A Model of the Current Account

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Economics 407, Yale

January 2014

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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- What is a model?
  - A simplified device that will allow us to measure and predict, in this case the CA
  - 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,

$$CA_t = \underbrace{TB_t}_{\text{trade balance}} + \underbrace{rB_{t-1}}_{\text{net investment income}}$$

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
- **Endoment 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

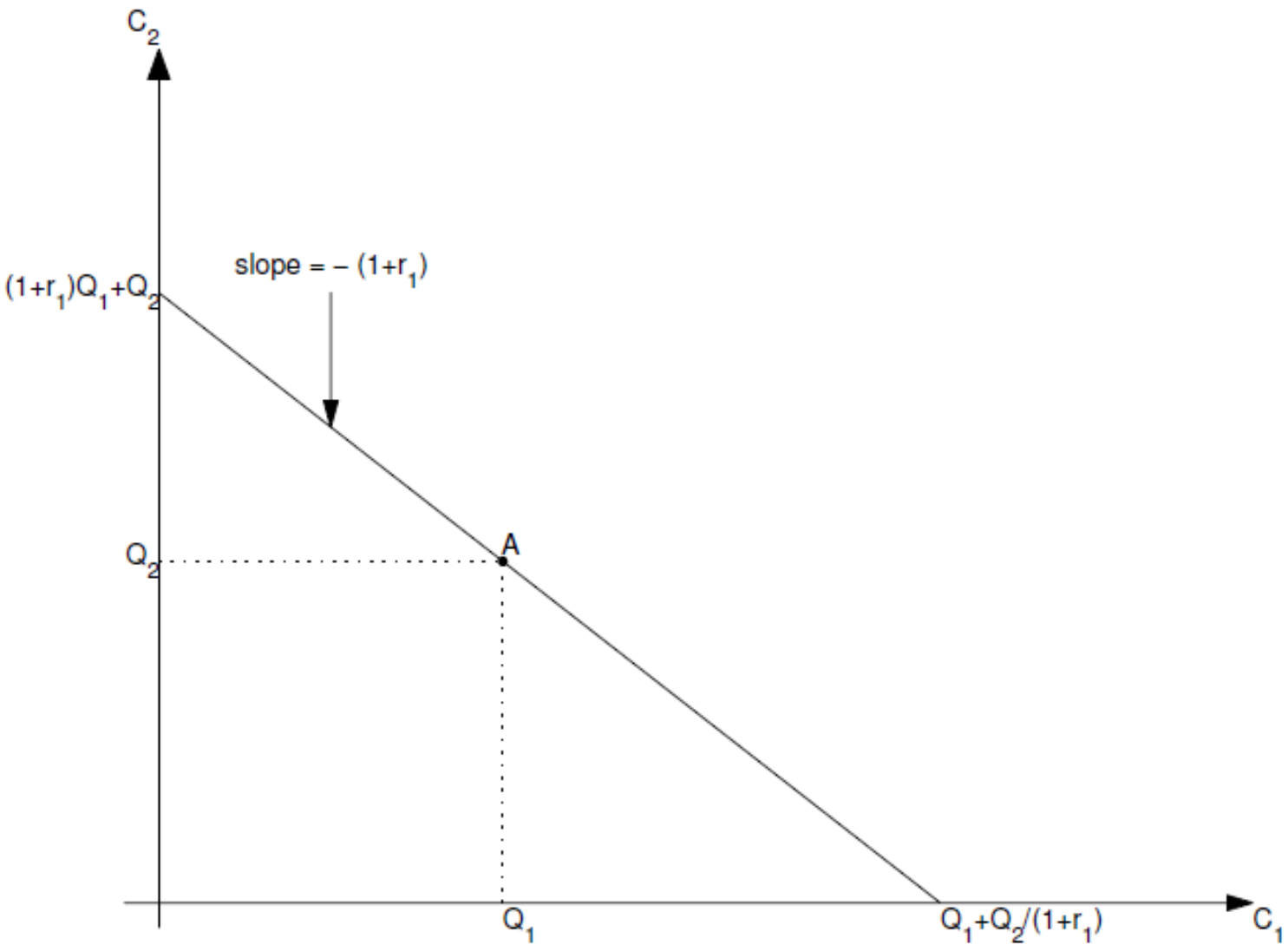
- Budget Constraints (BCs)
  - BC 1st period:
$$C_1 + B_1 - B_0 = r_0 B_0 + Q_1$$
  - BC 2nd period:
$$C_2 + B_2 - B_1 = r_1 B_1 + Q_2$$

