Monetary Systems and Macro Policy

Lecture Slides for KOMIE Ch19 (KOMIF Ch8)

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Preview

1. Overview of the goals of macroeconomic policy.
2. Implications of persistent current account deficits.
3. Varieties of monetary standards
   - Gold standard
   - International monetary system during 1918-1939
   - Bretton Woods system: 1944-1973
   - Collapse of the Bretton Woods system
4. International effects of macroeconomic policies.
5. Problems of macro policy coordination

Macroeconomic Goals

Internal Balance:

- efficient and sustainable use of domestic resources

External Balance:

- efficient and sustainable economic relations with other economies

Internal Balance

Internal Balance

- full employment (Y_f)
- price stability or low inflation

Deviations from Internal Balance

unemployment:

- resource waste
- other social costs (crime, health)

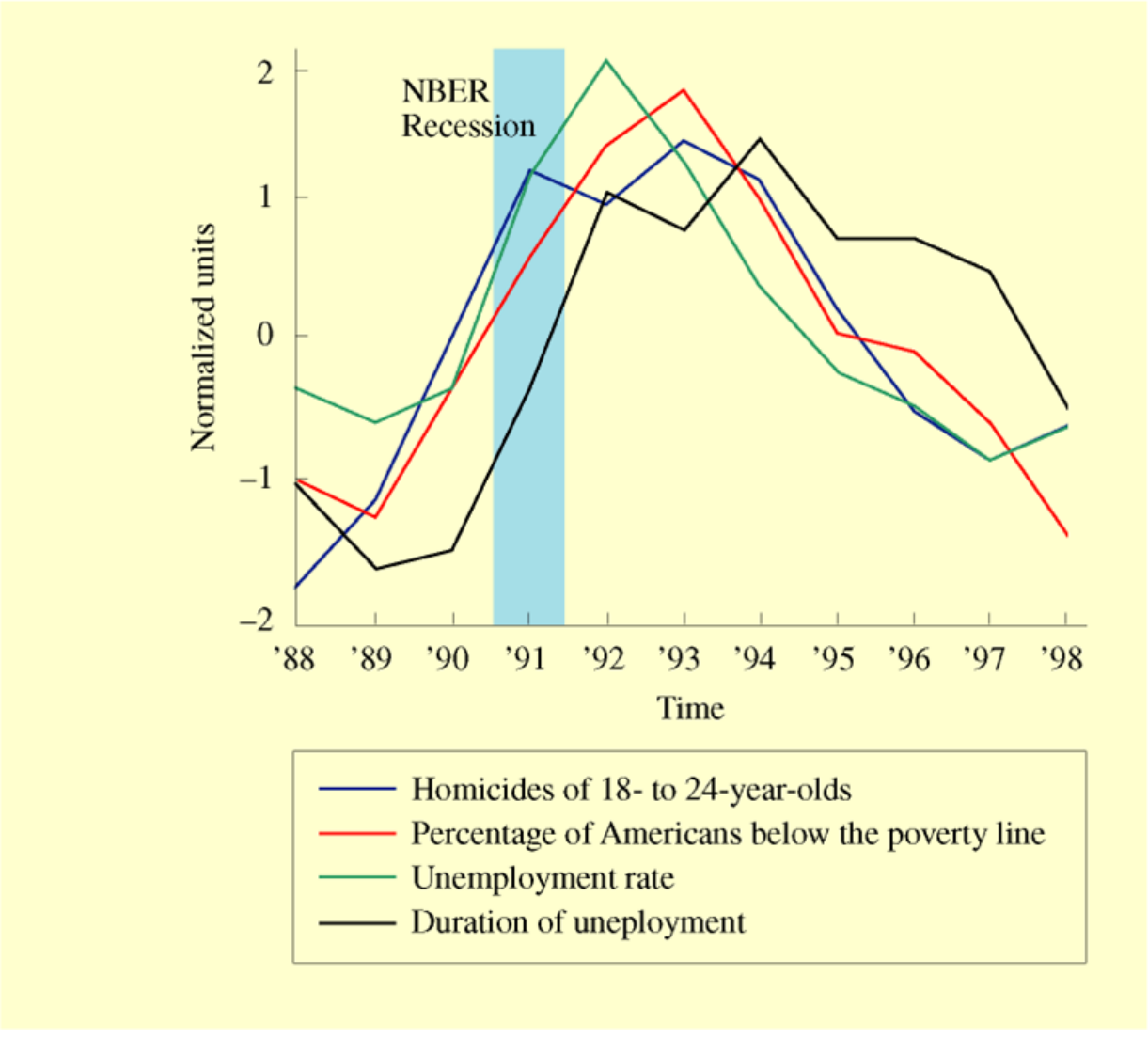
overemployment:

- unsustainable
- creates inflationary pressure
- variable inflation $\rightarrow$ - reduces value of price signals - complicates planning by households and businesses

unanticipated Inflation:

- redistributes income
  - from creditors to debtors
  - from workers to employers

Costs of Recession



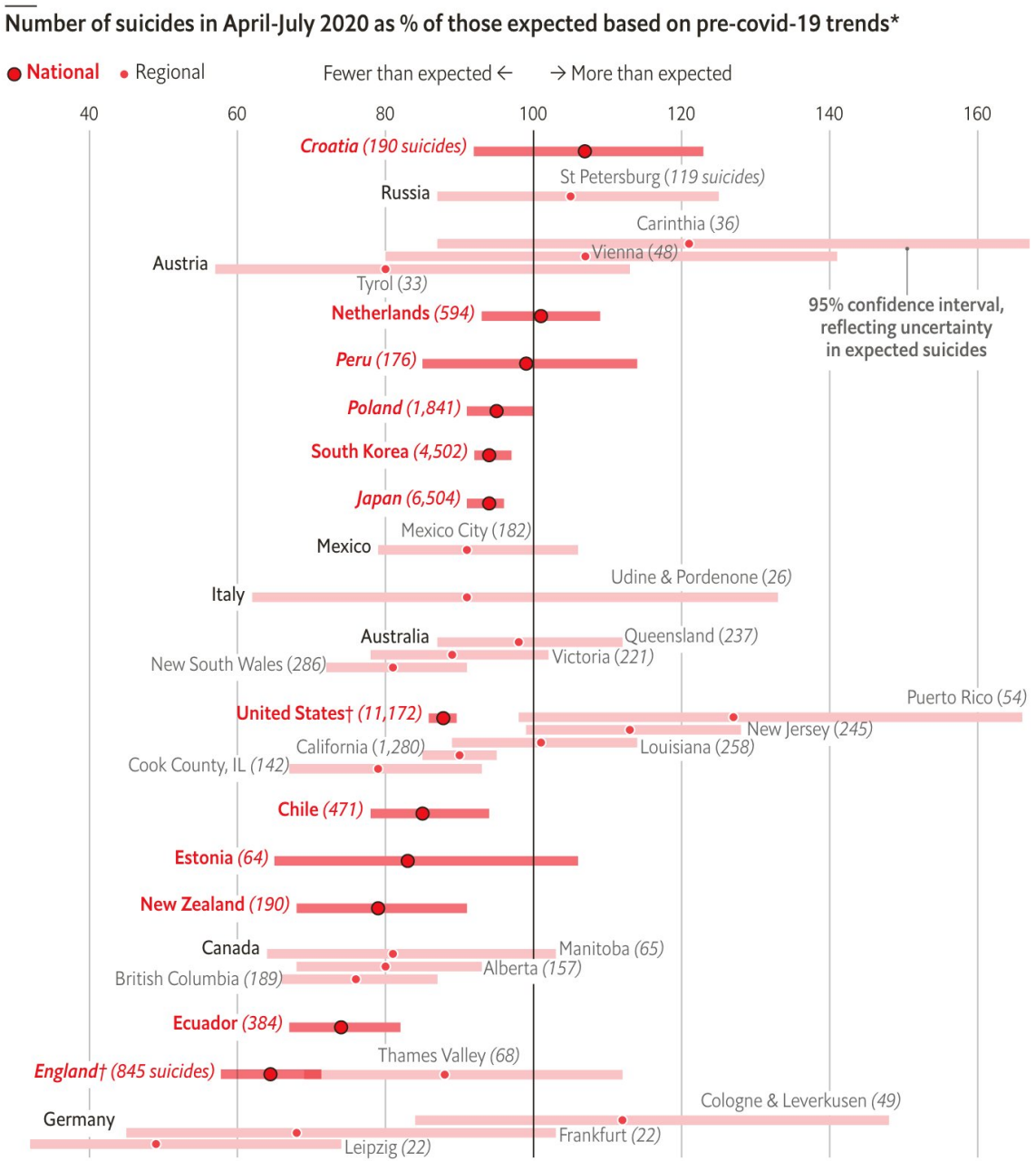
Suicide and the Great Recession

- sharp increase in middle-aged suicides around 2007
  http://www.sciencedirect.com/science/article/pii/S074937971400662X
- middle-aged suicide reasons: job, financial, and legal problems
- Great Recession is associated with at least 10000 additional economic suicides between 2008 and 2010.
  http://connection.ebscohost.com/c/articles/98001212/economic-suicides-great-recession-europe-north-a
- austerity measures imposed in Greece in 2011 "marked the beginning of significant, abrupt and sustained increases in total suicide."
  http://bmjopen.bmj.com/content/5/1/e005619.short?g=w_open_current_tab

Suicide and the Covid-19 Pandemic

Suicide rates do *not* appear to have risen during the covid-19 pandemic.
https://www.hopkinsguides.com/hopkins/view/Johns_Hopkins_Psychiatry_Guide/787393/all/Suicide_Risk_in_the_COVID_19_Pandemic
(However, violent crime did spike.)

Suicide and the Covid-19 Pandemic (cont.)



Internal Balance: The II Curve

- Suppose internal balance in the short run occurs when D=Yf

$$Yf = C[Y^f - T] + I + G + CA[EP*/P, Y^f - T]$$

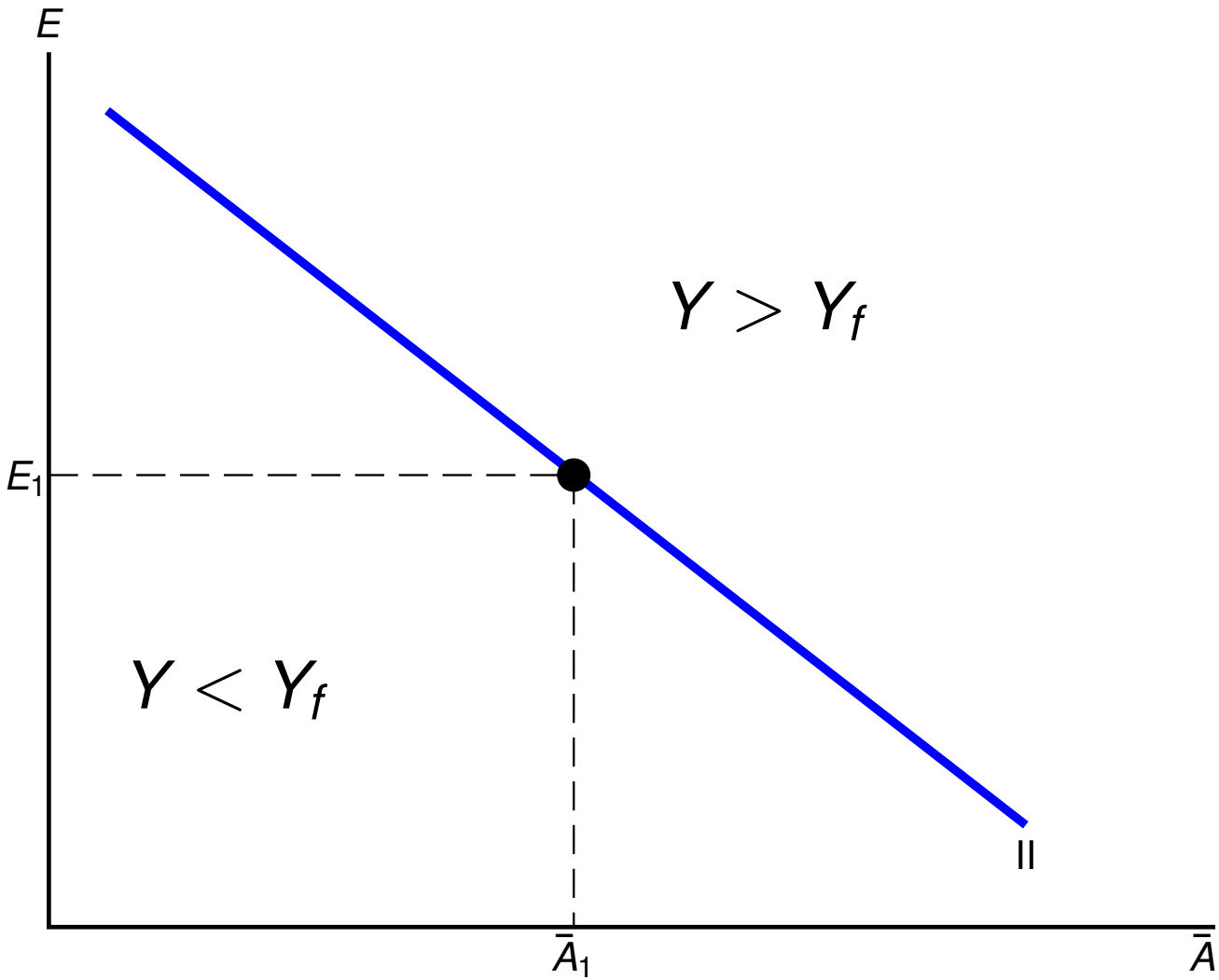
Consider a fiscal expansion starting at Y=Yf:

- ↑G (or ↓Tx) → ↑D → (Y>Yf)
- ↓E could restore internal balance in the short run
- the II curve slopes down in $(\bar{A}, E)$-space

Here $\bar{A}$ is exogenous aggregate demand. In particular, think of autonomous government expenditure (G).

