Inconsistency of Policies and Oil Shocks

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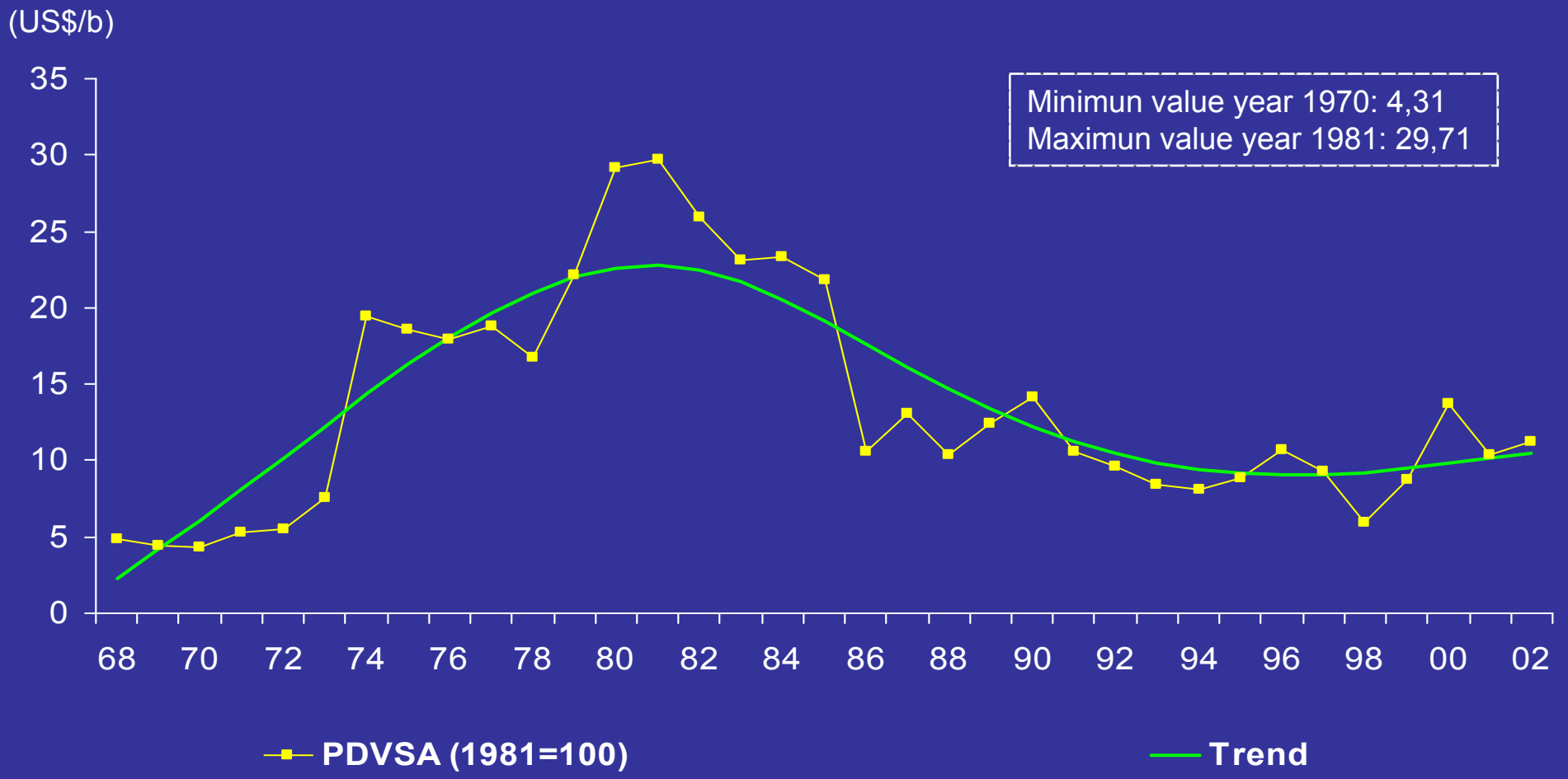
Motivation

- Venezuelan Experience
  - Adverse oil shocks
  - Structural deficits
  - Unstable borrowing
  - Debt restructuring
  - Switching exchange rate regimes
  - High and volatile inflation
  - Free fall in real money balances

