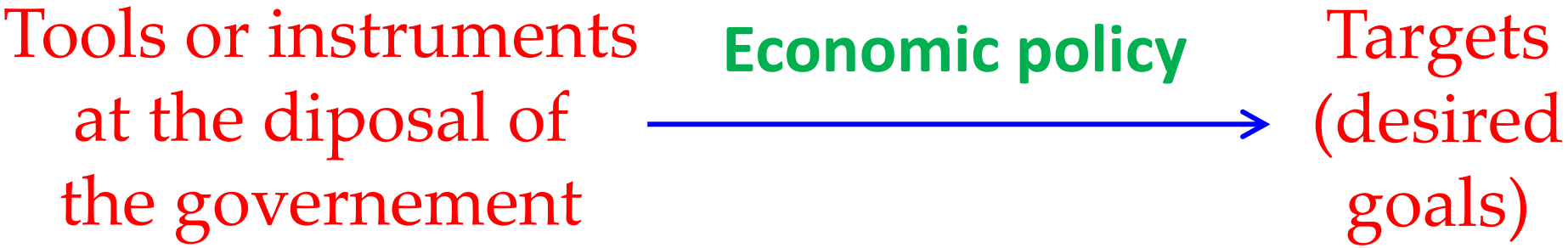
Economic policy

- The economic policy of a government consists of all the decisions by the government that affect the economy with the purpose of achieving certain preestablished goals.
- The following sketch is a basic outline of economic policy. For macroeconomic policy, the desired goals are expressed as values of certain macro-economic variables one wishes to influence.



Targets, instruments, indicators

- Targets: goals of policy identified with precision.
- Instruments: tools that the policymaker can control and manipulate directly.
- Indicators: variables that inform about the degree of fulfillment of targets.
- An ultimate target defines the goal in which the policymaker is really interested. An intermediate target is a goal considered relevant or necessary to achieve the ultimate target. As it signals closeness to the ultimate target, it may be used as indicator.

The Tinbergen precept

- Formulated by Jan Tinbergen, the precept (also known as "basic rule of economic policy") states that, when designing a specific economic policy, the number of independent instruments under the policymaker's control cannot be smaller than the number of ultimate targets.
- Short version: "Have at least as many instruments as goals" (no policy tool can serve two objectives: do not expect to kill two birds with one stone).
- For instance, to achieve three goals, the precept demands at least three instruments, each one of them capable of complying with a different goal.

First example /1

- An economy is described by the following equations (N is employment; the bar means "constant").

AS function	$Y = \pi \cdot N$
AD function	$AD = C + I + G$
Consumption function	$C = \bar{C} + c \cdot Y$
Investment function	$I = \bar{I}$
Government purchases	$G = \bar{G}$

- In equilibrium, $Y = AD$. Therefore, in equilibrium,

$$Y = \frac{1}{1-c}(\bar{C} + \bar{I} + \bar{G}).$$

First example /2

- Suppose $\bar{G}$ is adopted as a tool to achieve a certain level of employment $\bar{N}$. Using the previous result and the AS function,

$$\frac{1}{1-c}(\bar{C}+\bar{I}+\bar{G})=\pi\cdot\bar{N}.$$

- Solving for $\bar{G}$,

$$\bar{G}=\pi\cdot(1-c)\cdot\bar{N}-(\bar{C}+\bar{I})$$

- The above equation links the target $\bar{N}$ with the tool $\bar{G}$.

Second example /1

- Now imagine that the economy is described by the following equations.

AS function	$Y = \pi \cdot N$
AD function	$AD = C + I + G$
Consumption function	$C = \bar{C} + c \cdot Y$
Investment function	$I = \bar{I} - b \cdot i$
Government purchases	$G = \bar{G}$
Fisher equation	$i = \bar{r} + \pi$

- The policy tools are $\bar{G}$ (fiscal policy) and i (monetary policy). The policy goals are $\bar{N}$ and $\bar{\pi}$.

Second example /2

- The Fisher equation $i = \bar{r} + \pi$ directly links the target $\bar{\pi}$ with the instrument i: $i = \bar{r} + \bar{\pi}$.
- Using the equilibrium condition $Y = AD$,

$$Y = \frac{1}{1-c}(\bar{C} + \bar{I} + \bar{G}) - \frac{b}{1-c} \cdot i \,.$$

- Inserting this into the AS function

$$\frac{1}{1-c}(\bar{C} + \bar{I} + \bar{G}) - \frac{b}{1-c} \cdot i = \bar{\pi} \cdot \bar{N}$$

or

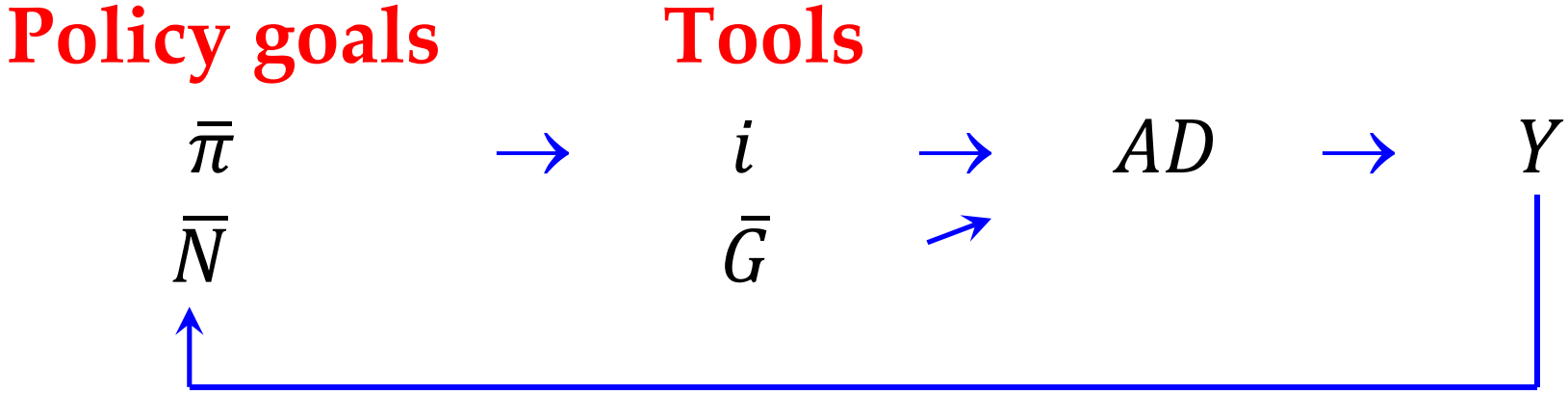
$$\frac{1}{1-c}(\bar{C} + \bar{I} + \bar{G}) - \frac{b}{1-c} \cdot (\bar{r} + \bar{\pi}) = \bar{\pi} \cdot \bar{N}.$$

Second example /3

- Solving for $\bar{G}$,

$$\bar{G} = \bar{\pi} \cdot [b + (1 - c) \cdot \bar{N}] + b \cdot \bar{r} - (\bar{C} + \bar{I}).$$

- This expression determines the value of the fiscal policy tool that, given the monetary policy goal $\bar{\pi}$, makes it possible to achieve the fiscal policy goal $\bar{N}$. Decisions and outcomes are summarized next.



Implementing problems

- The implementation of economic policies is subject to several limitations and constraints.
- Lags. Policymaking does not hit the economy immediately: there is a delay between the moment at which intervention is needed and the moment at which the economy responds to the policies.
- Credibility of policymakers and the temporal inconsistency of policies.
- Policymaking should take into account people's reaction to policies (see Goodhart's law).

Lags

- Recognition lag: period between the moment at which a disturbance (problem) occurs and the moment at which it is recognized the need to take some action (this lag makes policymaking analogous to driving a car looking backwards).

- Decision lag: time between the recognition of the problem and the policy decision. Action lag: delay between the policy decision and its execution.

- Effectiveness lag: time needed for the policy action to affect the economy and achieve the desired goal (the effects of the policy take time to appear).

Oil tanker example

- An oil tanker is heading to some obstacle at sea.
- The time took to detect the obstacle (from the time where it can be recognized) is the recognition lag.
- The decision lag refers to the time between the obstacle is detected and the captain decides whether to turn to port or turn to starboard. The action lag is the time needed to communicate that decision to the helmsman.
- The effectiveness lag is the time the tanker takes to turn.

Temporal inconsistency of policies

- A decision made at time t to be carried out at a later time t' is temporally inconsistent if, at time t', the decision-maker would prefer not to carry it out.
- Temporal inconsistent policies are ineffective because they are not credible: when it is the policymaker's turn to execute a temporally inconsistent, he will have an incentive to not execute it.
- Example: to attract foreign investors, a government promises not to tax profits from firms created by foreign investors; but, once the firms get the profits, the government has an incentive to tax them.

