

Slides for Chapter 14: Managing Currency Pegs

Columbia University

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These are the slides for the textbook, "International Macroeconomics: A Modern Approach," by Stephanie Schmitt-Grohé, Martín Uribe, and Michael Woodford, Princeton University Press, 2022, ISBN: 9780691170640.

Motivation

In countries with fixed exchange rates, a positive shock can be the prelude to a crisis:

— Consider a fall in the world interest rate. It causes increases in aggregate demand, employment, and wages.

— When the world interest rate goes back up to its normal level, aggregate demand contracts and, if wages are downwardly rigid, and the exchange rate is fixed (or the central bank has fear of floating) the economy can suffer persistent involuntary unemployment.

These dynamics are known as a *boom-bust cycle*.

Can the government do anything (other than floating) to smooth out boom-bust cycles?

This Chapter

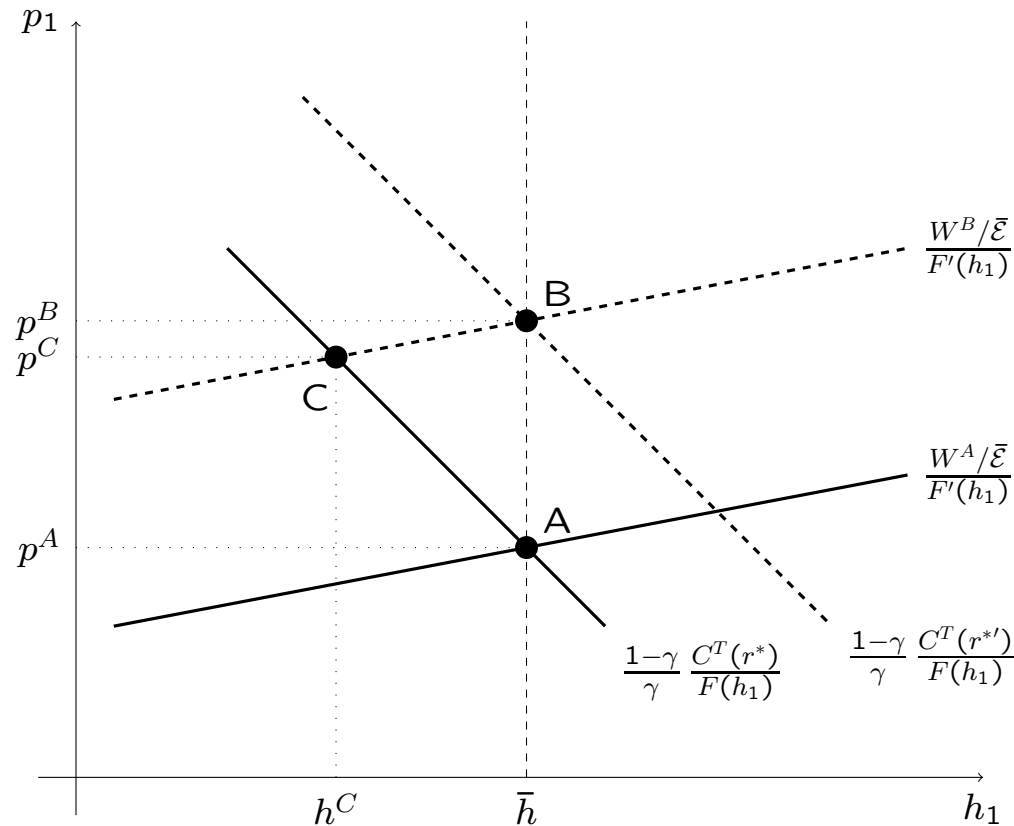
- Begins by analyzing the mechanics of a boom-bust cycle in the context of the TNT-DNWR model of Chapter 13.
- Shows that a currency peg and nominal rigidity create an externality (individual agents don't internalize that booms are the preamble of busts).
- Studies policy instruments to correct the externality, including
 - fiscal devaluations and
 - macroprudential capital control policy. (This analysis complements that of Chapter 12.)

A Boom-Bust Cycle

The figure on the next slide illustrates a boom-bust cycle in the context of the TNT-DNWR model, when the central bank pegs the exchange rate.