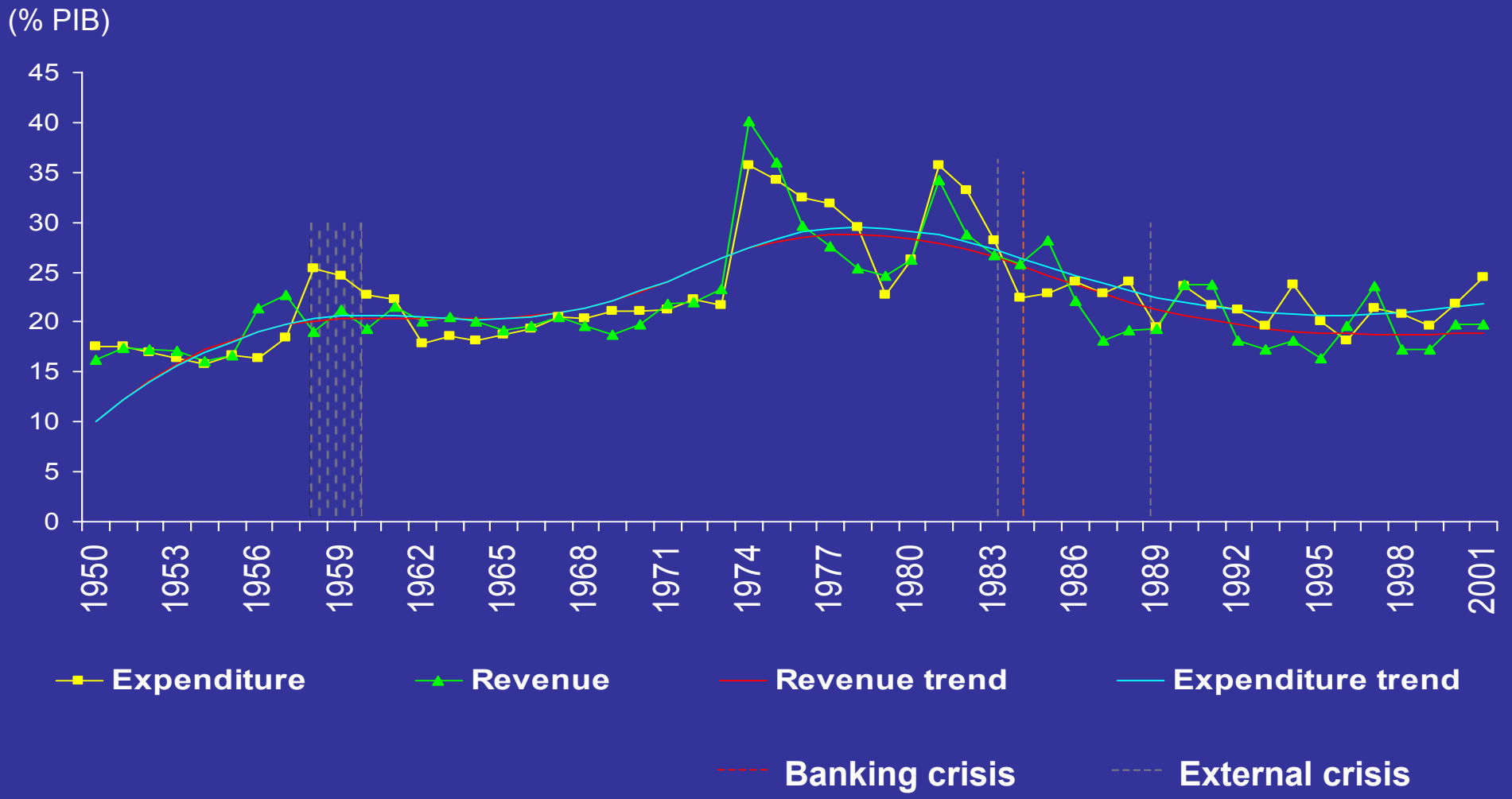
OIL PRICES
VENEZUELAN BASKET



Note: Adjusted with CPI- USA 1981=100.

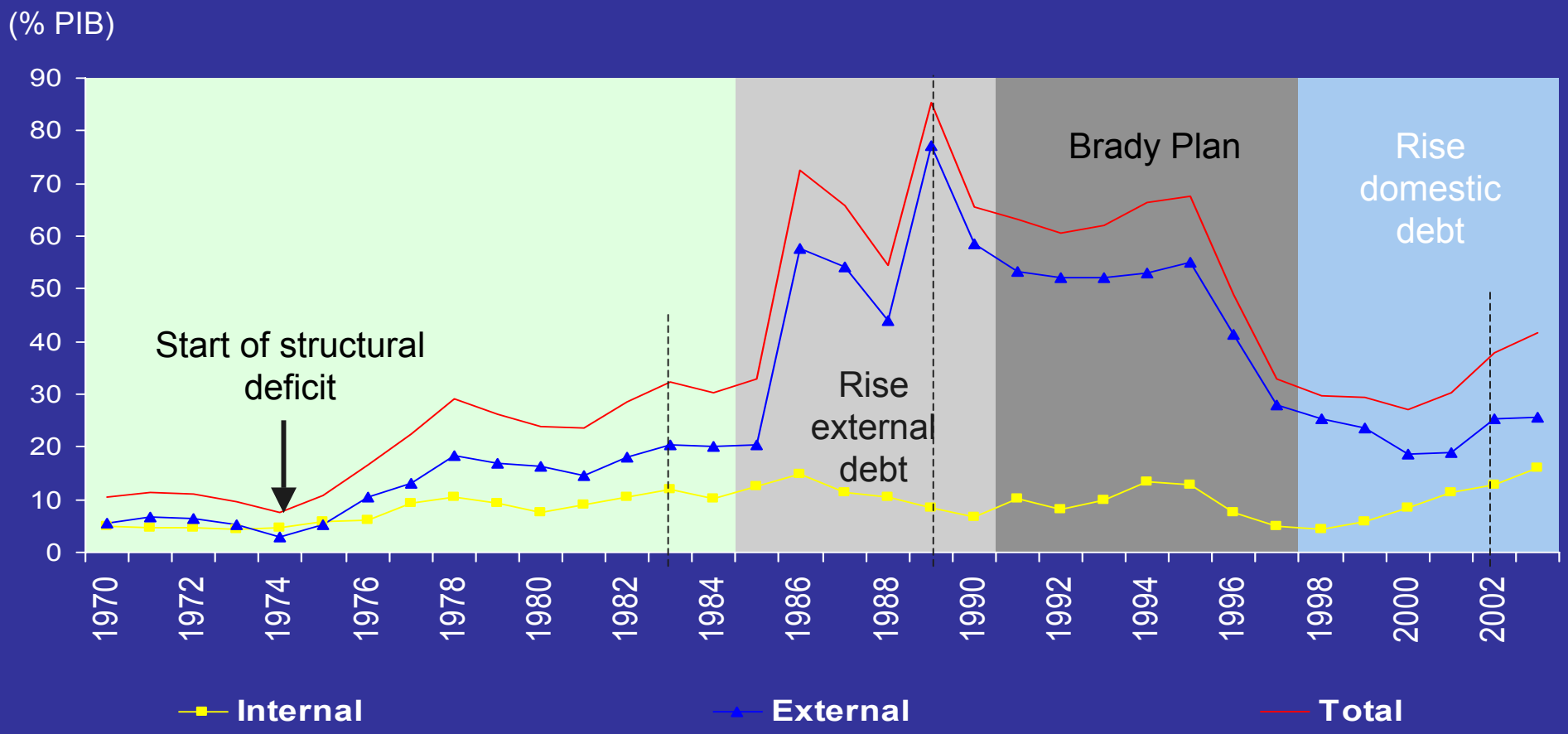
Source:BCV

FISCAL REVENUE AND EXPENDITURE
(1950-2001)



Source: FMI.

