International Economics II

Fiscal Policy and the Current Account

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Outline

Motivation

- The model economies we have studied thus far operate without a government.
- But in all countries the government is a large economic agent controlling directly or indirectly, through taxes, transfers, public consumption, and public investment a large fraction of aggregate economic activity!
- What is the role of the government in determine the current account?
  - Does an increase in taxes lead to an improvement or a deterioration in the current account?
  - Does government spending crowd out private investment?
- Study the twin deficits hypothesis.

Motivation

- General Idea of twin deficits: fiscal deficits cause current account deficits.

$$CA = S - I \tag{1}$$
$$S = S^p + S^g \tag{2}$$

  where S^p is private savings and S^p is public savings.

- The twin deficit hypothesis says: if $S^g \downarrow$, then $CA \downarrow$.
- But what if $S^g \downarrow$ results in $S^p \uparrow$?
- What do the data show? What does theory say?

Outline

A Model of CA Determination with a Government Sector

- Let's introduce a government in the two-period, small-open endowment economy.
- Government-sector setup:
  - G_1, G_2: government consumption in periods 1 and 2.
  - T_1, T_2: lump-sum taxes in periods 1 and 2.
  - B_t^g: government asset holdings in periods $t = 0, 1, 2$.
- If $B_t^g < 0$, then the government is indebted (public debt), and if $B_t^g > 0$ the government is a creditor.
- Lump-sum taxes: taxes that do not depend on any economic characteristic of the tax-payer, such as income, spending, or wealth.

Government Budget Constraint

- Use of funds:
  - Government spending: G_t
  - Interest service on the debt: $-r_{t-1}B^g_{t-1}$
- Source of funds:
  - Tax revenues: T_t
  - Issuance of new debt: $-(B^g_t - B^g_{t-1})$
- Period-1 budget constraint of the government:

$$G_1 - r_0 B^g_0 = T_1 - (B^g_1 - B^g_0). \tag{3}$$

- Period-2 budget constraint of the government:

$$G_2 - r_1 B^g_1 = T_2 - (B^g_2 - B^g_1). \tag{4}$$

Borrowing limit: $B^g_2 = 0$.

Government Budget Constraint

- Combine the government's period-by-period budget constraints to obtain a single present value budget constraint:

$$G_1 + \frac{G_2}{1+r_1} = T_1 + \frac{T_2}{1+r_1} + (1+r_0)B_0^g. \tag{5}$$

- The left-hand-side represents the present discounted value of government spending.
- The right-hand-side represents the present discounted value of tax revenues plus initial government assets.

Changes in Government Fiscal Position

Some definitions:

- Primary fiscal surplus = $T_1 - G_1$.
- Secondary fiscal surplus = $T_1 + r_0 B_0^g - G_1 = S_1^g$.
- The change in the secondary fiscal deficit is given by:

$$\Delta S_1^g = \Delta T_1 + \Delta(r_0 B_0^g) - \Delta G_1. \tag{6}$$

- All else constant, an increase in government spending, $\Delta G_1 > 0$, or a tax cut, $\Delta T_1 < 0$, decreases the fiscal surplus/increases the fiscal deficit.

Households

- This part of the model is almost the same as in the endowment economy.
- The only difference is that we replace the endowment, Q_t , with the after tax endowment (or disposable income), $Q_t - T_t$.
- The period 1 and 2 budget constraint of the household:

$$C_1 + B_1^p - B_0^p = Q_1 - T_1 + r_0 B_0^p, \tag{7}$$
$$C_2 + B_2^p - B_0^p = Q_2 - T_2 + r_1 B_1^p \tag{8}$$

  where B_t^p denotes bond holdings of private households at the end of period t.
- The transversality condition is $B_2^p = 0$.

Households

- Combine the period-by-period budget constraint of the household to obtain a single present value budget constraint:

$$C_1 + \frac{C_2}{1+r_1} = Q_1 + \frac{Q_2}{1+r_1} + (1+r_0)B_0^p - T_1 - \frac{T_2}{1+r_1}. \quad (9)$$

- Notice that the only difference to the PVBC in an economy without a government sector is the term $T_1 + T_2/(1+r_1)$, which represents the present discounted value of taxes.
- In the space (C_1, C_2), the intertemporal budget constraint of the household continues to be a straight downward sloping line with slope given by $-(1+r_1)$.

Households

- The household's optimization problem is to maximize lifetime utility:

$$\max U(C_1, C_2) \quad \text{subject to} \tag{10}$$
$$C_1 + \frac{C_2}{1+r_1} = Q_1 + \frac{Q_2}{1+r_1} + (1+r_0)B_0^p - T_1 - \frac{T_2}{1+r_1}.$$

- As usual, the household chooses a basket of consumption satisfying it's Euler equation:

$$U_1(C_1, C_2) = (1+r_1)U_2(C_1, C_2). \tag{11}$$

- This is exactly the same as in the previous lectures: this condition states that at the optimal consumption choice the indifference curve has a slope $-(1+r_1)$, the same slope as the intertemporal budget constraint.
- The way taxation was introduced is really important for this result, we will discuss later how other forms of taxes might change the decisions of the HH.

Equilibrium

- Combining the budget constraint of the government with the budget constraint of the household we obtain the following present value resource constraint of the country:

$$C_1 + \frac{C_2}{1+r_1} + G_1 + \frac{G_2}{1+r_1} = Q_1 + \frac{Q_2}{1+r_1} + (1+r_0)(B_0^p + B_0^g). \tag{12}$$

- The b.c. says that the present value of private and public consumption must equal the present value of the endowments plus initial foreign wealth of the country, $(1+r_0)(B_0^p + B_0^g)$.
- For a SOE, in equilibrium it must be true that: $r_1 = r^*$.
- It follows that in the small open economy fiscal deficits will not drive up interest rates. What about in a large economy?

Equilibrium

- Assume that G_1 and G_2 are exogenously given. Then an equilibrium in the small open endowment economy with a government are values for C_1, C_2, r_1, T_1, T_2 satisfying

$$C_1 + \frac{C_2}{1+r_1} = Q_1 + \frac{Q_2}{1+r_1} + (1+r_0)B_0^p - T_1 - \frac{T_2}{1+r_1}, \tag{13}$$

$$U_1(C_1, C_2) = (1+r_1)U_2(C_1, C_2), \tag{14}$$

$$r_1 = r^*, \tag{15}$$

$$G_1 + \frac{G_2}{1+r_1} = T_1 + \frac{T_2}{1+r_1} + (1+r_0)B_0^g. \tag{16}$$

given G_1, G_2, r^* , B_0^p, and B_0^g.

Equilibrium

- Question: There are 5 unknowns, C_1, C_2, r_1, T_1, T_2, but only 4 equilibrium conditions. How can this be?
- Notice that the equilibrium conditions depend only on the present discounted value of taxes, $T_1 + T_2/(1 + r_1)$, and thus only the present discounted value of taxes is uniquely determined, but T_1 and T_2 are not individually.

