

# The Monetary and Fiscal History of Latin America: Brazil

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**The Monetary and Fiscal History of Latin America:  
A comparative case study using a common approach  
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# INTRODUCTION

# Brazilian Hyperinflation: Protracted and Resilient

- Lasted a decade
- Why? Indexation made hyperinflation possible without output collapse;
- 5 failed attempts to stabilize;
- The last attempt worked: Real Plan (July, 1994);
- Inflation has been controlled for the last 2 decades;
- Money and inflation: annual inflation rates are well explained by static link with annual money growth.

# Not Classic Sargent-Wallace Fiscal Dominant Stabilization

- Standard fiscal-driven-stabilization logic assumes that money printing ends when a large credible fiscal adjustment is made;
- Brazilian *Real* was not like that;
- Money hyper-printing stopped in the *Real* Plan
- But fiscal situation deteriorated markedly under this plan
- Saw higher operational deficits (primary+real interest on debt)
- Only five years after stabilization did fiscal stance improve;
- Punchline: While fiscal stance eventually improved, there was no “deliberate and drastic” fiscal measures associated with the end of the Brazilian hyperinflation.
- Is Brazil a Pro-Friedman, Anti-Sargent-Wallace case?

# Brazilian Stabilization: Deindexation and Stop Money Printing

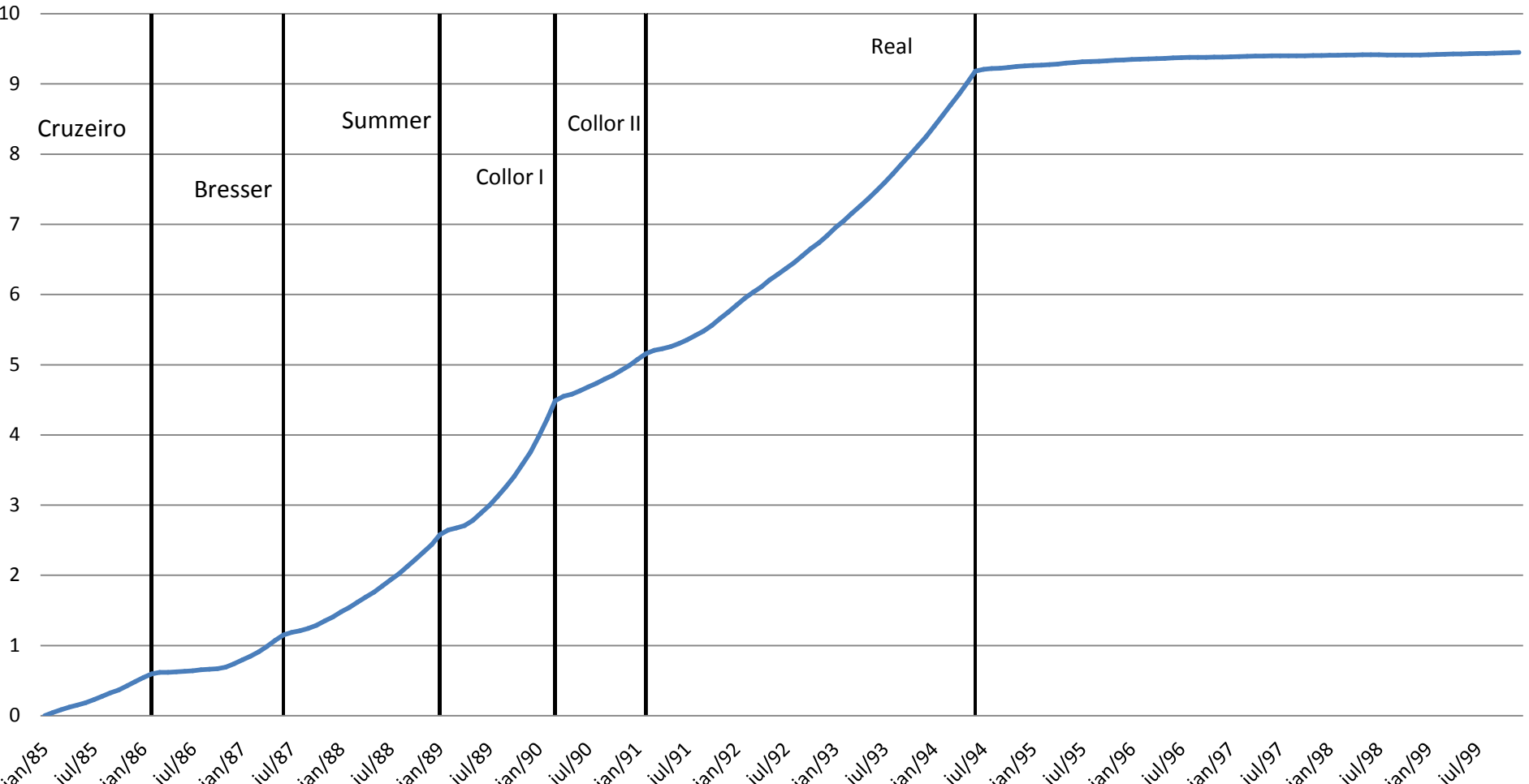
- Stabilization displays a close static link between money printing and inflation;
- The fiscal deterioration, from 1995 to 1999, somehow did not derail stabilization.

# Plan of This Talk

- History of the Brazilian hyperinflation;
- The 5 failed Stabilization attempts;
- The Real Plan: Why did it work?
- Because cut money growth;
- Didn't cut deficits;
- Tight contemporaneous link between money and inflation.

# **BRAZILIAN HYPERINFLATION: HISTORY**

**BRAZIL: PRICE LEVEL (in log)**  
**Consumer Price Index (log(Jan, 1985)=1)**

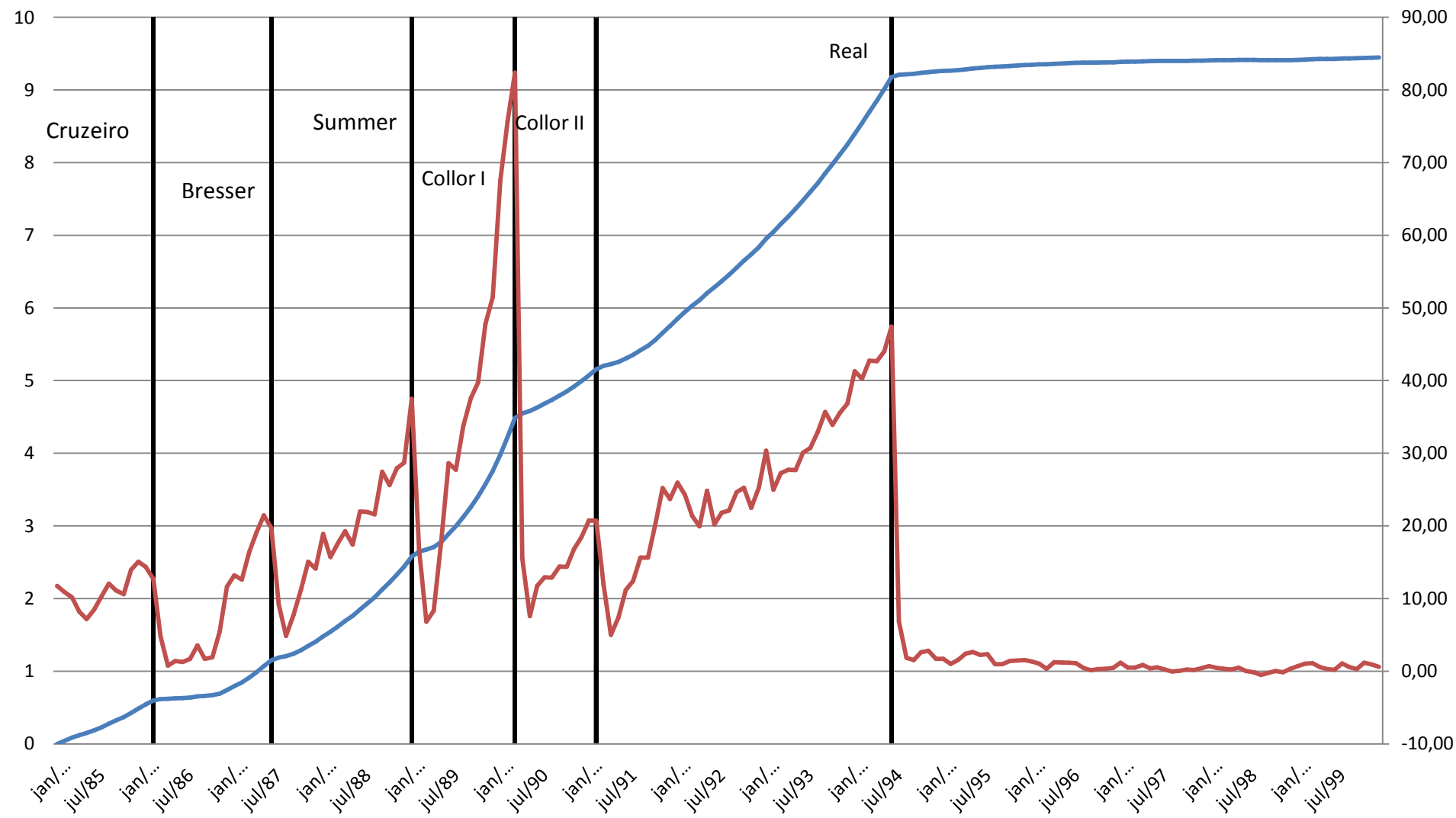


Source: Consumer Price Index (IPCA) from IBGE



# BRAZIL:

## PRICE LEVEL (in log) and INFLATION (% per month)



Source: Consumer Price Index (IPCA) from IBGE

# Brazilian Hyperinflation

- Lasted much longer than classic hyperinflations.