Internal Balance: The II Curve

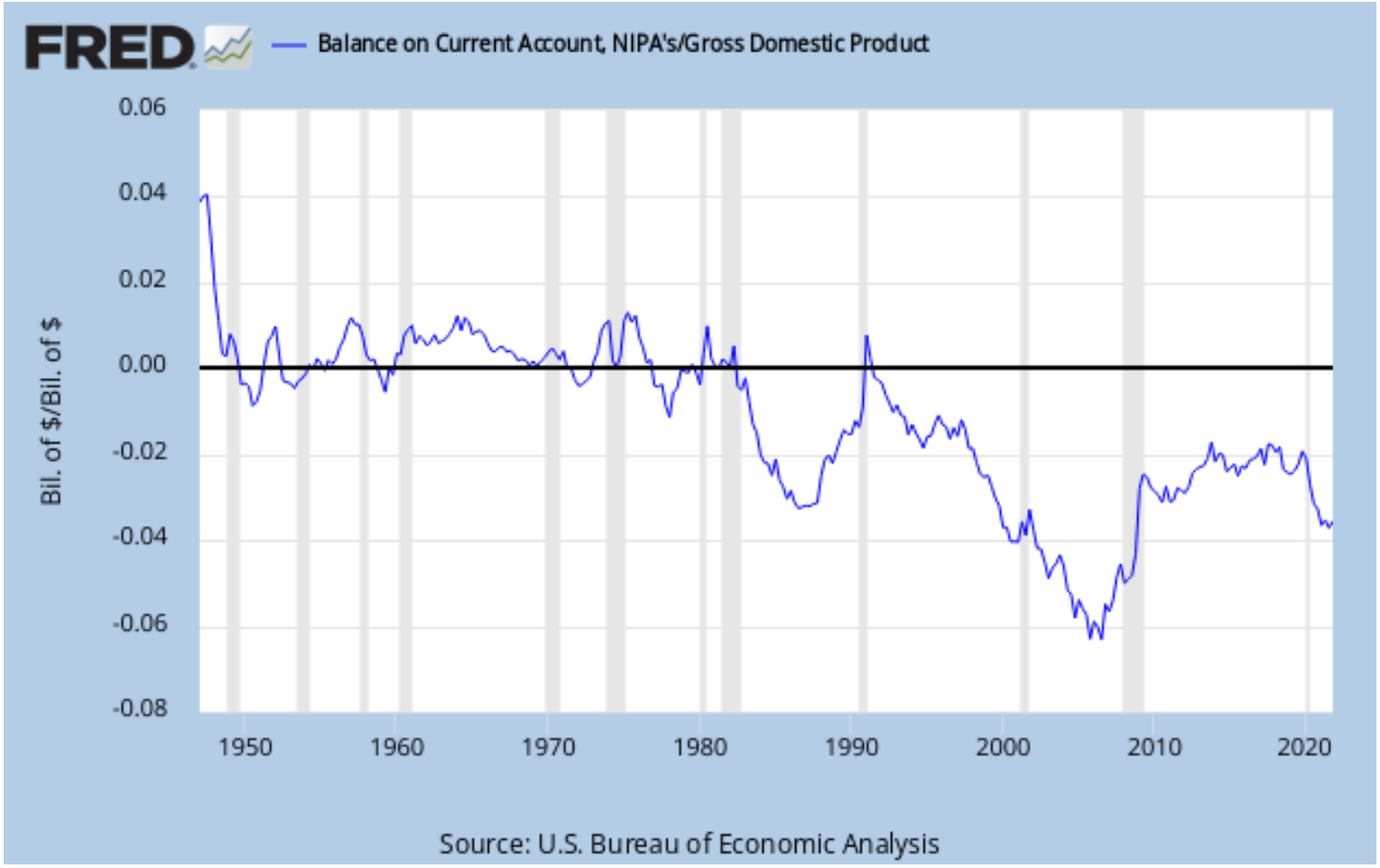
Internal balance *need not* occur at eqilibrium!



External Balance

- current account in “normal” range
- balance of payments “equilibrium”
  - official international reserves static; current account (plus capital account) matches the non-reserve financial account

U.S. Current Account (CA/GDP)



Source: `https://fred.stlouisfed.org/graph/fredgraph.png?g=KSar`

Possible Benefits of Nonzero Current Accounts

gains to intertemporal trade:

current account deficit may be cushioning a temporary negative shock

current account surplus may be finding more productive uses abroad for savings

Political Costs of Deviations from External Balance?

large CA surplus may induce protectionist sentiment abroad

large CA deficit may induce protectionist sentiment at home

creates questions of solvency if sustained

- creditors cease lending
- financial crisis

External Balance: The XX Policy Curve

- Suppose external balance in the short run occurs when CA = X (e.g., CA=0)

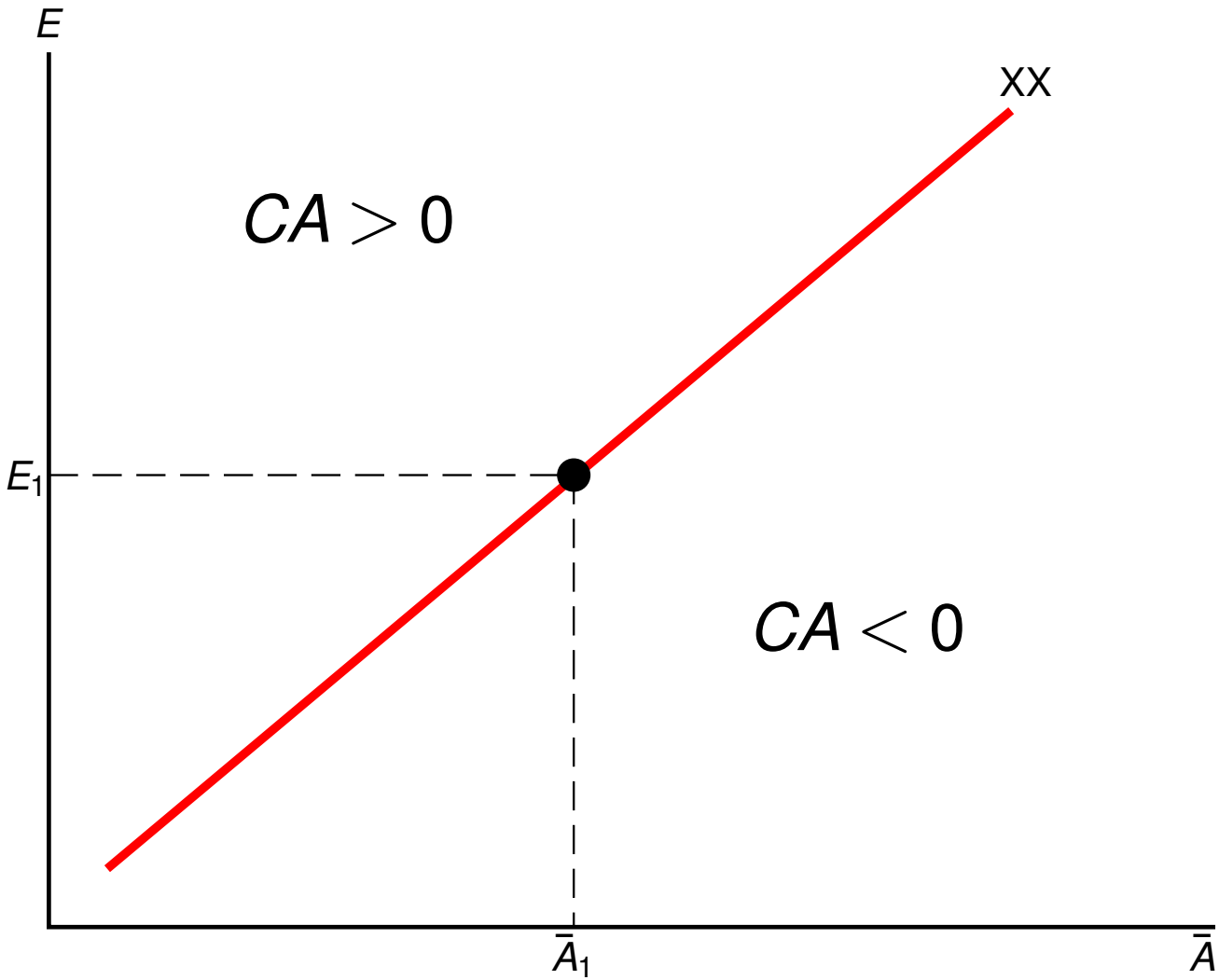
$$CA[EP^*/P, Y - T] = X$$

Consider a fiscal expansion starting at CA=X:

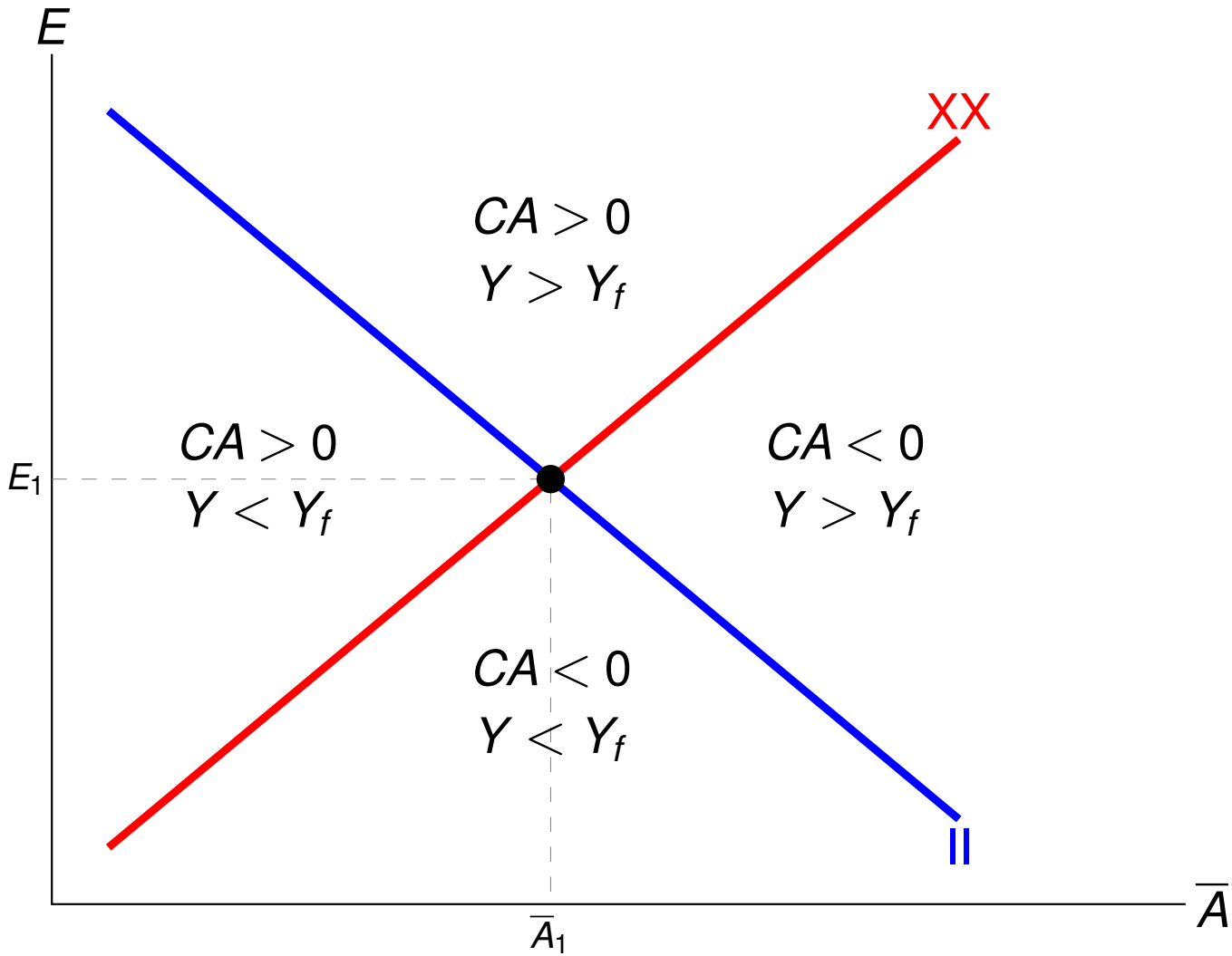
- ↑G (or ↓Tx) → ↑D → ↑Y → ↓CA
- ↑E could restore external balance in the short run
- the XX curve slopes up in $(\bar{A}, E)$-space

External Balance: The XX Curve

External balance *need not* occur at eqilibrium!



Four Zones of "Economic Discomfort"



Compare KOMIE Fig 19-2 (KOMIF Fig 8-2).

Tinbergen's Rule

Tinbergen's Rule Consistent, determinate policy systems require an equal number of targets and instruments

- reflects a mathematical fact
  - for a (linear, independent) equation system to have a unique solution.
- need an equal number of variables and equations

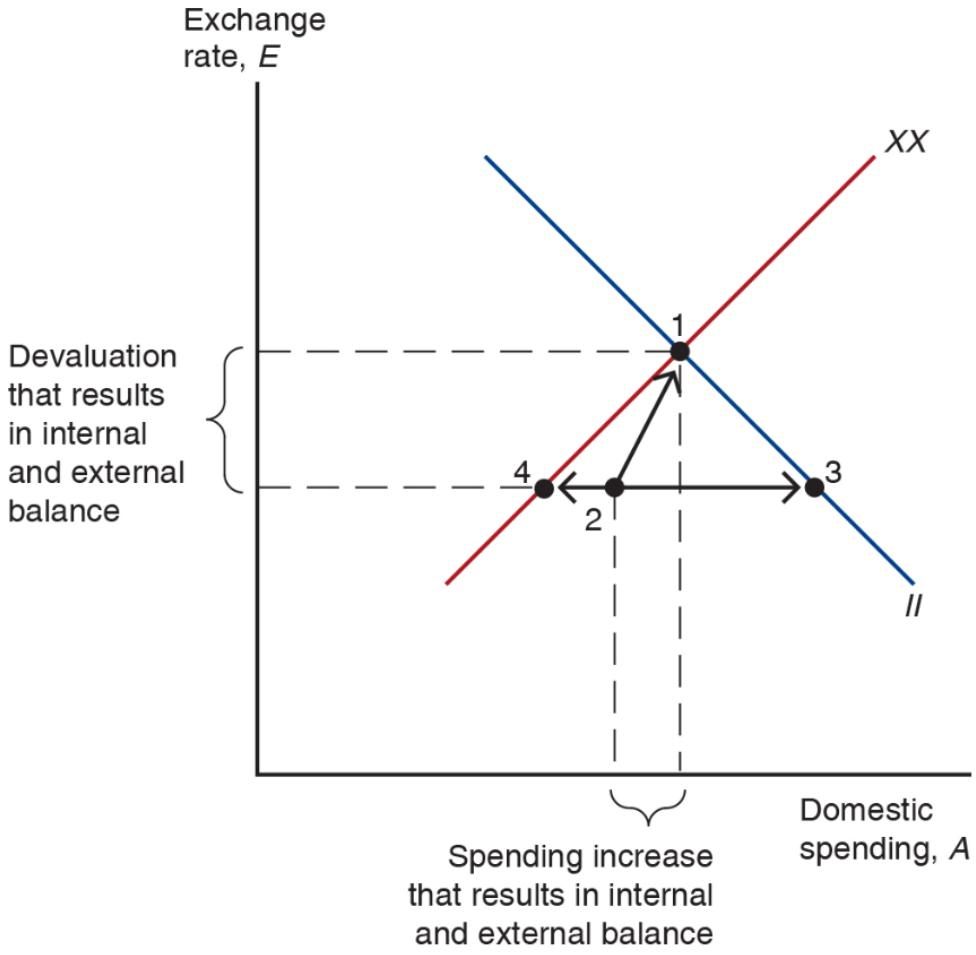
Macroeconomic Goals (cont.)