EVOLUTION OF VENEZUELAN PUBLIC DEBT (1970-2003)



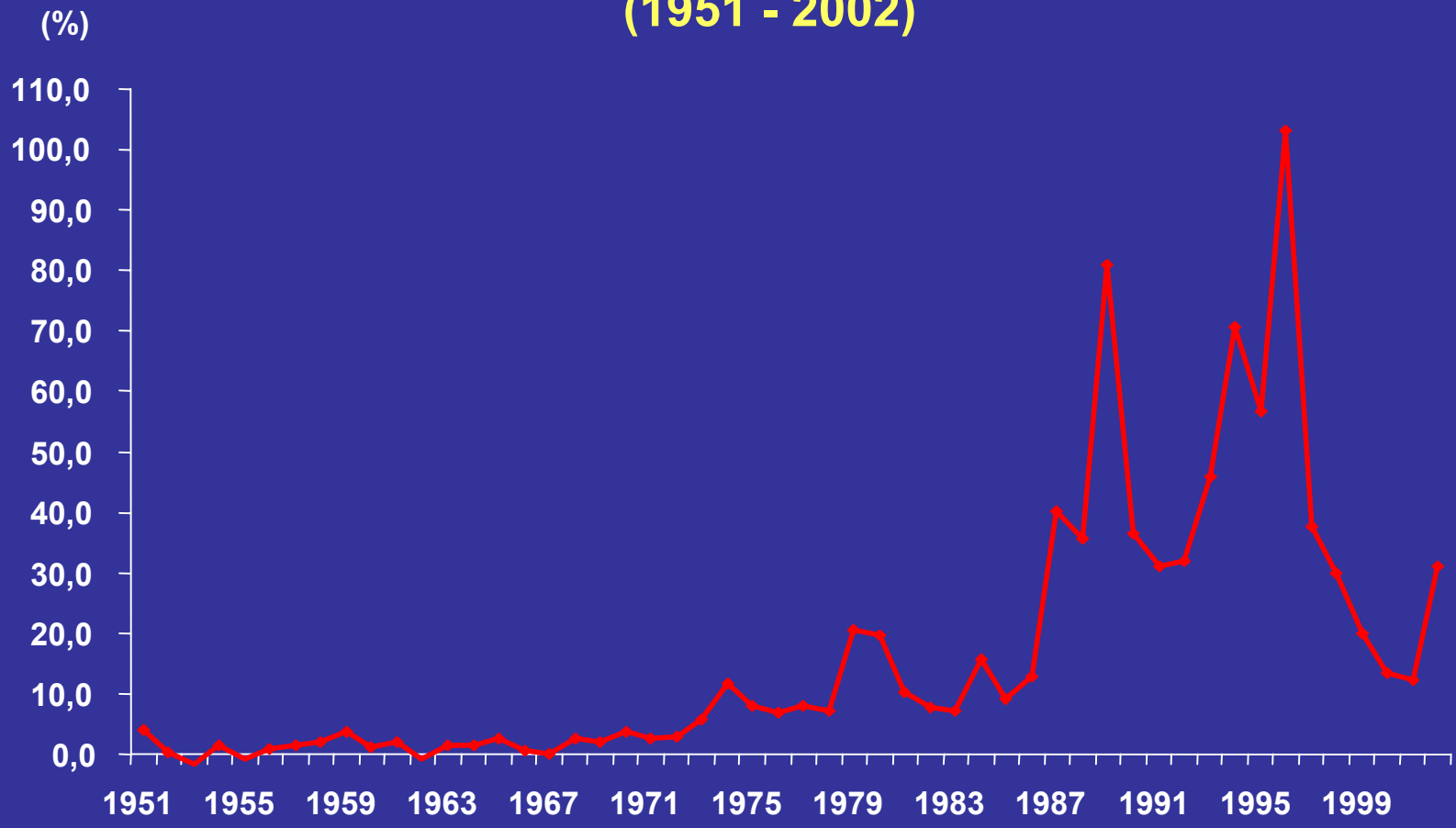
Source: Ministerio de Finanzas, BCV.

The Venezuelan Case

1941-1960	Multiple exchange rate system External Crisis (1958-1960)
1960(nov)-1963	Exchange Rate Control (M)
1964-1983 (Feb)	Fixed
1983-1989 (Feb)	External Crisis (1983) Restructuring (1984-1986) Exchange Rate Control (M) External Crisis (1989)
1989-1992 (Sep)	Managed Floating Restructuring (1989-1990)
1992-1994 (April)	Crawling Peg Banking Crisis (Jan 1994)
1994(May-Jun)	Floating Exchange Rate
1994 (Jul) –1996 (April)	Exchange Rate Control (U)
1996 (May-Jun)	Floating Exchange Rate
1996(July) – 2002 (Feb)	Exchange Rate within Crawling Bands Restructuring (1996) External Crisis (2002)
2002 (Feb)- 2003(Jan)	Floating Exchange Rate External Crisis (2002)
2003 (Jan)-today	Exchange Rate Control (U) Restructuring (Jul)