Goodhart's law

- Named for Charles Goodhart, a former chief advisor to the Bank of England, it was originally formulated in 1975 as *"Any observed statistical regularity will tend to collapse once pressure is placed upon it for control purposes"*.
- Marilyn Strathern's formulation: "When a measure becomes a target, it ceases to be a good measure".
- Goodhart's law expresses for the social world what the Heisenberg principle expresses for the phyical world: the act of measuring reality changes reality.

Illustrating Goodhart's law

- By Goodhart's law, an empirical regularity tends to vanish when it is used to control the evolution of the variables involved in the regularity.
- Suppose it is an empirical regularity that the students attending more than 85% of the classes pass. To avoid the cost of setting and correcting exams, a teacher may use this regularity to, by controlling attendance, give a pass to those students coming to at least 85% of the classes. If students knew that policy, attendance would no longer be a good measure of the students' performance. Why?

Goodhart's law & economic policy

- By Goodhart's law, when a policymaker makes use of some empirical regularity as a policymaking instrument, the regularity will tend to disappear.
- Empirical regularities link variables (course attendance and course performance in the previous example). If one of the variables is taken as target (performance), the other variables (attendance) may act as indicators. But taking the indicator as a measure of the target invalidates the indicator: controlling the indicator instead of the target destroys the empirical regularity.

Another example on Goodhart's law

"The most famous example of Goodhart's law should be the soviet factories which, when given targets on the basis of numbers of nails, produced many tiny useless nails and, when given targets on basis of weight, produced a few giant nails.

Numbers and weight both correlated well in a pre-central plan scenario. After they are made targets (in different times and periods), they lose that value."

http://lesswrong.com/lw/1ws/the_importance_of_goodharts_law/

Intervention vs no intervention

- The nonactivist position (no intervention) is based on the belief that the economy is self-regulating and works better when left by itself.
- Intervention may make things worse: policymakers have an imperfect knowledge of both the economic reality and the effects of policies, and may be guided by personal interests.
- Policy design is subject to the previous constraints.
- Crises are good for the economy, as they purge the economy of inefficiencies and weaknesses.

The issue of rules versus discretion

- When an activist position is adopted, the choice is between flexibility and certainty of the policy.
- Flexibility = policymakers do not tie their hands when choosing targets or using tools (the economy and what is known about it changes over time).
- Certainty = policy is conducted by preannounced rules that describe how the policy targets are determined and instruments used in every situation. Taylor's rule (due to John B. Taylor, 1993) is an example of a policy rule.

Taylor's rule

- Taylor's rule is a monetary policy rule telling the central bank (CB) how to set the nominal interest rate. The rule is given by an equation of the sort

$$i = \pi + \bar{r} + A(\pi - \bar{\pi}) + B(y - \bar{y})$$

where: $\bar{r}$ is the long-term real interest rate (Fisher hypothesis); $\bar{\pi}$ is the CB's target inflation rate (π is current inflation); $\bar{y}$ is the "normal" growth rate of the economy (y is current growth); constant $A > 0$ measures the CB's sensitivity to deviations from target $\bar{\pi}$; and constant $B > 0$ measures the CB's sensitivity to deviations from normal growth $\bar{y}$.

Taylor's rule & pure inflation targetting

- If the CB only cares about inflation (and not about growth or unemployment), then $B = 0$. In this case, Taylor's rule becomes $\boxed{i = \pi + \bar{r} + A(\pi - \bar{\pi})}$.
- When $\pi = \bar{\pi}$ (the CB's goal is met), $i = \pi + \bar{r}$. That is, $i - \pi = \bar{r}$: the current real interest rate $r = i - \pi$ equals the equilibrium real interest rate $\bar{r}$. Taylor's rule then generalizes the Fisher equation.
- The larger A, the more aggresive the central bank is in fighting inflation.

Taylor's rule: an example

- With rule $i = \pi + \bar{r} + A(\pi - \bar{\pi})$, if $\pi > \bar{\pi}$, then, to cool off the economy by cutting aggregate demand, the CB rises i so that the current real interest rate $r = i - \pi$ is above the equilibrium interest rate $\bar{r}$.

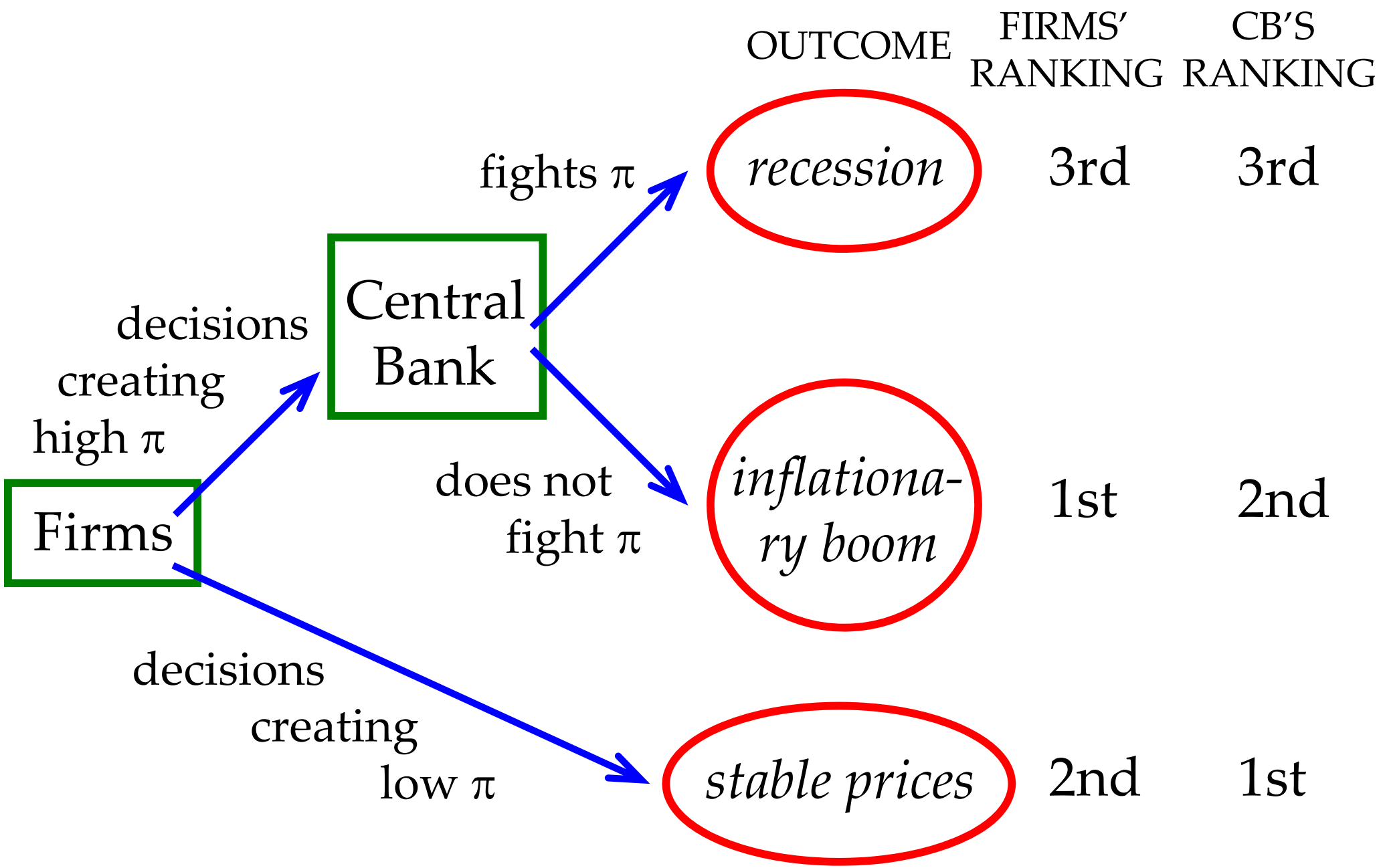
- Example. Let $\bar{r} = 1\%$, $\bar{\pi} = 3\%$, and $A = ½$ (so, for each inflation point above the goal, the CB rises i by 0.5 points). Suppose $\pi_0 = 3\%$. Then the CB sets $i_0 = \pi_0 + \bar{r} + (\pi_0 - 3)/2 = 3 + 1 + 0/2 = 4\%$.

- If $\pi_1 = 5\%$, $i_1 = \pi_1 + \bar{r} + (\pi_1 - 3)/2 = 5 + 1 + (5 - 3)/2 = 7\%$, so $r_1 = i_1 - \pi_1 = 7 - 5 = 2 > \bar{r} = 1\%$.