- The economy starts at point A, with full employment and wage W^A .
- The nominal exchange rate is fixed at $\bar{\mathcal{E}}$.
- A decline in the world interest rate from r^* to $r^{*'} < r^*$ shifts the demand schedule up and to the right, setting off a boom.
- At the existing nominal wage, there is excess demand for labor, so wages begin to rise, shifting the supply schedule up and to the left. The new equilibrium wage is W^B .
- In the boom equilibrium (point B) there is full employment and the relative price of nontradables rises to $p^B > p^A$.
- When the interest rate goes back up to r^* . The demand schedule shifts down and to the left back to its original position. But the supply schedule does not move, because the wage rate is downwardly rigid.
- The new equilibrium is at point C, with involuntary unemployment $\bar{h} - h^C$ and the relative price of nontradables falls to p^C .

A Boom-Bust Cycle in the TNT-DNWR Model with a Peg



Notes. The economy starts at point A, with full employment and wage W^A . The nominal exchange rate is fixed at $\bar{\epsilon}$. A decline in the world interest rate from r^* to $r^{*'} < r^*$ sets off a boom. The demand schedule shifts up and to the right. Wages rise to W^B and the supply schedule shifts up and to the left. In the boom equilibrium (point B) there is full employment and the relative price of nontradables rises to $p^B > p^A$. Then the interest rate goes back up to r^* . The demand schedule shifts down and to the left back to its original position. The new equilibrium is at point C, with involuntary unemployment $\bar{h} - h^C$ and the relative price of nontradables falls to p^C .

The Currency Peg Externality

When the interest rate falls, individual agents know that the boom in aggregate demand that their own consumption contributes to generate pushes wages up causing unemployment when the boom is over.

Yet, they don't curb their consumption during the boom, because they are too small to affect the equilibrium dynamics of wages.

Thus, the economy suffers from an externality—the *currency peg externality*.

The currency peg externality opens the door for corrective government policy.

A devaluation would fix the problem, but sometimes it is not an option (e.g., a currency union). What other policy instruments are available to the government to treat the currency peg externality?

Two Types of Policy to Address the Peg Externality

First Best Policies: Achieve full employment and an efficient intertemporal allocation of consumption. They are ex-post policies, because they take place when the boom is over. Disadvantage: could be impractical, as they might require parliament approval, so not easy to implement at business-cycle frequency.

- **Second Best Policies:** They reduce unemployment during recessions, but at the cost of distorting the intertemporal allocation of consumption. They are ex-ante (or macroprudential) because they take place when the economy is still booming. Advantage: can be applied quickly.

We first analyze second best policies.

Macroprudential Capital Control Policy

We saw that with DNWR and a currency peg, booms are inefficiently large, because when the economy lands there is involuntary unemployment.

A benevolent government would like to curb booms to make the landing softer.

Consider a tax on external borrowing. As discussed in Chapter 12, this type of tax is called capital controls. Here, the idea is to apply it when the economy is booming (before the bust). This type of policy is called macroprudential.

Effects of Macroprudential Capital Controls

The next figure shows how a macroprudential capital control tax works.

The boom-bust dynamics in the absence of capital controls (under free capital mobility) are like those shown in slide 5:

– the initial equilibrium is at point A.

A fall in the interest rate from r^* to $r^{*'} < r^*$ moves the equilibrium to point B, where wages and consumption of tradables are higher ($W^B > W^A$ and $C^T(r^{*'}) > C^T(r^*)$).

– When the interest rate goes back to r^* , the equilibrium shifts to point C, where there is unemployment in the amount $\bar{h} - h^C$.

- Now suppose that during the boom, the government imposes a capital control tax τ_1 .