Equilibrium

- Combining the present value budget constraints of the household and the government, equations (13) and (16) yields:

$$C_1 + \frac{C_2}{1+r_1} = \underbrace{Q_1 - G_1 + \frac{Q_2 - G_2}{1+r_1} + (1+r_0)(B_0^p + B_0^g)}_{=\tilde{Y}}. \quad (17)$$

- The equilibrium conditions can then be collapsed to:

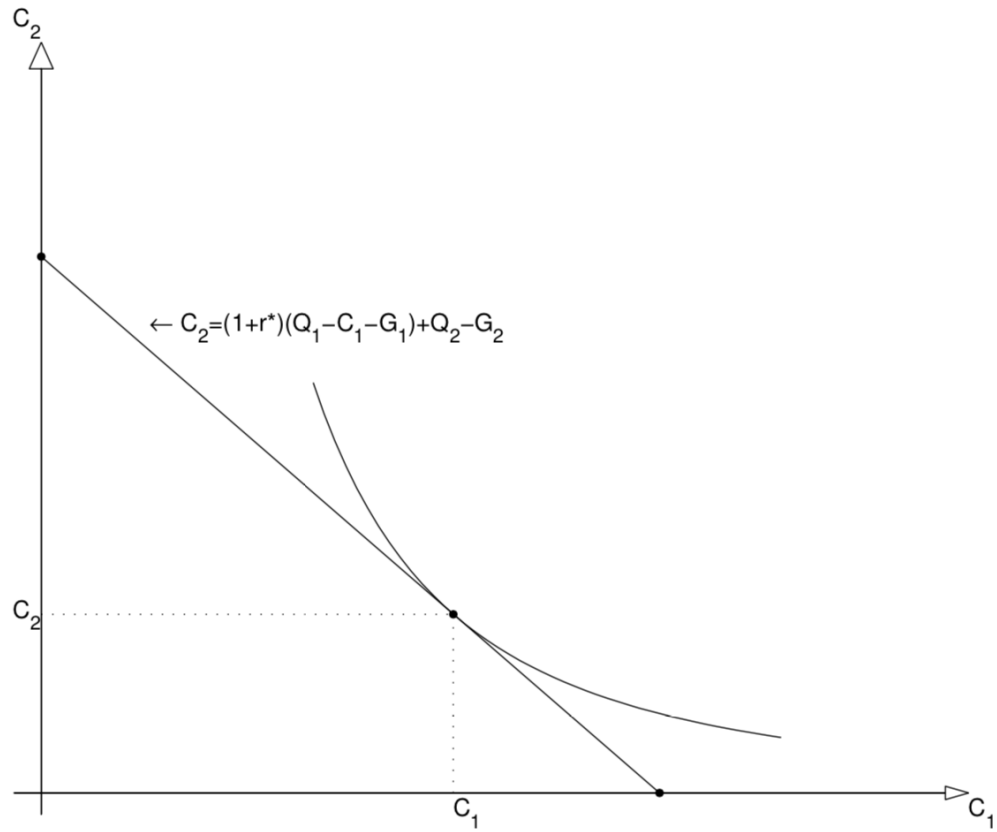
$$C_1 + \frac{C_2}{1+r_1} = \tilde{Y} \quad (18)$$

$$U_1(C_1, C_2) = (1+r_1)U_2(C_1, C_2) \quad (19)$$

$$r_1 = r^* \quad (20)$$

$\Rightarrow$ Identical equilibrium to equilibrium conditions in SOE with only households!

Optimal Consumption Choice with Government Sector



Note that in this case $B_0^p + B_0^g = 0$!

Irrelevance of Timing of Taxes

- Notice that the economy's resource constraint depends only on G_1 and G_2 and is independent of T_1 and T_2. Hence the timing of taxes is irrelevant for the optimal allocation.
- From here it follows that tax cuts that lead to an increase in the fiscal deficit, $G_1 - T_1$, will have no real effects and will not lead to a current account deterioration.
- Let's derive this result in more detail in the next sub-section...

Outline

The Effect of a Tax Cut on the Current Account

- Experiment: A tax cut in period 1 combined with no change in government spending, that is, $\Delta T_1 < 0$, and$\Delta G_1 = \Delta G_2 = 0$.
- Consider first the present value budget constraint of the government:

$$G_1 + \frac{G_2}{1+r_1} = T_1 + \frac{T_2}{1+r_1} + (1+r_0)B_0^g \tag{21}$$

- Without loss of generality, assume $B_0^g = 0$. Use equilibrium condition $r_1 = r^*$ and express the budget constraint in changes.

Change in Government Budget Constraint

- Then:

$$\Delta G_1 + \frac{\Delta G_2}{1+r_1} = \Delta T_1 + \frac{\Delta T_2}{1+r_1}. \tag{22}$$

- This says that tax cut in period 1 must leave the present discounted value of taxes unchanged.
- If G_t's are not changing, this requires that $\Delta T_2 = -(1+r^*)\Delta T_1 > 0$.
- That is, a tax cut in period 1 leads to a tax increase in period 2.

Change in Household's Budget Constraint

- Now recall the household's present value budget constraint:

$$C_1 + \frac{C_2}{1+r_1} = Q_1 + \frac{Q_2}{1+r_1} + (1+r_0)B_0^p - T_1 - \frac{T_2}{1+r_1}. \quad (23)$$

- It depends only on the present discounted value of taxes, and hence the tax cut in period 1 has no effect on the present value budget constraint of the household.

$$\Delta C_1 = 0. \quad (24)$$

- Hence it follows from the budget constraint in period 1 that households will save the entire tax cut.

- From the definition of private savings: $S_1^p = Q_1 - T_1 - C_1 + r_0 B_0^p$, it follows that $\Delta S_1^p = -\Delta T_1 > 0$.

Household's Savings Decision

- Why do households choose to save the entire tax cut, why don't they consume at least some of it?
- The reason is that households understand that taxes will increase in period 2. Thus they save more to avoid a cut in consumption in period 2.
- The result that a tax cut in the current period that leaves government spending unchanged has no real effects, that is, leaves the consumption allocation unchanged.
- This is known as **Ricardian Equivalence**.

Impact of a Tax Cut on the Current Account

- What is the effect of the tax cut on the current account? Find national savings:
- National Saving $= S_1 = S_1^p + S_1^g$.
- Recall that $\Delta S_1^g = \Delta T_1$ and $\Delta S_1^p = -\Delta T_1$, so change is:

$$\Delta S_1 = \Delta S_1^p + \Delta S_1^g = -\Delta T_1 + \Delta T_1 = 0. \tag{25}$$

- In the endowment economy: $\Delta CA_1 = \Delta S_1 \Rightarrow$ No change in the current account!

Impact of a Tax Cut on the Current Account

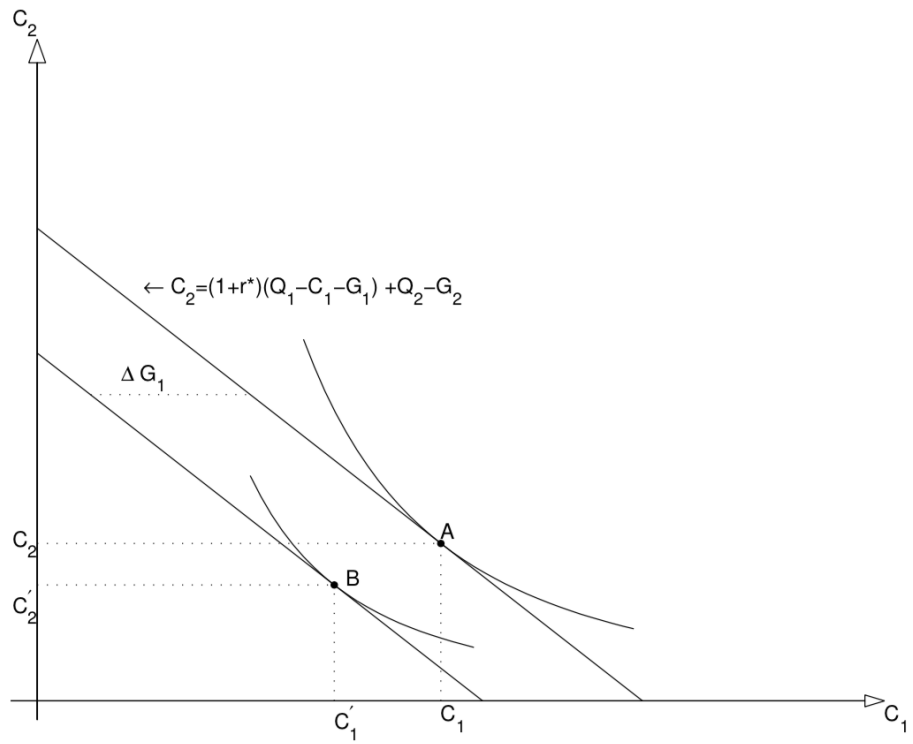
We have thus shown that a tax cut in period 1 that leaves government spending unchanged:

- Leads to a fiscal deficit in period 1, $\Delta S_1^g = \Delta T_1 < 0$.
- But, does not result in a decline in national savings because private savings increase one for one with the tax cut.
- So, does not lead to a current account deficit.