Comparison between rules & discretion

- Advantage of rules: when making decisions, people anticipate the policymakers' actions (uncertainty reduced). Problem 1: rules will be eventually changed. If the change is frequent, there is no much difference with discretion. Must there be rules for the change of rules? Problem 2: people need to believe that rules will be followed (reputation).

- Advantage of discretion: unexpected or serious economic problems can be attacked efficiently. Problem: predicting the policymakers' actions becomes a new problem for the agents in the economy (policies may be erratic and arbitrary).


OUTCOME
FIRMS' RANKING
CB'S RANKING
fights π
recession
3rd
3rd
Central Bank
decisions creating high π
Firms
does not fight π
inflationa-ry boom
1st
2nd
decisions creating low π
stable prices
2nd
1st

Importance of committing to policies

- Case 1: the CB acts discretionally. Solving by backwards induction, the CB prefers not to fight inflation. Given this, firms choose the high inflation option. This leads to the firms' best outcome.

- Case 2: the CB commits itself to fighting inflation. Assume the CB develops a reputation for fighting inflation regardless of any other consideration. Firms then choose the low inflation option. Now, the CB achieves its best outcome without having to engineer recessions: the belief that the CB is willing to generate a recession to fight inflation suffices.

Macroeconomic policies: a typology

- Macroeconomic policies can be classified into two broad categories.
- Supply-side policies. Try to shift the AS function to the right (never intended to shift it left).
- Demand-side policies. Their intended target is the AD function (to contract or expand it). They tend to achieve its goal faster than supply-side policies.
- The main demand-side policies are the fiscal policy (decided by the governement) and the monetary policy (decided by the CB, when independent).

Supply-side policies

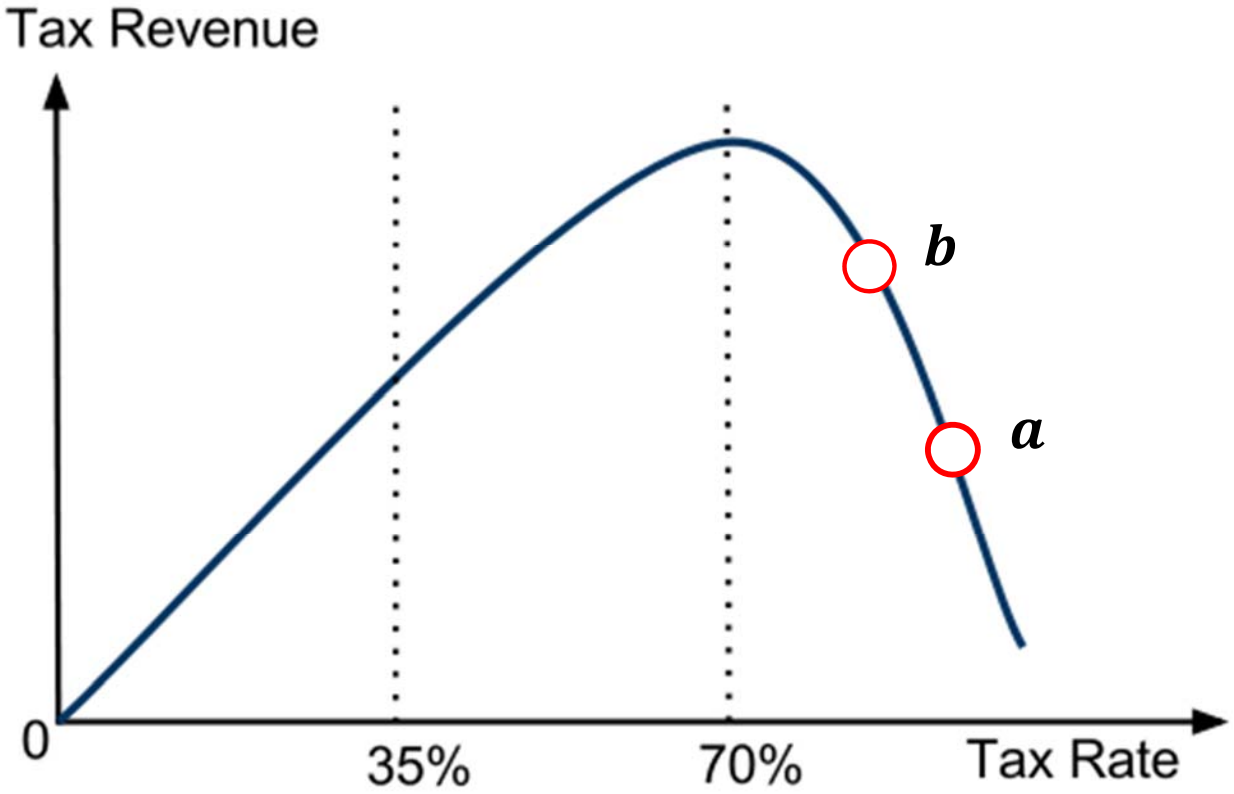
- Policies that move the AS function to the right by improving the productive capacity of the economy.
- Measures to rationalize the government intervention in the economy: remove unnecessary regulation, efficient provision of public services, privatization of public monopolies, tax reductions…
- Measures to improve the way markets operate: stimulate competition, reduce market power…
- Measures to improve the quality of inputs (retraining programmes for unemployed people) and to encourage technological progress.

Supply-side economics

- It is a school of economic thought that contends that the best way to stimulate growth consists of removing the obstacles to production.
- This is achieved by providing incentives to people and firms through reductions of the income tax rate and the capital tax gain rate. The Laffer curve constitutes a theoretical justification of this policy.
- The second typical recommendation is less regulation: the less a government interferes with the economy, the better for the economy.

The Laffer curve

- It is a theoretical relationship between the revenues obtained from taxation and the average tax rate.



A non-symmetric Laffer curve with a maximum Revenue point at around a 70% tax rate.

*The tax rate reduction from **a** to **b** benefits the economy and the government: a smaller tax rate induces people to work and produce more, and more production yields higher revenues.*

http://en.wikipedia.org/wiki/Laffer_curve

Fiscal vs monetary policy

- Fiscal policy (FP) instruments. Government expenditure (G), net transfers to the private sector (TR), and the tax rate (t).
- FP targets. Typically, GDP growth, unemployment, unemployment rate. Atypically, budget deficit.
- Monetary policy (MP) instruments. Open market operations (OMOs), interest rates set by the CB (discount rate), and reserve requirements.
- MP targets. Main: inflation rate. Secondary: GDP growth, unemployment rate, exchange rate.

Expansionary/contractionary policy

- An expansionary FP consists of ↑G, ↑TR, and/or ↓t.
- A contractionary FP consists of ↓G, ↓TR, and/or ↑t.
- An expansionary MP consists of an expansionary OMO, a reduction of the discount rate, and/or a reduction in the reserve requirements. A contractionary MP consists of the opposite.
- An expansionary FP/MP tries to shift the AD function to the right (increase expenditure). An contractionary FP/MP pursues the opposite.

Effects of the FP in the AS-AD model

Initial (primary) effects of an	instruments			effect on		
	G	TR	t	Y	π	u
expansionary fiscal policy	↑	↑	↓	↑	↑	↓
contractionary fiscal policy	↓	↓	↑	↓	↓	↑

Effects of the MP in the AS-AD model

Initial (primary) effects of an	implies		effect on		
	r	M1	Y	π	u
expansionary ("easy") monetary policy	↓	↑	↑	↑	↓
contractionary ("tight") monetary policy	↑	↓	↓	↓	↑

Okun's law

The government (govt) outlays

- The total spending by the govt (govt outlays) consists of three items.
- G = govt consumption expenditures (purchases on currently produced goods) + govt investment (purchases on capital goods).
- TR = transfer payments made to individuals from whom the govt does not receive current goods in exchange.
- INT = net interest payments = interest paid to the holders of govt bonds less interest paid to the govt

The government budget

- There are four main categories of tax receipts T:
  - personal taxes,
  - corporate taxes,
  - taxes on production (sales taxes) and imports (tariffs), and
  - contributions for social insurance.
- Govt budget deficit (or just deficit) = govt outlays – tax receipts = G + TR + INT – T.
- Primary govt budget deficit (or just primary deficit) = deficit – INT.

Financing budget deficits

- There are three basic ways of financing a deficit:
  - by increasing current taxes or creating new ones (= *tax now* option);
  - by issuing govt bonds (= *tax later* option);
  - by monetizing the deficit (= creating monetary base = printing money and/or selling the bonds to the CB).
- When considering the effects of an expansionary FP, the way it is financed should be taken into account, as it may offset the primary effect of the FP.