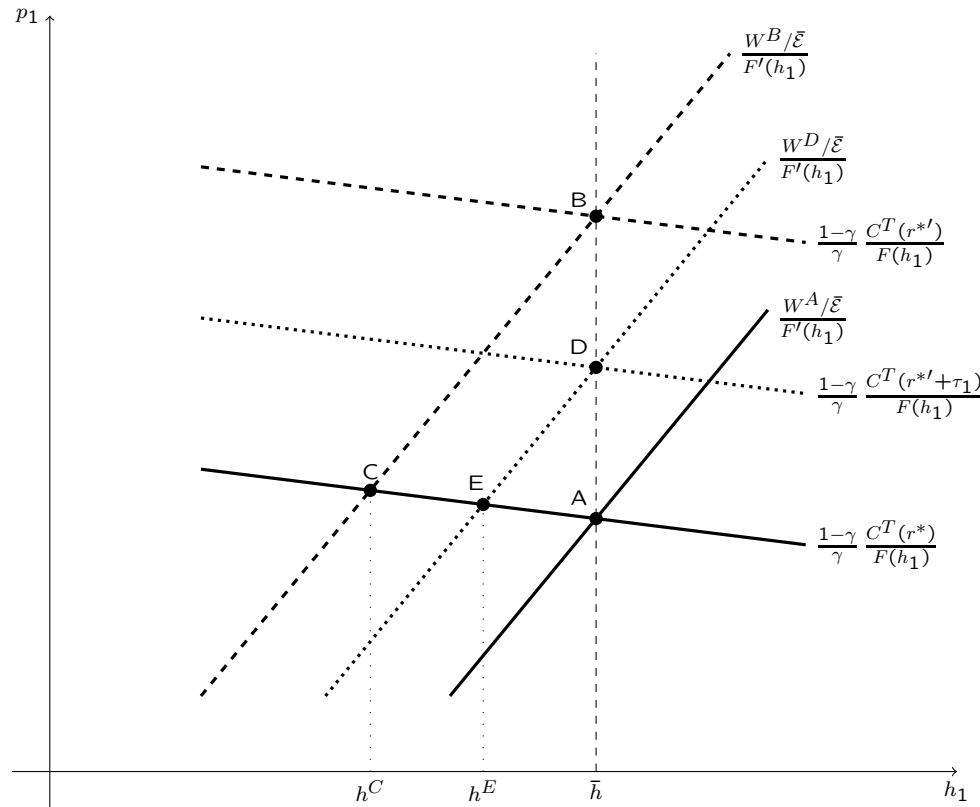
This tax raises the effective interest rate to $r^{*'} + \tau_1 \in (r^{*'}, r^*)$.

- So now the fall in the world interest rate shifts the demand schedule to the right but by less than under free capital mobility.

- The boom equilibrium with capital controls is at point D, where the wage and consumption of tradables are higher but lower than under free capital mobility ($W^D \in (W^A, W^B)$ and $C^T(r^{*'} + \tau_1) \in (C^T(r^*), C^T(r^{*'}))$).

- When the interest rate goes back to r^* , the government removes the capital control tax ($\tau_1 = 0$) so the equilibrium is at point E, where there is unemployment but less than under free capital mobility ($\bar{h} - h^E < \bar{h} - h^C$).

Capital Controls during a Boom-Bust Cycle in a Peg



The boom-bust dynamics under free capital mobility are identical to those shown in slide 5: the initial equilibrium is at point A. A fall in the interest rate from r^* to $r^{*'} < r^*$ moves the equilibrium to point B, where wages and consumption of tradables are higher ($W^B > W^A$ and $C^T(r^{*'}) > C^T(r^*)$). When the interest rate goes back to r^* , the equilibrium shifts to point C, where there is unemployment in the amount $\bar{h} - h^C$. During the boom, the government imposes a capital control tax τ_1 , which raises the effective interest rate to $r^{*'} + \tau_1 \in (r^{*'}, r^*)$. The fall in the interest rate shifts the demand schedule to the right but by less than under free capital mobility. The equilibrium is at point D, where the wage and consumption of tradables are higher but lower than under free capital mobility ($W^D \in (W^A, W^B)$ and $C^T(r^{*'} + \tau_1) \in (C^T(r^*), C^T(r^{*'}))$). When the interest rate goes back to r^* , the government removes the capital control tax ($\tau_1 = 0$), and the equilibrium is at point E, where there is unemployment but less than under free capital mobility ($\bar{h} - h^E < \bar{h} - h^C$).

Macroprudential Capital Controls as Second Best Policy

The figure suggests that applying capital controls during the boom phase of a boom-bust cycle can be beneficial because, by curbing the rise in nominal wages during the boom, they reduce the size of involuntary unemployment in the bust.

Because they are applied during the boom phase, this type of capital control policy is called macroprudential.

Although beneficial, macroprudential capital controls do not achieve the best possible allocation for two reasons:

- (1) some unemployment remains during the bust. And
- (2) By altering the interest rate perceived by households from $r^{*'} to $r^{*'} + \tau_1$, they distort the intertemporal allocation of consumption of tradables, C_1^T and C_2^T .$

Thus, compared to other possible policies (e.g., a floating exchange rate), macroprudential capital controls represent a second-best policy.