When Ricardian Equivalence holds and the fiscal deficit is the result of a tax cut, then the current account does not change.

Government Spending and Current Account Deficits

- Assume now that the fiscal deficit is not the result of a tax cut, but instead is brought about by a temporary increase in government spending.
- Experiment: $G_1 \uparrow$ and $\Delta G_2 = 0$.



Temporary Increase in Government Purchases

- According to the analysis of this graph, consumption falls in response to a temporary increase in government spending, but by less than the increase in government spending,

$$\Delta G_1 > 0 \Rightarrow 0 > \Delta C_1 > -\Delta G_1 \tag{26}$$

- This means that the trade balance, which is given by $Q_1 - C_1 - G_1$ deteriorates but by less than the increase in government spending.

$$\Delta TB_1 = \Delta Q_1 - \Delta(C_1 + G_1) = 0 - \Delta(G_1 + C_1) < 0. \tag{27}$$

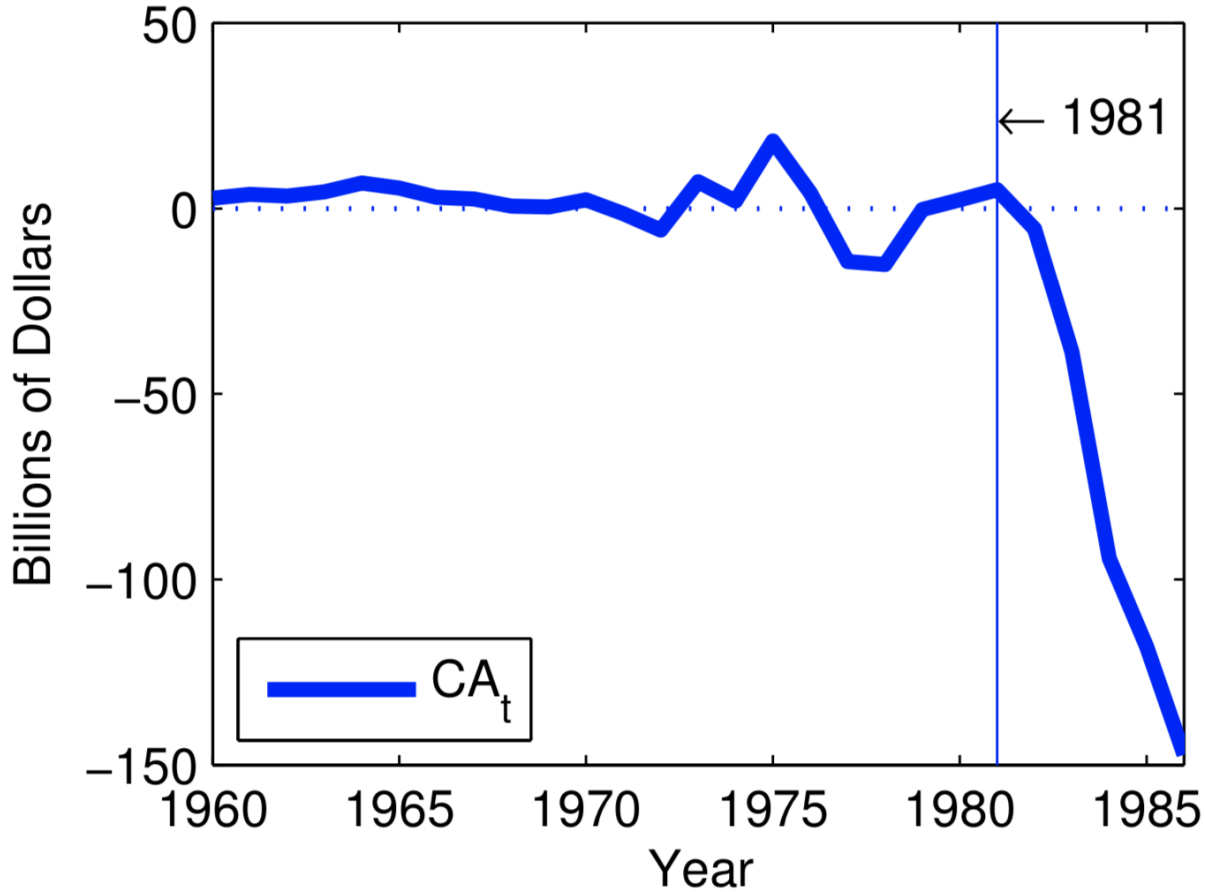
- Also, the current account, which is given by $CA_1 = TB_1 + r_0 B_0^*$ deteriorates but by less than the increase in government spending.