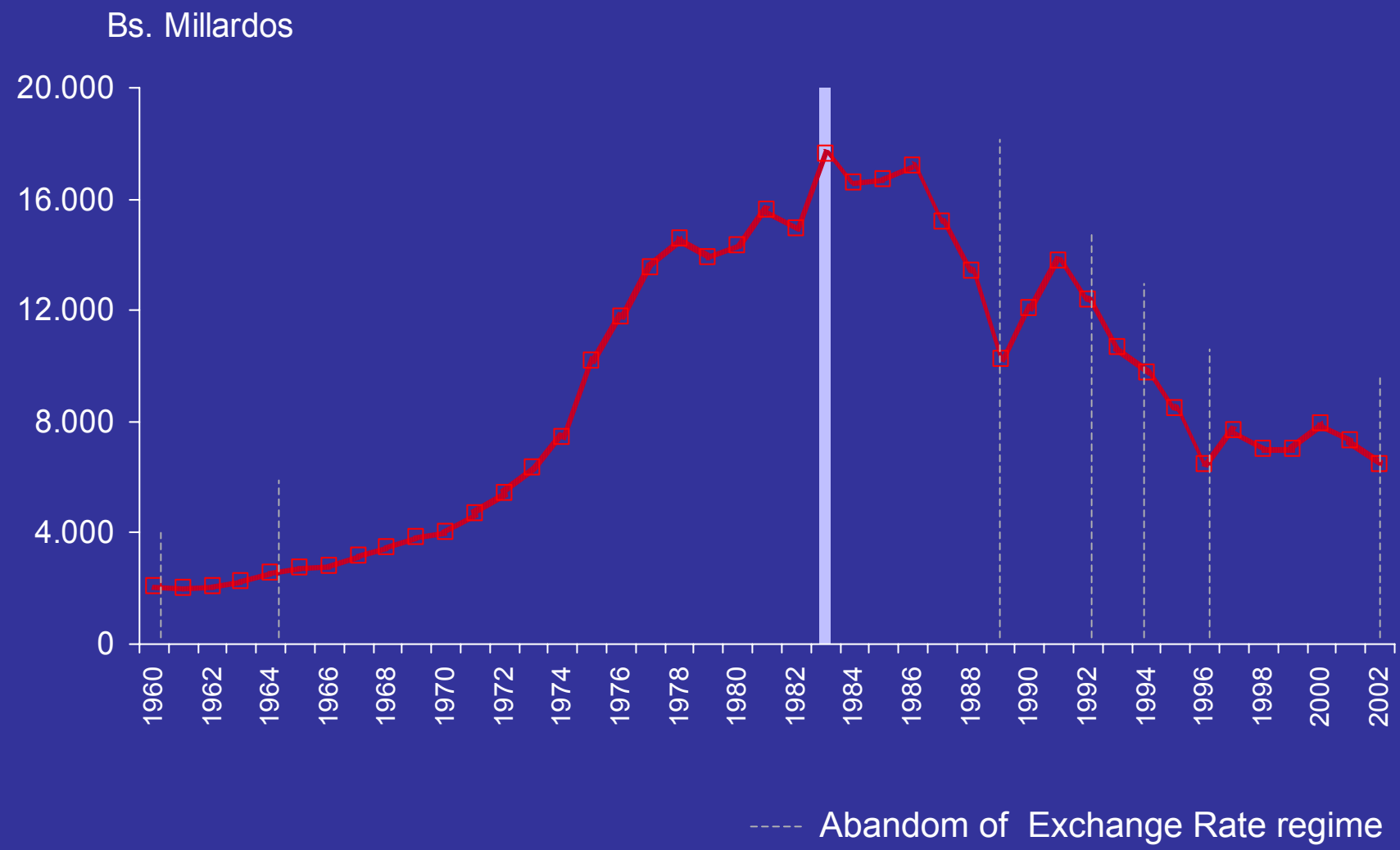
DINAMICS OF INFLATION

(1951 - 2002)



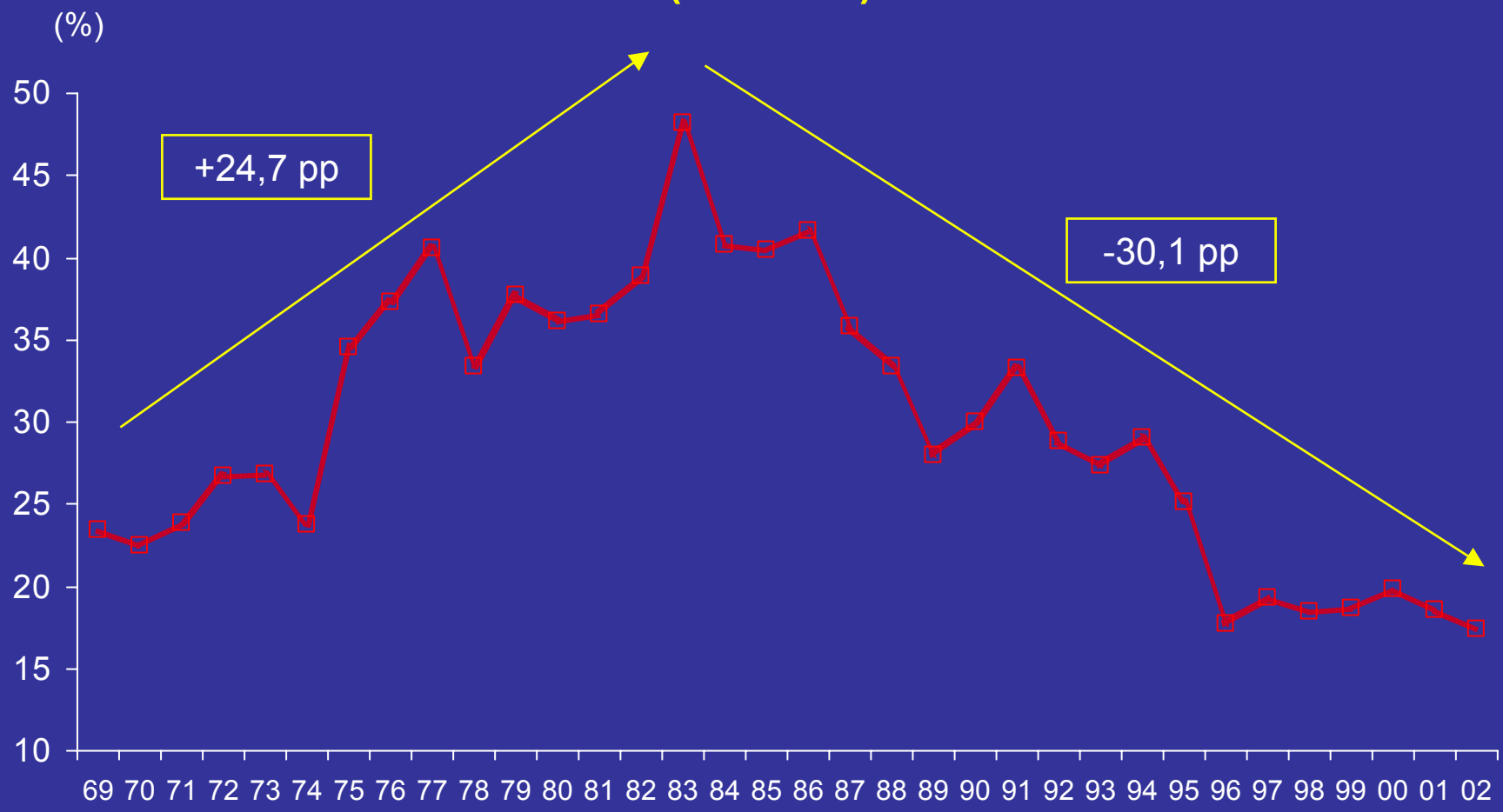
Source: BCV

REAL MONETARY BALANCES



Source: BCV.

MONETARY BALANCES (M2/GDP)



Source: BCV.