First-Best Policies

Next, we analyze policies that can achieve the first-best allocation:

- Full employment
- No distortions in the intertemporal allocation of consumption.

The motivation behind this class of policies starts by recognizing that the problem with currency pegs is that because of DNWR, the real wage W_t/\mathcal{E}_t becomes downwardly rigid during contractions.

So, first-best policies consist in applying taxes or subsidies that incentivize employment or the production or consumption of goods that use labor intensively.

These type of policy have two disadvantages: (1) unlike capital controls, they are not easy to implement in practice (requires congress approval); and (2) they can be deflationary.

Fiscal Devaluations

It consists of a wage subsidy.

Suppose that the government pays a fraction s_t of the firm's wage bill in period $t = 1, 2$. Then, profits are given by

$$\Pi_t = P_t^N F(h_t) - (1 - s_t)W_t h_t. \quad (1)$$

After dividing by \mathcal{E}_t and rearranging, the optimality condition is

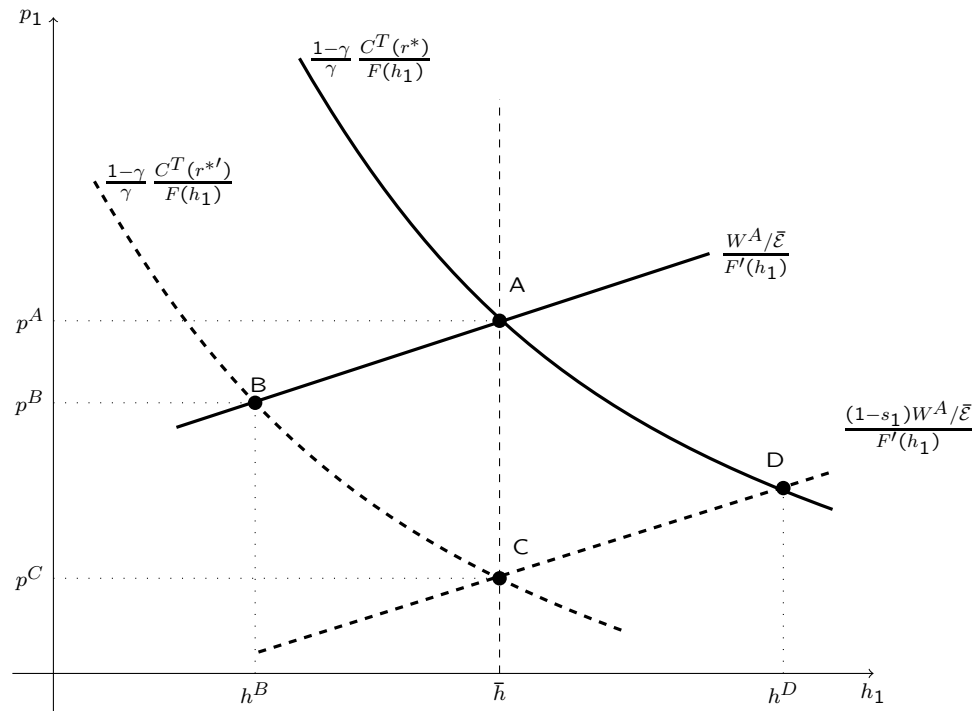
$$p_t = \frac{(1 - s_t)(W_t/\mathcal{E}_t)}{F'(h_t)}. \quad (2)$$

From the point of view of a nontraded goods producer, given p_t , a wage subsidy is identical to a decline in the wage or to a devaluation. So an increase in s_t shifts the supply schedule down and to the right.

The wage subsidy does not change the position of the demand schedule.

The figure on the next slide depicts the optimal use of a wage subsidy. Read the note to the figure.

A Fiscal Devaluation in the TNT-DNWR Economy



The figure shows the effect of a wage subsidy in the adjustment to an interest rate hike in the TNT-DNWR economy with a fixed exchange rate. Initially, the world interest rate is r^* , and the equilibrium is at point A. When the interest rate increases to $r^{*'} > r^*$, the demand schedule shifts down and to the left. The new equilibrium without a subsidy is point B and features involuntary unemployment. The wage subsidy, $s_1 > 0$, shifts the supply schedule down and to the right and leaves the demand schedule unchanged. The equilibrium with the subsidy is point C, where full employment is restored and the price of nontradables is lower, $p^C < p^B$.