Rules of the Bretton Woods system:

- fixed exchange rates
- infrequent devaluations
- fiscal policy the main policy tool to achieve both internal and external balance.

But in general, **expenditure changing** (fiscal policy) can not pursue both internal balance and external balance at the same time. However, **expenditure switching** (a devaluation) can pursue both internal balance and external balance at the same time.

Policies to Bring About Internal and External Balance

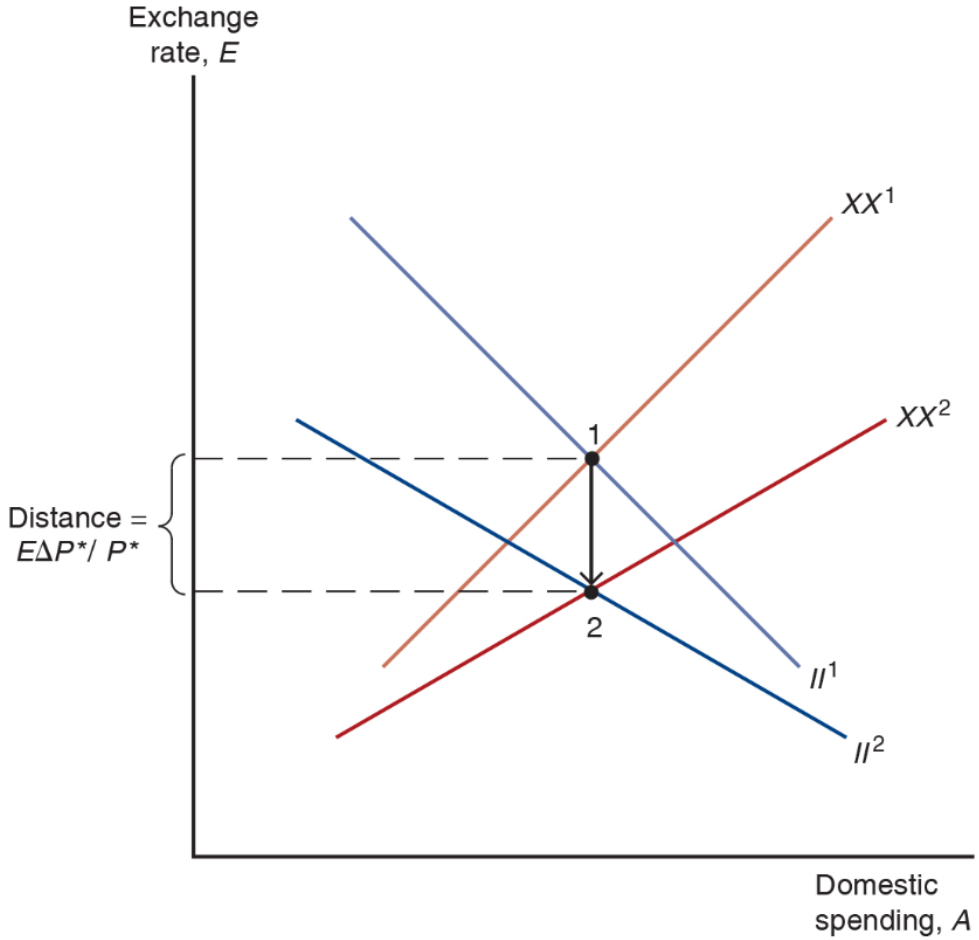


At point 2, the economy is below II and below XX: it experiences low output and a low current account

Compare KOMIE Fig 19-3 (KOMIF Figure 8-3)

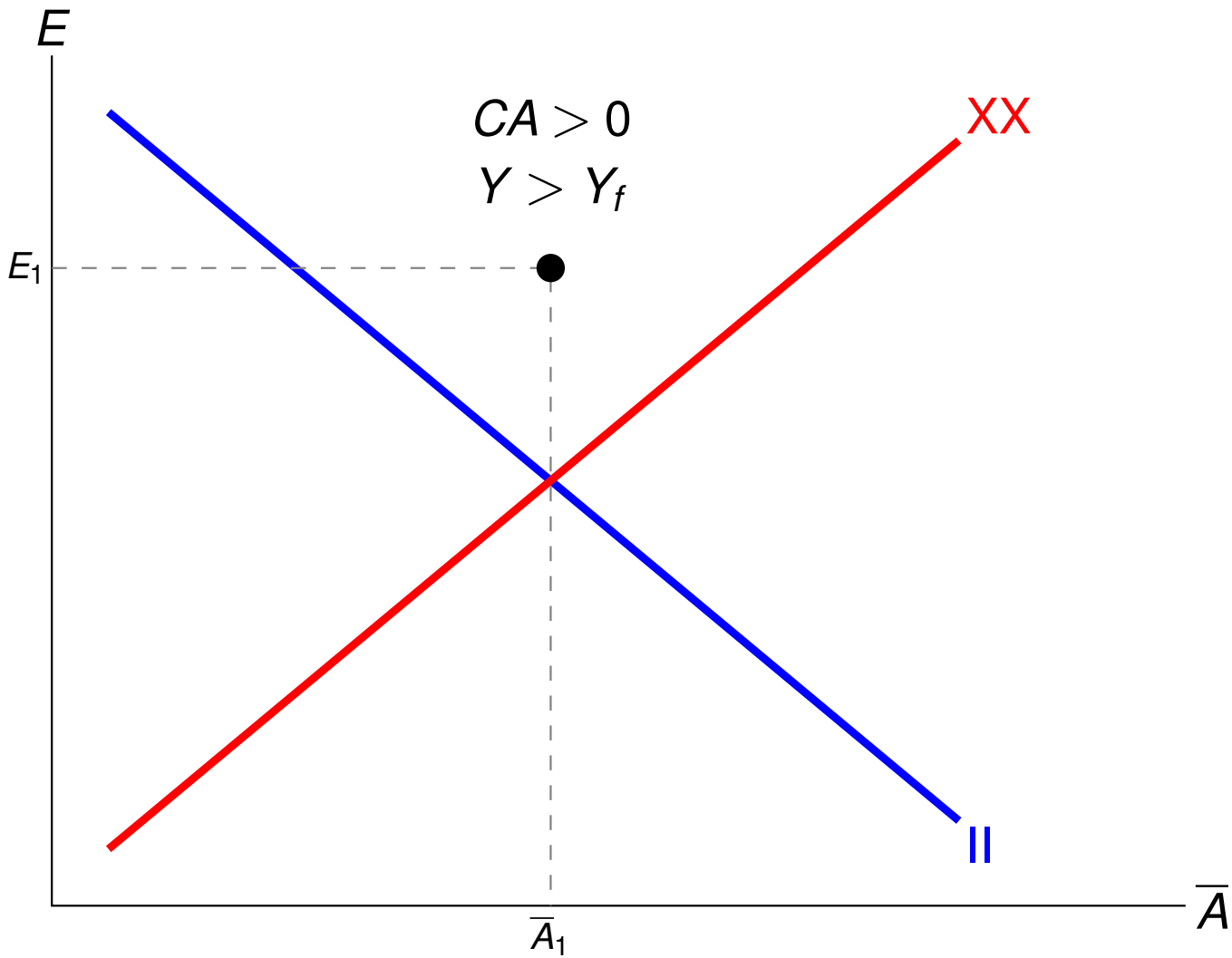
Rise in the Foreign Price Level, P*

Effect on internal and external balance:



Compare KOMIE Fig 19-4 (KOMIF Figure 8-4)

Fixed E $\rightarrow$ Rise in P* Creates Price Pressure



Dilemmas and Trilemmas

Triffin's Dilemma

1960 Robert Triffin testifies before US Congress

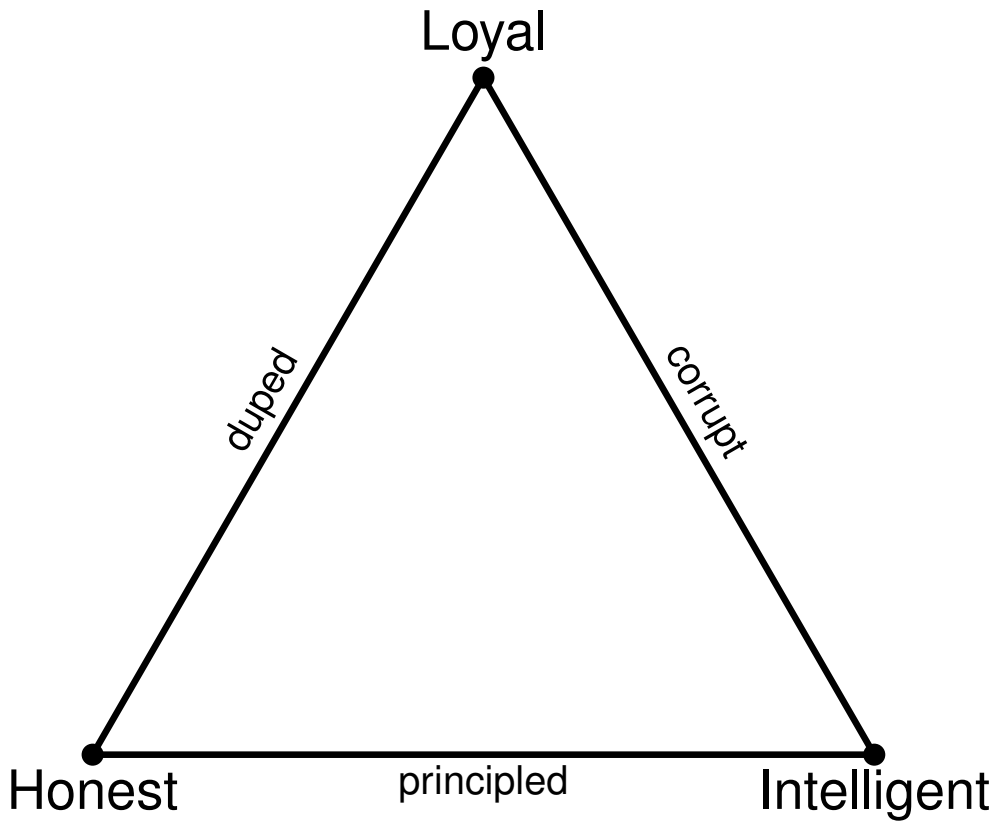
- US stops BoP deficit
  - $\rightarrow$ other countries lose largest source of additional reserves
  - $\rightarrow$ resulting shortage of internatonal liquidity
  - $\rightarrow$ could pull the world economy into contraction
  - $\rightarrow$ undermine system
- US deficits continue
  - number of dollars will eventually exceed US gold stock
  - $\rightarrow$ erode confidence in the value of the U.S. dollar
  - $\rightarrow$ dollar no longer be accepted as the world's reserve currency
  - $\rightarrow$ undermine system

Famous Trilemmas

Famous Trilemmas: Project Management

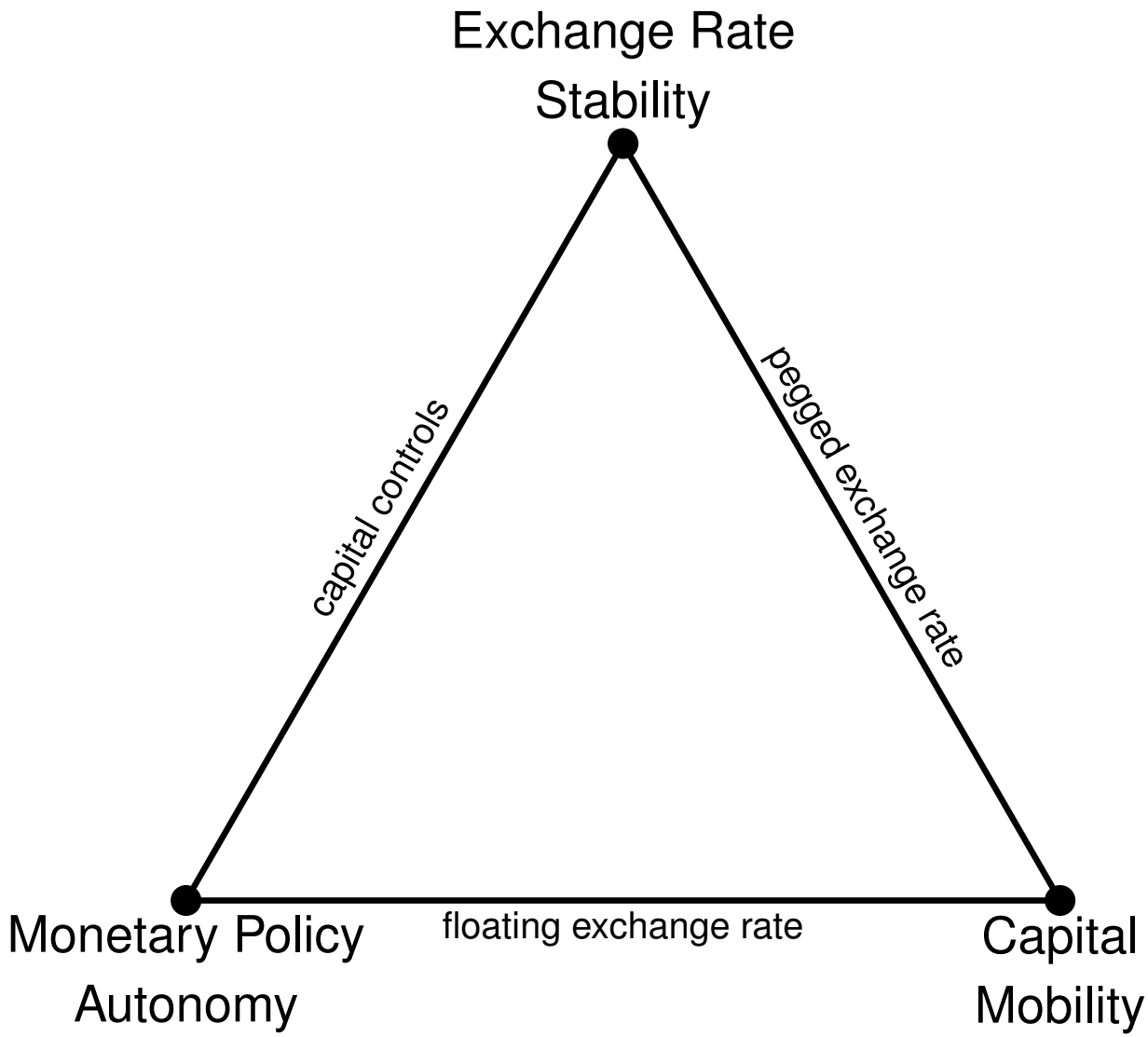
Source: Wikipedia

Famous Trilemmas: Political Personality



Žižek's trilemma of party politics.