Consequences of taxing now

- Suppose the govt executes an expansionary FP consisting of an increase in govt consumption (ΔG).
- The immediate effect of this policy is an increase in the deficit. Let it be financed by raising taxes now.
- Since people have less disposable income, they will probably cut consumption. Hence, the expansionary effect of ΔG on the AD function is followed by a contractionary effect caused by a reduction in consumption. This qualifies the primary effect of an expansionary FP: it may not alter Y^*.

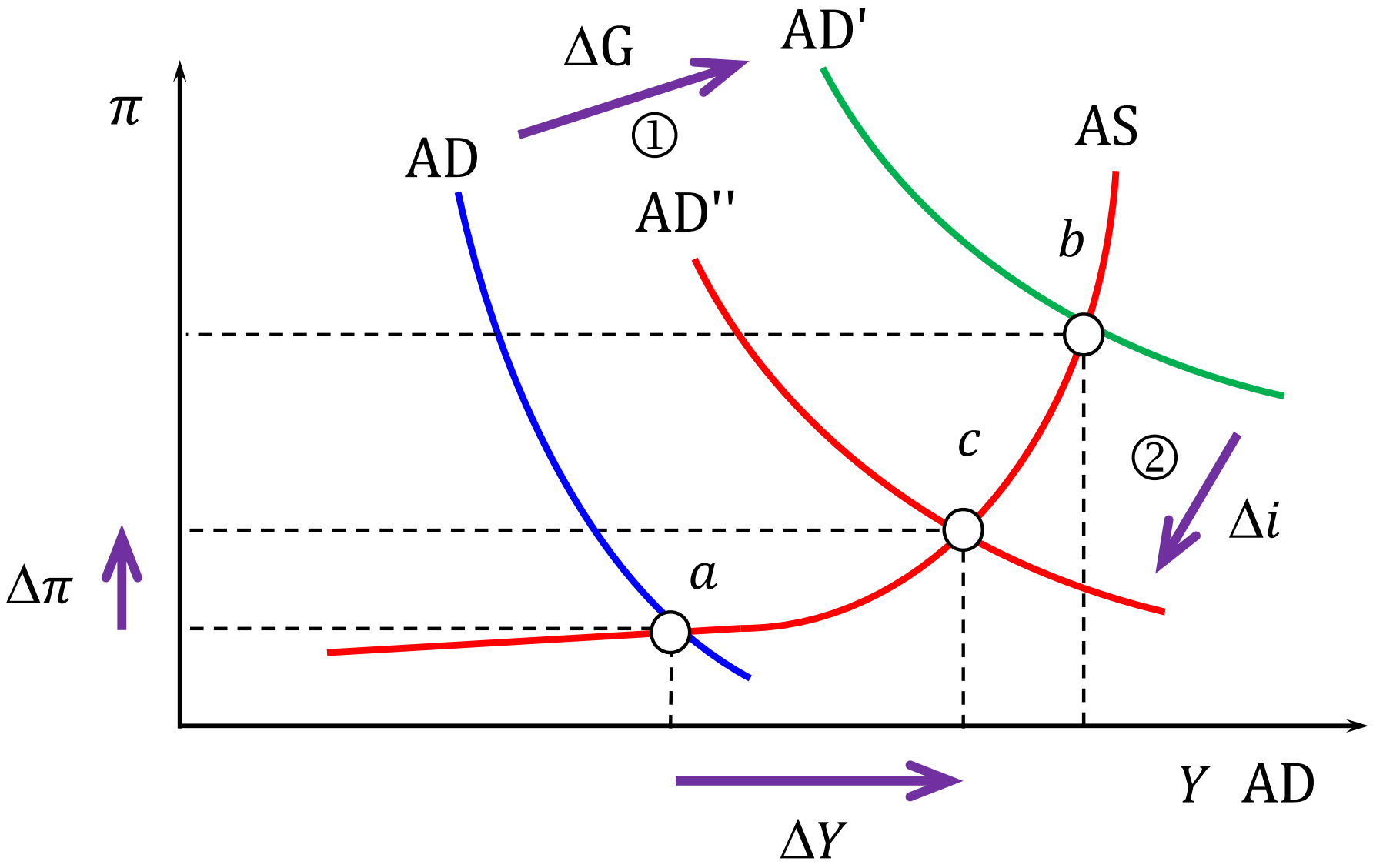
The Ricardian equivalence proposition

- Suggested by David Ricardo (1772-1823). As debt financing by bond issue just postpones taxation, people realize that bonds will be paid off with future increases in taxes, so they will save more now to be able to pay higher taxes in the future.
- The proposition holds that an increase in the deficit leads to an increase in saving equal to that deficit, so it does not matter if the deficit is financed by more taxes or by bond issue. If people save now the taxes to be paid in the future, consumption is reduced now and the effect of an expansionary FP may be neutralized.

Taxing later: the crowding-out effect

- Suppose an expansionary FP consisting of an increase in G is financed by bond issue. This shifts the demand for liquidity to the right causing, in the loan market, a rise in *i*.
- The increase in *i* is likely to have a negative impact on consumption and investment. Therefore, private spending is reduced.
- As a result, G (public spending) crowds out C + I (private spending). The next slide illustrates that phenomenon: instead of reaching *b*, the economy reaches *c* due to the effect of the FP on *i*.

Crowding-out in the AS-AD model



Rolling debt over

- To roll debt over is to pay debt with more debt.
- A major corporation may allow the debt to grow period after period, even choosing not to pay back the original loan, because the funds that would cancel the debt can be used in investment projects that generate sufficiently high profits.
- A government may roll debt over (take on more debt) in a booming economy if there is a better use for the funds than debt repayment and the revenue obtained from the GDP increase suffices to pay the interest on the new debt.

Burden of the (government) debt

- The burden of the debt refers to the annual interest on the debt as a percentage of annual GDP or, alternatively, to the taxes, as a percentage of GDP, needed to pay the interest on the debt.
- For instance, if interest payments on the debt rise by 3%, government spending is not altered, and debt is not rolled over, then taxes must rise by 3%.
- Part of the additional taxes collected go abroad if foreigners own part of the debt. Higher taxes tend to reduce AD and, therefore, GDP. This limits the government's ability to repay debt in the future.

A rising debt ⇏ a rising burden

- Consider the following debt rule: the growth rate of nominal debt should not be higher than the growth rate of nominal GDP.
- For example, according to the rule, if nominal GDP grows at 3% per year, then nominal debt cannot grow by more than 3% per year.
- Under the debt rule, a rising government debt does not imply a rising burden of the debt. To prevent the burden from rising, it is not necessary to run budget surpluses or reduce total debt. It all boils down to control the rate at which total debt grows.

Debt grows, constant burden

$$\boldsymbol{debt\ growth = 5\% = g_{GPD_n}}$$

burden of debt

t	g_{GPD_n}	GDP_n	nominal debt	$\frac{\text{debt}}{GDP_n}$	i	interest payment	$\frac{\text{int. pay.}}{GDP_n}$
1	5%	100	80	80%	3%	2.4	2.4%
2	5%	105	84.2	80%	3%	2.526	2.4%
3	5%	110.25	88.2	80%	3%	2.646	2.4%
4	5%	115.7625	92.61	80%	3%	2.7783	2.4%
5	5%	121.550625	97.2405	80%	3%	2.917215	2.4%