Outline

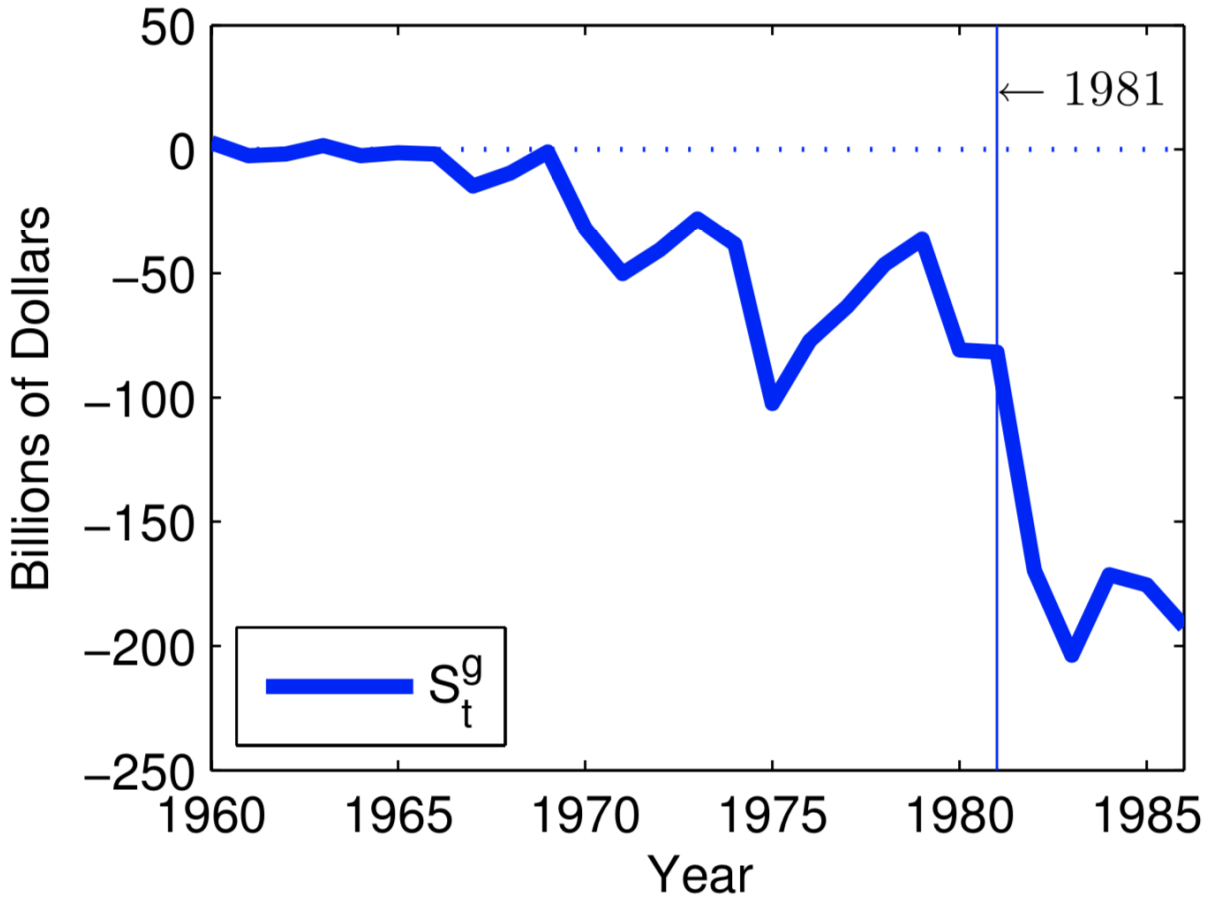
Back to the Twin Deficit Hypothesis

- We know that: $CA = S - I = (S^p + S^g) - I$
- Twin Deficit Hypothesis: if $S^g \downarrow$, then $CA \downarrow$.
- **The Genesis of the Twin Deficit Hypothesis:** The Reagan Fiscal Imbalances and the Beginning of Current Account Deficits: U.S. 1980s.
- Relevant today given Trump's fiscal plans sound similar (lower taxes and high spending).
- First let's look at the data about the joint occurrence of current account and fiscal deficits to check whether there is a pattern.

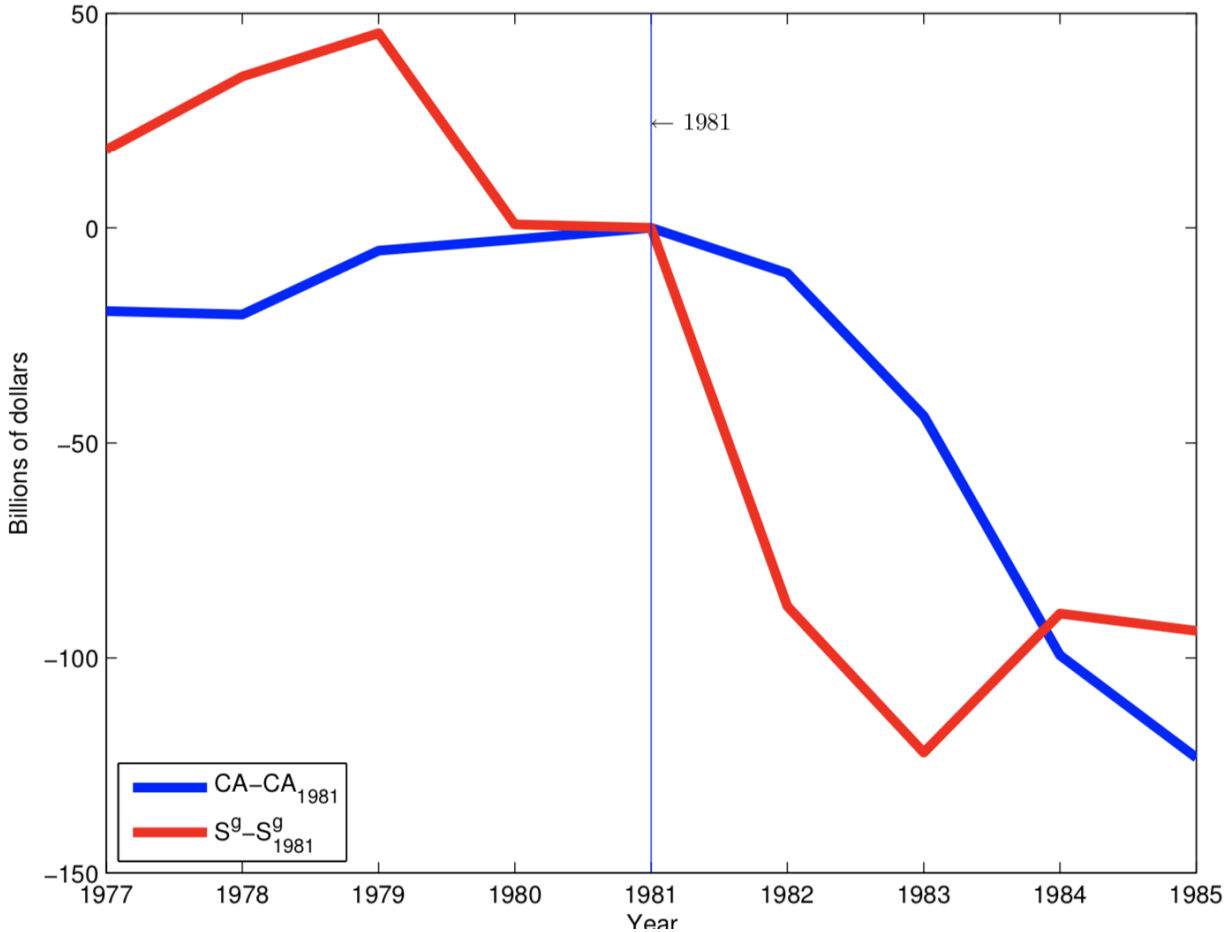
Large current account deficits open up in the early 1980s



...and at the same time the U.S. fiscal surplus, S^g, declines:



The Current Account and Fiscal Surplus



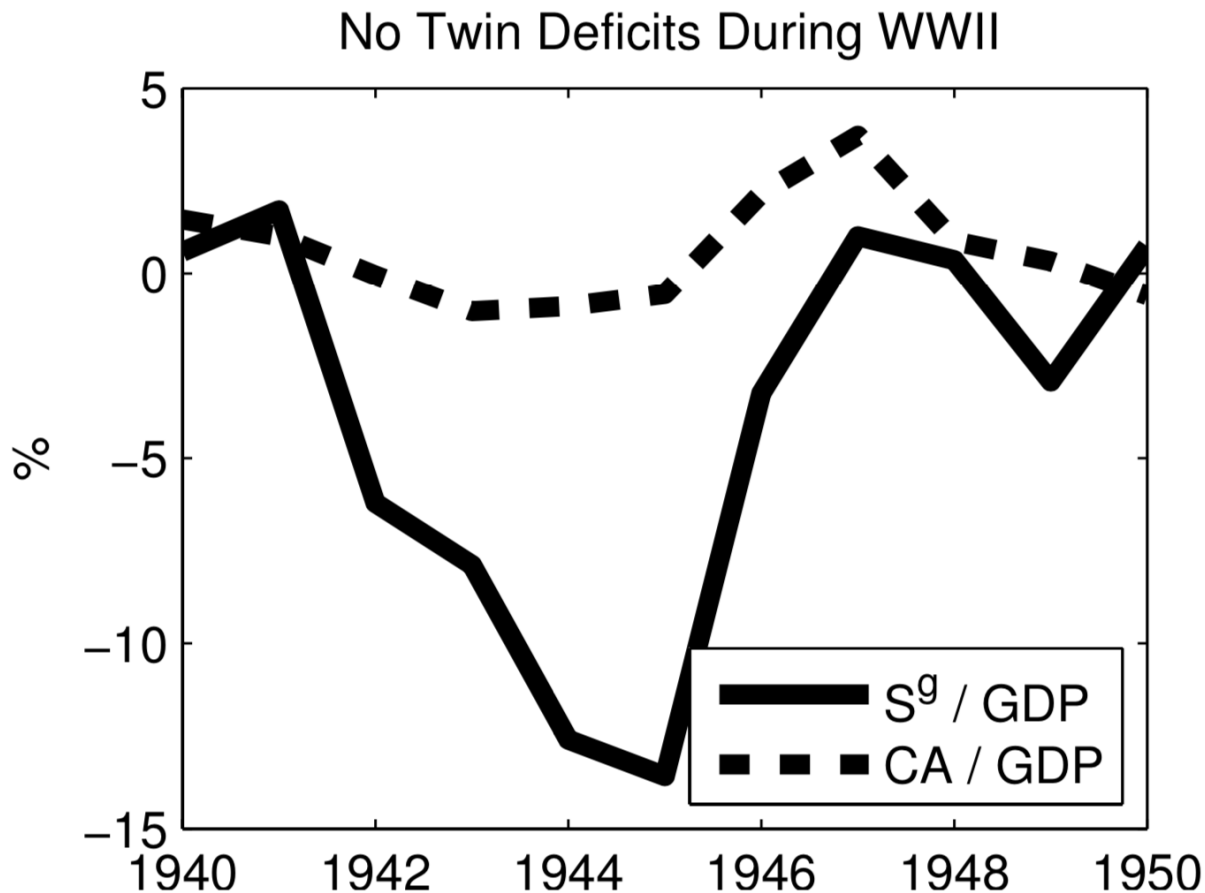
Putting these two graphs together and subtracting the respective 1981 values from CA_t and S_t^g, we see that between 1981 and 1984 both fell by about \$100 billion.

