A Model of the Current Account

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A Model of Current Account Determination

- The Model and the National Accounts
- The Formal Model
- Modeling the Government: Twin Deficits
- Academic Research: Capital Flows
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  - Useful: the equations of the model map to national accounts
  - We’ll see the former later, let us start by understanding how the model maps to the national accounts
Consumer Budget Constraint and National Accounts

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- Finally,

$$CA_t = TB_t + rB_{t-1}$$
Model Assumptions

- Let us now consider the formal model for 2 periods. A small open economy.

- **Consumers:**
  - Representative consumer
  - Period 1: allocates income to consumption or bonds (saving)
  - Consumption: $C_1, C_2$
  - Bonds $B_0$ (initial savings), $B_1, B_2$. Given interest $r_0, r_1$

- **Endowment Economy:** $Q_1, Q_2$ available to consumer

- **Equilibrium:** World interest rate equals $r^*$.
  - Impose no saving in last period $B_2 = 0$ (optimal in equilibrium)
  - Normalize the price of the good to 1, in each period
Consumer

• Budget Constraints (BCs)
  • BC 1st period:
    \[ C_1 + B_1 - B_0 = r_0 B_0 + Q_1 \]
  • BC 2nd period:
    \[ C_2 + B_2 - B_1 = r_1 B_1 + Q_2 \]
    No saving second period \( B_2 = 0 \)
  • Combine the budget constraints and \( B_2 = 0 \)
    \[
    \begin{align*}
    C_1 + \frac{C_2}{1 + r_1} &= (1 + r_0) B_0 + Q_1 + \frac{Q_2}{1 + r_1} \\
    C_2 + C_1 (1 + r_1) &= (1 + r_0) (1 + r_1) B_0 + Q_1 (1 + r_1) + Q_2
    \end{align*}
    \]
The Intertemporal Budget Constraint

Figure: Intertemporal BC with $B_0 = 0$
Consumer

- Utility $U(C_1, C_2)$
- Consumer maximizes utility $U(C_1, C_2)$ subject to (s.t.) budget constraint
  \[ C_1 + \frac{C_2}{1 + r_1} = (1 + r_0) B_0 + Q_1 + \frac{Q_2}{1 + r_1} \]
- If $B_0 \geq 0$, one choice is the basket $C_1 = Q_1, C_2 = Q_2$
Consumer Indifference Curves
In equilibrium

\[
\frac{U_1(C_1, C_2)}{U_2(C_1, C_2)} = 1 + r_1
\]

Equilibrium in the world market \( r_1 = r^* \)
The equations that characterize the equilibrium are

\[
\frac{U_1 (C_1, C_2)}{U_2 (C_1, C_2)} = 1 + r_1
\] (1)

\[
C_1 + \frac{C_2}{1 + r_1} = (1 + r_0) B_0 + Q_1 + \frac{Q_2}{1 + r_1}
\] (2)

\[
r_1 = r^*
\] (3)
Trade Balance

- In equilibrium

\[- (Q_1 - C_1) - \frac{(Q_2 - C_2)}{1 + r^*} = (1 + r_0) B_0 \implies \]

\[- TB_1 - \frac{TB_2}{1 + r^*} = (1 + r_0) B_0 \]

- The Model will predict a behavior for the trade balance over the two periods. If the country starts as a debtor, $B_0 < 0$, it requires to repay debt and thus $TB_1 > 0$ or $TB_2 > 0$ or both. (i.e. the firm has to be a net exporter to repay the debt)
Current Account

- We can rewrite the BC in terms of the current account

\[ CA_1 = r_0 B_0 + TB_1 \]  
\[ CA_2 = r^* B_1 + TB_2 \]

- Thus,

\[ -TB_1 - \frac{TB_2}{1 + r^*} = (1 + r_0) B_0 \]
\[ - (CA_1 - r_0 B_0) - \frac{(CA_2 - r^* B_1)}{1 + r^*} = (1 + r_0) B_0 \]
\[ - (CA_1) - \frac{CA_2}{1 + r^*} + \frac{r^* B_1}{1 + r^*} = B_0 \]
Current Account