    No saving second period $B_2 = 0$
- Combine the budget constraints and $B_2 = 0$

$$\begin{aligned} C_1 + \frac{C_2}{1+r_1} &= (1+r_0)\, B_0 + Q_1 + \frac{Q_2}{1+r_1} \iff \\ C_2 + C_1\,(1+r_1) &= (1+r_0)\,(1+r_1)\, B_0 + Q_1\,(1+r_1) + Q_2 \end{aligned}$$

The Intertemporal Budget Constraint

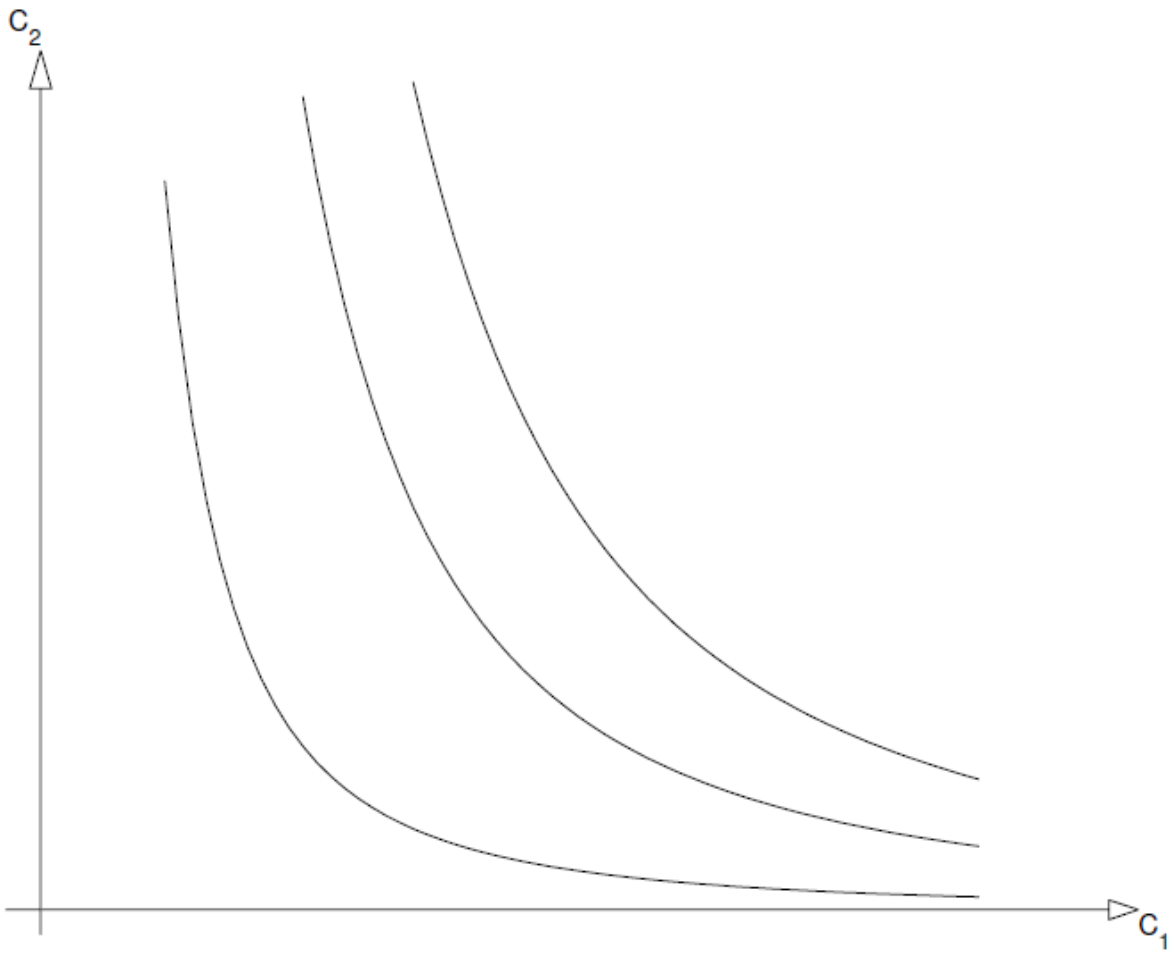
Figure: Intertemporal BC with $B_0 = 0$



Consumer

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

Consumer Indifference Curves



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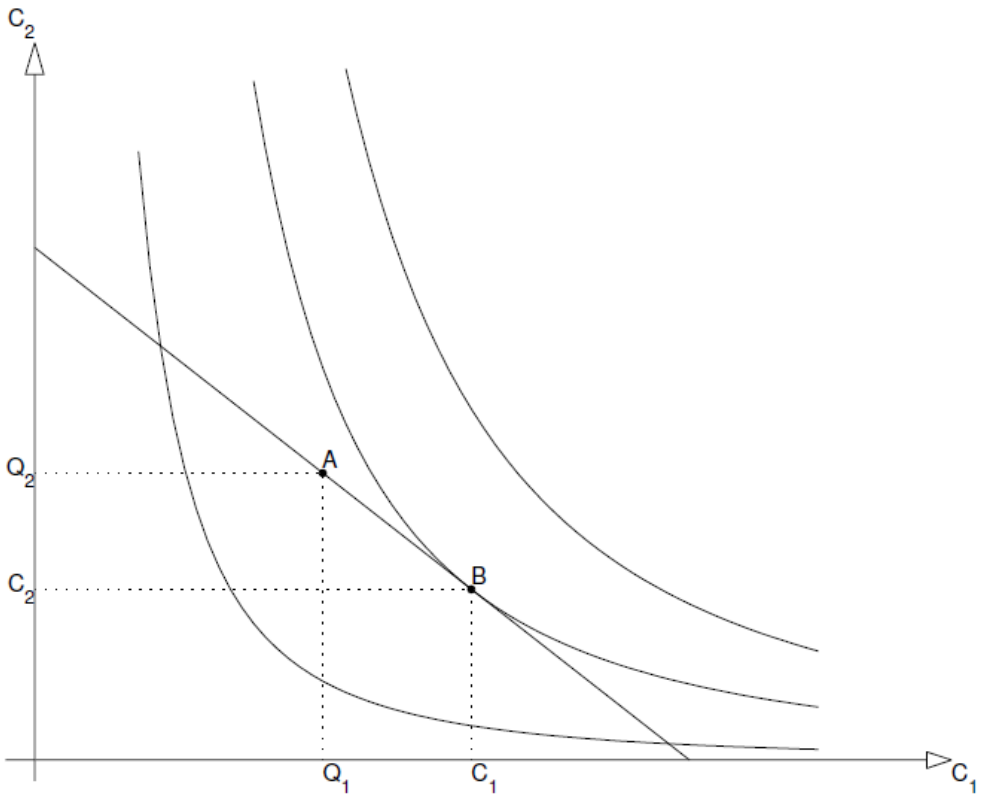

- In equilibrium

$$\frac{U_1\left(C_1, C_2\right)}{U_2\left(C_1, C_2\right)} = 1 + r_1$$

- Equilibrium in the world market $r_1 = r^*$

Equilibrium

- The equations that characterize the equilibrium are

$$\frac{U_1\left(C_1, C_2\right)}{U_2\left(C_1, C_2\right)} = 1 + r_1 \tag{1}$$

$$C_1 + \frac{C_2}{1 + r_1} = \left(1 + r_0\right) B_0 + Q_1 + \frac{Q_2}{1 + r_1} \tag{2}$$

$$r_1 = r^* \tag{3}$$

Trade Balance

- In equilibrium

$$
\begin{aligned}
-\left(Q_1 - C_1\right) - \frac{\left(Q_2 - C_2\right)}{1 + r^*} &= \left(1 + r_0\right) B_0 \implies \\
-TB_1 - \frac{TB_2}{1 + r^*} &= \left(1 + r_0\right) B_0
\end{aligned}
$$

- 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

$$
\begin{aligned}
CA_1 &= \underbrace{r_0 B_0}_{\text{net investment income}} + \underbrace{TB_1}_{\text{net exports}} \\
CA_2 &= r^* B_1 + TB_2
\end{aligned}
$$

- Thus,

$$
\begin{aligned}
-TB_1 - \frac{TB_2}{1+r^*} &= (1+r_0)\, B_0 \implies \\
-(CA_1 - r_0 B_0) - \frac{(CA_2 - r^* B_1)}{1+r^*} &= (1+r_0)\, B_0 \implies \\