Does the Hypothesis always hold?

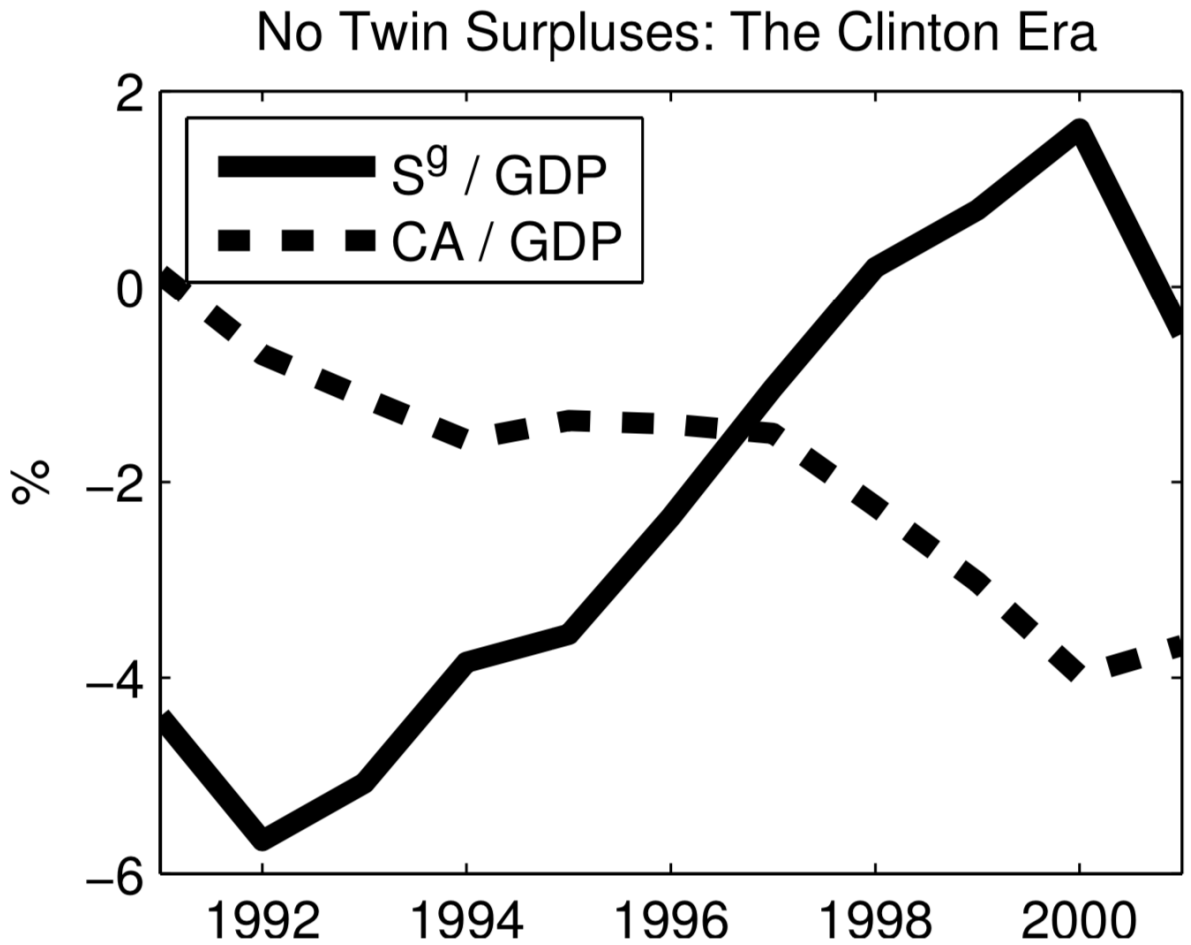
- In the Reagan period, the twin deficit was a reality. But we should ask ourselves whether this is a general regularity.
- Let's take a look at:

  1. US: The large fiscal deficits of World War II.
  2. US: The fiscal surpluses during the Clinton Era.
  3. US: The fiscal deficits during the Great Contraction of 2008.
  4. Spain: The boom and bust of the last 20 years.

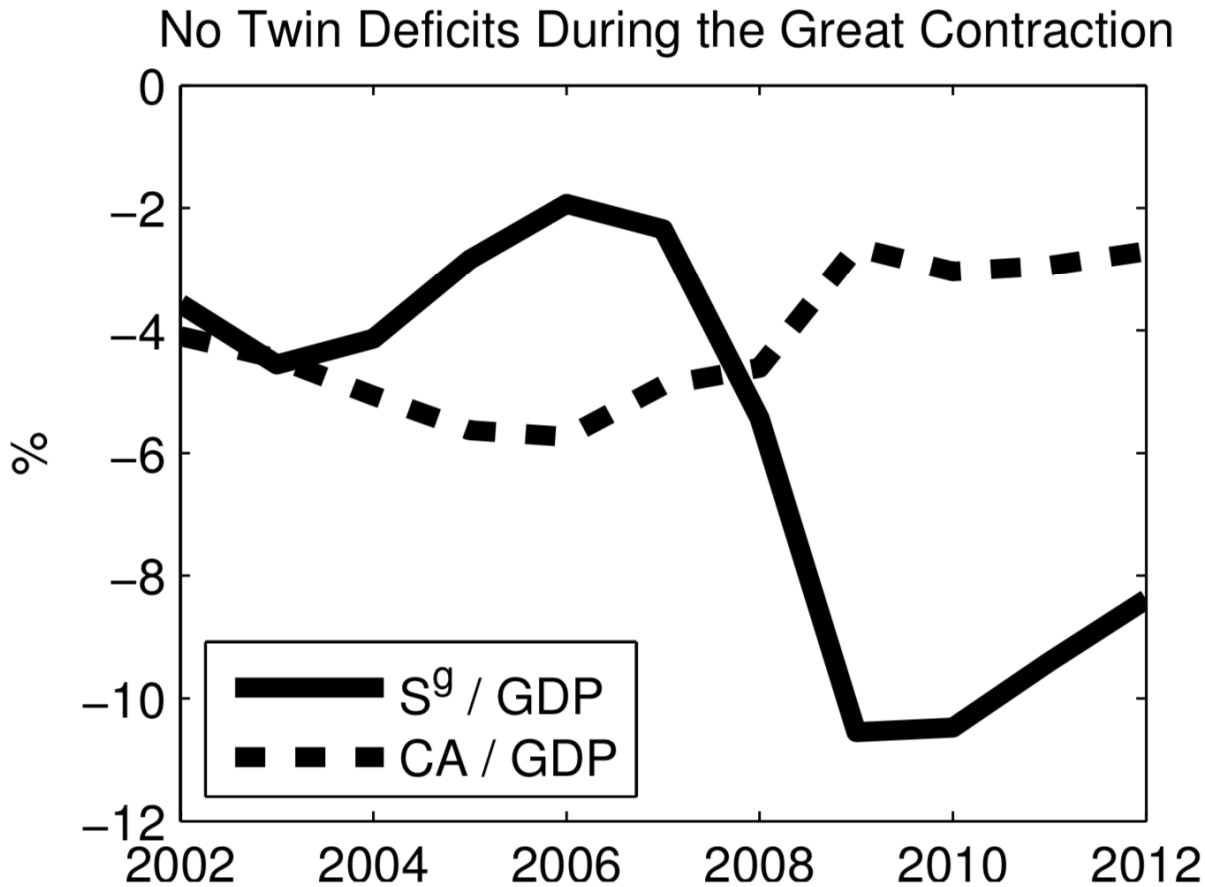
Twin Deficits During the World War II? - No