- Thus,
  \[-TB_1 - \frac{TB_2}{1 + r^*} = (1 + r_0)B_0 \implies \]
  \[-(CA_1 - r_0B_0) - \frac{(CA_2 - r^*B_1)}{1 + r^*} = (1 + r_0)B_0 \implies \]
  \[-(CA_1) - \frac{CA_2}{1 + r^*} + \frac{r^*B_1}{1 + r^*} = B_0 \implies \]

- But also \(CA_1 = B_1 - B_0\), (change in net investment position - accumulate debt or credit), so that
  \[-(1 + r^*)(CA_1) - CA_2 + r^*B_1 - r^*B_0 = B_0 \implies \]
  \[-CA_1 - CA_2 = B_0 \implies \]
Current Account Imbalances

- Can a country run a perpetual CA deficit?
  - If it starts with debt it cannot happen in finite lifetime (recall 2 period example and the use of the transversality condition $B_2 = 0$)
  - With infinite lifetime yes, make sure debt does not grow faster than your economy
Temporary vs Permanent Shocks

- Let us consider an output decline
  - Temporary decline: parallel shift of BC but change only in $Q_1$
    - Consumption smoothing in two periods (see FOCs)
    - CA deficit in first period. Surplus in second
Temporary vs Permanent Shocks

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    - CA deficit in first period. Surplus in second
  - Permanent decline: parallel shift of BC and change of $Q_1$ and $Q_2$
    - Consumption smoothing, the sign of CA might stay the same
- Conclusion. Temporary shocks, larger swings in CA.
So Are Global Imbalances Good or Bad?

- We just showed that there could be the result of optimal economic behavior
  - Many examples of that short: population dynamics, investment in infrastructure, better performing financial markets that attract foreign investment etc
- However many experts caution of the large global imbalances judging them as the result of economic distortions
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  - Dr. Stephen Roach from Yale SOM diagnoses the US imbalance as the result of distorting policies on savings.
    - He will analyse this and other of his views in a guest lecture in the class.
Modeling the Government: Twin Deficits
Twin Deficits: Fiscal & Current Account Deficits

- **Twin Deficits**: Conjecture that an important determinant of CA deficit is fiscal deficit (affects government savings and thus total savings)
- The mechanism: Remember that $CA = S - I$ where savings are private and government savings, $S = S_p + S_G$
  - If expansion in government spending leads to less government savings and $S_p$ remains constant, CA will show a larger deficit
Twin Deficits: Fiscal & Current Account Deficits

- Correlation: fiscal deficits various times coincide with CA deficits
  - E.g. Reagan tax cuts caused large deficits, same time CA turned negative
  - E.g.2 Obama stimulus plan, also at at time where deficit is very large

- Yet in other times the correlation is weak or the opposite from what expected
  - E.g. Clinton administration or WWII

- So much for the accounting identity. What would our theory tell us?
  - We need to model the government!
Modeling the Government

- Assume the existence of a Government

- Government has assets $B_0^g, B_1^g, B_2^g$ and purchases goods $G_1, G_2$. Imposes lump-sum taxes $T_1, T_2$.
  - Government has given needs for spending $G_1 = \bar{G}_1, G_2 = \bar{G}_2$.
  - It has to consider how to allocate taxes overtime, $T_1, T_2$
    - We consider a particular type of lump-sum taxes

- Timing of taxes may affect consumption and CA deficit
  - We will prove Ricardian equivalence: timing of taxes does not matter in this simple framework
Modeling the Government

- Assume the existence of a Government
- Government starts with assets $B^g_0, B^g_1, B^g_2$ and purchases goods $G_1 = \tilde{G}_1, G_2 = \tilde{G}_2$. Imposes lump-sum taxes $T_1, T_2$.
- Faces constraints

\[
\begin{align*}
\tilde{G}_1 + (B^g_1 - B^g_0) &= r_0 B^g_0 + T_1 \\
\tilde{G}_2 + (B^g_2 - B^g_1) &= r_1 B^g_1 + T_2
\end{align*}
\]