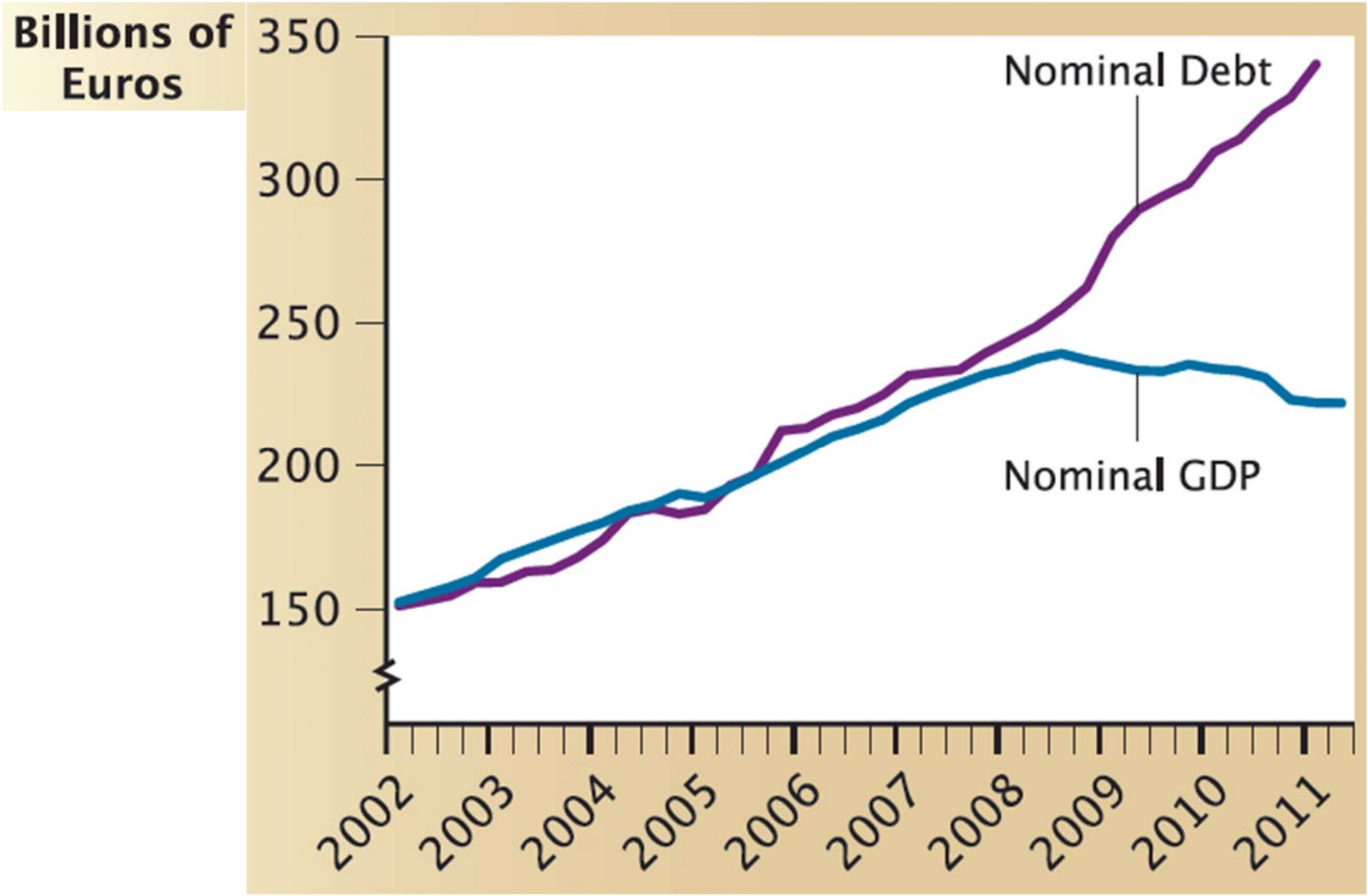
Debt grows, rising burden

$$debt\ growth = 10\% > g_{GPD_n}$$

burden of debt

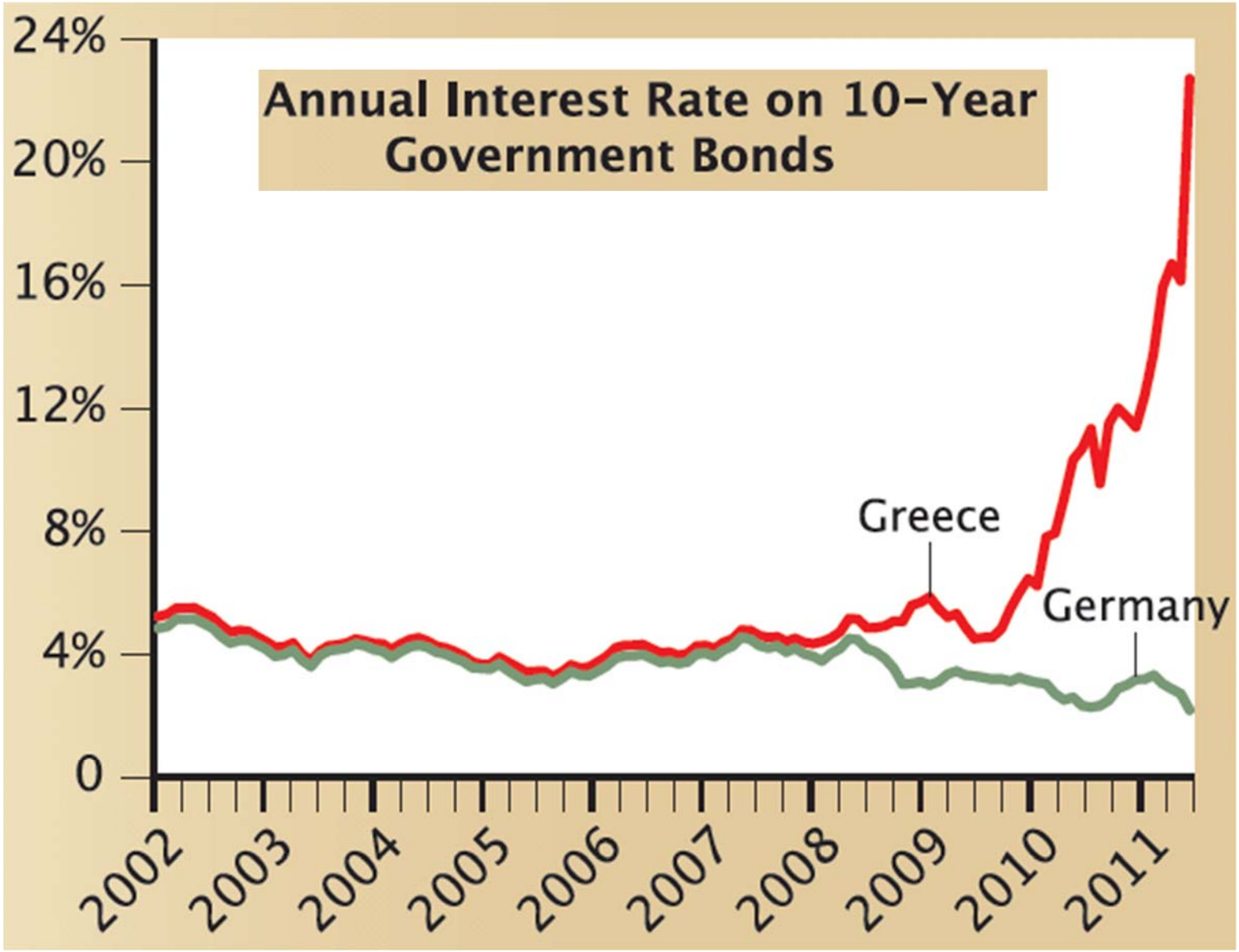
t	g_{GPD_n}	GDP_n	nominal debt	$\frac{\text{debt}}{GDP_n}$	i	interest payment	$\frac{\text{int. pay.}}{GDP_n}$
1	5%	100	80	80%	3%	2.4	2.4%
2	5%	105	88	83.8	3%	2.64	2.51%
3	5%	110.25	96.8	87.8	3%	2.904	2.63%
4	5%	115.7625	106.48	91.9	3%	3.1944	2.75%
5	5%	121.550625	117.128	96.3	3%	3.51384	2.89%

Greece's debt disaster /1



RE Hall & M Lieberman (2012): Macroeconomics. Principles and applications, p. 346

Greece's debt disaster /2



RE Hall & M Lieberman (2012): Macroeconomics. Principles and applications, p. 346

How to reduce the burden of debt /1

- Violations of the debt rule can only be transitory, since taxes collected from nominal GDP to pay the burden have nominal GDP itself as the upper limit.
- Violation of the debt rule rises the debt burden. Lower govt spending and/or higher taxes are necessary to cover the additional interest payments.
- If the rule is restored, spending need not be reduced further nor the tax rate raised again. The problem is that, in comparison with the values before the burden increased, spending is now (permanently) lower and/or the tax rate higher. ①

How to reduce the burden of debt /2

- To reduce the debt burden, the nominal GDP growth rate must be higher than the nominal debt growth rate, at least temporarily.
- This can be achieved by rising the nominal GDP growth rate above the nominal debt growth rate or by lowering the latter below the former.
- Allowing more inflation ② is the easiest way to implement the first option. But, by the Fisher effect, a rise in the interest rate is to be expected. The interest payments of the new debt will then be higher, so the burden reduction will be in danger.

How to reduce the burden of debt /3

- To implement the second alternative (reduce the nominal debt growth rate), the government budget deficit must be lowered.

③

- This requires a temporary rise in tax rates and/or a cut/slowdown in spending ("fiscal austerity").

- A fiscal stimulus leads to an initial GDP boom, but the long-run effects on GDP could be negative if taxes have to be raised to pay for the stimulus. By symmetry, fiscal austerity may contract GDP at first, to next expand it as lower taxes are expected in the future due to lower government debt.

