + \Upsilon_t \]
1. The Model: Expenditure

- **Unit** elasticity of substitution between tradables and non-tradables

\[ C_t \equiv \frac{C_T t C_{Nt}^{1-\gamma}}{\gamma (1 - \gamma)} \]

⇒ Share of tradables equal to \( \gamma \) (= 0.25)

- Elasticity of substitution between \( H \) and \( F \) tradables equal to \( \eta \) (= 2)

\[ C_{Tt} \equiv \left[ \alpha \frac{1}{\eta} (C_{Ht})^{n-1} + (1 - \alpha) \frac{1}{\eta} (C_{Ft})^{n-1} \right]^{\frac{n}{\eta-1}} \]

⇒ Share of \( H \) tradables equal to \( \alpha \) (= 0.7) > 0.5 (home bias)
1. The Model: Technology

- Final goods firms (perfect competition, flexible prices):

\[ Y_{kt} \equiv \left[ \omega_k^{-\frac{1}{\sigma}} \int_0^{\omega_k} Y_{kt}(f) \frac{\sigma-1}{\sigma} df \right]^{\frac{\sigma}{\sigma-1}}, \quad k = \{H, N\} \]

- Intermediate goods firms (monopolistic competition, staggered prices):

\[ Y_{kt}(f) = e^{(g^t+a^t)} L_{kt}(f) \]

- Stationary component of productivity:

\[ a^t = u^t - v^t, \quad u^t = \rho u^{t-1} + \epsilon_t + \epsilon_{ut} \]
\[ v^t = \rho_v v^{t-1} + \epsilon_t \]

- **Growth** ($\epsilon_t$) vs. **Level** ($\epsilon_{ut}$) effect
1. The Model: Open Economy

Terms of trade: \[ T_t \equiv \mathcal{E}_t P_{F,t}^* / P_{H,t} \]
Relative price of non-tradables: \[ X_t \equiv P_{N,t} / P_{T,t} \]

Real Exchange Rate:
\[
Q_t \equiv \left( \frac{\mathcal{E}_t P_t^*}{P_t} \right)^{1-\gamma} \left[ \frac{\alpha T_t^{1-\eta} + (1-\alpha)}{\alpha + (1-\alpha) T_t^{1-\eta}} \right]^{\frac{1}{1-\eta}} \left( \frac{X_t^*}{X_t} \right)^{1-\gamma}
\]

Current Account:
\[
CA_t \equiv \frac{B_t - B_{t-1}}{P_t} = \frac{(I_{t-1} - 1) B_{t-1}}{P_t} + NX_t
\]

Trade Balance:
\[
NX_t = \left[ \alpha + (1-\alpha) T_t^{1-\eta} \right]^{\frac{1}{\eta-1}} (X_t)^{-1} Y_{Ht} - \gamma C_t
\]
1. The Model: Monetary Policy

- **Baseline** monetary rule
  - Taylor rule with inertia: \( \frac{I_t}{I} = (\frac{I_{t-1}}{I})^\rho \Pi_t^{1-\rho} \phi_{\pi} \)

- **Alternative** specifications
  1. DPI inflation targeting: \( \Pi_{D,t} = \Pi_{H,t}^{\gamma} \Pi_{N,t}^{1-\gamma} = \bar{\Pi}_D \)
  2. CPI inflation targeting: \( \Pi_t = \Pi_{D,t} \left( \frac{T_t}{T_{t-1}} \right)^{(1-\alpha)\gamma} = \bar{\Pi} \)
  3. Modified Taylor rule: \( \frac{I_t}{I} = (\frac{I_{t-1}}{I})^\rho \Pi_t^{(1-\rho)\phi_{\pi}} \left( \frac{\mathcal{E}_t}{\mathcal{E}_{t-1}} \right)^{\phi_{\varepsilon}} \)
  4. Foreign peg: \( \mathcal{E}_t = \bar{\mathcal{E}} \)
Quantitative Experiment: Description

**CALIBRATION**

- Period is one quarter
- Follow OR whenever possible
- Other parameters standard
Quantitative Experiment: Description

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**INITIALIZATION**

- Initial stock of net foreign assets $B/(P_H Y_H) = -80\%$ annualized
- Pick saving and growth shocks s.t. $CA/(P_H Y_H) = -20\%$
- Sticky price model: Initialize $\tau_0$ and $x_0$ at flexible price levels
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INITIALIZATION

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TWO SCENARIOS

- **Slow burn**: Shocks phase out slowly
- **Fast burn**: Sudden reversal of growth prospects along the transition
2. Results: (i) Baseline Taylor Rule

R1: International variables in line with flexible price equilibrium

SLOW BURN SCENARIO

![Graphs showing NET FOREIGN ASSETS, CURRENT ACCOUNT, REAL EXCHANGE RATE, and EXPECTED REAL DEPRECIATION over 40 quarters for SLOW BURN SCENARIO. The graphs compare STICKY PRICES and FLEXIBLE PRICES scenarios.]
2. Results: (i) Baseline Taylor Rule