Summary of Fiscal Devaluations

- A fiscal devaluation reduces the marginal cost perceived by firms.
- It's a labor subsidy to firms that shifts the supply schedule to the right.
- In response to external shocks, it restores full employment without distorting the intertemporal allocation of consumption.
- The larger the negative external shock is, the larger the required labor subsidy will be.
- Similarities with a currency devaluation: same fall in the real wage faced by firms, same depreciation of the real exchange rate. same level of employment, no intertemporal distortions.
- Differences: it is more difficult to implement. It can cause core deflation.
- It must be removed when the recession is over, otherwise it piles up.
- It can alternatively be implemented via a production subsidy or a consumption subsidy to labor intensive goods.

Higher Inflation in a Monetary Union

The central bank of a monetary union can assist its member countries in a sudden stop by creating union-wide inflation.

Suppose that the foreign price, P_t^{T*} , can change by the action of the union's central bank.

The supply schedule becomes

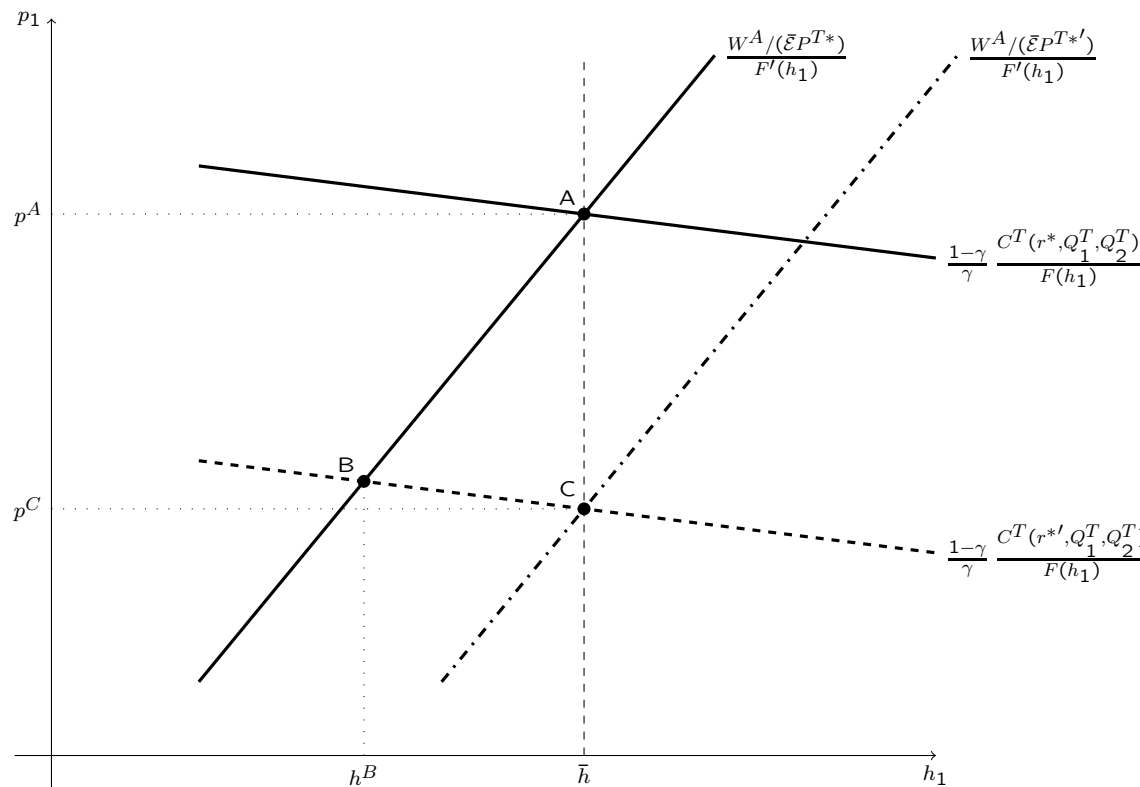
$$p_1 = \frac{W_1 / (\bar{\mathcal{E}} P^{T*})}{F'(h_1)}.$$

So union-wide inflation ($P_t^{T*} \uparrow$) shifts the supply schedule to the right.

If $B_0 = 0$, the demand schedule is unaffected.

Thus, union-wide inflation is like a devaluation. The next figure illustrates how it can help in a sudden stop.