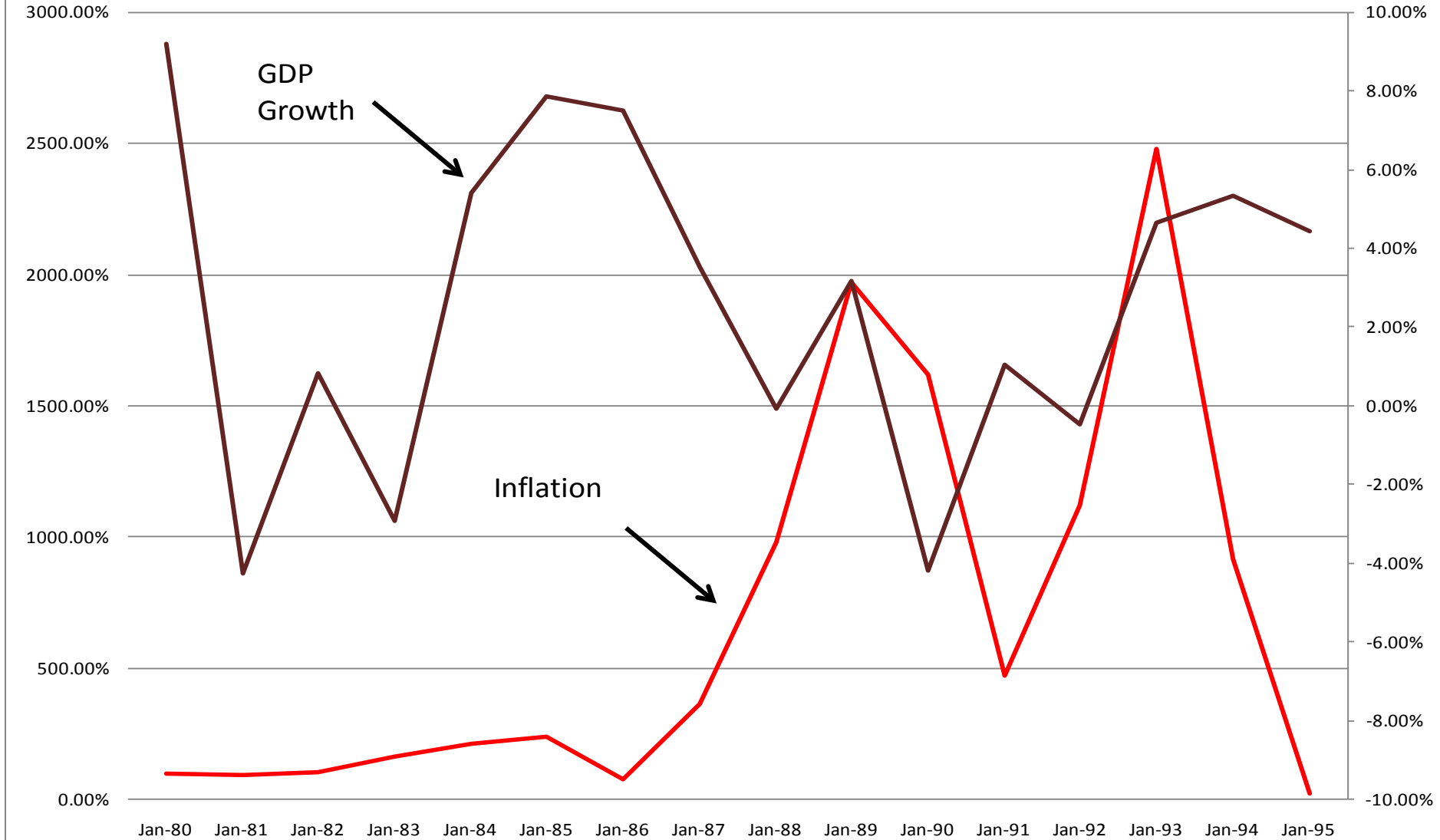
# Classical Hyperinflations

| Country       | Beginning        | End              | $P_t/P_0$                              | Av Monthly<br>Inflation Rate (%) | Av Monthly M<br>Growth (%) |
|---------------|------------------|------------------|--|----------------------------------|----------------------------|
| Austria       | Oct. 1921        | Aug. 1922        | 70                                     | 47                               | 31                         |
| Germany       | Aug. 1922        | Nov. 1923        | $1 \times 10^{10}$                     | 322                              | 314                        |
| Greece        | Nov. 1943        | Nov. 1944        | $4.7 \times 10^6$                      | 365                              | 220                        |
| Hungary 1     | Mar. 1923        | Feb. 1924        | 44                                     | 46                               | 33                         |
| Hungary 2     | Aug. 1945        | Jul. 1946        | $3.8 \times 10^{27}$                   | 19800                            | 12200                      |
| Poland        | Jan. 1923        | Jan. 1923        | 699                                    | 82                               | 72                         |
| Russia        | Dec. 1921        | Dec. 1921        | $1.2 \times 10^5$                      | 57                               | 49                         |
| <b>Brazil</b> | <b>Jan. 1983</b> | <b>Jun. 1994</b> | <b><math>1.4 \times 10^{10}</math></b> | <b>20</b>                        | <b>19</b>                  |

# Why Brazilian Hyperinflation Lasted So Long?

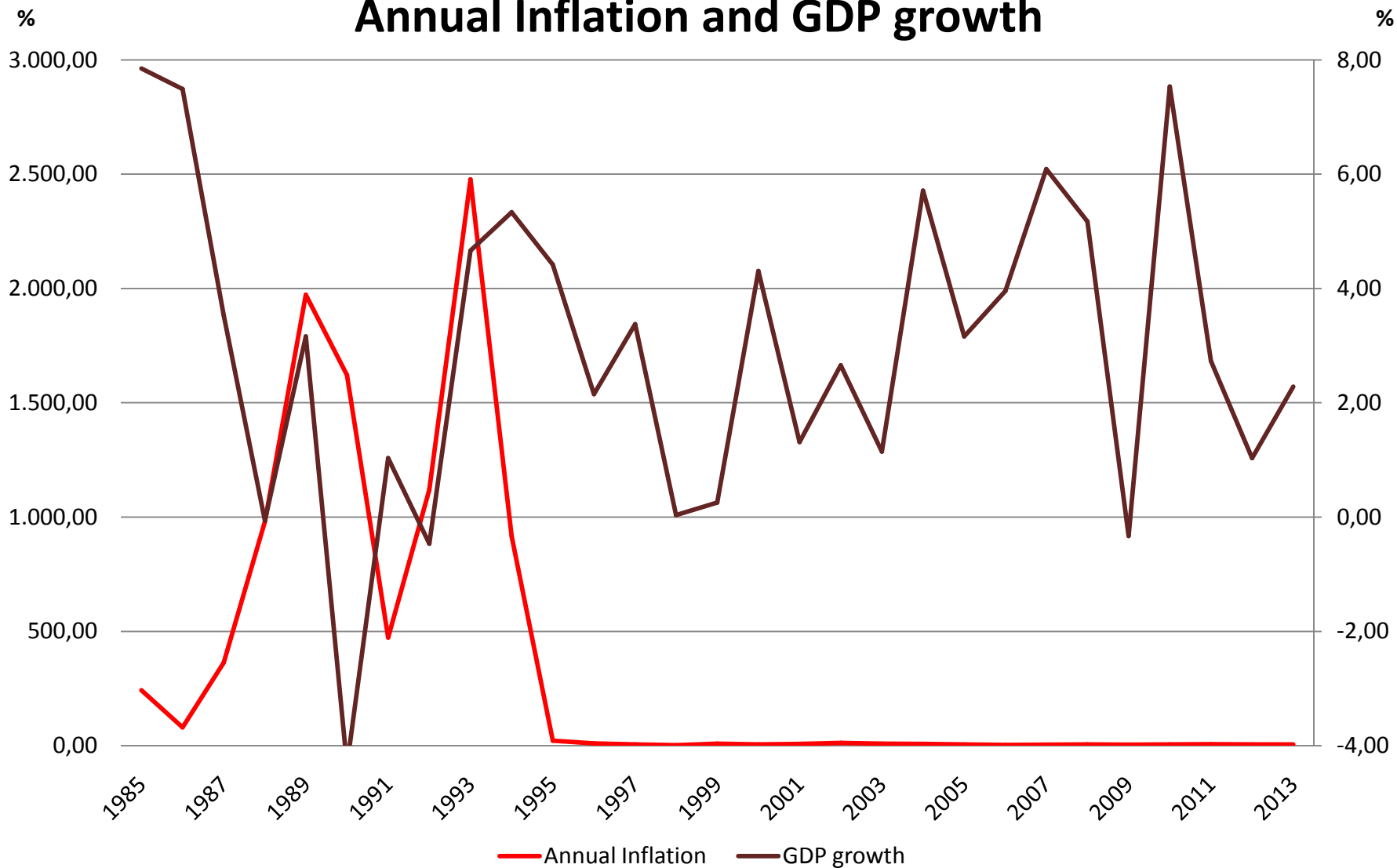
- Indexation makes possible to cope with hyperinflation;
- No collapse of GDP growth.