-(CA_1) - \frac{CA_2}{1+r^*} + \frac{r^* B_1}{1+r^*} &= B_0
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-(CA_1) - \frac{CA_2}{1+r^*} + \frac{r^* B_1}{1+r^*} &= B_0 \implies
\end{aligned}
$$

- But also $CA_1 = B_1 - B_0$, (change in net investmestment position -accumulate debt or credit). so that

$$
\begin{aligned}
-(1+r^*)(CA_1) - CA_2 + r^* B_1 - r^* B_0 &= B_0 \implies \\
-CA_1 - CA_2 &= B_0
\end{aligned}
$$

Current Account Imbalances

- Can a country run a perpertual 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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  - 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
  - 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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    - e.g. deterioration in US fiscal accounts, housing boom in the US
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    - 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 goverment 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_0^g,B_1^g, B_2^g and purchases goods $G_1 = \bar{G}_1$, $G_2 = \bar{G}_2$. Imposes lump-sum taxes T_1, T_2.
- Faces constraints

$$\begin{aligned} \bar{G}_1 + (B_1^g - B_0^g) &= r_0 B_0^g + T_1 \\ \bar{G}_2 + (B_2^g - B_1^g) &= r_1 B_1^g + T_2 \end{aligned}$$

  LHS is spending. RHS is revenues. No Ponzi $B_2^g \geq 0$ in equilibrium $B_2^g = 0$
- Let $B_0^g = 0$ 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

$$\begin{aligned} C_1 + T_1 + B_1^p &= Q_1 \\ C_2 + T_2 + B_2^p - B_1^p &= r_1 B_1^p + Q_2 \end{aligned}$$

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 constaint is satisfied.