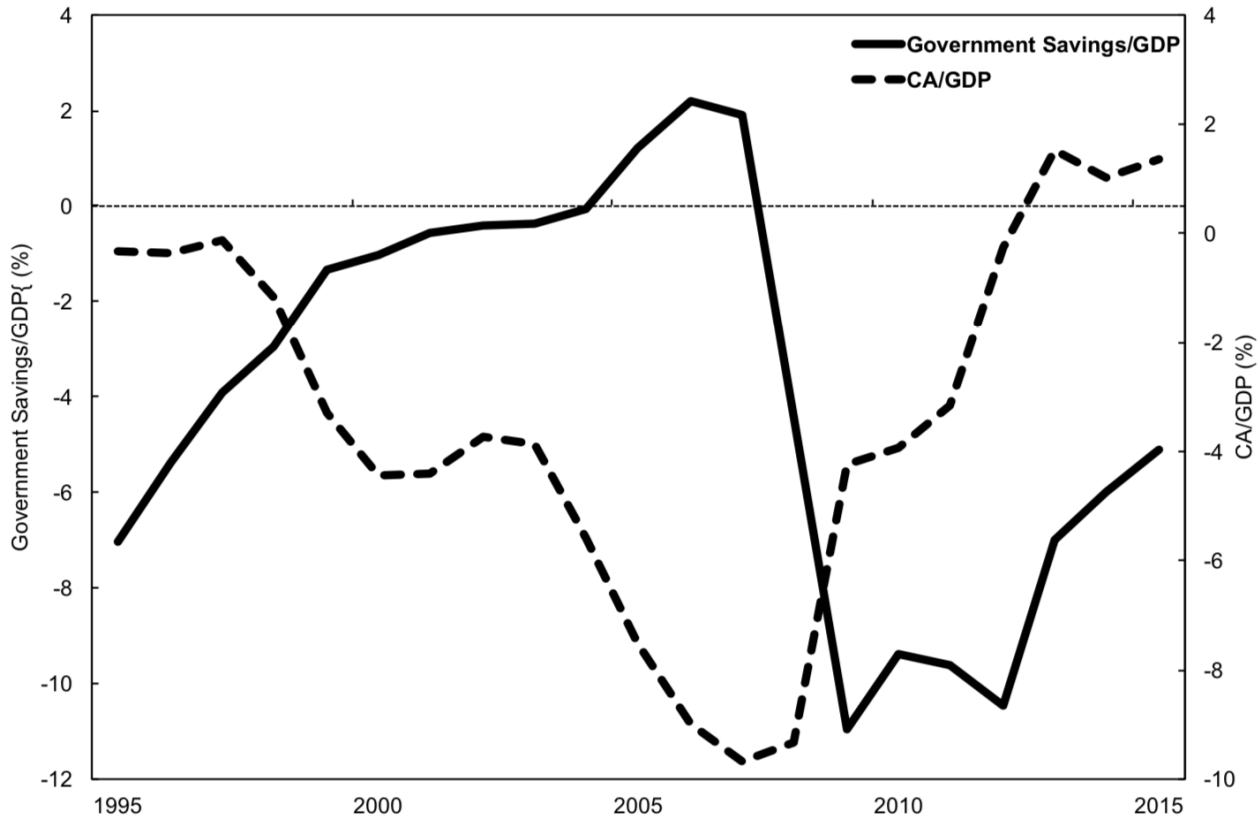
Twin Deficits During the Clinton Era Surpluses? - No



Twin Deficits During the Great Contraction? - No



Spain's recent experience?

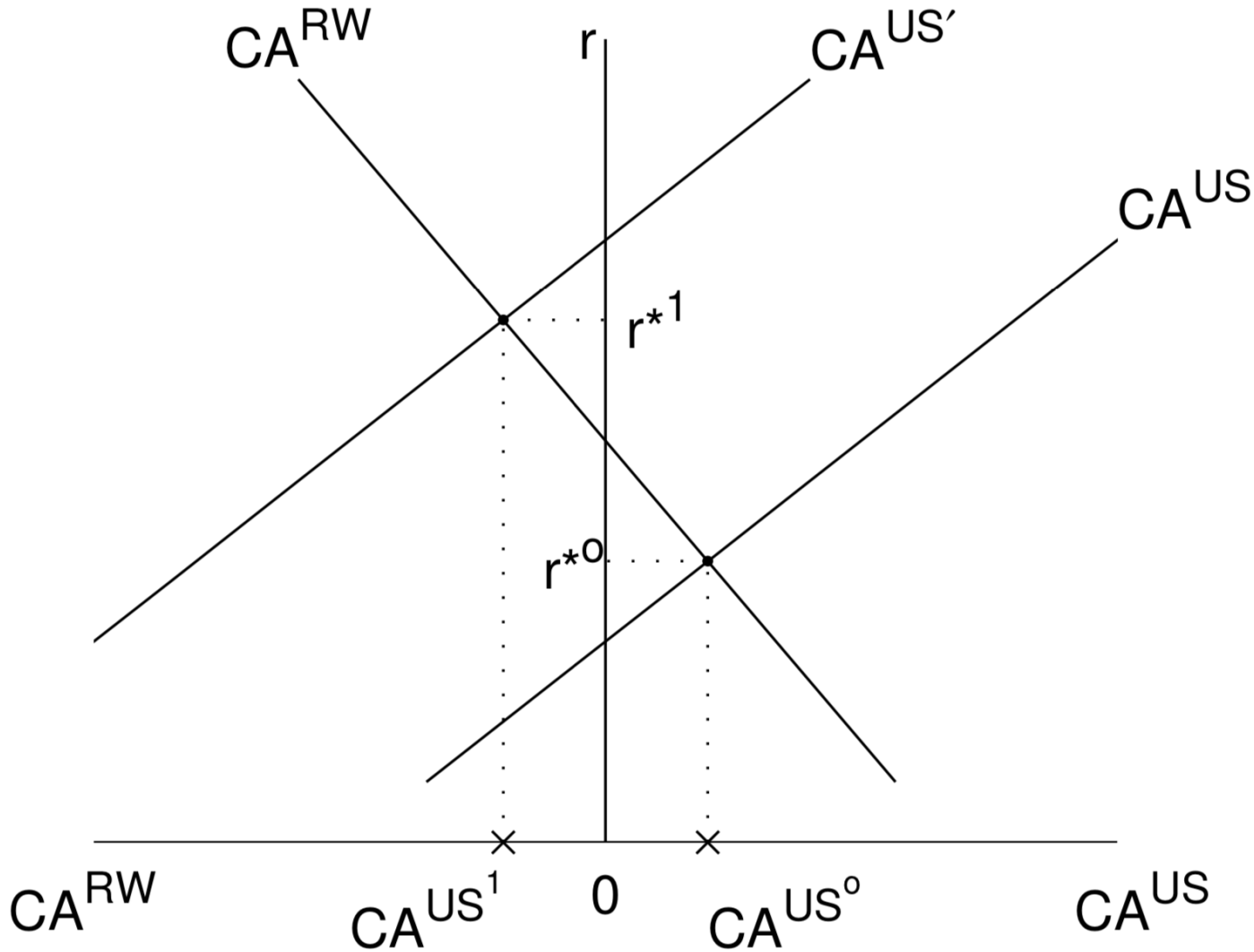


Correlation in opposite direction during boom, but then in "correct" direction post-crisis.