## Annual Inflation and GDP Growth



- Even during hyperinflation, no collapse of GDP growth

# Annual Inflation and GDP growth



# Why no collapse GDP growth: Indexation

- Started in late 60s;
- Idea: isolate real economy from inflation;
- Advocated by Milton Friedman;
  - “2<sup>nd</sup> best to price stability”;
- Mixed blessing:
  - Easy to live with high inflation, but
  - Made inflation fight more difficult and politically less desirable.
- One of the reasons inflation lasted longer.

# Why Didn't Brazil Endogenously Dollarize

- In most other hyperinflation, agents gave up holding local currency and used dollars;
- Didn't happen in Brazil because bank deposits were protected against inflation;
- To provide those inflation-protected deposits, banks held gov't bonds that were either indexed to inflation or of very short maturity;
- Punchline: Brazil avoid dollarization by engineering a domestic substitute to its hyperinflated currency, i.e., a domestic currency substitute



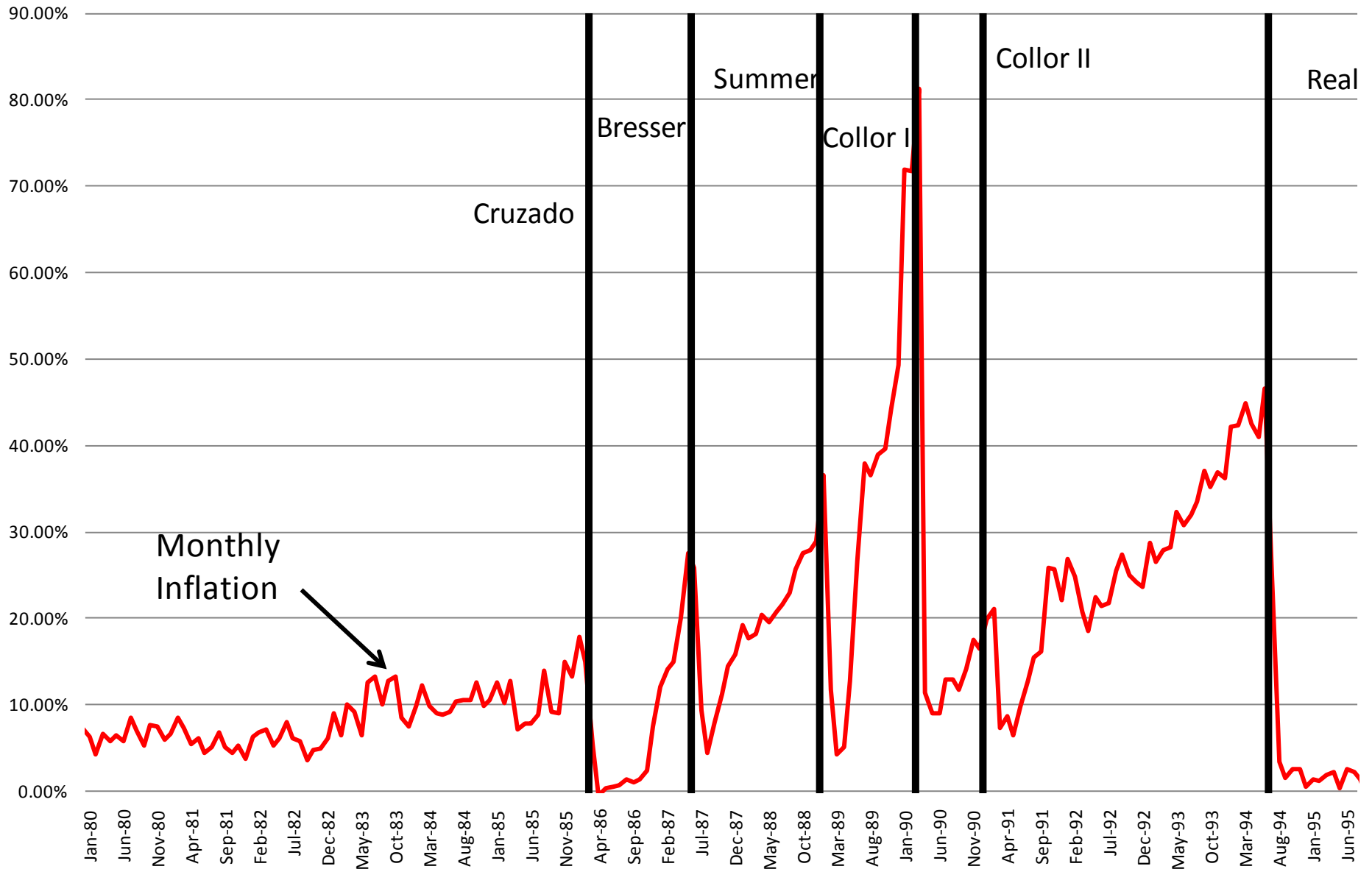
# How to Stop Printing Money?

- The Brazilian Central Bank could not raise much the real interest rate (passive monetary policy) or many banks would fail;
- So, money printing could not stop cold-turkey;
- What made possible the end of passive monetary policy was the end of indexation through the transformation of an indexed unit of account pegged to the US dollar (the *URV*, Real Unit of Value) in the new currency, the *Real*.

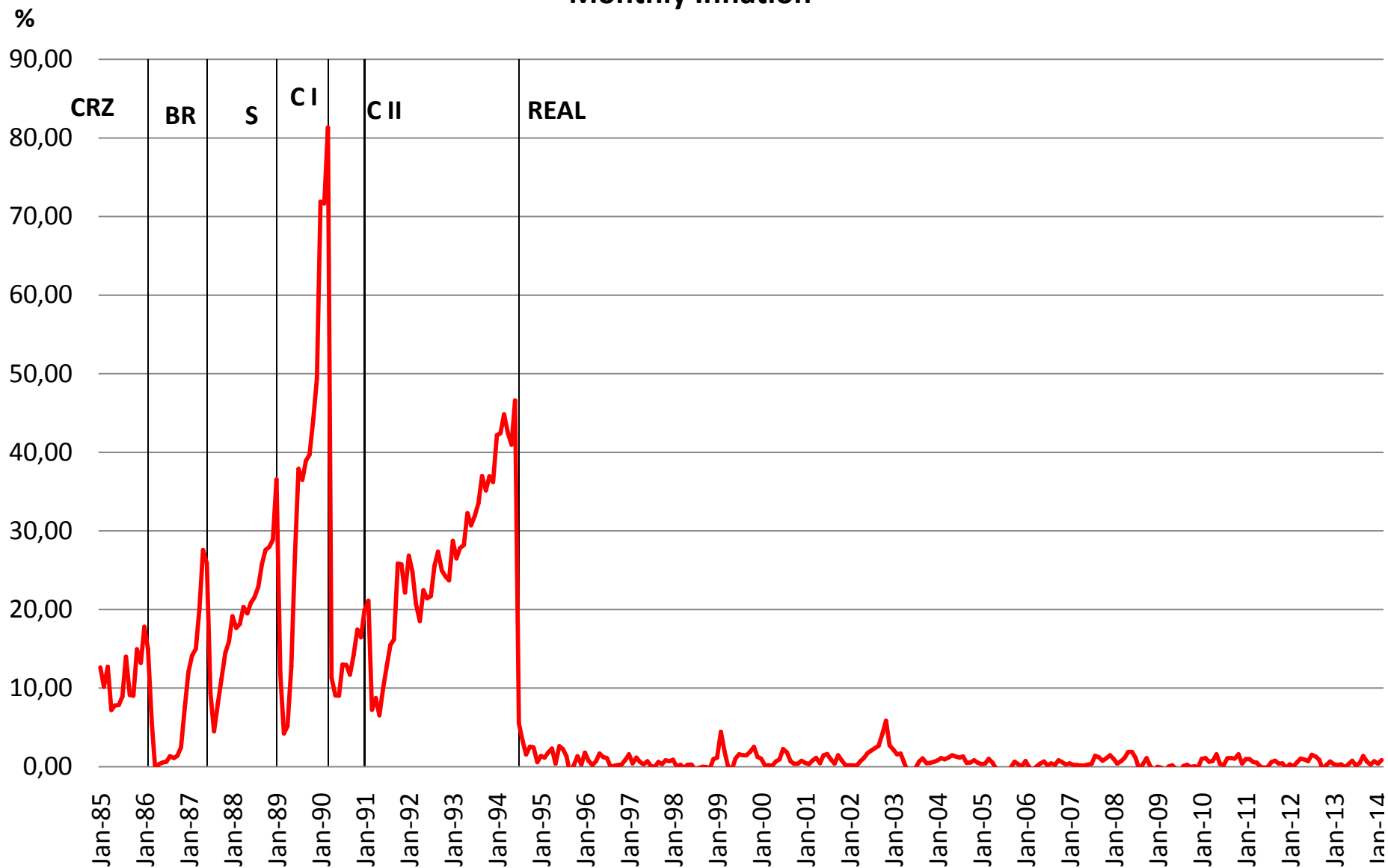
# Inflation History from 1980

- 1980-85: Crawling towards hyperinflation;
- 1985-94: Five failed plans
  - 1986: Cruzado
  - 1987: Bresser
  - 1989: Summer
  - 1990: Collor I
  - 1991: Collor II
- 1994: A successful plan: Real Plan