Adjustment to an Interest Rate Shock with Union-Wide Inflation



The initial equilibrium is at point A, where the external price is P^{T*} , the wage is W^A , the exchange rate is fixed at $\bar{\epsilon}$, and there is full employment. The increase in r^* shifts the demand schedule down and to the left. Then, the monetary authority increases the price level to $P^{T*'}$ $>$ P^{T*} , which shifts the supply schedule down and to the right. The new equilibrium is at point C, where full employment is preserved and the real exchange rate depreciates ($p_1 \downarrow$).

Higher Union-Wide Inflation (continued)

For countries that are net external debtors ($B_0 < 0$) union-wide inflation can have an additional expansionary effect via a reduction of the real value of net external liabilities.

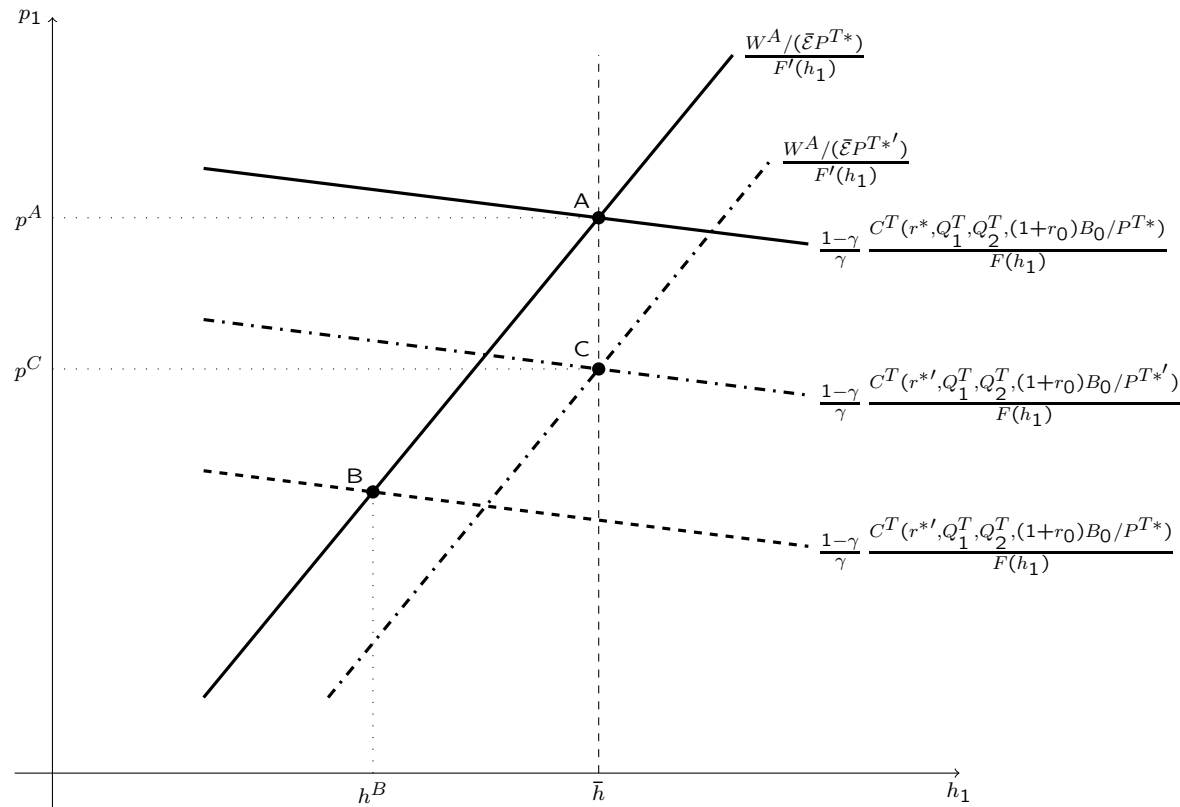
With $B_0 \neq 0$, the demand for tradable goods becomes

$$C_1^T = C^T(\underbrace{r^*}_{-}, \underbrace{Q_1^T}_{+}, \underbrace{Q_2^T}_{+}, \underbrace{(1+r_0)B_0/P^{T*}}_{+}).$$

So if $B_0 < 0$, an increase in P^{T*} , shifts the demand schedule up and to the right.

The next slide illustrates this effect.