Objective

- To analyze the inconsistency between monetary policy programs and a given fiscal policy for an oil economy
  - Permanent oil revenue reductions
  - Fiscal corrections are not implemented
  - Intermediate monetary policy variable maintained at original level
  - Inflation, debt, and real money balances

Literature Review

- Sargent and Wallace (1981), Leviatan (1984), Drazen (1985)
  - Unpleasant monetarist arithmetic
- Auernheimer (1987)
  - Failure of inconsistent stabilization programs based on exchange rate or monetary anchors
- Zavarce (1998)
  - Policy inconsistency for a peg with exchange rate control

The Model

- Two goods
  - X_g (state property)
  - Y (private property)
- Internationally traded without restrictions at given prices
  - X_g not consumed within the country
  - $P = E P_y$

The Model

- The government cum central bank – net debtor, *b*
- The private sector – net creditor, *a*
- The government and the private sector can lend and borrow at international markets at a rate *r*
- $r = r(\Omega, r^*) = r^* + \Psi(\Omega)$

The Government and the Central Bank

$$\underbrace{g - T - X_g \frac{P_g}{P_y} \frac{EP_y}{P}}_{\text{primary deficit}} + br = \dot{b} + \frac{\dot{M}}{P}$$

seigniorage $$\frac{\dot{M}}{P} = m\,\mu = \dot{m} + m\,\pi$$

indebtedness $$\dot{b} = d + br\left(r^*, \Omega\right) - \mu\, m$$

Households

$$\max_{\{c(t),m(t)\}} \int_0^{\infty} [u(c)+ v(m)]e^{-\rho t}\,dt$$

$$\dot{w} = y + wr - c - T - m(r+\pi)$$

$$w \equiv a + m$$

$$a(0) \qquad is\ given$$

$$\lim_{t\to\infty} we^{-rt} = 0$$

Balance of Payments

Country's net debt: $\Omega \equiv b - a$

$$\dot{\Omega} = \underbrace{\left(c + g - y - X_g P_g\right)}_{\text{balance trade deficit}} + \underbrace{\Omega r\left(r^*, \Omega\right)}_{\text{net interest payments}}$$

Inconsistency, Sustainability, and Solvency

Transversality condition:

$$\lim_{t \to \infty} \; e^{\int_0^t r\left(r^*, \Omega\right) dz} \; b\left(t\right) = \; 0$$

Maximum sustainable debt:

$$b\left(\bar{t}\right) = \max \; b \; = \frac{1}{\rho}\left[\max_{\pi} \; \left(\pi \; l\left(\tilde{c}, \pi \; + \; \rho\right)\right) - \; d\right]$$

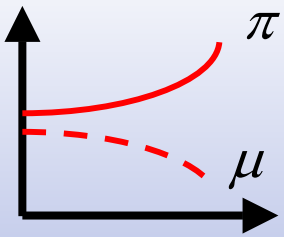
$$\tilde{b} \; = \; \frac{\mu \; \tilde{m} \; - \; d}{\rho} = \; \frac{\pi \; \tilde{m} \; - \; d}{\rho}$$

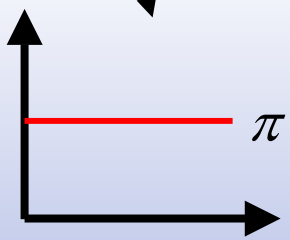
Results

Xg.Pg → C → DM

$$M = M(0)e^{\pi^0 t}$$

$$E = E(0)e^{\pi^0 t}$$





$$\dot{b} = d + br - m(\pi, c)\mu$$

$$\dot{b} = d + br - m(\pi, c)\pi$$

Debt intolerance and abandonment of exchange rate regime

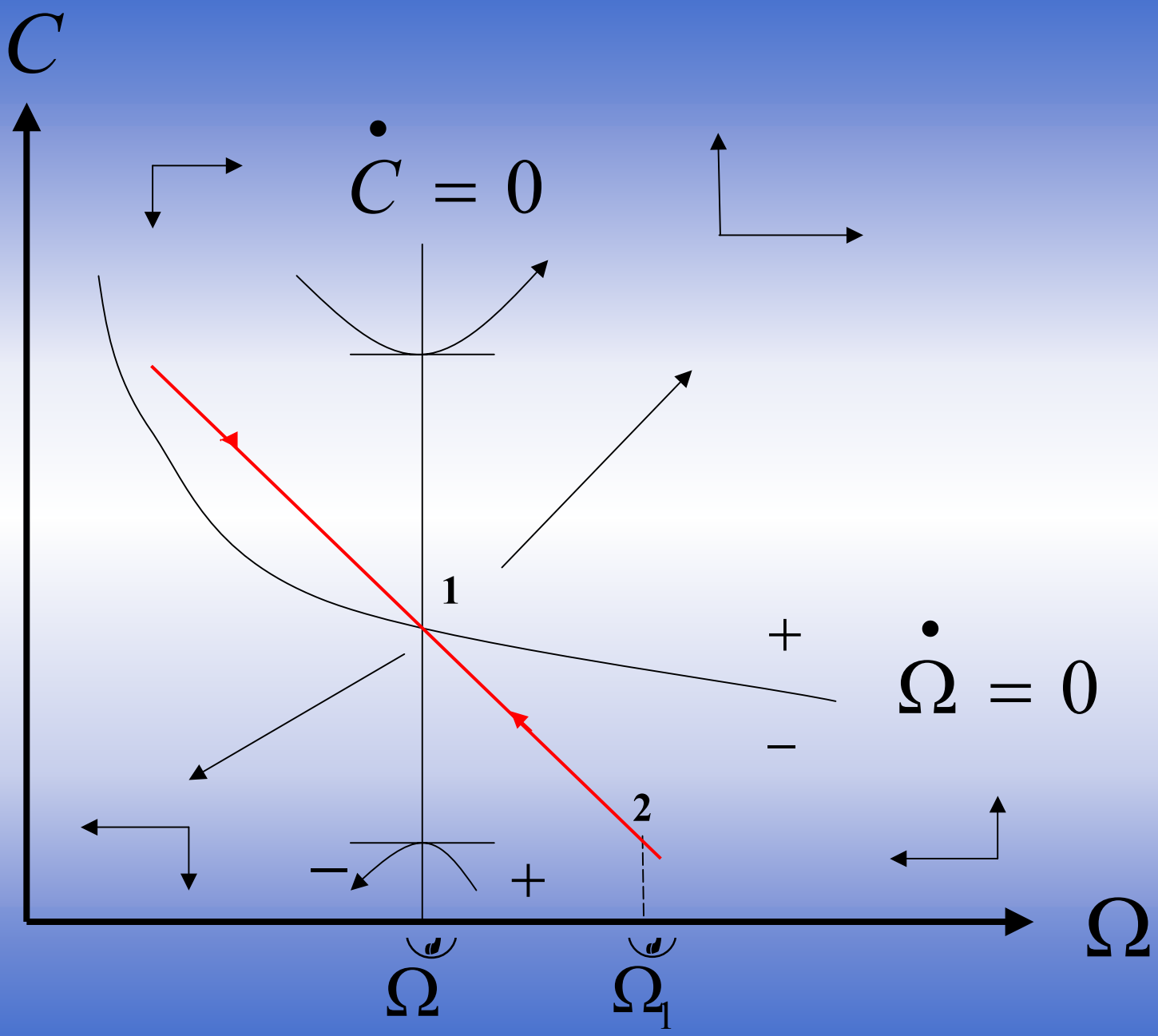
Solution to the Model

Euler's equation for consumption:

$$\dot{c} = \frac{u'}{u''}\left[\rho - r\left(r^*, \Omega\right)\right]$$

Country's net debt path:

$$\dot{\Omega} = \left(c + g - y - X_g P_g\right) + \Omega\, r\left(r^*, \Omega\right)$$


