(V) SMALL OPEN ECONOMIES

LECTURES 14, 15 & 17

• Devaluation in small open economies

• The Salter-Swan (NTGs) model

• The Dutch Disease
LECTURE 14: DEVALUATION IN SMALL OPEN ECONOMIES

Key Question:
If a country is too small to affect its terms of trade (i.e., it must take prices of its X & M as given on world markets), does that mean E has no effect on TB or BP?

Answer: No. Two channels --
(1) Contractionary effects of devaluation reduce spending.
(2) Output can shift from non-traded sector to traded.
After big devaluations in Mexico in 1994 and Korea in 1997 trade balances “improved” quickly. Can our model explain it?

Prices of their exports are mostly set on world markets and income *fell*. Maybe we need another model.

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**Trade Balances: Korea 1998 vs. Mexico 1995**

- **Korea**
- **Mexico**

The real balance effect can reduce spending.

Assume $P$ flexible; perhaps PPP even holds.

1. Devaluation: $E \uparrow \Rightarrow P \uparrow \Rightarrow M/P \downarrow$

   $\Rightarrow \text{“ED for } M\text{”} \Rightarrow \text{e.g., } A \downarrow \ (\text{via } i \uparrow) \Rightarrow BP \uparrow.$

Devaluation can also have other contractionary effects, besides real balance effect, as we will see. (Appendix II.)
Two experiments with $E$ fixed, in the version of MABP that assumes $P$ perfectly flexible so $Y = \bar{Y}$.

2. Monetary expansion: $NDA \uparrow \Rightarrow M/P \uparrow$

   $(\Rightarrow \text{“ES of } M\text{”}) \Rightarrow \text{e.g., } A \uparrow \text{ (via } i \downarrow \text{)} \Rightarrow BP \downarrow.$

3. Supply-side growth: $\bar{Y} \uparrow \Rightarrow L(Y) \uparrow \Rightarrow$

   $(\Rightarrow \text{“Excess Demand for } M\text{”}) \Rightarrow BP \uparrow.$

Recall that in the MABP, we assume that forex reserve flows are not sterilized; thus the BP becomes the channel via which a country’s $M$ is brought into line.
INTRODUCTION TO SALTER-SWAN MODEL

Key Assumptions:

• All Traded Goods (TGs) are aggregated together.
  => \( TB \) becomes: output of TGs minus consumption of TGs.

• There is also a 2\(^{nd}\) market, in NonTraded Goods (NTGs).

Key results:

(1) Devaluation works also by changing relative price of NTGs.

(2) To attain both internal and external balance (e.g., \( Y=\bar{Y} \) \& \( CA=0 \)), you need both expenditure-switching and expenditure-reducing policies.
Two alternative definitions of the real exchange rate

(I) Two-good model: \[ Q \equiv \frac{EP^*}{P} \]

(II) Small open economy model, a.k.a. dependent-economy, Salter (1959) - Swan (1963), Australian, or NonTraded Goods model:

“real exchange rate” \[ \equiv \frac{E \cdot PTG^*}{P_{NTG}} \]

where \( P_{TG}^* \) is exogenous.

or, instead, the reciprocal: “relative P of NTGs” \[ \equiv \frac{P_{NTG}}{E \cdot PTG^*} \]

\[ \equiv P_N. \]
Salter diagram

Start in a TB=0 equilibrium.

Production in each sector, coincides with respective consumption quantities
\[ X_{TG} = C_{TG} \quad \text{and} \quad X_{NTG} = C_{NTG} \]

if:
- the price mechanism is used to allocate resources,
- markets clear, and
- total consumer spending = total income.

Figure 20.1
Output and Consumption of Traded and Non-Traded Goods
Production occurs where the transformation curve is tangent to a relative price line. Consumption occurs where the budget line is tangent to an indifference curve. As drawn, the two points coincide, so output of traded goods, \( TG \), equals consumption of traded goods, and the same is true for non-traded goods, \( NTG \).
Experiment: Increase spending, A

⇒ Excess Demand for TG: $C_{TG} > X_{TG}$, i.e., trade deficit (at point F).

⇒ Would require fall in $P_N$ if Excess Demand for TG is to be eliminated:

\[
\begin{align*}
\text{output of TG} & \uparrow \\
C_{TG} & \downarrow \text{ (probably)}
\end{align*}
\]

\[\Rightarrow (X_{TG} - C_{TG}) \uparrow \quad \text{. (at point B).}\]
Rise in $A$ $\rightarrow$ TD at $F$; must be accompanied by a fall in $P_N$ if the Trade Balance is to be kept unchanged.