Private and Government Saving

- Assume $\bar{G}_1$, $\bar{G}_2$ are given
- Government saving

$$S_1^g = T_1 - \bar{G}_1 \implies \Delta S_1^g = \Delta T_1$$

- Private saving

$$S_1^p = Q_1 - T_1 - C_1 \implies \Delta S_1^p = -\Delta T_1$$

- Total saving is

$$\Delta S_1 = \Delta S_1^g + \Delta S_1^p$$

Ricardian Equivalence

- Combining all 3 total saving is

$$\Delta S_1 = \Delta S_1^g + \Delta S_1^p = 0$$

- 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 offseting 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 reassesment 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 $\implies y \equiv Y/L = A\left(\frac{k}{l}\right)^{\beta}$
  - Marginal product of capital $\implies r = \beta A\left(\frac{k}{l}\right)^{\beta-1} \implies r = \beta A^{1/\beta}(y)^{\frac{\beta-1}{\beta}}$
  - 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

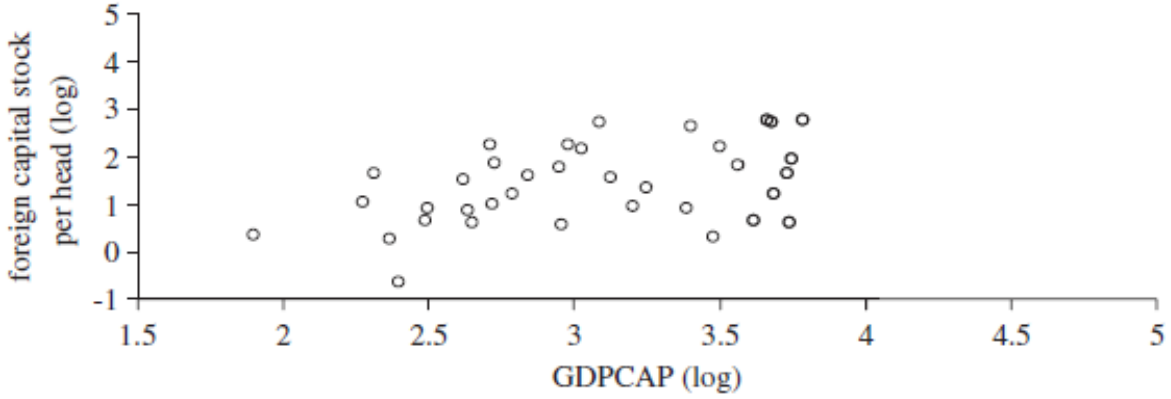
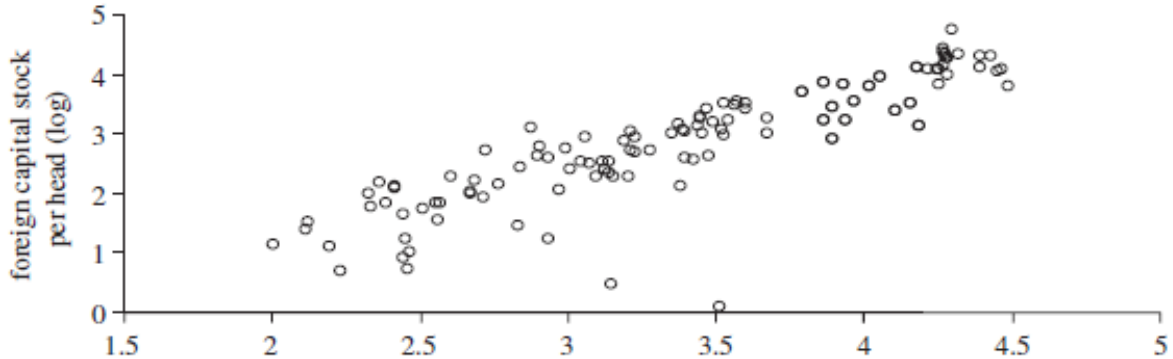


Figure 2 Cumulative capital inflows and initial GDP per capita (1890–1914) *Sources*: See text.



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  - Result robust to IV vs OLS specification.