C
$\dot{C} = 0$
1
+
$\dot{\Omega} = 0$
−
2
−
+
Ω
Ω
Ω_1

Intermediate Variable: Exchange Rate

Exchange rate rule

$$E(t) = E(0)e^{\pi t}$$

Inflation

$$\pi = \frac{\dot{E}}{E}$$

Demand for money

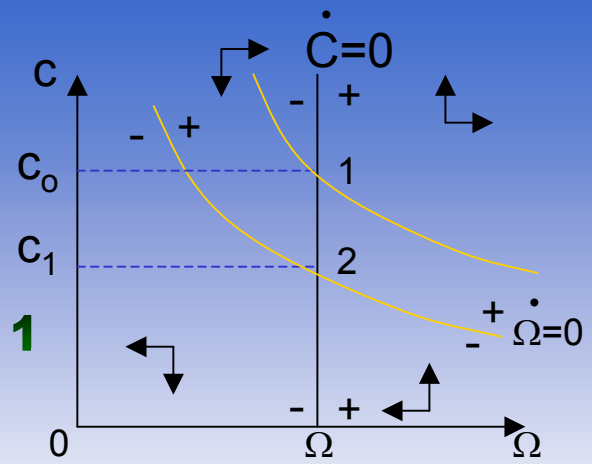
$$v'(m) = u'(c)\left[r\left(r^*, \Omega\right) + \pi\right]$$

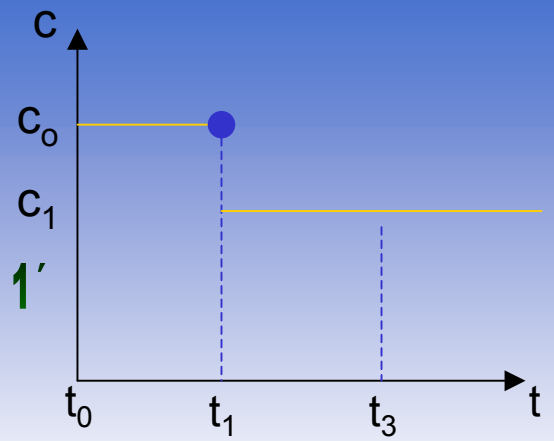
Path of real money balances

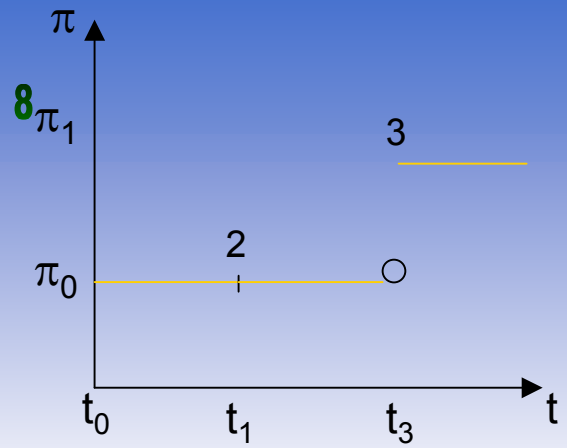
$$\dot{m} = 0$$

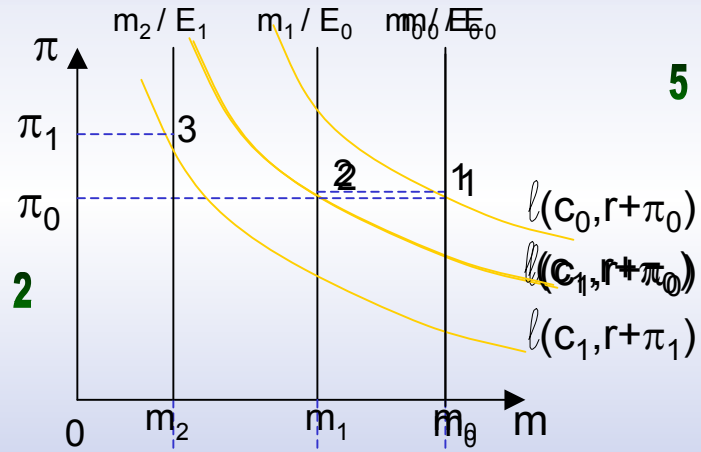
Public indebtedness

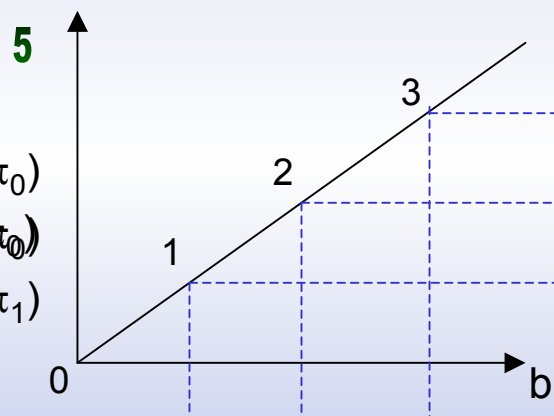
$$\dot{b} = d + br\left(r^*, \Omega\right) - \pi\, m$$