We have now derived the downward-sloping $BB$ relationship.
Experiment: Increase spending, $A$

$\Rightarrow$ Excess Demand for NTG (overheating) at point $F$.

$\Rightarrow$ Would require rise in $P_{N}$ to eliminate Excess Demand for NTG at $G$.

$\leqslant$ via

\[
\begin{align*}
\{ & \text{output of NTG } \uparrow \\
& C_{NTG} \downarrow \\
\} \Rightarrow (X_{NTG} - C_{NTG}) \uparrow
\end{align*}
\]
A rise in $A$ must be accompanied by a rise in $P_N$ if internal balance is to be kept unchanged.

We have now derived the upward-sloping $NN$ relationship.
The external balance line, $BB$, & internal balance line, $NN$, divide the $A-E$ space into 4 zones of macro-economic “illness.”

**Figure 20.5**
**Equilibrium in the Non-Traded Goods Market**
In the aftermath of the increase in expenditure, $A$, if the relative price of non-traded goods, $P_N$, is increased far enough, it will eliminate the excess demand for non-traded goods. Thus, equilibrium in the $NTG$ market gives the upward-sloping $NN$ schedule.
The Tinbergen-Meade principle of targets & instruments

To attain two goals -- internal and external balance -- you need two independent policy instruments:

expenditure-switching policies (exchange rate)

and expenditure-reducing policies (fiscal or monetary contraction).
China’s position in the Swan Diagram in 2008 called for real appreciation. In 2009, also demand expansion.
Two policy experiments

• (1) Fall in Demand: \( A \downarrow \)
  •  => recession at point \( H \) in fig. 20.6.

If \( P_N \) is sticky & exchange rate fixed, downward adjustment to point \( E \) may be slow & painful.
At point $H$, economy is in recession.

Eventually prices may fall enough to clear markets.

But with sticky prices, devaluation can speed up adjustment.
Second policy experiment

(2) Devaluation: $E \uparrow$

Improves $TB$ in two ways:

(i) Real balance effect, reduces spending.

(ii) Fall in $P_{NTG}/P_{TG}$, switches spending out of TG, & switches supply into TG (at $E$).
Appendix I: Rudiger Dornbusch, *AER* (1973)
“Devaluation, Money & Nontraded Goods”

Combines NTG model, with MABP

Two automatic mechanisms of adjustment:

(i) $P_{NTG}$ flexible => always on **NN**;
   $P_N$ rises instantly in response to ED.

(ii) reserve flows not sterilized;
    Money adjusts in response to TD.

E.g., two experiments

1. $NDA \uparrow \Rightarrow \text{jump to point } G$. (Fig. 20.5)
2. $E \uparrow \Rightarrow \text{jump to point } E$. (Fig. 20.6)

In each case, over time, reserve flows gradually bring the economy back to S (following the sequence of arrows).
Appendix II: CONTRACTIONARY EFFECTS OF DEVALUATION

Why were the real effects of the 1997-98 East Asia currency crisis so severe?

Two prominent explanations:

• High interest rates raise default probability. The IMF may not have sufficiently realized this – according to Furman & Stiglitz; and Radelet & Sachs; both in *BPEA* (1998).

• Devaluation is contractionary: many possible channels, including real balance effect & balance-sheet effect.
Possible Contractionary Effects of Devaluation

Some negative effects on AD:

• High import bill and low elasticities
• **Real balance effect** (MABP)
• Distribution effect: Diaz-Alejandro (1963)
  \[ \text{MPC}_{\text{urban workers}} > \text{MPC}_{\text{rich landowners}} \]
• **Balance sheet effect**: difficulty servicing $-denominated debts

2 negative effects on AS:

• Rise in \( P_{\text{imported inputs}} \), e.g., oil
• Rise in \( W \), e.g., where indexed to CPI.

TO BE CONTINUED IN ON CRISES IN EMERGING MARKETS
The balance sheet effect

In currency crises such as late-90s’, loss in output depends on foreign-denominated debt times real devaluation.