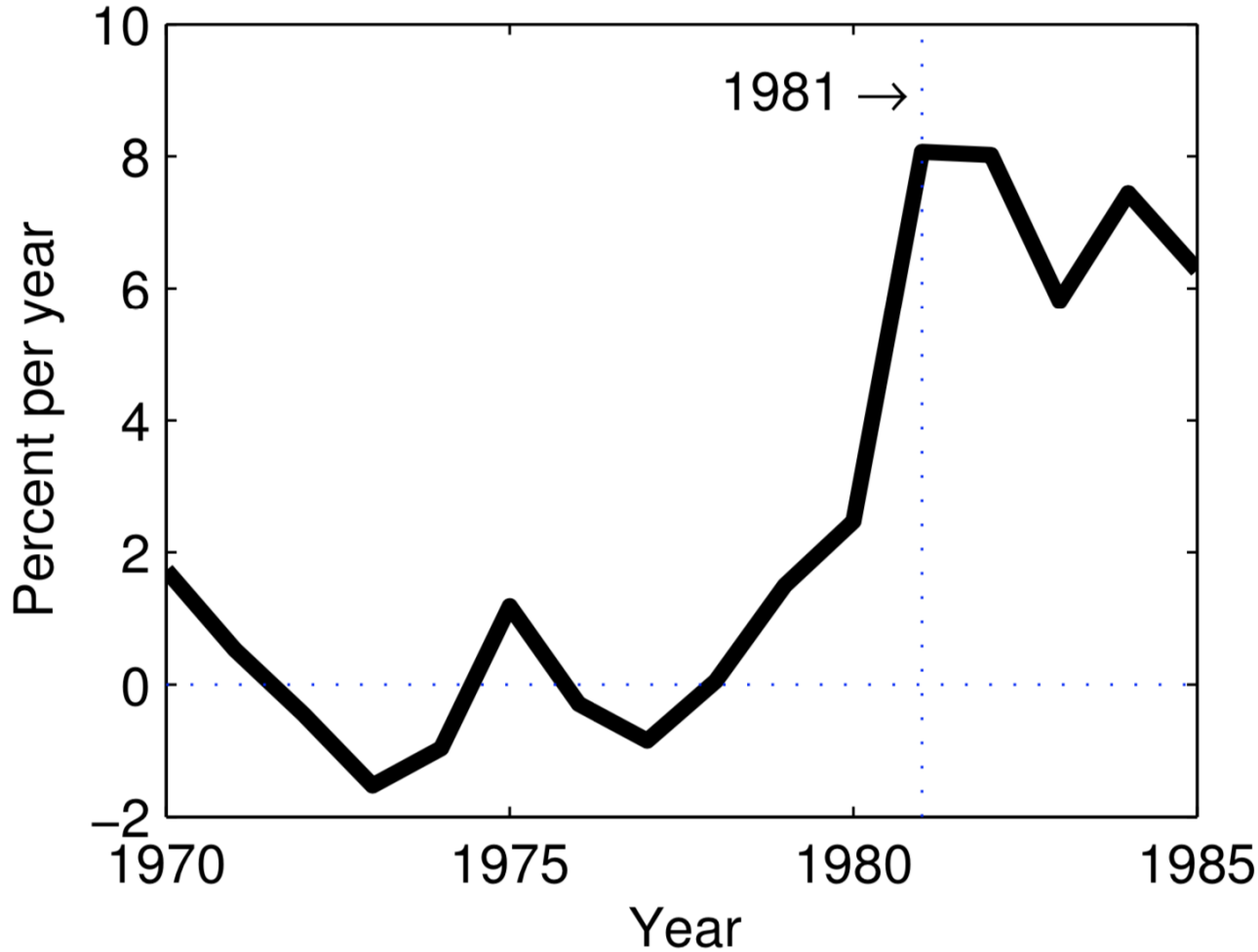
Not so Clear Cut...

- The data seems to suggest that sometimes large changes in government saving are reflected in similar changes in the current account balance and sometimes not.
- How can we understand this? What are potential testable hypotheses?
- We will return to the Genesis of the Twin Deficit Hypothesis, the Reagan era budget deficits.
- Reagan's fiscal plan $\Rightarrow$ raise expenditure and decrease taxes.
- That supports the view that the United States wanted to borrow more from the rest of the world.
- This view would imply a decrease in S^g and an increase r^*.

The U.S. Current Account



Interest Rates in the United States, 1977–1985



⇒ Large increase in interest rates in 1980s!

National and Private Savings and Investment in the U.S., 1977–1989

Data is as a Percentage of GNP.

What do the Graphs tell us?

- Large increase in r, consistent with the view that the effect was "made in the US".
- Looking at the overall trend, we see that both S and I fall initially, but S falls even more by 1982, while I starts to rise again $\Rightarrow CA = S - I \downarrow$.
- The gap between S and S^p, which equals S^g, starts to widen at the beginning of the 1980s, so while private savings does not change a lot, government savings falls more and more, which drives overall national savings.
- These observations give credence to idea of the Twin Deficit hypothesis holding. behavior.

Recall the Theory

- But as we saw in the theory, changes in fiscal policy might lead to other actors in the economy to change their behavior. Namely, private savings might also react given government's.
- In particular, we saw that when the **Ricardian Equivalence Holds**:
  - A tax cut does not change the CA, the fall in public savings, ΔS^g, is fully compensated by the increase in private savings, ΔS^p.
  - A temporary increase in government purchases deteriorates the CA, but by less than the increase in government spending.
- Let's analyze whether these predictions come true from the data.

Empirical Relevance of the Tax Cut

- If the model of Ricardian Equivalence represents an adequate description of how the economy works and if the main cause of the fiscal deficits of the 1980s was the Reagan tax cuts:
- Then what we should have observed is a decline in public savings, an offsetting increase in private savings, and no change either in national savings or the current account.
- What does the data show?
- In the 1980s there was a significant cut in taxes. As predicted by theory, the tax cuts were accompanied by a significant decline in public savings.

Empirical Relevance of the Tax Cut

- However, contrary to the predictions of Ricardian Equivalence, private savings did not increase by the same amount as the decline in public savings.
- As a result both national savings and the current account plummeted.
- We therefore conclude that either the fiscal deficits of the 1980s:
  - were caused by factors other than the tax cuts, such as increases in government spending,
  - or Ricardian Equivalence does not hold,
  - or both.

Empirical Relevance of the Gov Purchase Increase

- Let's see if we could explain the size in the decline in the current account in the early 1980s by the observed size of the increase in government spending.
- Reagan's military buildup of the early 1980s represented an increase in gov't spending of about 1.5% of GDP. $(\Delta G_1 = 0.015 \times GDP)$.
- Theory tells us that this should be associated with a deterioration of the CA. But the deterioration should be less than the increase in gov't spending, i.e., less than 1.5% of GDP.
- Yet during this period the current account deteriorated by 3% of GDP. Thus, there is at least 1.5% of GDP of current account deficit that is not accounted by the military build up.