Famous Trilemmas: Macro Policy



Compare: KOMIF 11 Figure 8-1.

International Capital Markets

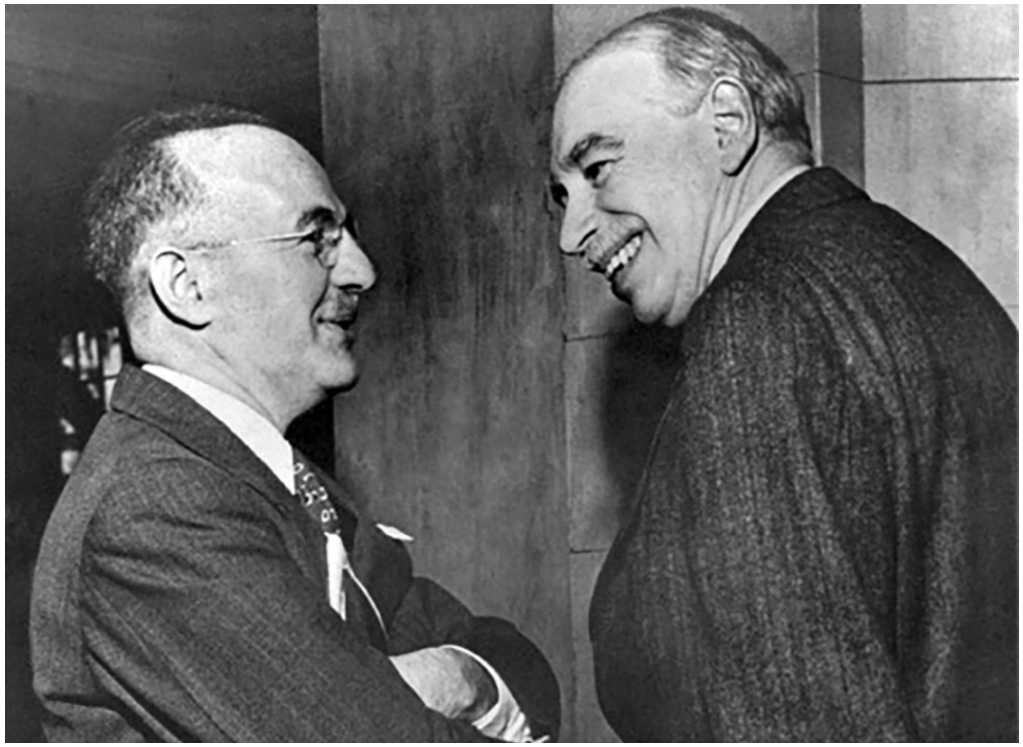
Because of highly liquid international capital markets, policy makers generally have a choice of 2 of the following 3 policies:

- A fixed exchange rate
- Monetary policy aimed at achieving domestic economic goals
- Free international flows of financial capital

International Capital Markets (cont.)

- A fixed exchange rate and an independent monetary policy can exist if restrictions on flows of assets prevent speculation and capital flight.
- An independent monetary policy and free flows of financial capital can exist when the exchange rate fluctuates.
- A fixed exchange rate and free flows of financial capital can exist if the central bank gives up its domestic goals and maintains the fixed exchange rate.

Collapse of Bretton Woods



Harry Dexter White (US) and John Maynard Keynes (UK)

Source: https://www.nationalww2museum.org/war/articles/1944-bretton-woods-conference

Collapse of the Bretton Woods System

Collapse often blamed on US imbalances in 1960s and 1970s.

- increased aggregate demand and output, rising inflation
  - Rapidly increasing government purchases due to Vietnam War
  - US dollar became over-valued in terms of gold and in terms of foreign currencies.
- US current account went into deficit in 1971.

Bretton Woods Collapse (cont.)

U.S. policy intransigence: not willing to reduce government purchases or increase taxes significantly, nor reduce money supply growth.

Reason for intransigence: These policies would have reduced aggregate demand, output and inflation, and increased unemployment.

- The U.S. could have attained some semblance of external balance at a cost of a slower economy.
- A devaluation, however, could have avoided the costs of low output and high unemployment and still have attained external balance (an improved current account and official international reserves).

Collapse of the Bretton Woods System (cont.)

Financial markets felt that the U.S. economy was experiencing *fundamental disequilibrium* so that a devaluation would be necessary. Speculation made the system of fixed exchange rates harder to maintain:

US imbalances led to

- speculation about the value of the USD
- corresponding imbalances for other countries
- flight into gold

Collapse of the Bretton Woods System (cont.)

Flight into gold:

- fears of dollar devaluation led speculators to buy large quantities of gold.
- $\rightarrow$ the Federal Reserve sold large quantities of gold in March 1968
- $\rightarrow$ closed markets afterwards.

Gold pool:

- individuals and private institutions were no longer allowed to redeem gold from the Federal Reserve or other central banks.
- The Federal Reserve would sell only to other central banks at \$35/ounce.

Even this arrangement did not hold . . .

Collapse of the Bretton Woods System (cont.)

Flight into foreign assets:

- fears of dollar devaluation led speculators to buy foreign assets.
- the U.S. devalued its dollar about 8% in terms of gold in December 1971 to $38/ounce.
  - coordinated devaluation with other BWS countries

Speculation about another devaluation: European central banks sold huge quantities of European currencies (i.e., bought dollars) in early February 1973, but closed markets afterwards.

Collapse and general float: Central banks in Japan and Europe stopped selling their currencies and stopped purchasing of dollars in March 1973.

Demand and supply of currencies pushed the value of the dollar downward.

Case for Floating Exchange Rates: Four Claims

Four major claims favoring floating exchange rates:

- monetary policy autonomy
- symmetry (all players are equal, vs. e.g. Bretton Woods)
- swift and automatic stabilization (vs. e.g., relative price adjustment via P)
- avoidance of large CA imbalances

We will consider these in turn.

Monetary Policy Autonomy

Under Bretton Woods, countries (except the US) gave up the ability to conduct independent monetary policy.
This is the cost of fixed exchange rates when capital can flow.
One response was: capital controls.
But in 1960s many countries felt that to avoid importing inflation from the US they would need to revalue.
Solution: float E, and rely on it to maintain PPP.

Symmetry

Under Bretton Woods, the US had a unique position.

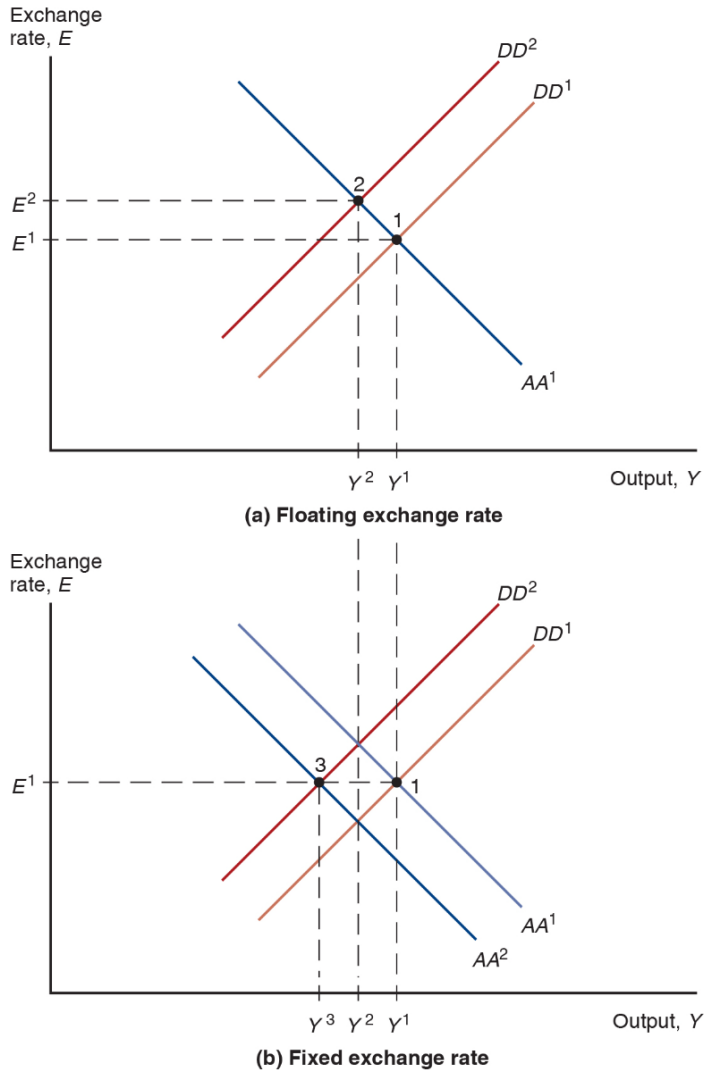
- the dollar had a key role as the reserve currency
- other countries could change their parity against the dollar (in principle, under fundamental diseq), but the US could not move the dollar parity against another currency

Floating avoided this asymmetry and let markets not governments determine exchange rates.

Automatic Stabilization

Floating exchange rates were believed to at least partially insulate countries against certain kinds of foreign shocks.
We will illustrate the effects of a temporary fall in export demand, but the insulation is even larger for a permanent fall.

Automatic Stabilization: Effects of a Temporary Fall in Export Demand



Compare KOMIE Fig 19-5.

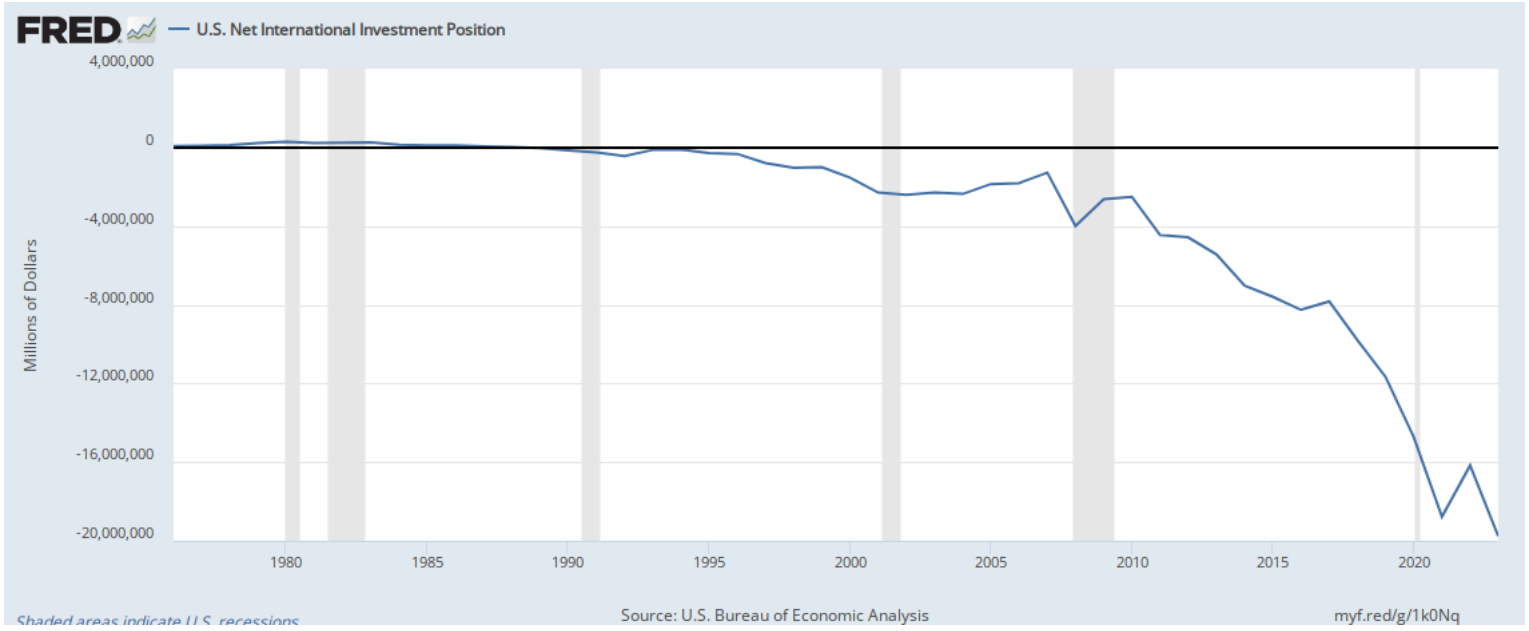
Avoid Large CA Imbalances

It was also believed that floating would avoid large CA imbalances.
For example, suppose capital is immobile and E moves to balance CA.
But in the real world, capital is highly mobile, and large CA imbalance persist even with floating E.