Intertemporal budget constraint /1

- According to the intertemporal government budget constraint, total debt outstanding has to be balanced by the present discounted value of future government budget surpluses.
- The current debt burden is considered sustainable if lenders believe that it will be repaid by future budget surpluses.
- But how distant is that future? That is, when is this constraint actually binding? Is debt repayment more certain if smaller surpluses are immediately obtained or if larger surpluses are obtained later?

Intertemporal budget constraint /2

- To illustrate the effects of the budget constraint, suppose a government "lives" two periods, 1 and 2. Let G_t the government spending in period t, T_t taxes collected in period t, and B_t the bonds issued in period t to finance a possible budget deficit. The interest rate of the bonds issued at t is i_t.
- In $t = 1$, the government budget constraint is $G_1 = T_1 + B_1$: spending is financed by taxes or debt.
- In $t = 2$, $G_2 + (1 + i_1) \cdot B_1 = T_2$, where $(1 + i_1) \cdot B_1$ is the debt the government must pay back in $t = 2$: B_1 (the loan) $+ i_1 \cdot B_1$ (interest payment).

Intertemporal budget constraint /3

- $B_2 = 0$ because no one will lend (by purchasing bonds) in $t = 2$ to a goverment that no longer exists at $t = 3$ (so lenders will not be paid back).
- Dividing by $1 + i_1$ the constraint in $t = 2$, $\frac{G_2}{1+i_1} + B_1 = \frac{T_2}{1+i_1}$. Adding up both constraints, B_1 cancels out and the intertemporal government budget constraint is obtained.

$$\underbrace{G_1 + \frac{G_2}{1+i_1}}_{\text{present discounted value of the government spending}} = \underbrace{T_1 + \frac{T_2}{1+i_1}}_{\text{present discounted value of the government revenue}}$$

Intertemporal budget constraint /4

- The intertemporal government budget constraint means that the there is a limit (a constraint) to what the government can spend: the actual value of all outlays cannot be larger than the actual value of all taxes collected.
- The constraint implies that, eventually, taxes pay off (the value of) all government spending.
- Consequently, debt is merely a instrument to postpone payment not a means of payment itself: more debt today means higher taxes tomorrow (T_2 is obviously higher with a positive B_1).

Debt and deficit /1

- Deficit is a flow variable: the current borrowing of the government (in one year, for instance).
- Debt is a stock variable: what the government currently owes as a result of past deficits.
- The government budget constraint implies that the change in the government debt in period t equals the government budget deficit in period t. That is,

$$\underbrace{B_t - B_{t-1}}_{\text{(real) change in debt}} = \underbrace{r_{t-1} \cdot B_{t-1}}_{\text{(real) interest payment}} + \underbrace{(G_t + TR_t - T_t)}_{\text{(real) primary deficit}} .$$

Debt and deficit /2

- Defining $PD_t = G_t + TR_t - T_t$, and letting the real interest rate be constant, the previous expression can be rewritten as

$$B_t = (1 + r) \cdot B_{t-1} + PD_t.$$

- Let real GDP Y grow at a constant rate g, so $Y_t = (1 + g) \cdot Y_{t-1}$. Dividing both sides by Y_t,

$$\frac{B_t}{Y_t} = (1 + r) \cdot \frac{B_{t-1}}{(1 + g) \cdot Y_{t-1}} + \frac{PD_t}{Y_t}$$

and using the approximation $\frac{1+r}{1+g} \approx 1 + r - g$

Debt and deficit /3

$$\frac{B_t}{Y_t} \approx (1 + r - g) \cdot \frac{B_{t-1}}{Y_{t-1}} + \frac{PD_t}{Y_t}.$$

- In sum,

$$\underbrace{\frac{B_t}{Y_t} - \frac{B_{t-1}}{Y_{t-1}}}_{\text{change in the debt-to-GDP ratio}} \approx \underbrace{(r - g)}_{\text{real interest rate minus GDP growth}} \cdot \underbrace{\frac{B_{t-1}}{Y_{t-1}}}_{\text{initial debt-to-GDP ratio}} + \underbrace{\frac{PD_t}{Y_t}}_{\text{primary deficit-to-GDP ratio}}.$$

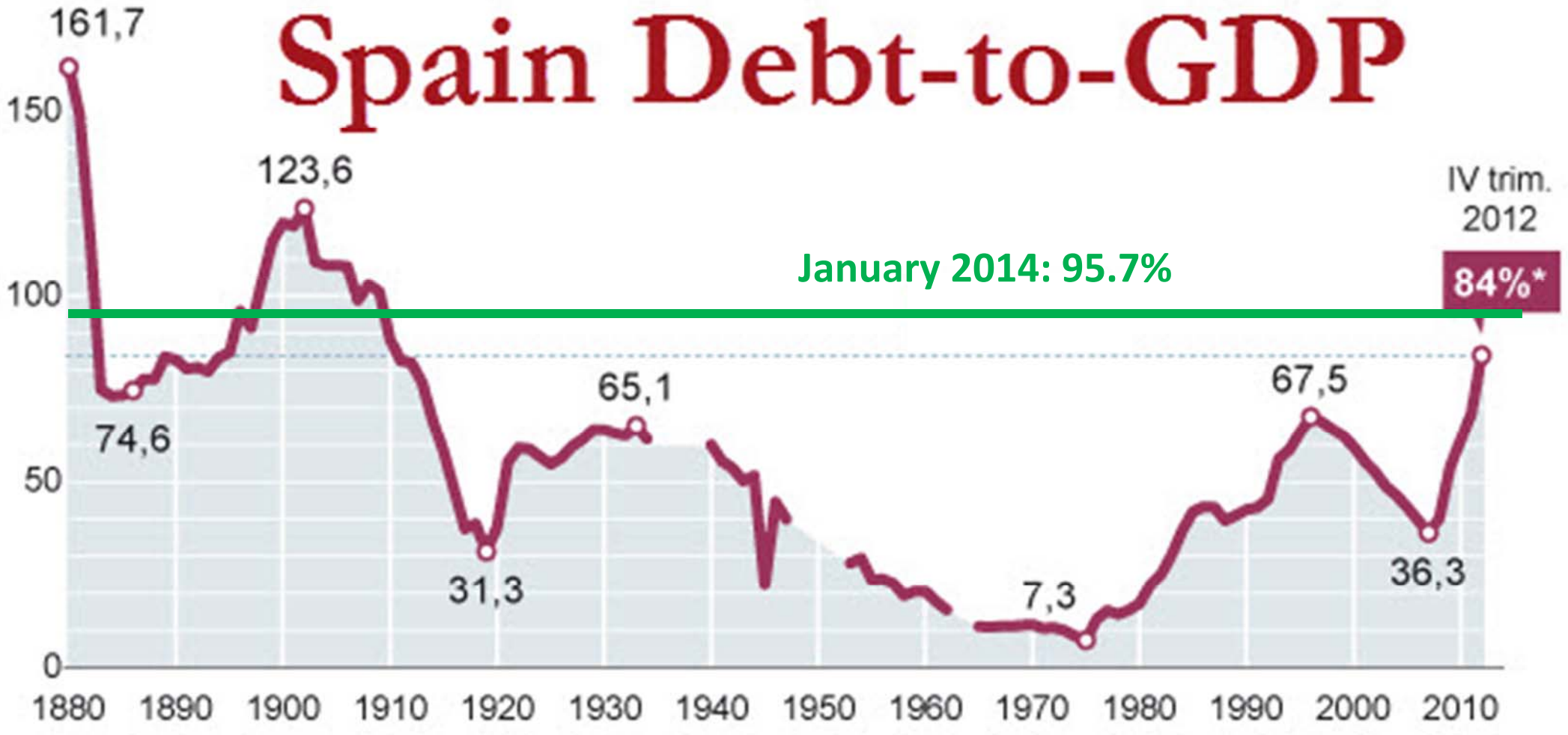
Debt and deficit /4

- Since $B_t = (1 + r) \cdot B_{t-1} + PD_t$, when PD_t is always zero, debt grows at a rate r. As GDP grows at rate g, the difference $r - g$ is the rate of growth of the debt-to-GDP ratio under zero primary deficit.

- According to the final equation in the preceding slide, a reduction of the debt-to-GDP ratio requires
  - that $g > r$ (the GDP growth rate is larger than the real interest rate), o
  - that $PD_t < 0$ (the current primary deficit is reduced).