LHS is spending. RHS is revenues. No Ponzi $B^g_2 \geq 0$ in equilibrium $B^g_2 = 0$
- Let $B^g_0 = 0$ for simplicity
Government and Household Budget Constraint

• Combining Equations we have Gov. BC

\[ \bar{G}_1 + \frac{\bar{G}_2}{1 + r_1} = T_1 + \frac{T_2}{1 + r_1} \]

• And household budget constraint

\[ C_1 + T_1 + B_1^p = Q_1 \]
\[ C_2 + T_2 + B_2^p - B_1^p = r_1 B_1^p + Q_2 \]

where household has to pay taxes and \( B_2^p = 0 \). Impose \( r = r^* \) and combining the two

\[ C_1 + \frac{C_2}{1 + r^*} = Q_1 - T_1 + \frac{Q_2 - T_2}{1 + r^*} \]
Combining All the Constraints

- Combining the above equations

\[ C_1 + \bar{G}_1 + \frac{C_2 + \bar{G}_2}{1 + r^*} = Q_1 + \frac{Q_2}{1 + r^*} \]

LHS is present discounted value of domestic absorption
RHS is present discounted value of production

- Notice that taxes are not there. So that the timing of the taxes may not matter
  - As long as \( \bar{G}_1, \bar{G}_2 \) are given and gov. intertemporal budget constraint is satisfied.
Private and Government Saving

- Assume $\bar{G}_1$, $\bar{G}_2$ are given
- Government saving
  \[ S^g_1 = T_1 - \bar{G}_1 \implies \Delta S^g_1 = \Delta T_1 \]
- Private saving
  \[ S^p_1 = Q_1 - T_1 - C_1 \implies \Delta S^p_1 = -\Delta T_1 \]
- Total saving is
  \[ \Delta S_1 = \Delta S^g_1 + \Delta S^p_1 \]
Ricardian Equivalence

• Combining all 3 total saving is

\[ \Delta S_1 = \Delta S^g_1 + \Delta S^p_1 = 0 \]

• National savings is unaffected by the timing of taxes: If Ricardian equivalence holds:
  • Implies \( \Delta CA_1 = \Delta S_1 - \Delta I_1 = 0 \)
  • Changes in fiscal deficit may induce offsetting increases in private savings (leaving total savings and CA constant)
  • Households internalize government’s problem, adjust savings/consumption rationally
If Ricardian Equivalence holds what is the cause of twin deficits?

- Reagan time: Government savings plummeted but private savings did not increase as much
  - National Savings and the CA plummeted
- Some of the premises of the theory seem to fail in this case
  - Type of taxation may play a role
  - Borrowing constraints
  - Intergenerational transfers
The Overall Evidence

- A reassessment of the evidence indicates a weak link between fiscal and CA deficit (Bartolini and Lahiri ’06)
  - Still at times of large government deficit, the hypothesis raises a lot of academic attention
Academic Research: Capital Flows
Why Capital Does not Flow from Rich to Poor? (Theory)

- Lucas (1990): If all the countries have the same technologies
- Cobb-Douglas prod function $Y = Ak^\beta l^{1-\beta}$, $k$ : capital, $l$ : labor
- Income per capita $\implies y \equiv Y/L = A \left(\frac{k}{T}\right)^{\beta}$
- Marginal product of capital $\implies r = \beta A \left(\frac{k}{T}\right)^{\beta-1} \implies r = \beta A^{1/\beta} (y) \frac{\beta-1}{\beta}$
- New investment should occur in poor countries
- Quite the opposite, capital flows to/among rich countries
- What is the explanation? Human capital? Externalities of human capital?
Historical Data on Capital Flows and GDP per Capita

Figure: Capital Stock and GDP per capita in two eras of globalization: Schularick (2006) International Journal of Finance and Economics

Figure 2 Cumulative capital inflows and initial GDP per capita (1890–1914) Sources: See text.
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