Net International Investment Position (IIP)

Abbreviated NIIP or just IIP.

U.S. IIP



Source: FRED (`https://fred.stlouisfed.org/graph/fredgraph.png?g=1k0Nq`)

Net International Investment Position (IIP)

BEA Release: `http://www.bea.gov/data/intl-trade-investment/international-investment-position`

IIP and Total National Income (Y)

Recall: we have mostly ignored primary income, which is part of GNP.

Recall: national income as measured in the BoP accounts includes "primary income" (net factor income from abroad).

Simplification: focus on investment income (and ignore other primary income, such as remittances).

Let r be the rate of return on the net international investment position (IIP).

$$Y = \text{GDP} + r \cdot \text{IIP}$$

IMF Definition of Primary Income: `https://www.imf.org/external/pubs/ft/bop/2014/pdf/BPM6_13F.pdf`

Three Simplifications

In an attempt to simplify for now:

- focus on investment income (and ignore other primary income, such as remittances).
- Ignore capital gains and losses (so Δ IIP is due to the CA).
- Ignore changes in the interest rate.
- Ignore changes in the growth rate of GDP.

Even with these simplifications, the algebraic analysis will be a bit complicated.

Absorption Approach to Current Account

Revisit the **absorption approach** to the current account.

$$\begin{aligned}
\mathrm{CA} &= Y - A \\
&= \underbrace{\mathrm{GDP} + r \cdot \mathrm{IIP}}_{\mathrm{Y}} - \underbrace{(C + I + G)}_{\mathrm{A}} \\
&= \underbrace{\mathrm{GDP} - (C + I + G)}_{\text{net exports}(\mathrm{NX})} + r \cdot \mathrm{IIP}
\end{aligned}$$

Here: Y is GNP, and NX is net exports of goods and services. So we can decompose the current account into two components:

$$\mathrm{CA} = \mathrm{NX} + r \cdot \mathrm{IIP}$$

- the "balance of trade" (net exports of goods and services)
- "primary income" (here, just net investment income from abroad)

Intertemporal Budget Constraint

Recall from previous slides:

$$\mathrm{CA}_t = \mathrm{NX}_t + r \cdot \mathrm{IIP}_t$$

In the absence of valuation changes, CA determines change in IIP

$$\begin{aligned} \mathrm{IIP}_{t+1} - \mathrm{IIP}_t &= \mathrm{CA}_t \\ &= \mathrm{NX}_t + r \cdot \mathrm{IIP}_t \end{aligned}$$

$$\mathrm{IIP}_{t+1} = (1 + r)\mathrm{IIP}_t + \mathrm{NX}_t$$

Adjacent Periods

We have found a relationship between any two adjacent periods:

$$\mathrm{IIP}_{t+1} = (1+r)\mathrm{IIP}_t + \mathrm{NX}_t$$

For example:

$$\mathrm{IIP}_1 = (1+r)\mathrm{IIP}_0 + \mathrm{NX}_0$$

Now for the trick: by rearrangement we see that IIP this period must equal the discounted present value of IIP next period, after adjusting for the trade balance.

$$\mathrm{IIP}_0 = \frac{1}{1+r}\left(\mathrm{IIP}_1 - \mathrm{NX}_0\right)$$

Adjacent Periods (Continued)

So we have

$$\mathrm{IIP}_0 = -\frac{\mathrm{NX}_0}{1+r} + \frac{\mathrm{IIP}_1}{1+r}$$

Similarly,

$$\mathrm{IIP}_1 = -\frac{\mathrm{NX}_1}{1+r} + \frac{\mathrm{IIP}_2}{1+r}$$

Together these imply

$$\mathrm{IIP}_0 = -\frac{\mathrm{NX}_0}{1+r} - \frac{\mathrm{NX}_1}{(1+r)^2} + \frac{\mathrm{IIP}_2}{(1+r)^2}$$

Implication of the Intertemporal Budget Constraint

Suppose all debts must eventually be repaid. Then this process equates our initial net international investment position to an infinite sum of *future* trade balances:

$$\mathrm{IIP}_0 = -\sum_{t=0}^{\infty} \frac{1}{(1+r)^{t+1}} \mathrm{NX}_t$$

In principle, a country starting with positive IIP can run deficits into the future,

In contrast, a country starting with negative IIP must run surpluses in the future.

Deflating by GDP

Rewrite this as a proportion of GDP. Define:

$$\begin{aligned} \text{iip} &= \text{IIP}/\text{GDP} \\ \text{nx} &= \text{NX}/\text{GDP} \\ (1+g) &= \text{GDP}_{t+1}/\text{GDP}_t \end{aligned}$$

Then we can rewrite the previous slide's equality in a very similar way:

$$\begin{aligned} \frac{\text{IIP}_0}{\text{GDP}_0} &= -\sum_{t=0}^{\infty} \frac{1}{(1+r)^{t+1}} \frac{\text{NX}_t}{\text{GDP}_0} \\ &= -\sum_{t=0}^{\infty} \frac{(1+g)^t}{(1+r)^{t+1}} \frac{\text{NX}_t}{\text{GDP}_t} \end{aligned}$$

$$\text{iip}_0 = -\frac{1}{1+g} \sum_{t=0}^{\infty} \left(\frac{1+g}{1+r} \right)^{t+1} \text{nx}_t$$

Representing the Infinite Sum

Suppose we run $\overline{\text{nx}}$ forever.

$$\text{iip}_0 = -\frac{1}{1+g}\sum_{t=0}^{\infty}\left(\frac{1+g}{1+r}\right)^{t+1}\overline{\text{nx}}$$

Is there a "sustainable" BoP deficit? Assume $r > g \geq 0$, so that this summation makes sense and

$$\begin{aligned}
\frac{1}{1+g}\sum_{t=0}^{\infty}\left(\frac{1+g}{1+r}\right)^{t+1} &= \frac{1}{1+r}\sum_{t=0}^{\infty}\left(\frac{1+g}{1+r}\right)^{t} \\
&= \frac{1}{1+r}\left(\frac{1}{1-\frac{1+g}{1+r}}\right) \\
&= \frac{1}{1+r}\left(\frac{1}{\frac{r-g}{1+r}}\right) \\
&= \frac{1}{r-g}
\end{aligned}$$

Sustainable Balance of Trade

Under the assumption that $r > g$, the conclusion is that:

$$\mathrm{iip}_0 = \frac{-\overline{\mathrm{nx}}}{r-g}$$

Solving this for the sustainable balance of trade produces:

$$\overline{\mathrm{nx}} = -(r-g)\mathrm{iip}_0$$

So a country with a positive iip_0 can in principle run a negative balance of trade forever. (Just negative enough that it does not continually run up iip.)

Implied Current Account

Keep in mind the fixed sustainable net exports:

$$\overline{\mathrm{nx}} = -(r-g)\mathrm{iip}_0$$

In period 0, the corresponding current account (as a fraction of GDP) is

$$\begin{aligned}\mathrm{ca}_0 &= \overline{\mathrm{nx}} + r \cdot \mathrm{iip}_0 \\ &= -(r-g)\mathrm{iip}_0 + r \cdot \mathrm{iip}_0 \\ &= g \cdot \mathrm{iip}_0\end{aligned}$$

Growth matters: if an indebted country is growing, it can continuously run a small curent account deficit, paying back just enough to keep iip constant.

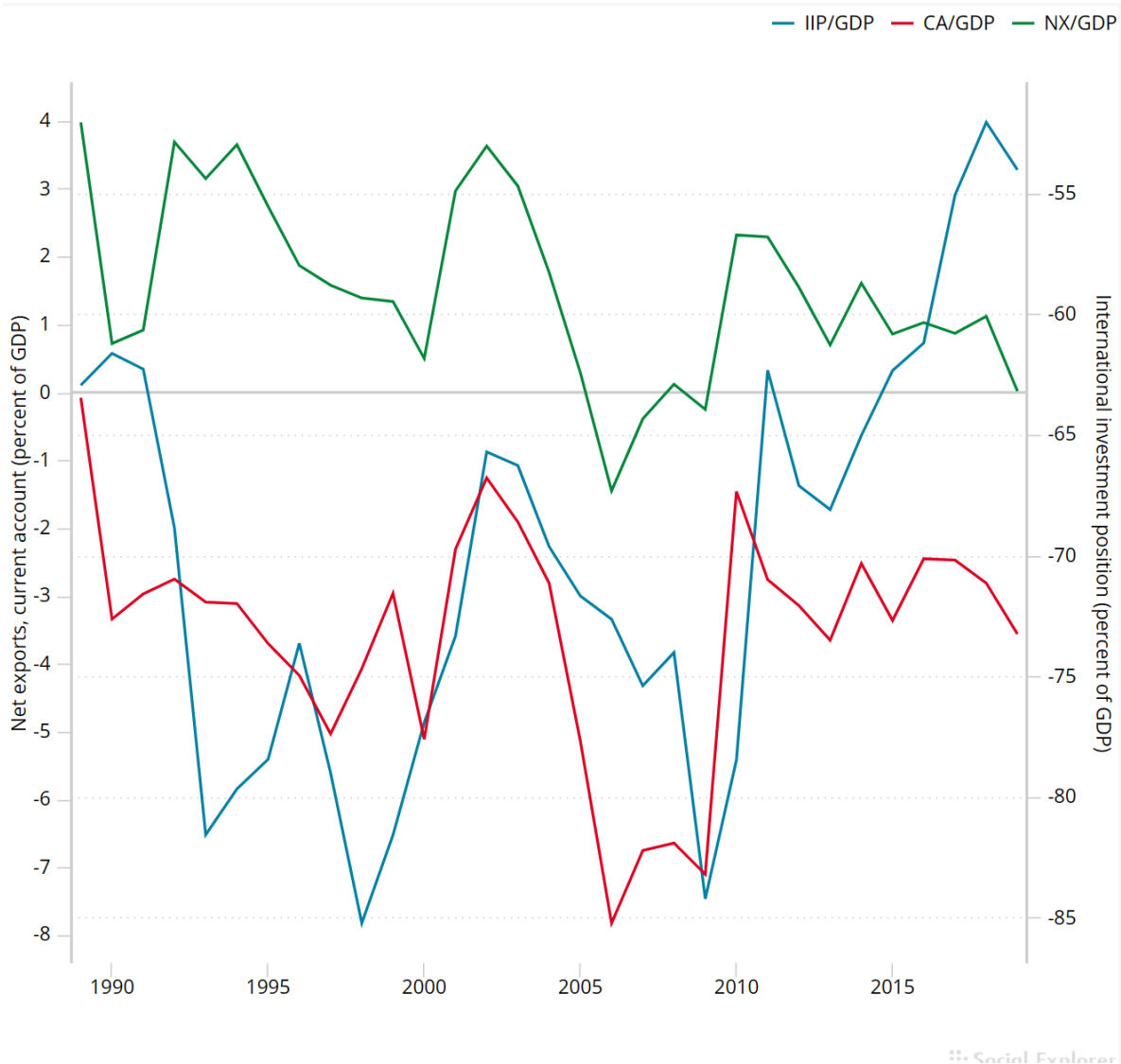
Example: New Zealand

New Zealand

- small open economy (population around 5 million)
- has run current account deficits every year for many years, as far back as the country's official statistics reach.
- net debt to foreign lenders stands at around 50 percent of its national output.

Yet lenders continue to extend credit and seem not to worry about repayment.

New Zealand Current Account



New Zealand's NX, CA, and IIP

Source: KOMIF12 p. 570

Example: New Zealand

From 1992-2019, NZ had:

- (CA/GDP)<0 every year but (NX/GDP)>0 most years
- (IIP/GDP) around -0.7
- annual nominal GDP growth around 0.05

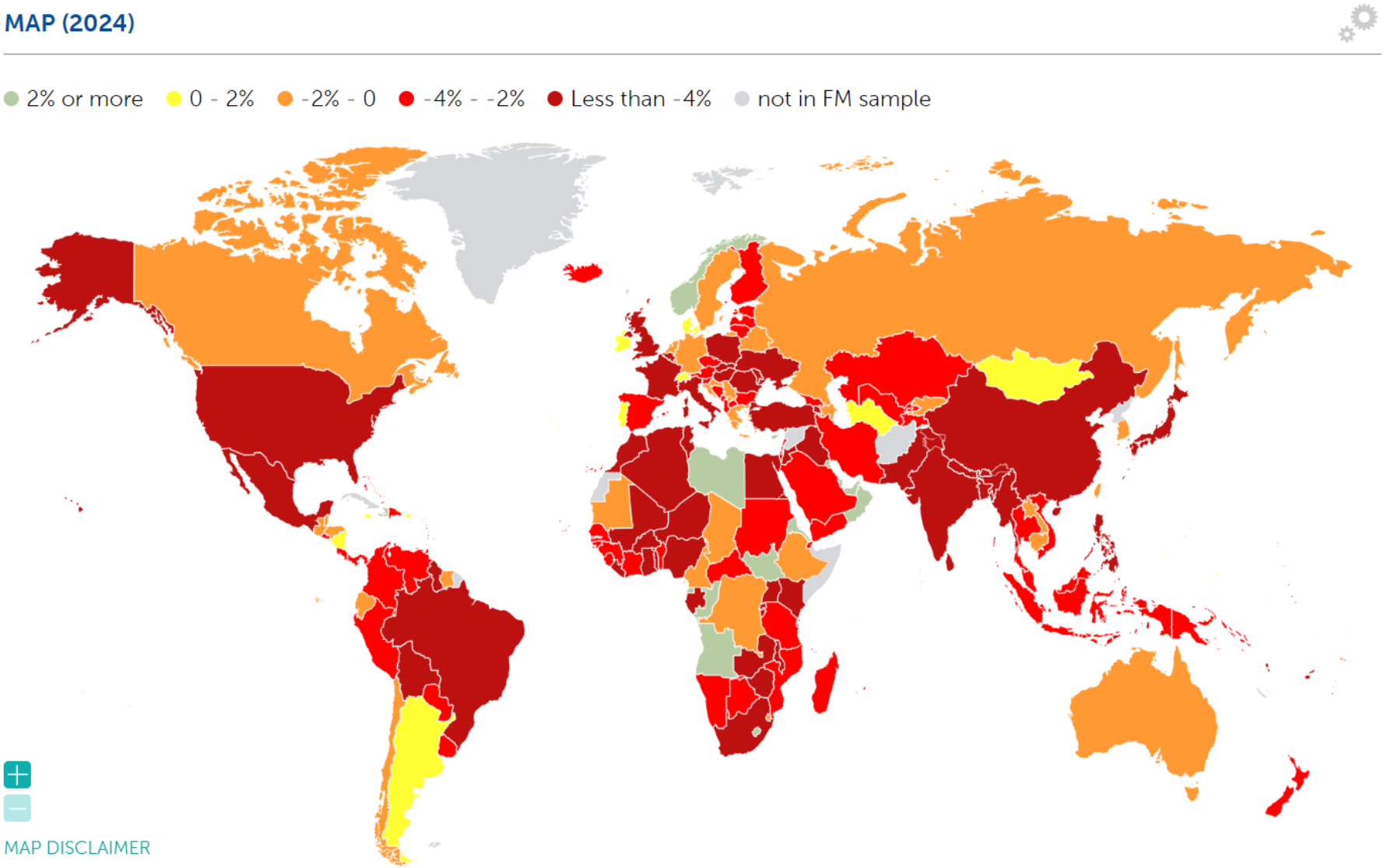
NZ current account:
`https://www.rbnz.govt.nz/statistics/key-graphs/key-graph-current-account`
Assuming (with you textbook) that $r = 0.06$, we have

$$\begin{aligned}\overline{\text{nx}} &= -(r-g)\text{iip}_0 \\ &= -(0.06-0.05)(-0.7) \\ &= 0.007\end{aligned}$$

This 0.7% of GDP is in fact below the average ratio of NZ's exports to GDP over the same period.