# Monthly Inflation



## Monthly Inflation



# **THE PREVIOUS 5 FAILED PLANS**

# Five Failed Plans

- Many were ambitious  
... but all failed




# Five Failed Plans

- Many were ambitious  
... but all failed.
- Main weakness: **continued printing money**

# Details of the Five Failed Plans



# Cruzado Plan (1986)

- Froze Prices and wages, but:
  - Wages were raised at the beginning of the plan;
  - If inflation > 20%, wages automatically adjusted;
- Pegged exchange rate to \$;
- Changed currency (cut 3 zeros);
- Forced interest rate conversion; 
- Ended Central Bank automatic finance; 
- No effective major change in fiscal policy;
- In 10 months, back to double-digit monthly inflation. 

# Forced Interest Rate Conversion

- Existing contract: example
  - Suppose cruzeiro interest rate: 14% per month;
  - Borrowed 1000 cruzeiros just before the plan;
  - Owed 1,140 cruzeiros in one month.
- Under plan:
  - Forced conversion into cruzado contract;
  - 0% interest rate in new currency;
  - Now owe 1 cruzado in a month.

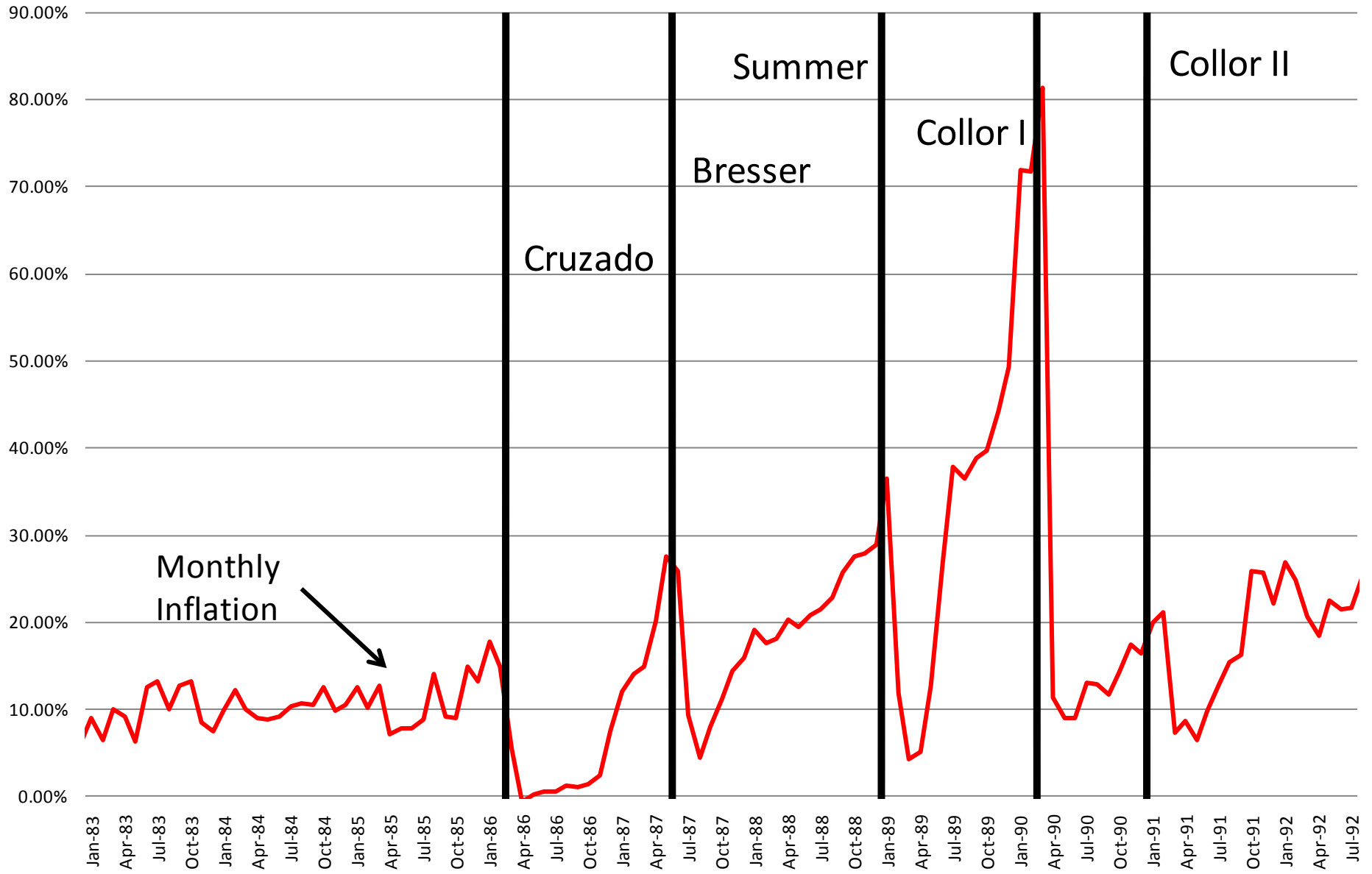


# End of Central Bank automatic finance



- Before the plan:
  - Commercial government bank (Banco do Brasil) gave subsidized loans to both private agents and the government;
  - Central Bank printed money to cover subsidies.
- Plan:
  - Forbade this practice.



# Monthly Inflation



# Bresser Plan (1987)

- Froze prices;
- Adjusted wages based on the average of the three previous months;
- Raise real interest rates to a positive value;
- Fiscal: intended to keep nominal deficit to 3.7%, but actual nominal deficit was 33%. 
- In 3 months, back to double digit monthly inflation. 

# New Constitution (1988)

- Worsened fiscal situation and made harder to adjust labor and spending:
  - Increased expenditures and transfers from the central government to states and municipalities;
  - Reduced work week from 48 to 44 hours;
  - Increased firing costs and overtime compensation;
  - Earmarked revenues.

# Summer Plan (1989)

- New Constitution 1988;
- Froze prices (designed to last 4 to 8 weeks);
- New currency: cruzado novo (cut 3 zeros);
- Fixed exchange rate (1 Cruzado Novo = US\$1);
- De-indexed prices;
- Ambitious fiscal and monetary reform:
  - Congress refused.

# Collor I Plan (1990)

- Froze Prices and Wages;
- New Currency: Cruzeiro;
- Monetary Component:
  - Suspension of convertibility of 80% of all financial assets for 18 months.
- Fiscal Component:
  - Ambitious fiscal plan:
    - Privatizations: some succeeded.
    - Other fiscal reforms: short-lived.