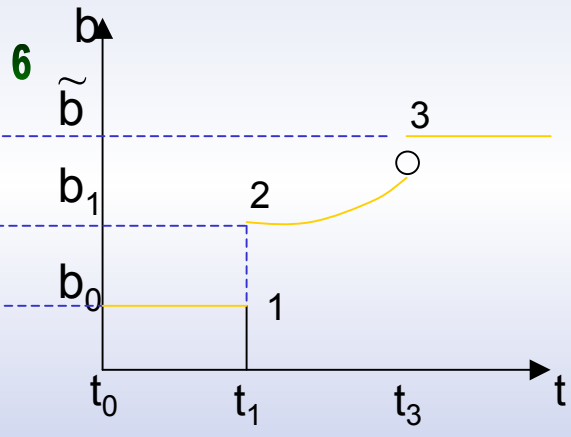

$\dot{C}=0$
c
c_o
c_1
1
2
0
Ω
Ω
$\dot{\Omega}=0$

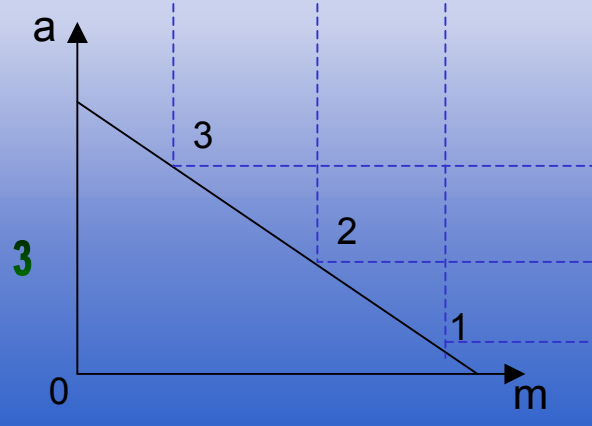

c
c_o
c_1
1′
t_0
t_1
t_3
t

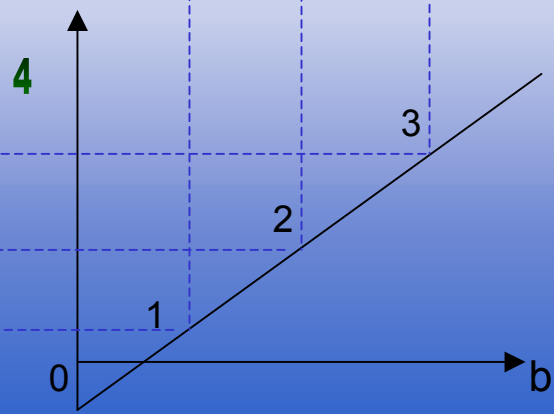

π
8
π_1
π_0
3
2
t_0
t_1
t_3
t

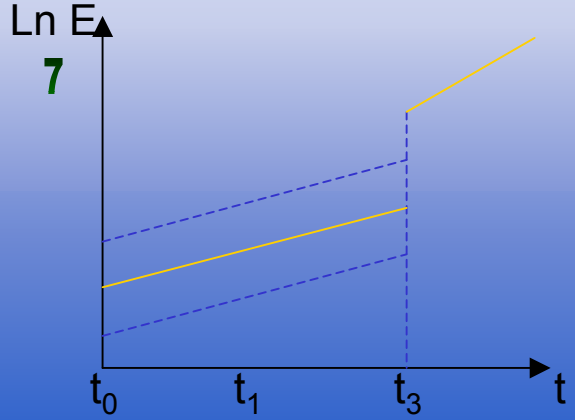

m_2 / E_1
m_1 / E_0
π
π_1
π_0
2
3
1
$\ell(c_0, r+\pi_0)$
$\ell(c_1, r+\pi_0)$
$\ell(c_1, r+\pi_1)$
0
m_2
m_1
m


5
3
2
1
0
b


6
b
$\tilde{b}$
b_1
b_0
3
2
1
t_0
t_1
t_3
t


a
3
2
1
0
m


4
3
2
1
0
b


Ln E
7
t_0
t_1
t_3
t

Intermediate Variable: Monetary Rule

Monetary Rule

$$M(t) = M(0)e^{\mu t}$$

Inflation

$$\pi = \frac{v'(m)}{u'(c)} - r$$

Path of real money balances

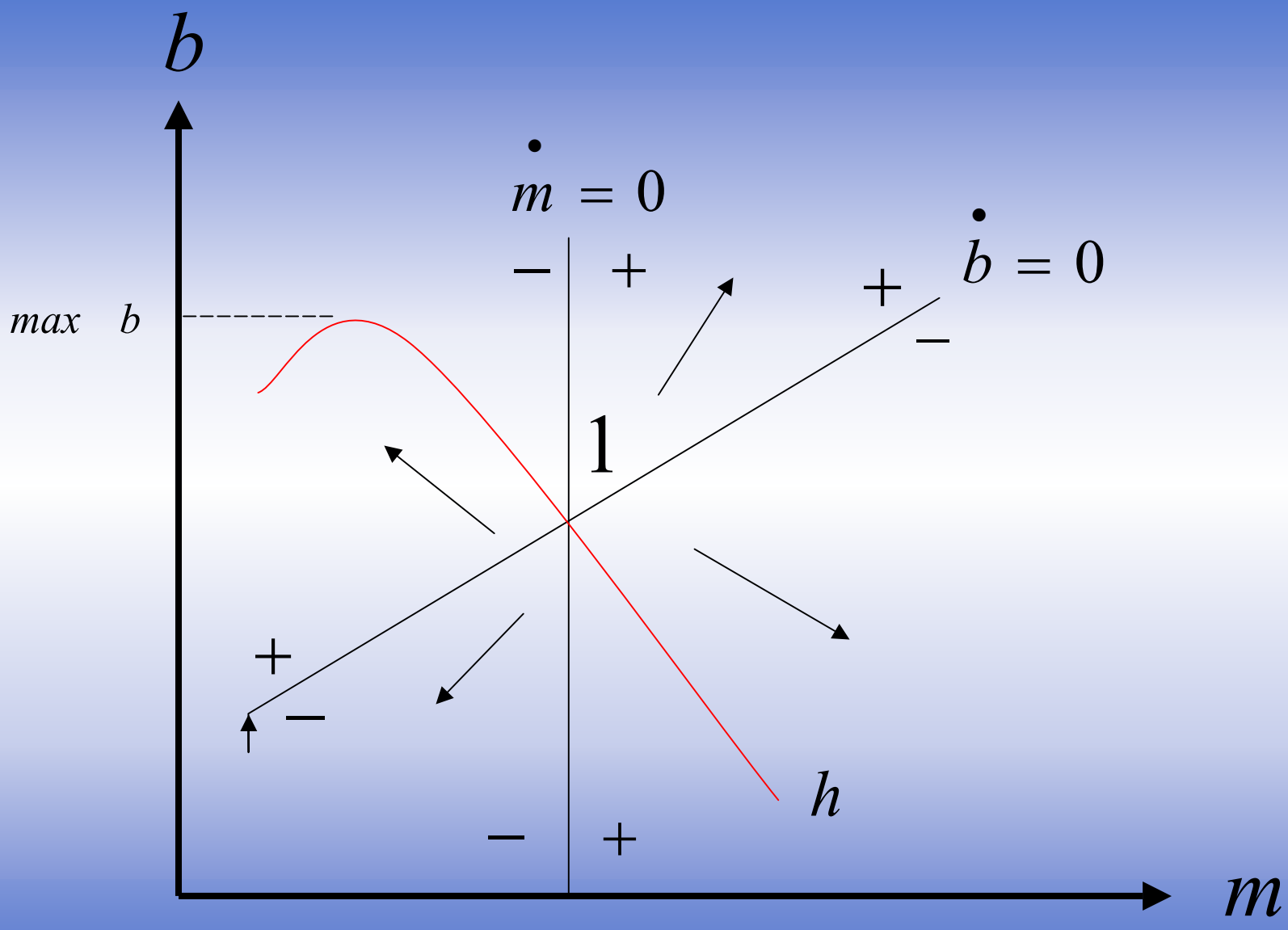
$$\dot{m} = m\left[\mu + r - \frac{v'(m)}{u'(c)}\right]$$