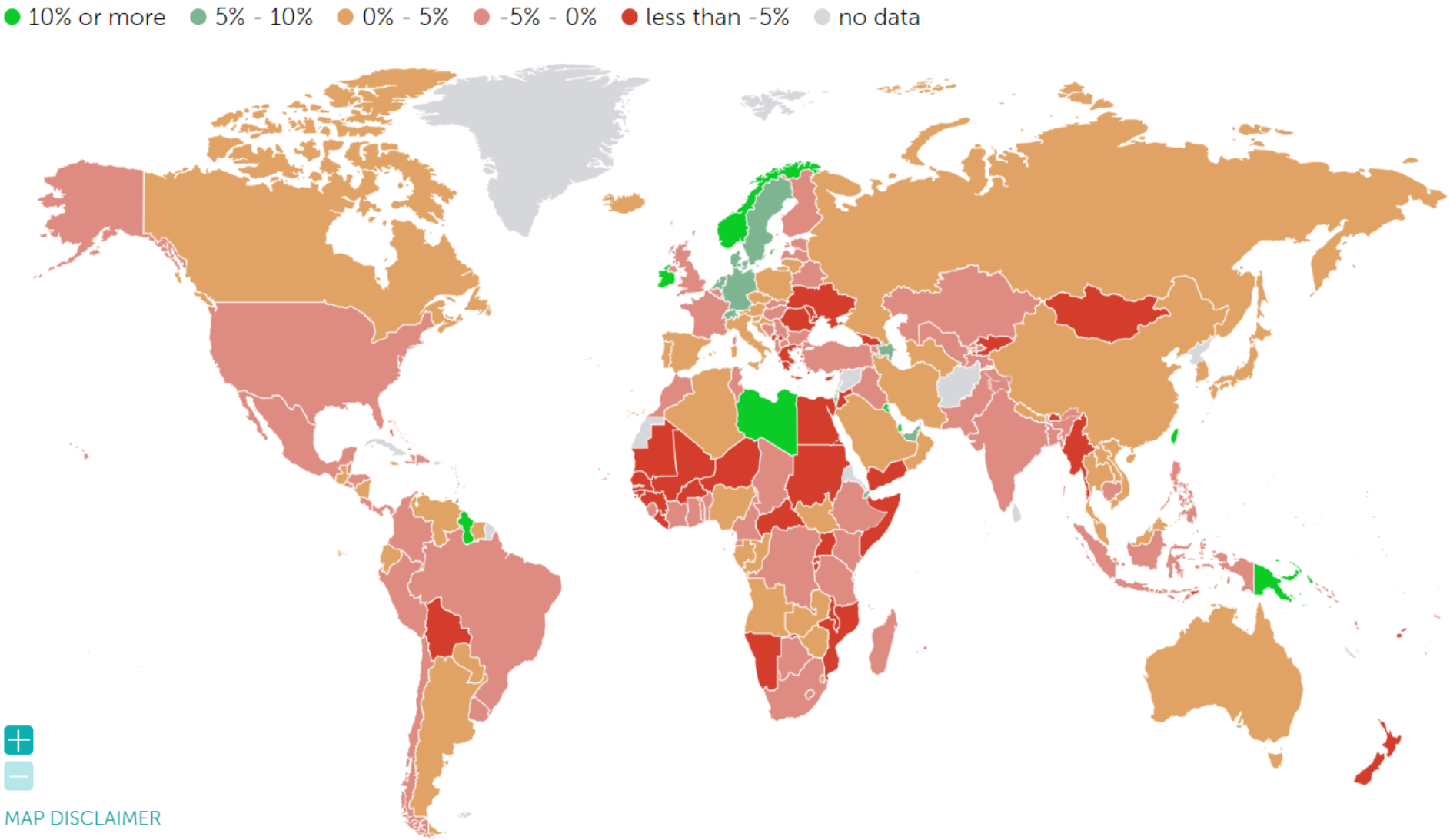
Twin Deficits One More Time: Mapping the World

World Fiscal Deficits (%GDP) 2024



Source: https://www.imf.org/external/datamapper/GGXCNL_G01_GDP_PT@FM/FM_EMG/FM_LIDC/ADVEC

World Current Accounts (%GDP) 2024



Source: https://www.imf.org/external/datamapper/BCA_NGDPD@WEO/OEMDC/ADVEC/WEOWORLD

International Policy Coordination

International Monetary Policy Coordination

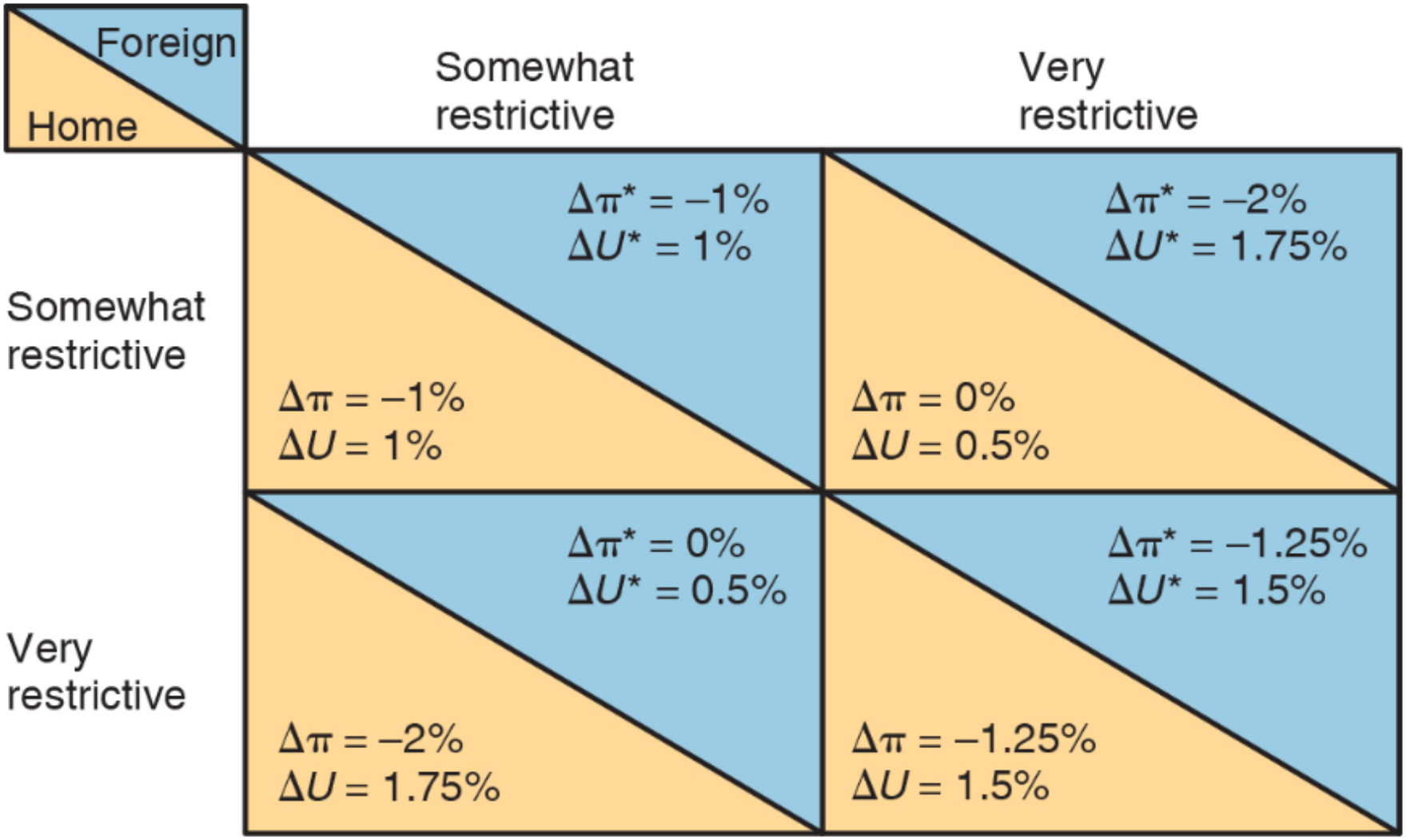
Core message: policy coordination can benefit everyone.

Illustrative incident: monetary contractions of 1981 $\rightarrow$ world recession

Constraint: less contraction than neighbors $\rightarrow$ depreciation $\rightarrow$ price pressures

International Monetary Policy Coordination

For simplicity, consider two countries, and let the consequences of policy be symmetrical:

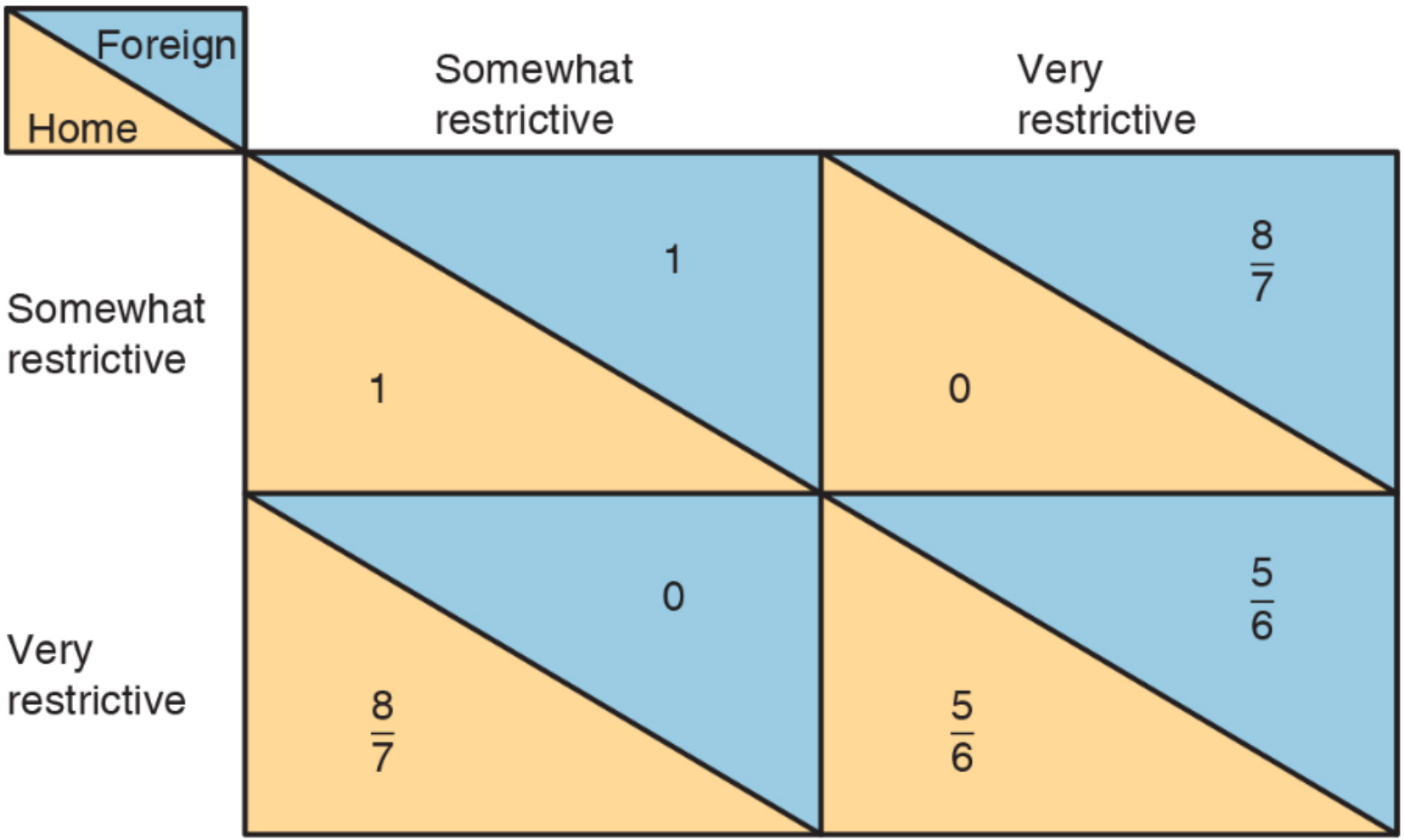


International Monetary Policy Coordination

Suppose the central bank wishes to maximize

$$\text{payoff} = -\frac{\Delta\pi}{\Delta U}$$

The payoff matrix is then a “prisoner’s dilemma”:



International Monetary Policy Coordination as PD

In order to escape the PD, countries must be able to make a new move: explicit binding agreement on policy stance.