Debt and deficit /5

- The increase in the debt-to-GDP ratio will be larger
  - the higher the initial debt-to-GDP ratio $\frac{B_{t-1}}{Y_{t-1}}$;
  - the higher the real interest rate r;
  - the lower the growth rate g of real GDP; or
  - the larger the primary deficit to GDP ratio $\frac{PD_t}{Y_t}$.
- High $\frac{B}{Y} \Rightarrow \uparrow$default risk $\Rightarrow \uparrow i \Rightarrow \uparrow r \Rightarrow \downarrow AD \Rightarrow \downarrow Y \Rightarrow \downarrow g \Rightarrow$ need to $\downarrow \frac{PD}{Y} \Rightarrow$ fiscal austerity $\Rightarrow \downarrow AD \Rightarrow \downarrow Y \Rightarrow \downarrow g \Rightarrow \uparrow$default risk $\Rightarrow \uparrow i \Rightarrow \uparrow r \Rightarrow$ … debt-to-GDP ratio harder to lower and more likely a debt explosion is (Spain, 2007: 36%; 2013: 94%).



http://www.zerohedge.com/news/2013-02-18/chart-day-spanish-debt

http://economia.elpais.com/economia/2014/03/17/actualidad/1395050058_140377.html

Controversial ideas /1

- 1/ Expansionary fiscal contraction. Fiscal austerity may be expansive because a reduction in government spending expands private investment, GDP growth, and employment.
- Fiscal austerity may calm down financial markets in a debt crisis. Interest rates fall and, through the rise of value of financial assets, financial wealth rises. Even if fiscal austerity reduces GDP in the short-run (mandated social spending may increase and tax revenues decrease when economic activity declines), it is argued that long-term positive effects outweigh short-term negative effects.

Controversial ideas /2

- 2/ High debt-to-GDP ratios (the fatal 90%) damages GDP growth. Conclusion in a 2010 paper by C. Reinhart and K. Rogoff. Subsequent studies suggested the opposite: low growth causes high debt.
- 3/ The banking sector can be dispensed with in macroeconomic models. But banks may stop performing their presumed function: to channel funds for savers to investors.
- By excluding the banking system from macro models, it is not possible to see that excessive bank lending may lead to a financial crisis.

Controversial ideas /3

- In the recent financial crisis, the problem was not lack of money (bank lending creates money), but the risky and undercapitalized structure of the banks' balance sheets and the failure of regulators and policy makers to realize that.
- Policy based on wrong economic ideas makes economic problems worse and persistence in wrong policies multiply the problems and the harm done.

http://www.forbes.com/sites/francescoppola/2014/03/22/three-dangerous-economic-ideas/

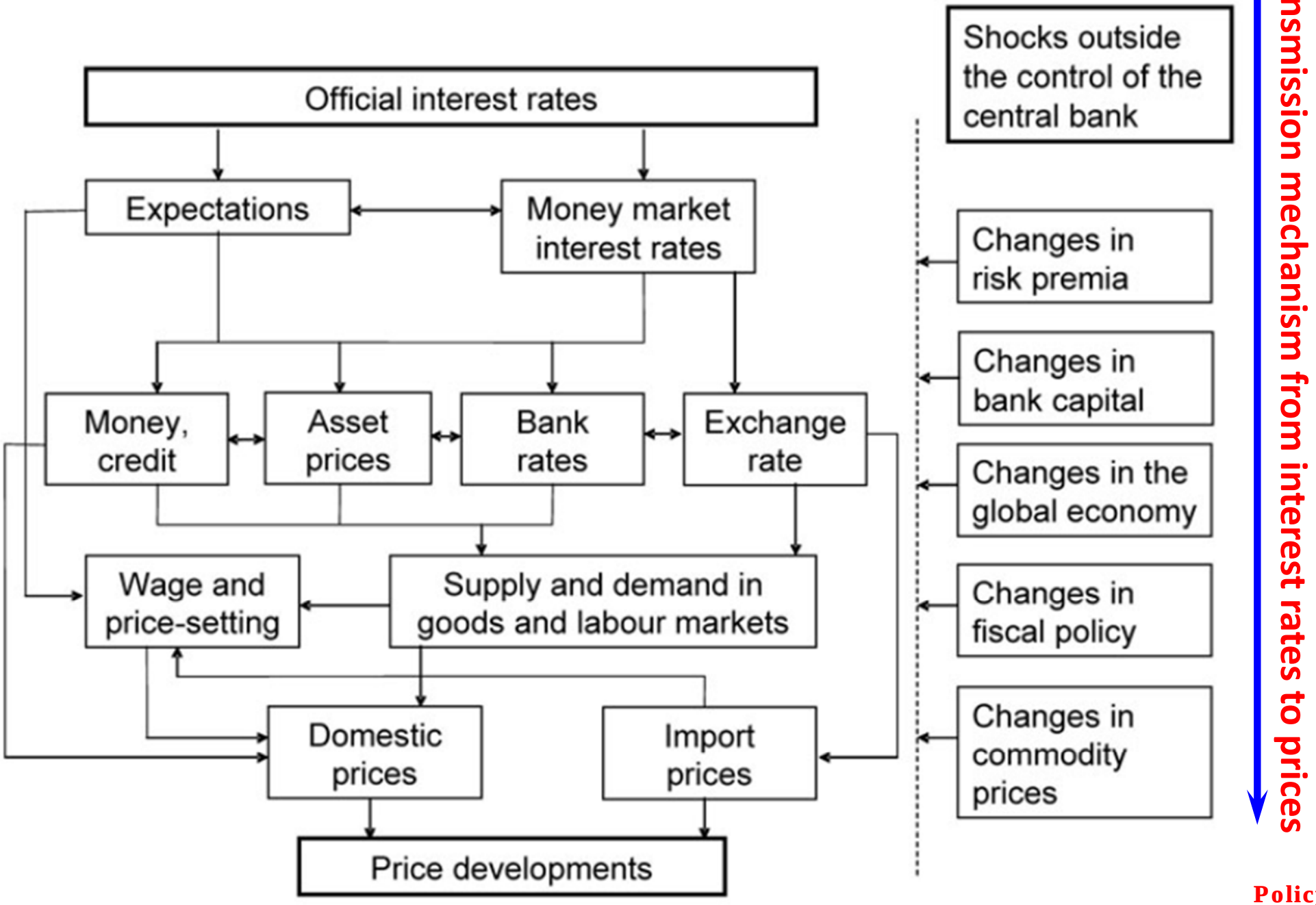
Monetary policy design

Instruments (tools) the CB has → Intermediate targets → Ultimate targets

- Instruments: OMOs, discount rate, and reserve requirements (tools under the CB's direct control).
- Intermediate targets: i, M2, M1, growth of M1… (variables that the CB can influence directly and signal if the CB is closer to the desired target).
- Ultimate targets: Y, y, π, u… (they are the goals of policy: variables in which the CB is really interested [desired target] and can be affected in a predictable way by the intermediate targets)

MP transmission channels

http://www.ecb.europa.eu/mopo/intro/transmission/html/index.en.html



Interest rate channel of MP

- The interest rate channel of MP collects all the effects on the economy that work through changes in the (real) interest rate.
- The following sequence illustrates how the channel works when the MP consists of an expansionary open market operation (the sequence presumes that i reacts quicker than π, which seems reasonable since the prices of financial assets change typically faster than the prices of goods).

$$\uparrow \mathrm{M0} \Rightarrow \uparrow \mathrm{M1} \Rightarrow \downarrow i \Rightarrow \downarrow r \Rightarrow \uparrow \mathrm{C}\, \uparrow \mathrm{I} \Rightarrow \uparrow \mathrm{AD} \Rightarrow \uparrow \mathrm{Y}$$

Exchange rate channel of MP

- The exchange rate channel of MP collects all the effects on the economy that work through changes in the (real) exchange rate e_r.

- A tightening of MP raises e_r. Since e_r is a mesure of the economy's competitiveness, a contractionary MP erodes competitivenss. The following sequence shows how this channel works when the MP consists of an expansionary open market operation.

$$\uparrow \mathrm{M0} \Rightarrow \uparrow \mathrm{M1} \Rightarrow \downarrow i \Rightarrow \downarrow e \Rightarrow \downarrow e_r \Rightarrow \uparrow \mathrm{NX} \Rightarrow \uparrow \mathrm{AD} \Rightarrow \uparrow \mathrm{Y}$$

The credit channel of MP

- This channel collects the effects on the economy that work through credit supply and demand.
- Supply. If the reserve ratio is increased, banks cut lending to accumulate more reserves. Purchases by consumers or small firms that depend on that lending cannot be carried out and AD falls.
- Demand. A tight MP makes borrowers less eligible for loans: if i rises, the firms' financial costs also rise (so their profits fall) and, for consumers, their financial wealth is reduced ($\uparrow i \Rightarrow \downarrow$price of shares).