R1: International variables in line with flexible price equilibrium

FAST BURN SCENARIO

![Graphs showing net foreign assets, current account, real exchange rate, and expected real depreciation for sticky and flexible prices.](image-url)
2. Results: (i) Baseline Taylor Rule

OR’s decomposition of real exchange rate

SLOW BURN SCENARIO

\[ q_t = \frac{(2\alpha - 1) \tau_t}{0.4} + \frac{(1 - \gamma) (x^*_t - x_t)}{0.75} \]
2. Results: (i) Baseline Taylor Rule

OR’s decomposition of real exchange rate

**FAST BURN SCENARIO**

\[
q_t = \underbrace{(2\alpha - 1)}_{=0.4} \tau_t + \underbrace{(1 - \gamma)}_{=0.75} (x^*_t - x_t)
\]
2. Results: (i) Baseline Taylor Rule

Domestic Variables – Additional Remarks

Is monetary policy tight enough (SLOW BURN)?

![Graphs of CPI Inflation, Nominal Interest Rate, Output, and Consumption with Sticky Prices and Flexible Prices](image-url)
2. Results: (i) Baseline Taylor Rule

Domestic Variables – Additional Remarks

Output drop and compositional effects (FAST BURN)
2. Results: (ii) Domestic Inflation Targeting

R2: DPI Targeting is good policy

- Accounts for effects of global imbalances on inflation
- Avoids distortions due to stabilization of import prices (flexible)
2. Results: (ii) Domestic Inflation Targeting

R2: DPI Targeting is good policy

- **Slow burn scenario:** $\pi_t$ on average 20 basis point above target

![Graphs showing CPI inflation, output, and nominal interest rate over time for sticky and flexible prices.](image)
2. Results: (ii) Domestic Inflation Targeting

R2: DPI Targeting is good policy

- **Fast burn scenario**: Output in line with natural level...
2. Results: (ii) Domestic Inflation Targeting

R2: DPI Targeting is good policy

- Fast burn scenario: ...But sectoral misalignments persist
2. Results: (iii) Alternative Rules

TWO RULES TO AVOID IN A FAST BURN SCENARIO

- **CPI inflation targeting** generates DPI deflation

Results (almost) identical with **modified Taylor rule**
2. Results: (iv) Foreign Peg

TWO QUESTIONS

1. Depart from symmetry (cooperation)
2. Role of exchange rate policy for current account deficits (China, OPC)
2. Results: (iv) Foreign Peg

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1. Depart from symmetry (cooperation)
2. Role of exchange rate policy for current account deficits (China, OPC)

Slow burn scenario: Most substantial effect on $\pi_t^*$
2. Results: (iv) Foreign Peg

**TWO QUESTIONS**

1. Depart from symmetry (cooperation)
2. Role of exchange rate policy for current account deficits (China, OPC)

- Recent CPI data for **China** broadly in line with model predictions
2. Results: (iv) Foreign Peg

TWO QUESTIONS

1. Depart from symmetry (cooperation)
2. Role of exchange rate policy for current account deficits (China, OPC)

Supportive evidence also from CPI data for OPC
2. Results: (iv) Foreign Peg

TWO QUESTIONS

1. Depart from symmetry (cooperation)
2. Role of exchange rate policy for current account deficits (China, OPC)

Fast burn scenario: Foreign economy bears most of the adjustment
3. Extension: Imperfect Pass-Through

- So far, model consistent with evidence of exchange rate pass-through on CPI
- Now introduce imperfect pass-through on import prices (Monacelli, 2005):
  \[\Rightarrow\] Monopolistically competitive importers set prices on a staggered basis
3. Extension: Imperfect Pass-Through

So far, model consistent with evidence of exchange rate pass-through on CPI

Now introduce imperfect pass-through on import prices (Monacelli, 2005):

⇒ Monopolistically competitive importers set prices on a staggered basis

Might be particularly relevant for the “fast burn” scenario

### Imperfect Pass-Through on Import Prices - 1992 ERM Crises.

<table>
<thead>
<tr>
<th>Country</th>
<th>3 Quarters</th>
<th>4 Quarters</th>
<th>6 Quarters</th>
<th>8 Quarters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italy</td>
<td>49%</td>
<td>81%</td>
<td>66%</td>
<td>69%</td>
</tr>
<tr>
<td>Sweden</td>
<td>66%</td>
<td>53%</td>
<td>68%</td>
<td>72%</td>
</tr>
<tr>
<td>U.K.</td>
<td>55%</td>
<td>78%</td>
<td>84%</td>
<td>72%</td>
</tr>
</tbody>
</table>
3. Extension: Imperfect Pass-Through