International Climate Policy Coordination

[Soroos-1994-JPeaceRes] proposes that we understand the economics of climate change as a prisoner's dilemma. For a single country, building a sea wall is cheaper than adequately cutting back on CO2. But a world where every reduces CO2 is preferable to one where everyone builds and maintains high sea walls.

C1\C2	↓C02	wall
↓C02	-2,-2	-4,-1
wall	-1,-4	-3,-3

Summary

Summary

1. Internal balance means that an economy enjoys normal output and employment and price stability.
2. External balance roughly means a stable level of official international reserves or a current account that is not too positive or too negative.
3. The gold standard had two mechanisms that helped to prevent external imbalances
   - Price specie flow mechanism: the automatic adjustment of prices as gold flows into or out of a country.
   - Rules of the game: buying or selling of domestic assets by central banks to influence flows of financial assets.

Summary (cont.)

4. The Bretton Woods agreement in 1944 established fixed exchange rates, using the U.S. dollar as the reserve currency.
5. The IMF was also established to provide countries with financing for balance of payments deficits and to judge if changes in fixed rates were necessary.
6. Under the Bretton Woods system, fiscal policies were used to achieve internal and external balance, but they could not do both simultaneously, so external imbalances often resulted.

Summary (cont.)

7. Internal and external imbalances of the U.S.—caused by rapid growth in government purchases and the money supply—and speculation about the value of the U.S. dollar in terms of gold and other currencies ultimately broke the Bretton Woods system.
8. High inflation from U.S. macroeconomic policies was transferred to other countries late in the Bretton Woods system.

Appendices

Appendix: Classifying Monetary Systems: History of Exchange-Rate Regimes

Exchange-Rate Regimes: A Little History

Gold Standard, Revisited

An international gold standard among industrial nations emerged during the 19th century.

1819 UK discards restrictions on gold flows.

1821 UK's formal adoption of gold specie makes it the first country on a gold standard.

1844 UK's Bank Charter Act $\rightarrow$ Bank of England notes fully backed by gold

1871 Germany adopts the gold standard, making it tgruly international

late 19th century, other countries join gold standard (e.g., US, DE, JP)

Gold-Standard Adjustment Mechanisms

1870–1914 and after 1918 mechanisms that prevented flows of gold reserves (the balance of payments) from becoming too positive or too negative.

- Prices tended to adjust according the amount of gold circulating in an economy, which had effects on the flows of goods and services: the current account. (Price-specie-flow mechanism.)
- Central banks influenced financial asset flows, so that the non-reserve part of the financial account matched the current account in order to reduce gold outflows or inflows.

Price-Specie-Flow Mechanism

domestic price level rises or falls in response to gold ("specie") inflows or outflows:

- relative price changes cause an adjustment in the flow of goods

inflow of specie:

- tends to inflate prices
- $\rightarrow$ demand shifts toward foreign goods

outflow of specie:

- tends to deflate prices
- $\rightarrow$ demand shifts toward home goods

Example with $\mathrm{CA} > 0$:

- $\rightarrow$ gold earned from exports flows into the country
- $\rightarrow$ domestic prices rise; foreign prices fall
- $\rightarrow$ domestic goods become relatively costly
- $\rightarrow \downarrow$CA and $\uparrow$CA*

(More carefully: gold flows in when CA surplus exceeds the non-reserve financial account.)

Gold Standard, Revisited (cont.)

Price specie flow mechanism is the adjustment of prices as gold ("specie") flows into or out of a country, causing an adjustment in the flow of goods.

- An inflow of gold tends to inflate prices.
- An outflow of gold tends to deflate prices.

Gold Standard, Revisited (cont.)

If a domestic country has a current account surplus in excess of the non-reserve financial account,

- gold earned from exports flows into the country—raising prices in that country and lowering prices in foreign countries.
- Goods from the domestic country become expensive and goods from foreign countries become cheap, reducing the current account surplus of the domestic country and the deficits of the foreign countries.

Thus, price specie flow mechanism of the gold standard could **automatically** reduce current account surpluses and deficits, achieving a measure of external balance for all countries.

Policy under the Price Specie Flow Mechanism

In principle, the price-specie-flow mechanism automatically ensured adjustment.
In practice, central banks actively influenced financial capital flows.

- constrained gold flows, especially outflows
- tried to match the non-reserve part of the financial account to the current account

Policy under the Price Specie Flow Mechanism

Gold standard "Rules of the Game" another adjustment process that was theoretically carried out by central banks:

- Sell domestic assets to acquire money when gold exited the country as payments for imports. This decreased the money supply and increased interest rates, attracting financial inflows to match a current account deficit.
  This reversed or reduced gold outflows.
- Buy domestic assets when gold enters the country as income from exports. This increased the money supply and decreased interest rates, reducing financial inflows to match the current account.
  This reversed or reduced gold inflows.

Gold Standard, Revisited (cont.)

- Banks with decreasing gold reserves had a strong incentive to practice the rules of the game:
- Banks with increasing gold reserves had a weak incentive to practice the rules of the game: gold did not earn interest, but domestic assets did.
- In practice, central banks with increasing gold reserves seldom followed the rules.
- And central banks often sterilized gold flows, trying to prevent any effect on money supplies and prices.

Gold Standard Performance

The gold standard's record for internal balance was mixed.

- The U.S. suffered from deflation, recessions and financial instability during the 1870s, 1880s, and 1890s while trying to adhere to a gold standard.
- The U.S. unemployment rate 6.8% on average from 1890–1913, but it was less than 5.7% on average from 1946–1992.

Worl War and Interwar (1918–1939) Years

1914–1918 The gold standard was stopped in due to war but afterwards attempted again.

- The U.S. reinstated the gold standard from 1919–1933 at $20.67 per ounce and then from 1934–1944 at $35.00 ounce (devaluing the dollar).
- The UK reinstated the gold standard from 1925–1931.

Observation: Countries that adhered to the gold standard for the longest time, without devaluing their currencies, suffered most from reduced output and employment during the 1930s. Keynes 1931 video.

Bretton Woods System: 1944–1973

End of WWII: the U.S. has 75% of the world's monetary gold
the dollar is now the only currency still directly backed by gold.

In July 1944, 44 countries met in Bretton Woods, NH, to design the

- Bretton Woods system: fixed exchange rates against the U.S. dollar and a fixed dollar price of gold ($35 per ounce).

Creation of new institutions:

- The International Monetary Fund
- The World Bank
- General Agreement on Trade and Tariffs (GATT), the predecessor to the World Trade Organization (WTO).

International Monetary Fund

Backdrop (1918–1939): volatile exchange rates, caused by devaluations and the vagaries of the gold standard. Viewed as a source of economic instability.

IMF mandate: lend to countries with persistent balance of payments deficits, and approve needed devaluations.

- Loans were made from a fund paid for by members in gold and currencies.
- Each country had a quota, which determined its contribution to the fund and the maximum amount it could borrow.
- Large loans were made conditional on the supervision of domestic policies by the IMF: IMF conditionality.
- Devaluations could occur if the IMF determined that the economy was experiencing a “fundamental disequilibrium”.
- By supporting borrowing and occasional devaluations, IMF provided countries enough flexibility to attain an external balance, while still maintaining internal balance and stable exchange rates.

Bretton Woods System: 1944–1973

- In order to avoid sudden changes in the financial account (possibly causing a balance of payments crisis), countries in the Bretton Woods system often prevented flows of financial assets across countries.
- Yet, they encouraged flows of goods and services because of the view that trade benefits all economies.
  - Currencies were gradually made convertible (exchangeable) between member countries to encourage trade in goods and services valued in different currencies.

Bretton Woods System: 1944–1973 (cont.)

- Under a system of fixed exchange rates, all countries but the U.S. had ineffective monetary policies for internal balance.
- The principal tool for internal balance was fiscal policy (government purchases or taxes).
- The principal tools for external balance were borrowing from the IMF, restrictions on financial asset flows and infrequent changes in exchange rates.

Automatic Adustment: The Costs

- When money is coined precious metal
  - Prices tended to adjust according the amount of coin circulating in an economy
- prices in turn affect international flows of goods and services (CA)
- Coinage Act of 1873
  - demonetized silver
  - "Crime of 1873"
  - Deflation despite increased gold supplies from 1849 California Gold Rush
- demand grew faster than supply
- 1875-1896 saw CPI fall about 1% per year
- 1894 recession: U reached 18%
- Gold discoveries ended the deflation
  - big discoveries in South Africa and Alaska
- Gold Standard Act of 1900

Policy constraints of the Bretton Woods system

- fiscal policy
  - was supposed to be the main policy tool
- for both internal *and* external balance!
- but what about a situation of unemployment and CA deficit?!
  - may not be able to attain both internal balance and external balance
- devaluations
  - were supposed to be infrequent
  - can reduce U and improve CA simultaneously
- but what about a situation of overemployment and CA deficit?!

Macroeconomic Goals (cont.)

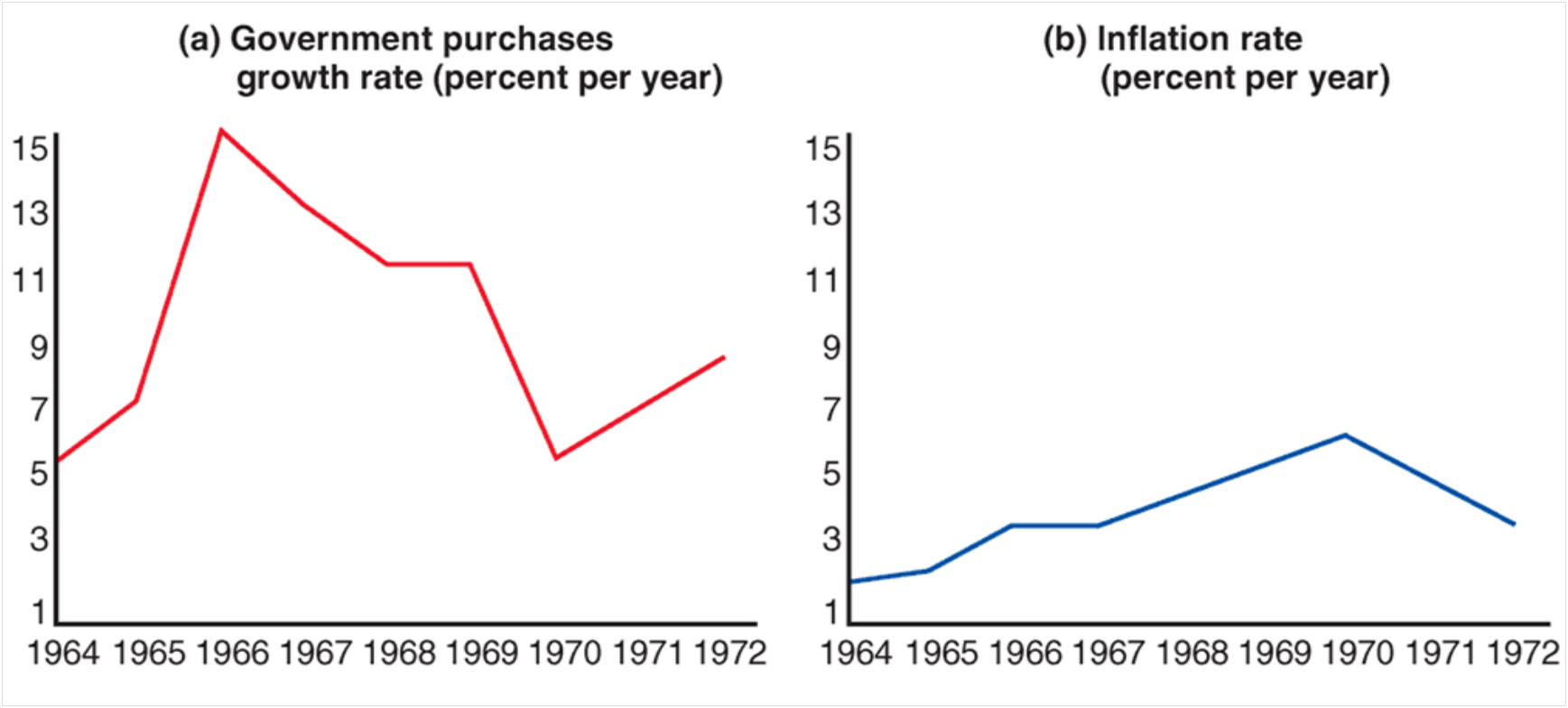
- Under the Bretton Woods system, policy makers generally used fiscal policy to try to achieve internal balance for political reasons.
- Thus, an inability to adjust exchange rates left countries facing external imbalances over time.
  - Infrequent devaluations or revaluations helped restore external and internal balance, but speculators also tried to anticipate them, which could cause greater internal or external imbalances.

External and Internal Balances of the U.S.

Bretton Woods collapse: primarily caused by imbalances of the U.S. during the 1960s and 1970s.