THE DUTCH DISEASE

Question: What are the consequences of a natural resource boom in exports? particularly oil, minerals & agricultural commodities. E.g., commodity booms of 2003-08 and 2010-11.
Resource boom when there are only (two) TGs

- Country with comparative advantage in oil
  - is better off when world oil price rises.
- So what’s the problem?
  - Manuf.s may have spillover benefits
  - Switching sectors may be costly
  - Spending may rise too much
    - under belief that boom is permanent.
  - especially if it is in fact temporary.
- If substitution between oil & manufactures is limited, the 1st two problems might seem limited.
  - But we will bring NTGs back in.
THE DUTCH DISEASE

$BP \uparrow$ due to commodity boom:

- $P_{natural\ resource} \uparrow \implies TB \uparrow$
  
  - or resource supply $\uparrow$ (e.g., good harvest) $\implies TB \uparrow$

- or oil discovery $\implies$ capital inflow to develop oil; or, by analogy,

- $KA \uparrow$ due to stabilization or liberalization; or inflow of foreign aid.

Undesired side effect:
  
  real appreciation & crowding-out of non-commodity TGs.

How?

- Under fixed rate, $Res$ inflows $\implies MB \uparrow$

  $\implies$ inflation in $P_{NTG}$. (Also via $G \uparrow$) or

- Under floating, appreciation $E \downarrow \implies P_{TG} \downarrow$.

- Either way, $\implies (P_{NTG}/P_{TG}) \uparrow$. 
The Dutch Disease in terms of the Salter diagram

A commodity boom stretches the Production Possibility Frontier rightward (H):

\[ TB > 0 \Rightarrow \text{real apprec.} \]

The new LR equilibrium point, \( E' \), (external balance & internal balance) now implies a higher relative price of NTGs, inducing land & labor to move out of non-commodity TGs, into the NTG sector.

**Figure 7.1** The Geometry of the Dutch Disease.

Movement to point $E_N'$ may be rapid, especially if exchange rate floats or $P_{NTG}$ is flexible.

Alternative strategy for dealing with inflows:

Try to avoid/postpone real appreciation, e.g., by sterilized intervention,

- if BP shift known temporary, e.g., transitory commodity boom, and
  - if short-term capital inflows are excessive ("over-borrowing")
  - or perhaps if shifts from $E_N$ to $E_N'$ are costly;
- or if crowded-out non-commodity TGs had positive spillovers.

Typically sterilization only works temporarily, especially if capital markets are open.
Response to Dutch disease. One plausible sequence:

1. Sterilize reserve inflow
2. Allow inflow to raise money supply
3. Appreciate currency if boom looks permanent.

$BB$ shifts out. Again: the new equilibrium is a higher $P_{NTG}/P_{TG}$. But how do we get there? And is it wise, if the boom might reverse?

$P_N \equiv P_{NTG}/P_{TG}$
Another common aspect of the Dutch Disease: governments over-spending, in response to high revenue.

- For example, the government wage bill goes up – which is difficult to reverse when export revenues go back down (Arezki & Ismail, *JDE*, 2013).
- This is one source of the pro-cyclicality of government spending that is so common among developing countries, esp. Latin America.

References for procyclical fiscal policy:
- Gavin & Perotti, 1997
- Kaminsky, Reinhart & Vegh, 2004
- Talvi & Vegh, 2005
- Alesina & Tabellini, 2005
- Mendoza & Oviedo, 2006
- Céspedes & Velasco, 2014
Iran’s government wage bill has been heavily influenced by what oil prices were 3 years before.
Correlations between Gov't Spending & GDP 1960-1999

Adapted from Kaminsky, Reinhart & Vegh, 2004, “When It Rains It Pours”

Pro-cyclical spending

G always used to be pro-cyclical for most developing countries.

Counter-cyclical spending
The procyclicality of fiscal policy, continued

- Pro-cyclicality has been especially strong in commodity-exporting countries, historically.

- An important development after 2000 -- some developing countries, including commodity producers, were able to break the pattern in the most recent decade:
  - taking advantage of the boom of 2002-2008
    - to run budget surpluses & build reserves,
  - thereby earning the ability to expand fiscally in the 2008-09 crisis.
  - Chile is the outstanding model;
    - also Botswana, China, Korea & Malaysia.
  - Exceptions: Argentina, Venezuela.
    - Brazil, India, Thailand have backslid.
Correlations between Government spending & GDP 2000-2009

In the last decade, about 1/3 developing countries switched to countercyclical fiscal policy: *Negative* correlation of G & GDP.

Frankel, Vegh & Vuletin (*JDE*, 2013)
The Dutch Disease is one component of the NRC

Natural Resource Curse: A large primary sector does not necessarily lead to GDP growth. (See Appendix.)