Stock market channel of MP

- The stock market channel of MP collects all the effects on the economy that work through changes in the stock prices (and, in general, in the financial asset prices).
- The following sequence shows how this channel works when the MP consists of an expansionary open market operation.

$$\uparrow \text{M0} \Rightarrow \uparrow \text{M1} \Rightarrow \downarrow i \Rightarrow \uparrow \text{price of financial assets} \Rightarrow$$
$$\Rightarrow \uparrow \text{wealth} \Rightarrow \uparrow \text{C} \uparrow \text{I} \Rightarrow \uparrow \text{AD} \Rightarrow \uparrow \text{Y}$$

Classical dichotomy

- The classical dichotomy holds that real variables do not depend on nominal variables (for instance, real GDP is not affected by changes in M1). The classical dichotomy is not consistent with the Phillips curve (there is a relationship between a real variable, u, and a nominal variable, π).
- It appears that most macroeconomists (and virtually all textbooks) believe that the classical dichotomy holds in the long run: even though nominal variables may have an impact on real variables in the short run, in the long run that effect vanishes (so, in the long run, MP is ineffective).

Neutrality of money

- Money is neutral if changes in the money stock do not affect real variables (but merely the price level).
- The belief that the classical dichotomy holds in the long run implies the belief that money is neutral in the long run.
- Money neutral in the long run means that more money in the economy only amounts, eventually, to more inflation not more wealth. Mainstream macroeconomics accepts that money is neutral in the long run (that justifies the present role of CBs).

Monetarism

- It is a school of thought that holds that the money stock is the chief determinant of the (short-run) aggregate demand (and, therefore, the nominal GDP, the price level, and the inflation rate).
- Its main policy recommendation is to control the inflation rate by controlling the money stock.
- According to Milton Friedman (1912-2006), monetarism's leading exponent, "Inflation is always and everywhere a monetary phenomenon". Monetarism is based on the quantity equation.

Quantity equation

- The quantity equation (or equation of exchange) is

$$M \cdot V = P \cdot Y$$

where M = money stock, V = velocity of money (number of times per year a euro turns over), P = price level, Y = real GDP (so $P \cdot Y$ is nominal GDP).

- The equation says that the total number of EUR spent in a year ($M \cdot V$) equals the nominal value of the goods produced that year (nominal GDP = $P \cdot Y$). That is, the nominal value of everything sold equals the nominal value of everything bought.

Quantity equation & rates of change

- Using lower case letters to designate rates of change, the rates of change version of the quantity equation is $\boxed{m + v \approx \pi + y}$.
- If the velocity of money remains constant, $v = 0$. In this case, $m \approx \pi + y$. That is, $\pi \approx m - y$.
- This means that the excess of money growth with respect to the economy's growth is inflation. If the economy does not grow ($y = 0$), then $\pi \approx m$: all the increase in the money stock becomes inflation (more money, higher inflation).

Monetization of budget deficits

- A CB monetizes budget deficits when it purchases debt issued by the government to finance a deficit.

- In practice, monetizing the deficit is like paying the budget deficit by issuing/printing new money. This source of revenue for governments is known as seigniorage.

- Monetization may feed inflation. If the CB does not monetize the deficit and the government finances it by issuing bonds, the interest rate will rise and crowd out private expenditure.

The costs of inflation

- The cost of holding money rises with inflation. A cost of holding money is the interest forgone by not holding an interest-bearing asset. By the Fisher effect, more inflation leads to higher interest rates.

- Inflation as a tax. A rising inflation reduces the purchasing power of money (is like losing money).

- Wealth redistribution. Inflation redistributes wealth between debtors and creditors: it benefits nominal debtors and hurts those receiving fixed nominal payments (like pensioners).

Why are CBs independent?

"The central banker's task is to provide the monetary and credit conditions that achieve the ideal balance between accommodating economic expansion and engendering inflation or deflation. […] Why do we have independent central banks? To provide a barrier between government and the money supply. Why is this necessary? Because doing the right thing for the long-term interests of the people can be very hard to do. Monetary policymakers often have to make decisions that can cause economic pain for real people in the short term, or decide not to do things that could help people out of an immediate bad situation, in order to preserve the welfare of the people over the long run."

http://www.dallasfed.org/news/speeches/fisher/2008/fs080207.cfm

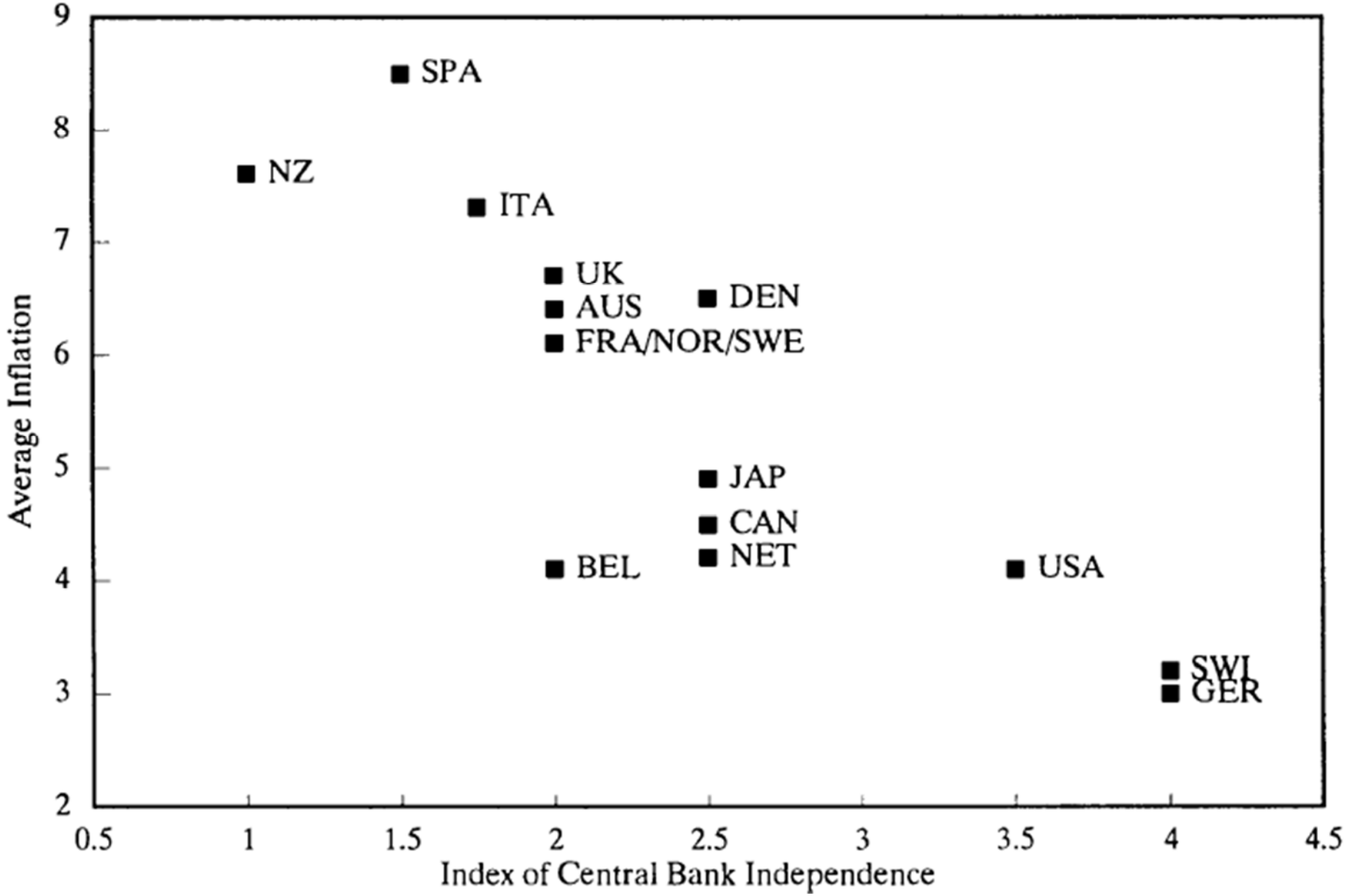
Monetization in Zimbabwe 2004-2009

- Zimbabwe experienced hyperinflation from 2004 to April 2009, with an unemployment rate of 94% at the beginning of 2009, thereby becoming one of the worst economies in the world.

- By December 2008, annual inflation was estimated at 6.5×10^{108} % (6.5 octodecillion = 650 million googol; 1 googol = 10 sexdecilliard = 10^{100}).

- In 2007, President Mugabe unsuccessfully declared inflation illegal. Final solution: in April 2009 the home currency (Zimbabwean dollar) was suspended and foreign currencies were adopted instead.

CB independence & inflation (1955-88)



http://www.deu.edu.tr/userweb/yesim.kustepeli/dosyalar/alesinasummers1993.pdf