# Collor II Plan (1991)

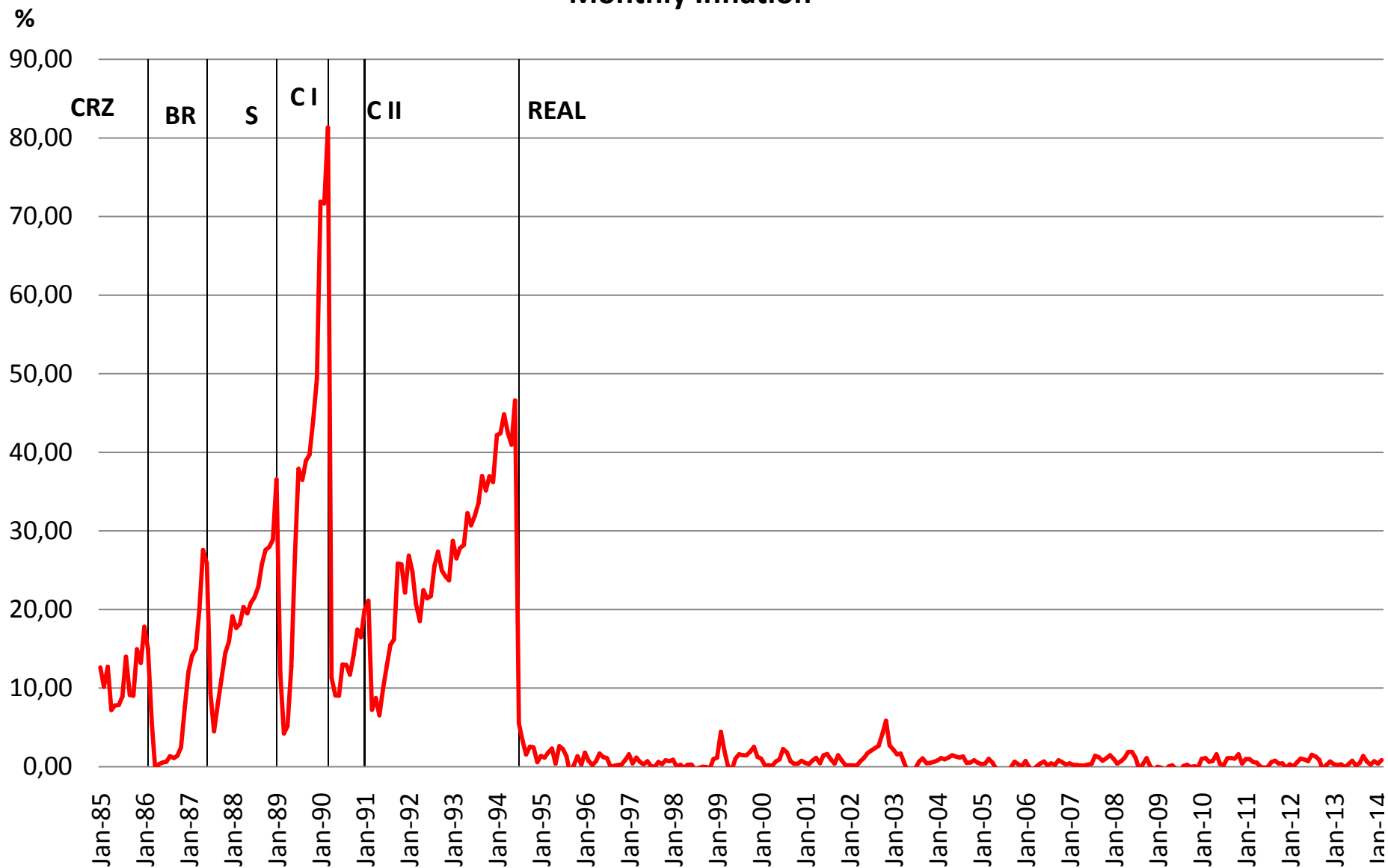
- Froze Prices;
- Fixed exchange rate;
- Opens up the economy;
- Fiscal:
  - reduce government expenditures:
    - firing civil servants (many got reinstated in courts);
    - closing public services (many reopened);
    - privatization of state owned enterprises.

**THE REAL PLAN: WHY DID IT WORK?**

# Why the Real Plan worked

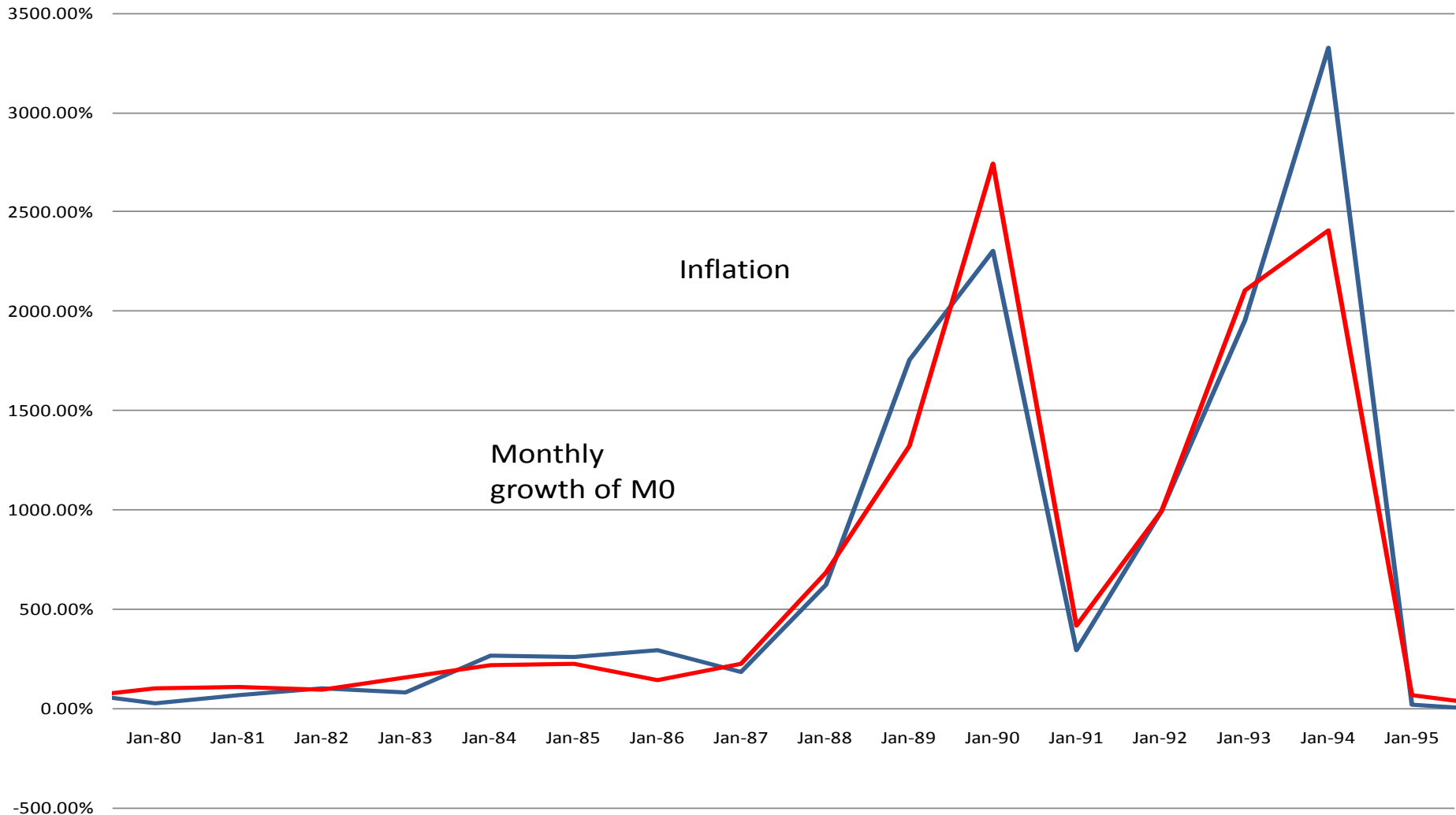
- Because stopped printing money;
- NOT because of credible fiscal reform;
- In fact, fiscal policy got worse during first 5 years of the plan;
- Consistent with Friedman;
- Not consistent with Sargent Wallace fiscal dominant regime;
- Is consistent with SW money dominant regime;
- Tight money now means low inflation now.

## Monthly Inflation



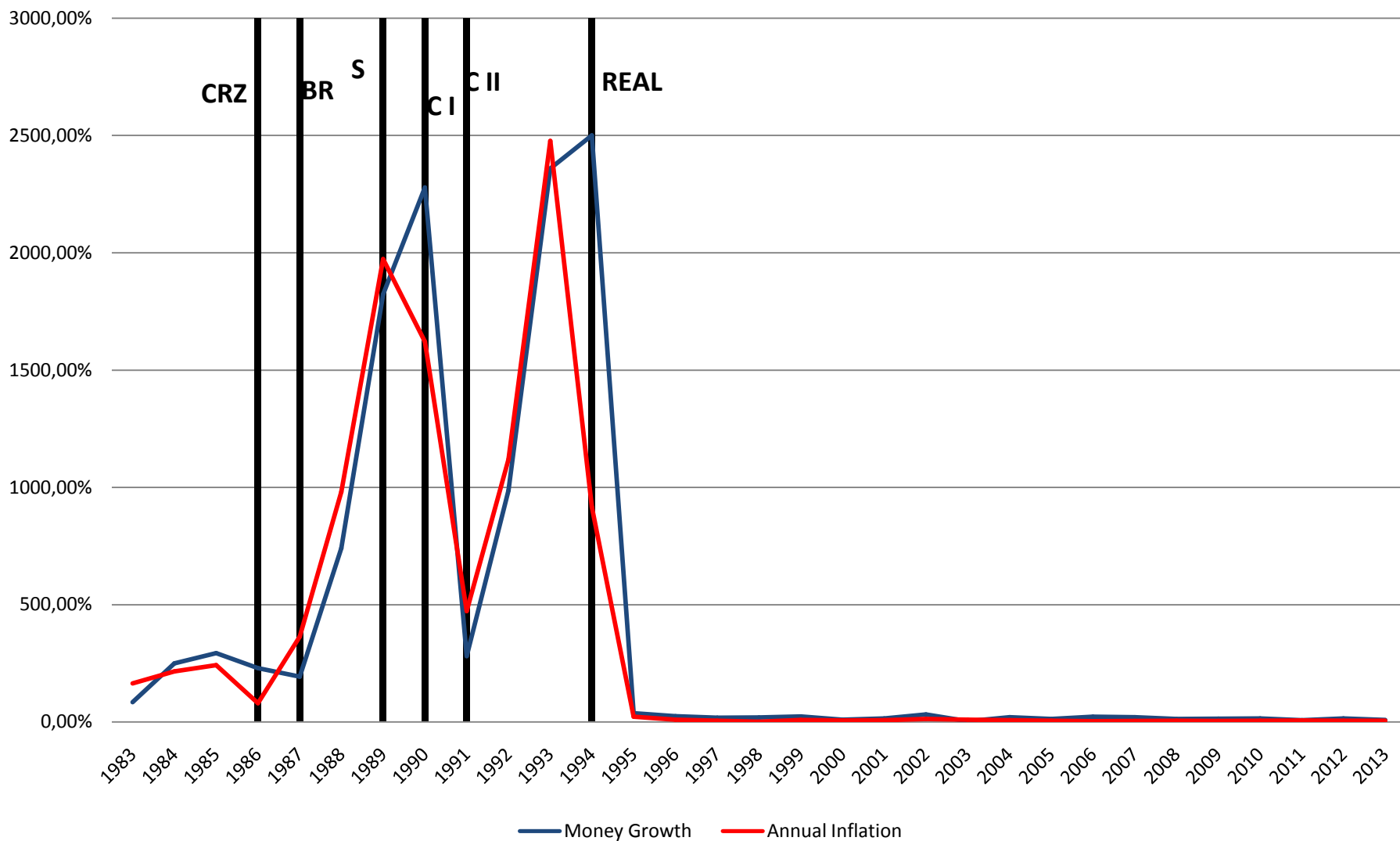
# **TIGHT CONTEMPORANEOUS LINK BETWEEN MONEY AND INFLATION**