Adjustment to an Interest Rate Shock with External Inflation and Initial Debts



The initial equilibrium is at point A, where the wage is W^A , the exchange rate is fixed at $\bar{\epsilon}$, and the external price level is P^{T*} . Absent policy intervention, an increase in r^* to $r^{*'}$ moves the equilibrium to point B. Now the union's central bank increases P^{T*} to $P^{T*'}$, which shifts the demand schedule up and to the right (downward-sloping dash-dotted line) and the supply schedule down and to the right (upward-sloping dash-dotted line). The new equilibrium is at point C.

The Boom-Bust Cycle in Peripheral Europe, 2000–2011

- We started by analyzing boom-bust cycles from the theoretical perspective of the TNT-DNWR model. These dynamics are depicted in the figure in slide 5.
- To see if those predictions are empirically plausible, we close by looking at an actual boom-bust cycle, the one in peripheral Europe around the global financial crisis of 2007 (see the next figure).
- The euro was introduced in 1999 and replaced the currencies of the country members, so the German mark, the Italian lira, the French franc, the Spanish peseta, etc. all disappeared.
- So in effect all countries in the monetary union (colled the euro-zone) adopted a currency peg vis-à-vis the other member countries at a 1-for-1 exchange rate.

The Boom

The eurozone started with a boom driven by optimistic foreign creditors. So large current-account deficits took place (top left panel).

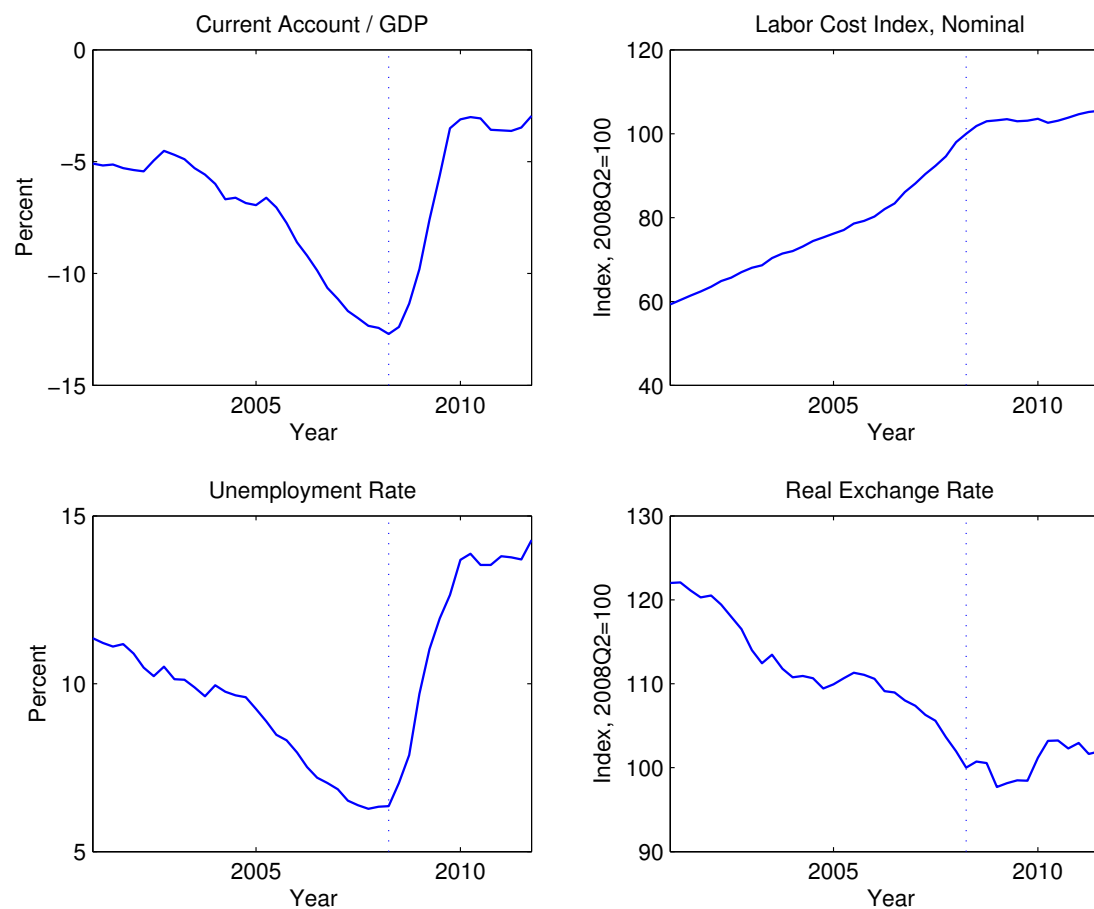
- The boom was accompanied by a sharp increase in nominal wages (top right panel), a significant fall in unemployment (bottom left panel), and a large real exchange rate appreciation (bottom right panel).
- This is similar to what happens in the TNT-DNWR model, when the equilibrium moves from point A to point B in the figure of slide 5.