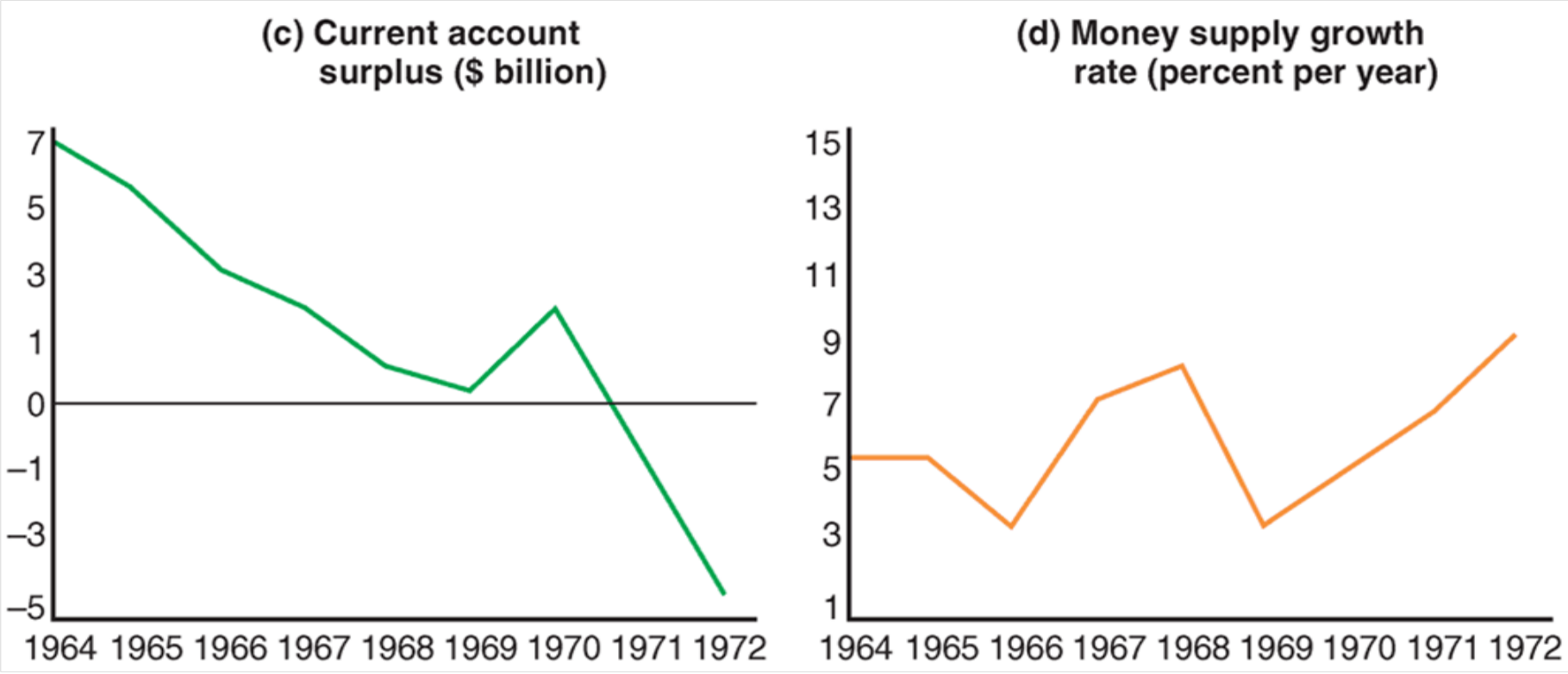
- The U.S. current account surplus became a deficit in 1971.
- Rapidly increasing government purchases increased aggregate demand and output, as well as prices.
- Rising prices and a growing money supply caused the U.S. dollar to become overvalued in terms of gold and in terms of foreign currencies.

U.S. Macroeconomic Data, 1964–1972



Source: Economic Report of the President, 1985. Money supply growth rate is the December to December percentage increase in M1. Inflation rate is the percentage increase in each year's average consumer price index over the average consumer price index for the previous year.

U.S. Macroeconomic Data, 1964–1972



Source: Economic Report of the President, 1985. Money supply growth rate is the December to December percentage increase in M1. Inflation rate is the percentage increase in each year's average consumer price index over the average consumer price index for the previous year.

Problems of a Fixed Exchange Rate, Revisited

- Another problem was that as foreign economies grew, their need for official international reserves grew to maintain fixed exchange rates.
- But this rate of growth was faster than the growth rate of the gold reserves that central banks held.
  - Supply of gold from new discoveries was growing slowly.
  - Holding dollar denominated assets was the alternative.
- At some point, dollar denominated assets held by foreign central banks would be greater than the amount of gold held by the Federal Reserve.

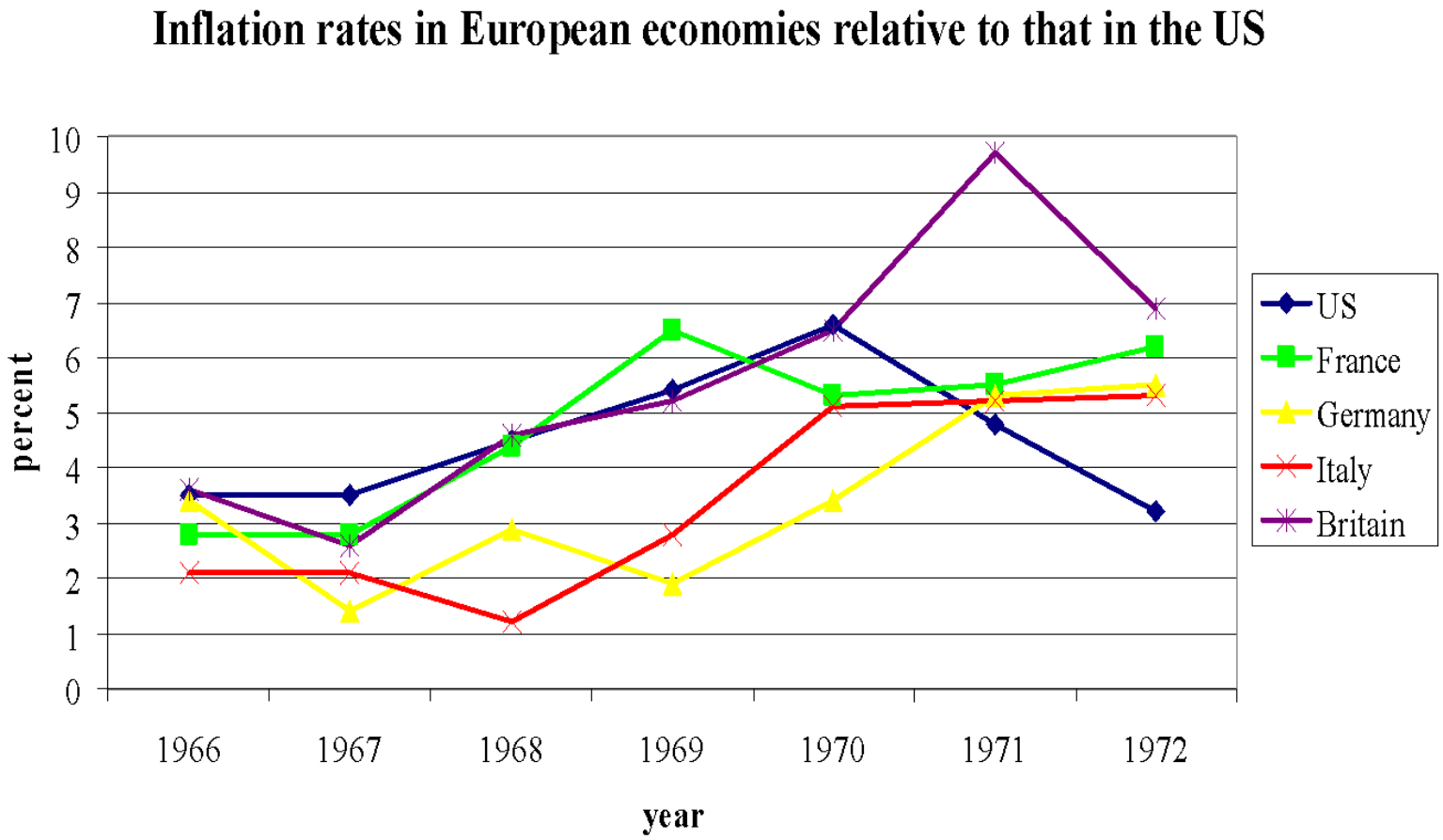
Problems of a Fixed Exchange Rate, Revisited (cont.)

- The Federal Reserve would eventually not have enough gold: foreigners would lose confidencein the ability of the Federal Reserve to maintain the fixed price of gold at $35/ounce, and therefore would rush to redeem their dollar assets before the gold ran out.
  - This problem is similar to what any central bank may face when it tries to maintain a fixed exchange rate.
  - If markets perceive that the central bank does not have enough official international reserve assets to maintain a fixed rate, a balance of payments crisis is inevitable.

International Effects of U.S. Macroeconomic Policies

The monetary policy of the country which owns the reserve currency is able to influence other economies in a reserve currency system.
The acceleration of inflation that occurred in the U.S. in the late 1960s also occurred internationally during that period.

International Effects of U.S. Macroeconomic Policies (cont.)



Source: Organization for Economic Cooperation and Development. Figures are annual percentage increases in consumer price indexes. Inflation rates in European economies relative to that in the US.

International Effects of U.S. Macroeconomic Policies (cont.)

Paradox: money supply growth rates in other countries exceeded the rate in the U.S.

- This could be due to the effect of speculation in the foreign exchange markets.
  - Central banks were forced to buy large quantities of dollars to maintain fixed exchange rates, which increased their money supplies at a more rapid rate than occurred in the U.S.

Table 18-2: Changes in Germany's Money Supply and International Reserves, 1968–1972 (percent per year)

Growth rate of	1968	1969	1970	1971	1972
Money supply	6.4	−6.3	8.9	12.3	14.7
Official international reserves	37.8	−43.6	215.7	36.1	35.8

Source: Organization for Economic Cooperation and Development. *Main Economic Indicators: Historical Statistics, 1964–1983.* Paris: OECD, 1984. Figures are percentage increases in each year's end-of-year money supply or international reserves over the level at the end of the previous year. Official reserves are measured net of gold holdings.

Appendix: Arguments For and Against Flexible Exchange Rates

Arguments for Flexible Exchange Rates: Monetary Policy Autonomy

Monetary policy autonomy

- Without a need to trade currency in foreign exchange markets, central banks are more free to influence the domestic money supply, interest rates, and inflation.
- Central banks can more freely react to changes in aggregate demand, output, and prices in order to achieve internal balance.

Arguments for Flexible Exchange Rates: Automatic Stabilization

Automatic Stabilization

- Flexible exchange rates change the prices of a country's products and help reduce "fundamental disequilibria".
- One fundamental disequilibrium is caused by an excessive increase in money supply and government purchases, leading to inflation, as we saw in the US during 1965–1972.
- Inflation causes the currency's purchasing power to fall, both domestically and internationally, and flexible exchange rates can automatically adjust to account for this fall in value, as purchasing power parity predicts.

Arguments for Flexible Exchange Rates (cont.)

- Another fundamental disequilibrium could be caused by a change in aggregate demand of a country's products.
- Flexible exchange rates would automatically adjust to stabilize high or low aggregate demand and output, thereby keeping output closer to its normal level and also stabilizing price changes in the long run.

Effects of a Fall in Export Demand

- Reduction in aggregate demand
- Depreciation leads to higherdemand for and output of domestic products
- Fixed exchange rates mean output falls as much as the initial fall in aggregate demand

Arguments for Flexible Exchange Rates (cont.)

- In the long run, a real depreciation of domestic products occurs as prices fall (due to low aggregate demand, output and employment) under fixed exchange rates.
- In the short run and long run, a real depreciation of domestic products occurs through a nominal depreciation under flexible exchange rates.
- Fixed exchange rates can not survive for long in a world with divergent macroeconomic policies and other changes which affect national aggregate demand and national income differently.

Arguments for Flexible Exchange Rates (cont.)

Flexible exchange rates may also prevent speculation in some cases.

- Fixed exchange rates are unsustainable if markets believe that the central bank does not have enough official international reserves.

Arguments Against Bretton Woods System

Symmetry (not possible under Bretton Woods)

- The U.S. is now allowed to adjust its exchange rate, like other countries.
- Other countries are allowed to adjust their money supplies for macroeconomic goals, like the U.S. could.

Arguments Against Flexible Exchange Rates

Uncoordinated macroeconomic policies

- Flexible exchange rates lose the coordination of monetary polices through fixed exchange rates.
  - Lack of coordination may cause “expenditure switching” policies: each country may want to maintain a low-valued currency, so that aggregate demand is switched to domestic products at the expense of other economies
  - In contrast, “expenditure changing” fiscal policies are thought to change the level of aggregate demand in the short run for both domestic and foreign products.

Arguments Against Flexible Exchange Rates (cont.)

Lack of coordination may cause volatilityin national economies: because a large country's fiscal and monetary policies affect other economies; aggregate demand, output, and prices become more volatile across countries if policies diverge.

- Volatile aggregate demand and output, especially in export sectors and import-competing sectors, lead to volatile employment.
- Volatility, not stabilization, may occur.

Arguments Against Flexible Exchange Rates (cont.)

Speculation and volatility in the foreign exchange market may become worse, not better.

- If traders expect a currency to depreciate in the short run, they may quickly sell the currency to make a profit, even if it is not expected to depreciate in the long run.
- Expectations of depreciation lead to actual depreciation in the short run.
- Earlier we assumed that expectations do not change when temporary economic changes occur, but this assumption is not valid if expectations change quickly in anticipation of even temporary economic changes.

Arguments Against Flexible Exchange Rates (cont.)

- Such speculation tends to increase the fluctuations of exchange rates around their long run values, as currency traders quickly react to changing (interpretations of) economic news.
- In fact, volatility of exchange rates since 1973 has become larger.
- But how big of a problem is this?

Arguments Against Flexible Exchange Rates (cont.)

Reduction of trade and international investment caused by uncertainty about exchange rates.

- But precisely because of a desire to reduce this uncertainty, forward exchange rates and derivative assets were created to insure against exchange rate volatility.
- And international investment and trade have expanded since the Bretton Woods system was abandoned.
- And controls on flows of financial asset flows are often necessary under fixed exchange rate systems, in order to prevent capital flight and speculation.

Arguments Against Flexible Exchange Rates (cont.)

Discipline: if central banks are tempted to enact inflationary monetary policies, adherence to a fixed exchange rates may force them not to print so much money.

- But the temptation may not go away: devaluation due to inflationary monetary policy may still occur.
- And inflation is contained in the country that creates it under flexible exchange rates: the U.S. could no longer “export” inflation after 1973.
- And inflation targets may be better discipline than exchange rate targets.

Arguments Against Flexible Exchange Rates (cont.)

Illusion of greater monetary policy autonomy

- Central banks still need to intervene in the foreign exchange market because the exchange rate, like inflation, affects the economy a great deal.
- But for the U.S., exchange rate stability is usually considered less important by the Federal Reserve than price stability and low unemployment.