## Annual Inflation and Money Growth

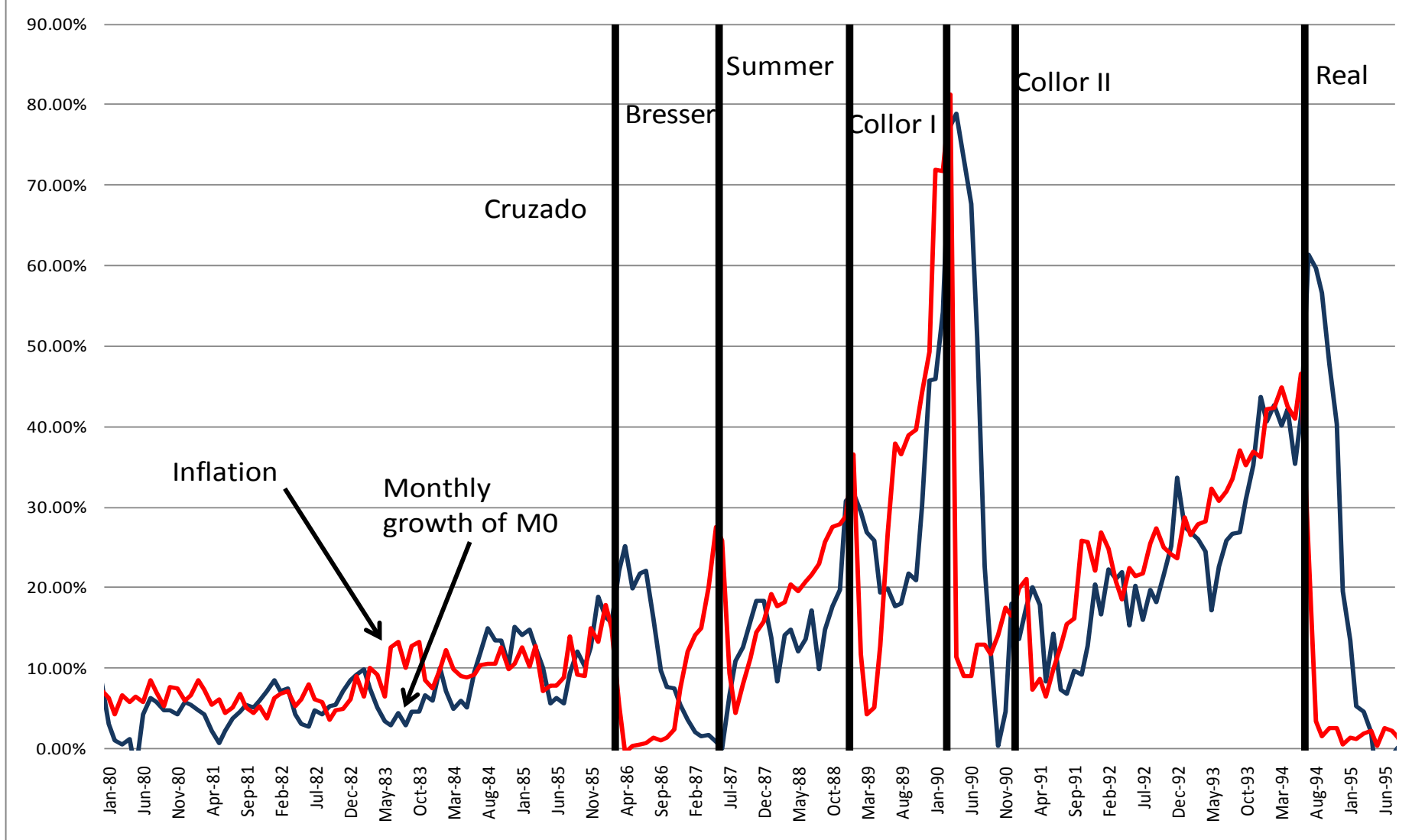


- Money growth and inflation graph (annual tracks)

## Annual Inflation and Money Growth



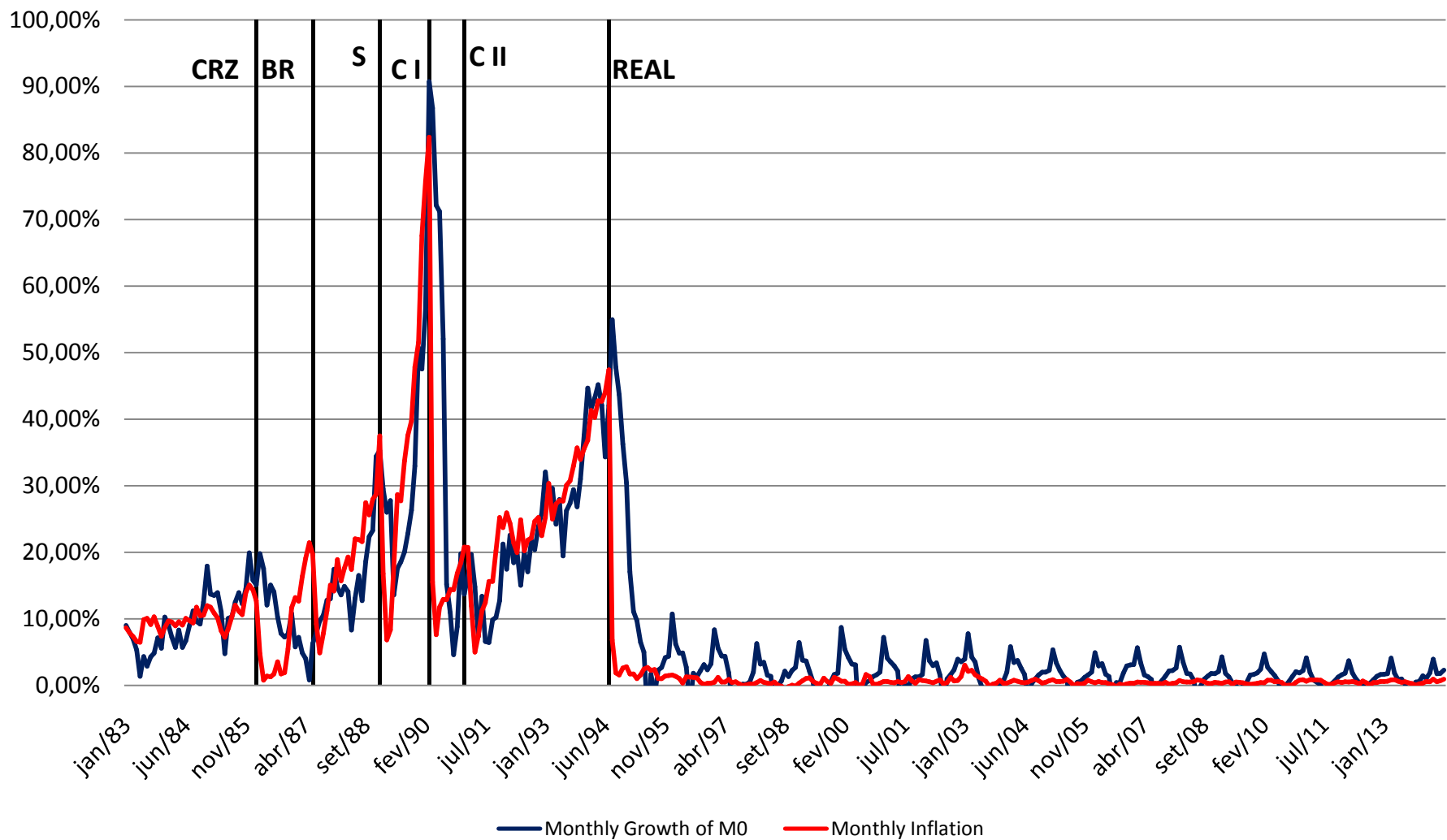
## Monthly Inflation and Monthly Growth of M0 (5 month moving average)