Public indebtedness

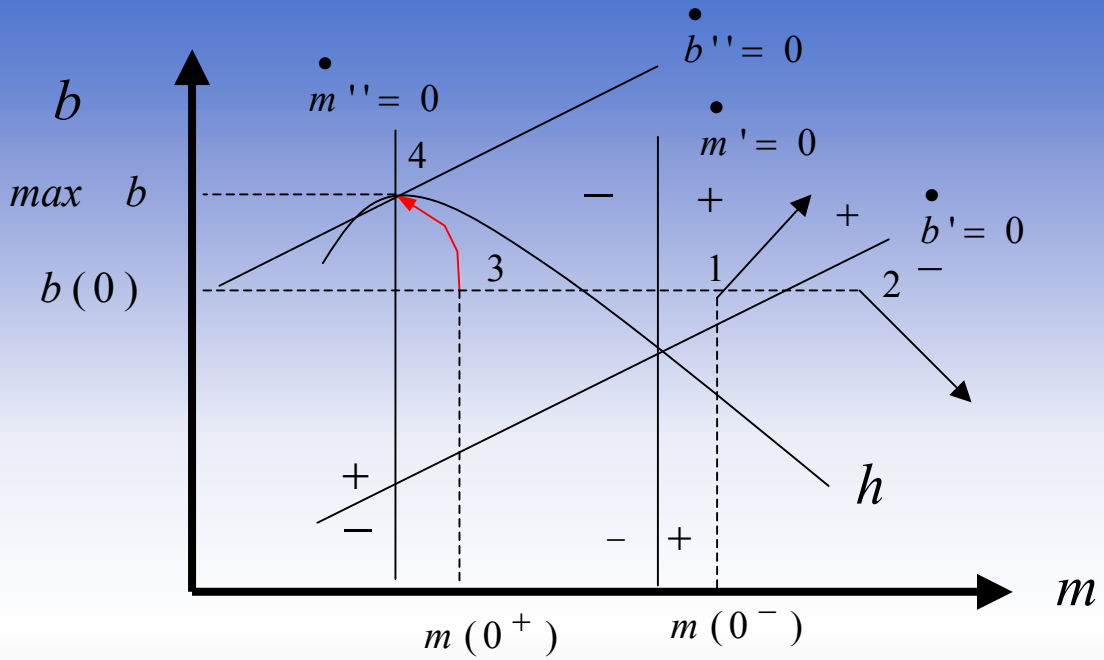
$$\dot{b} = d + br - \mu m$$

h curve

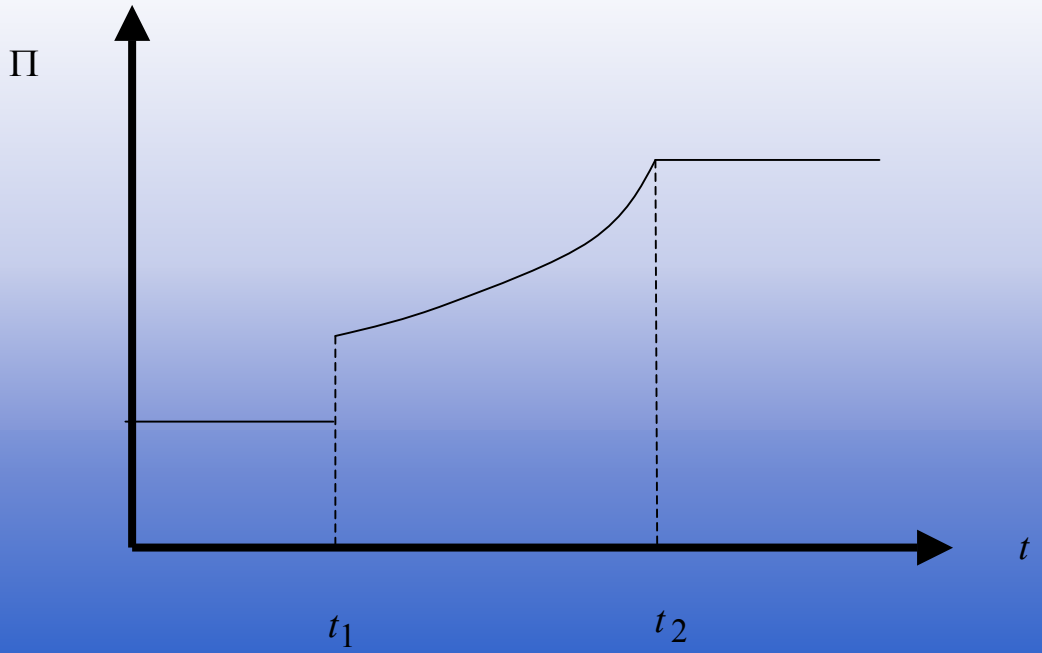
$$b = \frac{1}{r}\left[\left(\frac{v'(m)m}{u'(c)} - mr\right) - d\right]$$


b
max b
$\dot{m} = 0$
$\dot{b} = 0$
1
h
m

(1)



(2)



Concluding Remarks

- *Ceteris paribus*, a permanent oil revenue reduction may lead to higher inflation and greater indebtedness
- Inflation exhibits unstable dynamics under monetary rule

Further Research Topics

- Why does the monetary authority keeps the monetary regime when the economy is hit by a permanent shock to public income?
  - Uncertain timing for fiscal adjustments
  - Fiscal discipline

Further Research Topics

- How is the macroeconomic dynamic under inflation targeting?
- Which regime is Pareto superior?
- Which regime implies the largest transition period?