FAST BURN (BASELINE) SCENARIO – TWO MAIN RESULTS

1. Much slower correction of current account
2. Sharper contraction in output

Reason: Depreciation of $ has much smaller effect on domestic export
3. Extension: Imperfect Pass-Through

**FAST BURN SCENARIO – ALTERNATIVE POLICY RULES**

1. DPI targeting robust policy prescription
2. CPI targeting, however, not as harmful as before

**Reason:** Smaller effect of exchange rate depreciation on CPI
Conclusions: Back to Initial Questions

- Close current account deficit $\Rightarrow$ Real $\$ \text{ depreciation} \approx 30\%$
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  1. Relative price adjustment and short run inflation dynamics

  2. Effects on equilibrium real interest rate due to correction in savings
Conclusions: Back to Initial Questions

- Close current account deficit ⇒ Real $ depreciation ≈ 30%

- Will depreciation be source of inflationary pressures?
  1. Relative price adjustment and short run inflation dynamics ⇒ Concern under abrupt correction of external imbalances
  2. Effects on equilibrium real interest rate due to correction in savings ⇒ Policy rule needs to keep track of evolution of real rate
Conclusions: Back to Initial Questions

- Close current account deficit $\Rightarrow$ Real $\$ \text{ depreciation} \approx 30\%

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  1. Relative price adjustment and short run inflation dynamics
     $\Rightarrow$ Concern under abrupt correction of external imbalances

  2. Effects on equilibrium real interest rate due to correction in savings
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- Domestic inflation targeting helps along both margins
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- Close current account deficit $\Rightarrow$ Real $\$\$\$\$\$$ depreciation $\approx 30\%$

- Will depreciation be source of inflationary pressures?
  
  1. Relative price adjustment and short run inflation dynamics $\Rightarrow$ Concern under abrupt correction of external imbalances
  
  2. Effects on equilibrium real interest rate due to correction in savings $\Rightarrow$ Policy rule needs to keep track of evolution of real rate

- Domestic inflation targeting helps along both margins

- Caveat: Welfare costs from sectoral adjustments
Quantitative Experiment: Parameters

Model calibrated at quarterly frequency

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma )</td>
<td>0.25</td>
<td>PREFERENCE SHARE FOR TRADABLES</td>
</tr>
<tr>
<td>( \alpha )</td>
<td>0.7</td>
<td>PREFERENCE SHARE FOR HOME TRADABLES</td>
</tr>
<tr>
<td>( \eta )</td>
<td>2</td>
<td>ELASTICITY OF SUBSTITUTION BETWEEN H AND F TRADABLES</td>
</tr>
<tr>
<td>( \beta )</td>
<td>0.99</td>
<td>S.S. DISCOUNT FACTOR</td>
</tr>
<tr>
<td>( \varphi )</td>
<td>2</td>
<td>INVERSE FRISCH ELASTICITY</td>
</tr>
<tr>
<td>( \sigma )</td>
<td>11</td>
<td>ELASTICITY OF SUBSTITUTION AMONG VARIETIES</td>
</tr>
<tr>
<td>( \xi )</td>
<td>0.66</td>
<td>PROBABILITY OF NOT ADJUSTING PRICE</td>
</tr>
<tr>
<td>( \phi_\pi )</td>
<td>2</td>
<td>INFLATION FEEDBACK IN TAYLOR RULE</td>
</tr>
<tr>
<td>( \rho )</td>
<td>0.75</td>
<td>INTEREST RATE SMOOTHING</td>
</tr>
<tr>
<td>( g )</td>
<td>0.5%</td>
<td>S.S. GROWTH RATE</td>
</tr>
<tr>
<td>( \rho_\varsigma )</td>
<td>0.97</td>
<td>PERSISTENCE OF PREFERENCE SHOCKS</td>
</tr>
<tr>
<td>( \rho_u )</td>
<td>0.999</td>
<td>PERSISTENCE OF FIRST COMPONENT OF TFP</td>
</tr>
<tr>
<td>( \rho_v )</td>
<td>0.997</td>
<td>PERSISTENCE OF SECOND COMPONENT OF TFP</td>
</tr>
</tbody>
</table>
2. Quantitative Experiment: TFP Shocks

**TFP process:** \( a_t = u_t - v_t \)

\[
\begin{align*}
  u_t &= \rho_u u_{t-1} + \epsilon_t + \epsilon_{ut} \\
  v_t &= \rho_v v_{t-1} + \epsilon_t
\end{align*}
\]

**SLOW BURN SCENARIO:** Response to a 1% shock to \( \epsilon_t \)
2. Quantitative Experiment: TFP Shocks

TFP process: \( a_t = u_t - v_t \)

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    v_t &= \rho_v v_{t-1} + \epsilon_t
\end{align*}
\]

**FAST BURN SCENARIO**: Response to a 1\% shock to \( \epsilon_t \) (reversal after 8 periods)
4. Extension: Imperfect Pass-Through

Model pass-through on import prices consistent with ERM evidence