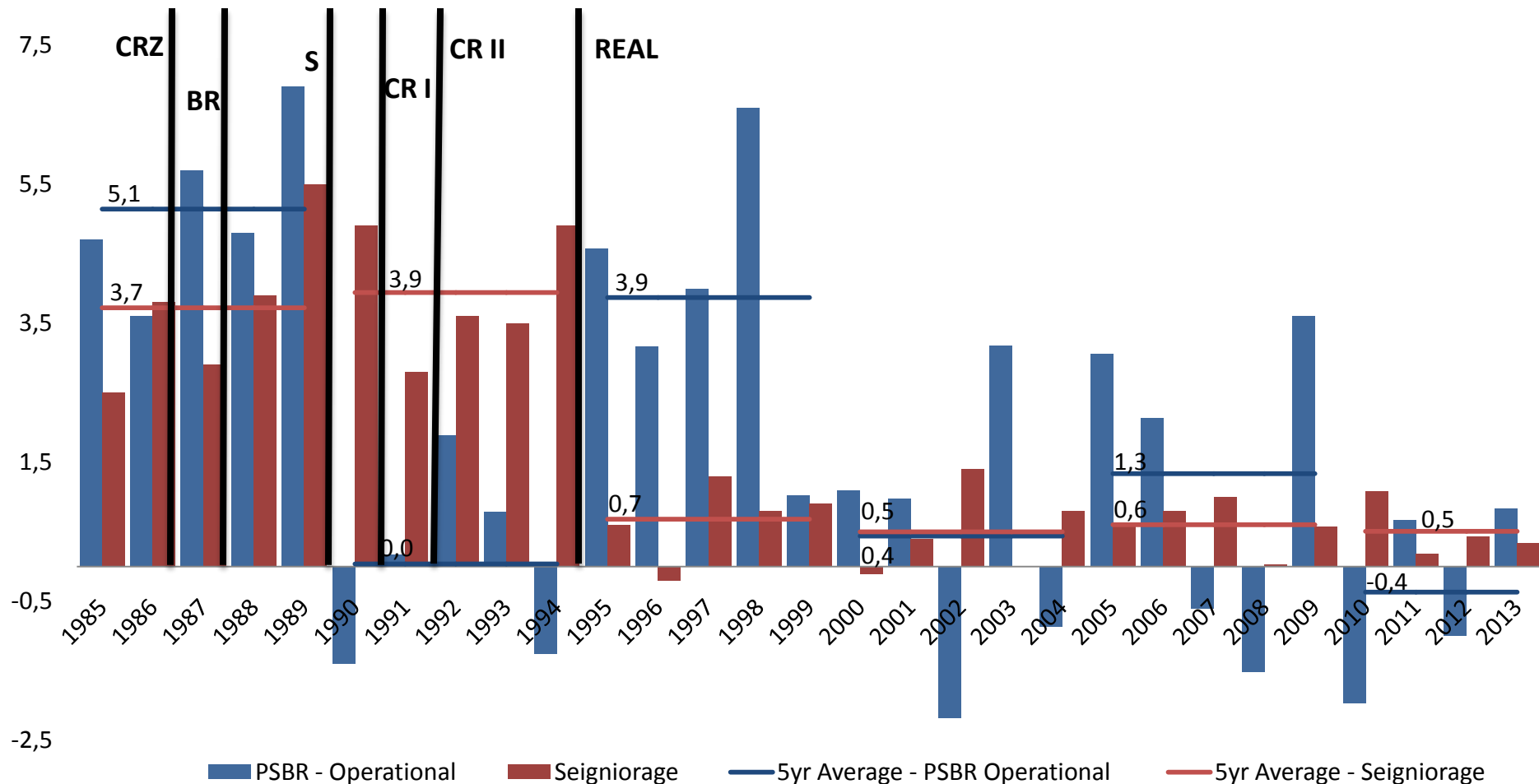
- Money growth and inflation (monthly dances)



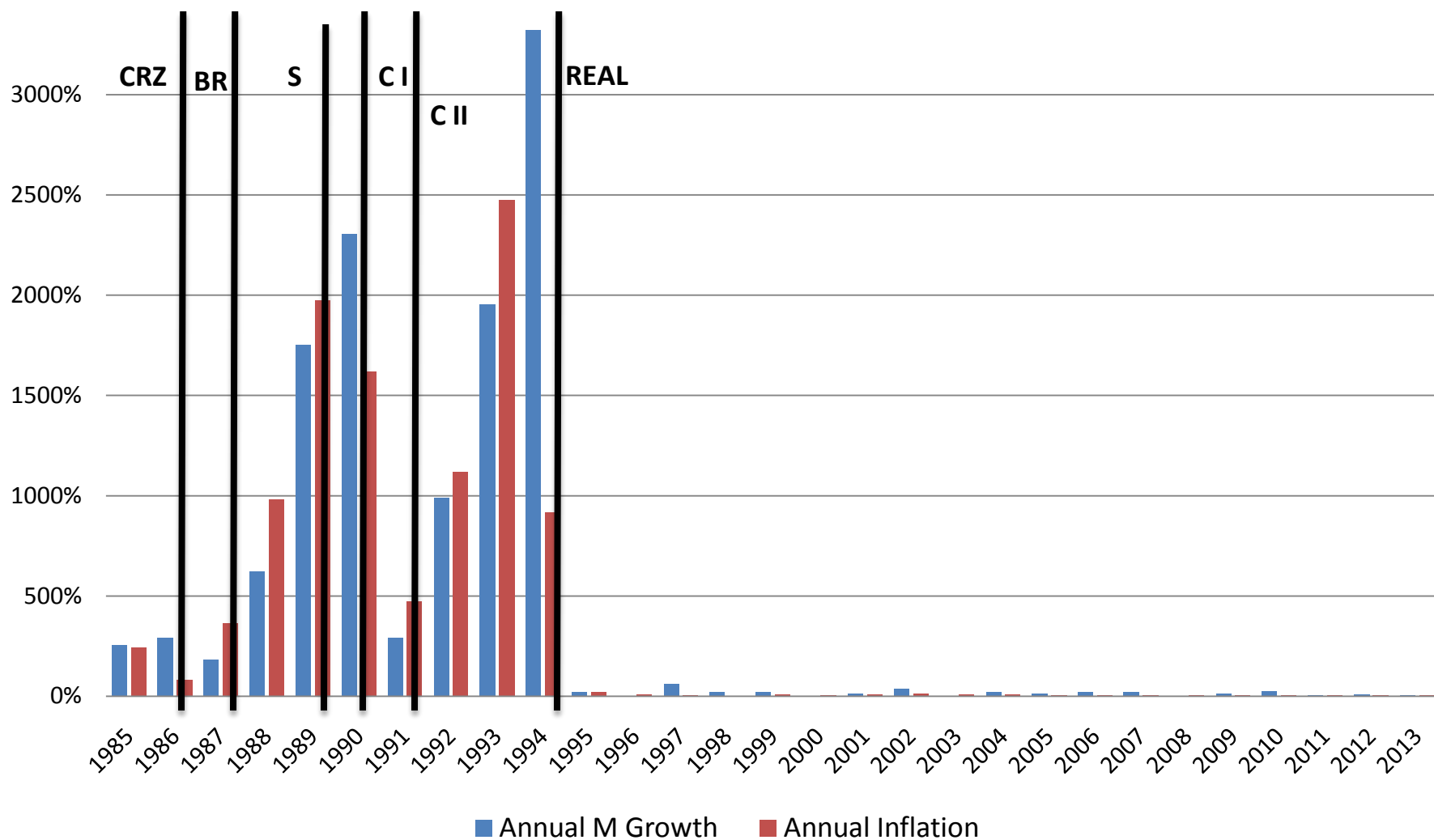
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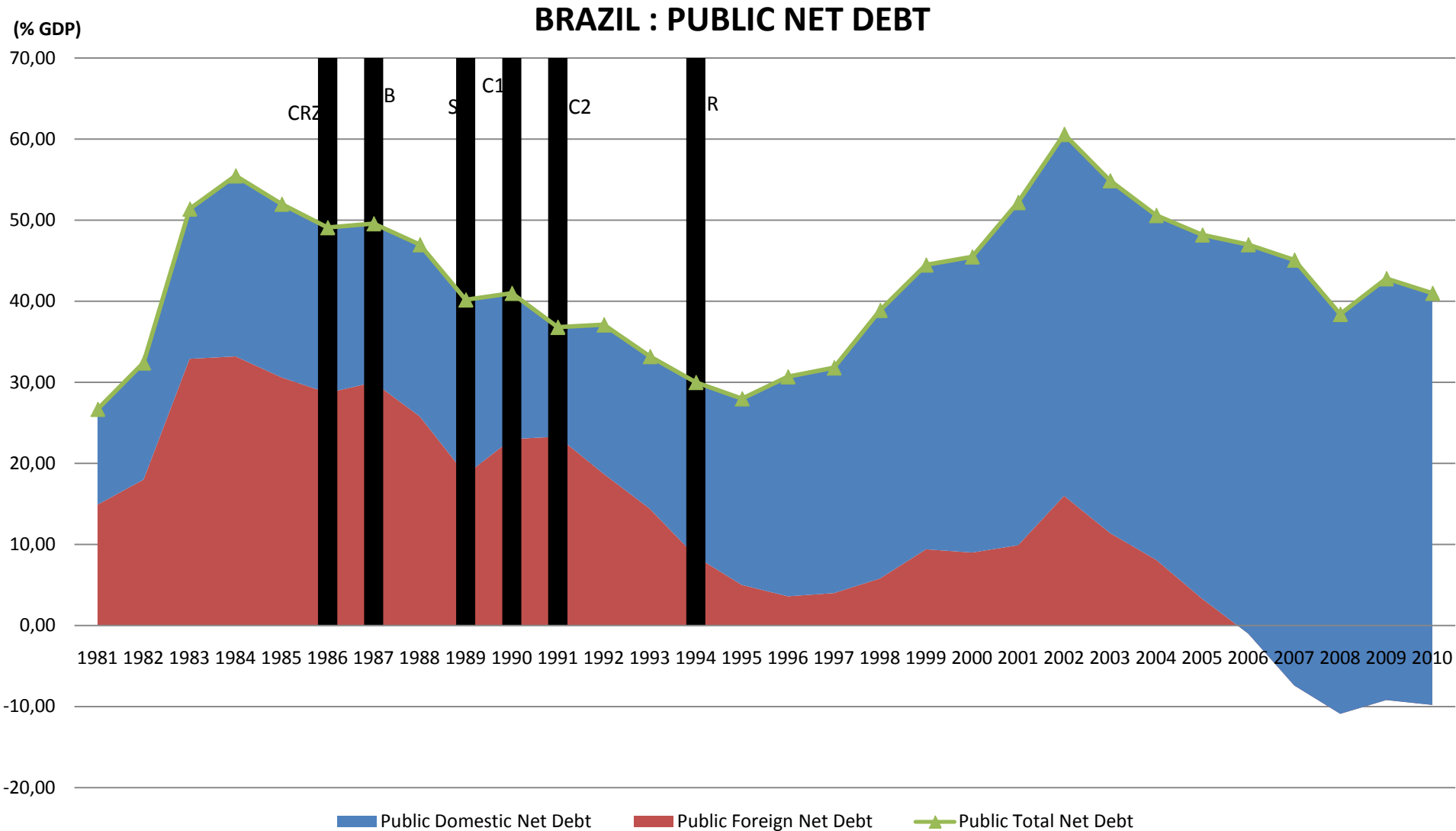
# Fiscal Improvement Pre-Real Fiscal Deterioration Under Real