Empirical Relevance of the Gov Purchase Increase

- We saw that if Ricardian equivalence holds, the Reagan tax cut of the early 1980s, which did amount to about 1.5% of GDP, cannot explain the 1.5% deterioration in the current account that the military buildup can't explain.
- But what if Ricardian equivalence doesn't hold? Could it be that in this case the 1.5%-of-GDP Reagan tax cut explain the 1.5% current account deterioration that the military buildup leaves unexplained?
- We turn to this issue next.

Outline

Failure of Ricardian Equivalence

- The Ricardian Equivalence is a theoretical proposition that it is often criticized by its lack of relevance in the real world.
- But even in the theory, its foundations lie on very strong assumptions.
- Three Reasons Why It May Fail:

1. Borrowing Constraints.
2. Intergenerational Effects.
3. Distortionary Taxation

Borrowing Constraints

- Assume that private households face borrowing constraints:
- Period-1 budget constraint: $C_1 + B_1^p = Q_1 - T_1$, but with $B_1^p \geq 0$.
- Imagine that the endowment is much higher in period 2: $Q_2 >> Q_1$.
- HH would want to borrow, but cannot $\Rightarrow B_1^p = 0$, the borrowing constraint is binding.
- Consider now a tax cut, $\Delta T_1 < 0$. Then $\Delta C_1 = -\Delta T_1 > 0$ and $\Delta S_1^p = \Delta Q_1 - \Delta T_1 - \Delta C_1 = 0$.
- That is, households consume the tax cut rather than save it (which is what they would do in the absence of binding borrowing constraints).

Borrowing Constraints

- What is the effect on national savings, $S_1 = S_1^g + S_1^p$?

$$\Delta S_1 = \underbrace{\Delta S_1^g}_{\Delta T_1} + \underbrace{\Delta S_1^p}_{=0} < 0 \tag{28}$$

- National savings fall. What is the effect of the tax cut on the current account?
- $\Delta CA_1 = \Delta S_1 = \Delta T_1 < 0 \Rightarrow$ so it deteriorates, and we observe a Twin Deficit.
- Note that for a tax cut of \$100 to lead to a current account deterioration of the same magnitude, we need that 100% of households benefiting from the tax cut are borrowing constraint.

Intergenerational Effects

- Generation that benefits from the tax cut not the same as the one that pays for the future tax increases.
- Assume that households are one-period lived. Budget constraint of generation alive in period 1 and 2:

$$C_1 = Q_1 - T_1 \Rightarrow \Delta C_1 = \Delta T_1 \tag{29}$$
$$C_2 = Q_2 - T_2 \Rightarrow \Delta C_2 = \Delta T_2 \tag{30}$$

- No savings: why save if I am dead tomorrow when the gov't comes to collect the taxes...
- From the government's budget constraint:

$$G_1 + \frac{G_2}{1+r_1} = T_1 + \frac{T_2}{1+r_1}. \tag{31}$$

Intergenerational Effects

- Tax cut in period 1: $T_1 < 0$ and no change in government spending: $\Delta G_1 = \Delta G_2 = 0$.
- By gov't budget constraint: $\Delta T_1 = -\Delta T_2/(1 + r_1)$.
- In period 1:

$$\Delta S_1^p = \Delta Q_1 - \Delta T_1 - \Delta C_1 = 0 - \Delta T1 - -\Delta T_1 = 0, \quad (32)$$

$$\Delta S_1^g = \Delta T_1 \quad (33)$$

- Thus, $\Delta CA_1 = \Delta S_1 = \Delta S_1^g = \Delta T_1 < 0$,
- The tax cut gives rise to a fiscal deficit and a current account deterioration of the same magnitude, generating a Twin Deficit.

Distortionary Taxation

- Consider the 2-period endowment economy model with free capital mobility, and no initial household or government borrowing.
- New: proportional consumption taxes in periods 1 and 2.
- Household budget constraint in period 1 and 2 is now:

$$(1+\tau_1)C_1 + B_1^p = Q_1 \tag{34}$$

$$(1+\tau_2)C_2 = Q_2 + (1+r_1)B_1^p \tag{35}$$

- Therefore, the HH's present value budget constraint is:

$$(1+\tau_1)C_1 + \frac{1+\tau_2}{1+r_1}C_2 = Q_1 + \frac{Q_2}{1+r_1} \tag{36}$$

Distortionary Taxation: HH's problem

- Like in our standard model, the household will maximize lifetime utility, $U(C_1, C_2)$, subject to her intertemporal constraint (36), taking Q_1, Q_2, τ_1, τ_2, and r_1 as given.
- As before, we can take FOCs to arrive at the Euler equation:

$$\frac{U_1(C_1, C_2)}{U_2(C_1, C_2)} = \frac{1 + \tau_1}{1 + \tau_2}(1 + r_1), \tag{37}$$

- which looks very similar to the standard model, but now with a "wedge", $(1 + \tau_1)/(1 + \tau_2)$, between the marginal rate of substitution and the interest rate.
- This type of taxation "distorts" the decision of the consumer.

Distortionary Taxation: Temporary Tax Cut

- A temporary tax cut: $\downarrow (1+\tau_1)/(1+\tau_2)$, then, all else equal, the household should increase C_1 and decrease C_2.
- It follows that a cut in τ_1 most likely leads to a decline in the trade balance and hence the current account in period 1 implying that Ricardian equivalence fails.
- Argument focuses on substitution effect, but what about income effect?
- In this case, the tax cut, $\downarrow \tau_1$ does not result in an income effect. Let's check check the economy wide resource constraint.
- First consider the budget constraint of the government.

Distortionary Taxation: Government

- Notice that the total taxes collected in period 1 and 2: $\tau_1 C_1$ and $\tau_2 C_2$. The government's period-1 and 2 constraint are:

$$\tau_1 C_1 = G_1 + B_1^g. \tag{38}$$
$$\tau_2 C_2 = G_2 - (1 + r_1) B_1^g \tag{39}$$

- Therefore, its present value budget constraint is

$$G_1 + \frac{G_2}{1 + r_1} = \tau_1 C_1 + \frac{\tau_2 C_2}{1 + r_1}. \tag{40}$$

- Assuming that government spending G_1 and G_2 are exogenously given, the government must choose τ_1 and τ_2 so is satisfy (40). Once it settles on τ_1, it must set τ_2 to ensure satisfaction of (40).

Distortionary Taxation: Economy's Resource Constraint

- We can combine the HH's intertemporal budget constraint with the gov's, to obtain the intertemporal resource constraint of the economy:

$$C_1 + \frac{C_2}{1+r_1} + G_1 + \frac{G_2}{1+r_1} = Q_1 + \frac{Q_2}{1+r_1}. \tag{41}$$

- It follows that a tax cut in period 1 does not change the economy's resource constraint, and thus have no income effect in equilibrium.
- Therefore, the tax cut will lead to an increase in period 1 consumption causing a trade deficit and a current account deficit.
- When we have distortionary taxation the Ricardian equivalence fails!

Taking Stock

- We introduced the government in our 2-period model of current account determination.
- In the simplest version of the model with lump-sum taxes, the Ricardian Equivalence holds, meaning that:
  - A tax cut does not generate changes in the CA, since the HH's save the extra income.
  - An increasing in gov spending generates a CA deterioration, but by less than the increase in G.
- We saw that the twin deficit hypothesis, although true during the 80's in the US, does not seem to generalize.
- The simplest model cannot explain the full CA deterioration of the twin deficit hypothesis.
- We show that this may be evidence that the Ricardian Equivalence does not hold, and we discuss why this can be the case.