The Bust

- The boom came to an abrupt end with the onset of the global financial crisis, as foreign investors suddenly stopped extending credit (a sudden stop).
- The current account experienced a sharp reversal. (top left panel) Nominal wages, however, remained as high as at the peak of the boom. Though the real exchange rate depreciated, it did not return to its pre-boom level.

- Viewed through the lens of the TNT-DNWR model, the observed contraction in the eurozone corresponds to the move from point B to point C in the figure of slide 5.

Boom-Bust Cycle in Peripheral Europe, 2000–2011



Notes. Arithmetic mean of Bulgaria, Cyprus, Estonia, Greece, Ireland, Lithuania, Latvia, Portugal, Spain, Slovenia, and Slovakia. The vertical line indicates the beginning of the recession in 2008Q2. Data Source: Eurostat.

Summing Up

In the presence of nominal rigidity and free capital mobility, the exchange rate can be a powerful tool to stabilize aggregate activity and prices over the business cycle. When the central bank pegs the currency, it gives up this tool. This chapter analyzes alternative stabilization policies that can substitute for the loss of monetary autonomy.

- In a currency peg, a positive external shock can be a Trojan horse. When the economy expands, the real wage goes up. Once the boom is over, the real wage must fall to equilibrate the labor market. The combination of downward nominal wage rigidity and a fixed exchange rate makes the real wage downwardly rigid, giving rise to involuntary unemployment. This is called a boom-bust cycle.
- Downward nominal wage rigidity and a currency peg combined produce an externality, originating in the fact that individual agents fail to internalize that capital inflows in the expansionary phase of the business cycle push wages up, placing the economy in a vulnerable position to adjust in the contractionary phase of the cycle.
- Capital controls can help reduce the amplitude of the business cycle in economies with a currency peg.
- Capital controls must be raised during booms and lowered during contractions, to reduce the volatility of capital inflows. This type of preemptive policy is called macroprudential, as it acts before the economy enters a downturn.

Summing Up (continued)

- Capital controls do not achieve the first-best allocation, as they represent a trade-off between reducing unemployment and hindering the free flow of capital. For this reason, they are known as second-best instruments.
- One advantage of capital controls is that they are relatively easy to change over the business cycle.
- Labor subsidies or cuts in labor taxes can also be used to stabilize an economy subject to a currency peg and free capital mobility. An increase in a labor subsidy acts as a devaluation, as it lowers the labor cost of firms.
- Because changes in labor subsidies (labor taxes) mimic changes in the exchange rate, they are called fiscal devaluations.
- Unlike capital controls, labor subsidies (taxes) do not hinder the free flow of capital.
- Appropriate movements in labor subsidies (taxes) can achieve the first best allocation—namely, full employment and an efficient intertemporal allocation of resources.

Summing Up (concluded)

- Labor subsidies (labor tax cuts) are politically easy to pass but difficult to remove. In addition, they require parliamentary approval, which is often slow. These issues render fiscal devaluations impractical for stabilization purposes, as the optimal policy requires introducing subsidies (tax cuts) during recessions and removing them during booms. This might explain why fiscal devaluations are not commonly observed in practice.
- In a currency union, all members use the same currency as legal tender. For this reason, from the perspective of a member country, a currency union can be thought of as a currency peg in which the exchange rate is fixed at 1.
- An increase in union-wide inflation acts as a devaluation, because it increases the price of the internationally traded good.
- For this reason, union-wide inflation can reduce unemployment in member countries hit by negative external shocks.
- The 2000-2011 boom-bust cycle in the periphery of the eurozone (Ireland, Spain, Portugal, Greece, the Baltics, etc.) shares a number of features with the boom-bust cycle predicted by the TNT-DNWR model: Current account deficits, rising real wages, expansions in consumption and employment, and real exchange rate appreciation during the boom phase and a current account reversal, failure of real wages to decline, a collapse in consumption, and unemployment during the contractionary phase.