Source: Frankel (2012)
Appendix to L17: The Natural Resource Curse

Seven possible channels that some have suggested could lead to sub-standard economic performance:

- **Long-term trends in world commodity prices** (Prebisch-Singer hypothesis, 1950. But negative trend has not been borne out.)

- **Volatility** (e.g., Hausmann & Rigobon, 2003)

- **Permanent crowding out of manufacturing** (Matsuyama, 1992)

- **Unsustainability**

- **Civil war** (Collier, 2007...)

- **Poor institutions** (Auty; Sachs-Warner; Engerman-Sokoloff...), and

- **Cyclical Dutch Disease**.
Natural resources need not necessarily be a “curse.”

- Chile & Botswana are examples of countries that have done well
  – better than others in their regions,
- due in part to “good institutions,”
  – including some specific institutions that others could emulate.

What institutions can best avoid the resource pitfalls?
• The Dutch Disease & commodity price volatility are two components of the longer-run NRC.

• Another important source of the NRC: natural resource abundance may be conducive to bad institutions, including rent-seeking & corruption.

• The Engerman-Sokoloff hypothesis (e.g., North America vs. South America): extraction by mine & plantation
  => monopoly/authoritarianism/inequality;
  => societies without private incentives,
  => ill-suited to develop manufacturing & services.
Institutional mechanisms
to reduce cyclicality of fiscal policy

• **Independent central banks**, to be able to resist political pressure to monetize budget deficits;

• **Budget rules**, to be able to resist pressure to increase in spending overly when revenue is temporarily high;

• **Well-managed Sovereign Wealth Funds (SWFs)** to insulate accumulated assets from pressure to spend (especially in the case of a depletable natural resource), or from temptation to allocate assets on political grounds.
Institutions to fix the procyclicality of fiscal policy in commodity-producing countries: The case of Chile
In 2009, the popularity of the Socialist President of Chile Michelle Bachelet rose sharply (both with respect to handling of the economy and overall), to the highest levels since the restoration of democracy 20 years earlier. More remarkable: the rise in the polls, from very low to very high, came just as the economy moved from rapid growth to slow growth -- not the usual pattern. Why?

In August 2009, the popularity of the Finance Minister, Andres Velasco, ranked behind only President Bachelet, higher than any other minister since democracy. Why?

Nota 1: Al entrevistado se le lee una lista cerrada de personajes que debe evaluar.
Nota 2: La evaluación positiva y negativa está medida entre quienes tienen opinión (se elimina la categoría No sabe, No contesta y No conoce a la persona).

In 2008, a copper price spike had looked permanent to many. In 2009, the price reverted toward its long run trend.
Chile’s structural budget rule

• Government must set a fiscal target:
  – In booms, can only spend structural revenue,
    • must save the cyclical component.
  – Structural ≡ economy at full employment & price of copper at its long-run level
  – Under Bachelet, structural deficit target was 0.

• Estimates of structural vs. cyclical are made by commissions of experts, not politicians, which avoids wishful thinking.
  – In other countries, official fiscal forecasts have optimism bias.

Forecasts internalize the tendency for copper prices to revert toward long-run equilibrium.
Innovations to deal with the resource curse:
Ways to reduce exposure of economy to volatility in world price of export commodity

1. Hedge commodity revenues in options markets, e.g., Mexico hedges oil receipts.

2. Link debt to commodity price, instead of $. 

3. Try a monetary anchor that accommodates terms of trade:
   • Nominal GDP targeting, in place of CPI target; or
   • Include export commodity in currency basket (Product Price Targeting).
Institutional mechanisms to deal with the resource curse: Sovereign Wealth Funds

• Commonly suggested model:
  – Norway’s National Petroleum Fund (now “Pension Fund”)
  – When oil prices are high, save it in a fund to offset depletion of reserves.
  – Internationally diversified.

• Even better model:
  – Botswana’s Pula Fund
  – Professionally managed; no political interference.
Institutions to deal with the natural resource curse, cont.

  - International oil companies “publish what you pay.”

- **Nigeria**
  - attempt to save its oil revenues in “excess crude” account.
  - Proposal to distribute directly to the people - Sala-i-Martin & Subramanian, 2003.

- **World Bank plan to safeguard Chad oil revenue**
  - revenue would have gone to Citibank escrow account in London;
  - law dedicated 70-90% for spending on health, ed., & roads,
  - 10% for “future generations fund”
  - Chad backed out.

- **Collier (2007):** International charter: members pledge formal revenue audits.
  - The World Bank or IMF holds the kitty.