# Annual Money Growth and Inflation



# Public Debt Increased Under Real Plan



# Real Plan

- Ingenious mechanism (URV) to get relative prices “right” in the new currency, the real; 
- Exchange rate ceiling: 1 real = 1 dollar:
  - Given high interest rates, capital flew in and parity to dollar became credible, serving as a nominal anchor;
- Fiscal:
  - Suspension of part of earmarked transfers to states and municipalities to get fiscal surpluses;
  - Extra taxes on financial intermediaries;



# THE URV (became the Real)

- Real Unit of Value: 1 URV = 1 US\$;
- March-June 94: new unit of account with stable purchasing power;
- Labeled prices in both URV and cruzeiro real;
- Idea:
  - Paid for goods only in cruzeiro real;
  - Prices in unit of account URV were stable;
  - Replaced URV with real on July 1, 1994.



# Conclusion

- In the Brazilian hyperinflation experience, the link between inflation (and, therefore, seignorage) and money growth is contemporaneous;
- On the other hand, fiscal improvements in the early 90s did not help on the inflation front, until the 94 Real Plan, while the marked deterioration of the fiscal stance from 95 to 99 did not derail stabilization.
- Friedman-like monetary dominant regime fits data better than fiscal dominant regime as in “unpleasant arithmetic” or “end of 4 big inflations”.

# The Fiscal Theory of Inflation



# The Fiscal Theory of Inflation (à la Sargent not Woodford)

# The Fiscal Theory of Inflation

Assume:

1. Brazil has given path for real deficits
2. Keeps the real debt to output ratio constant
3. Finances nominal deficits with seignorage

Question:

How much inflation does this fiscal theory generate?

## Fiscal Theory of Inflation: Preliminaries

- ▶ **Government budget constraint**

$$B_{t+1} - B_t + M_{t+1} - M_t = (r_t + \pi_t) B_t + P_{t+1} (G_{t+1} - T_{t+1})$$

- ▶ **Primary deficit**

$$P_t (G_t - T_t)$$

- ▶ **Operational Deficit:** adds real interest payments on debt

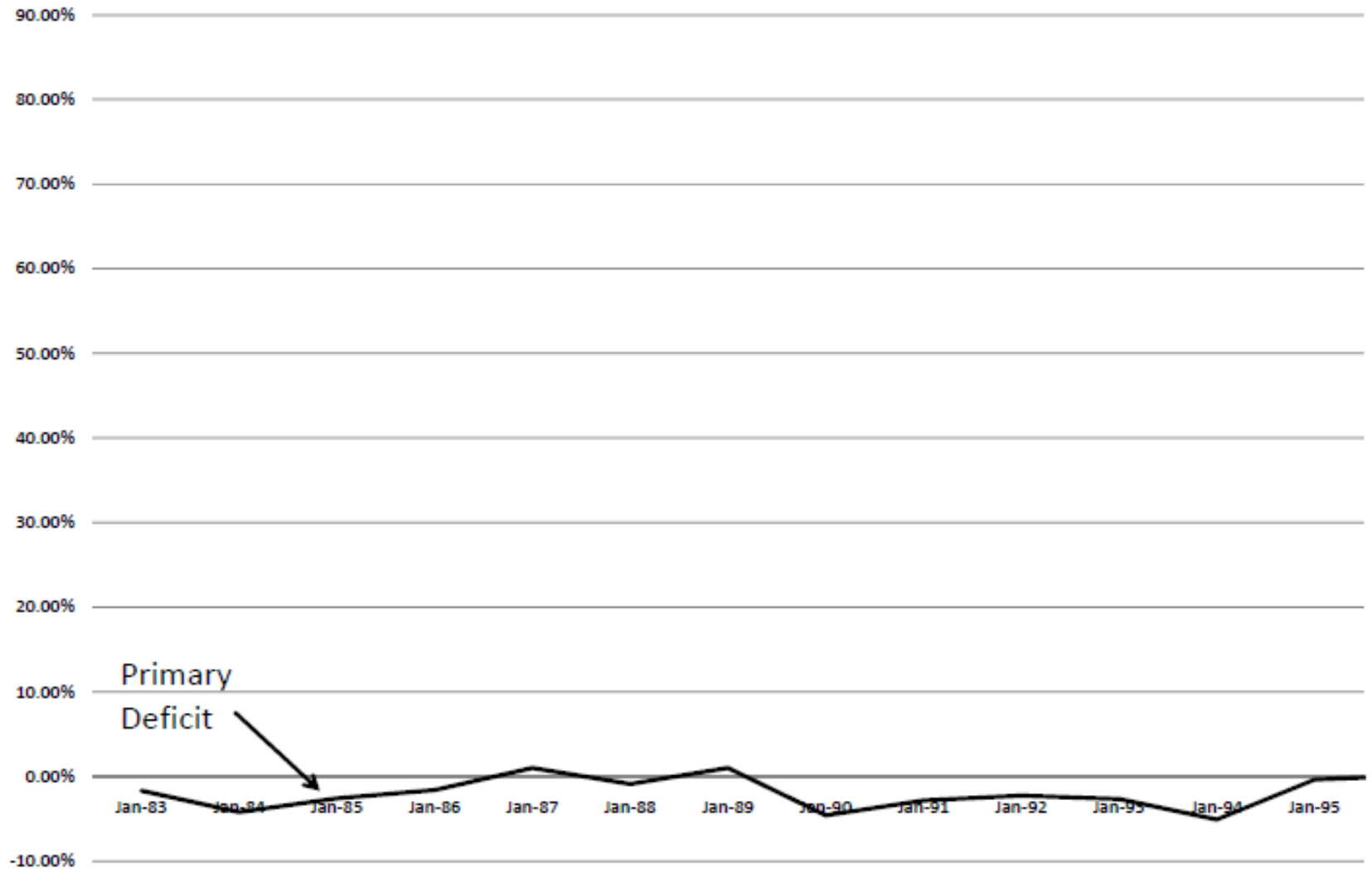
$$r_t B_t + P_t (G_t - T_t)$$

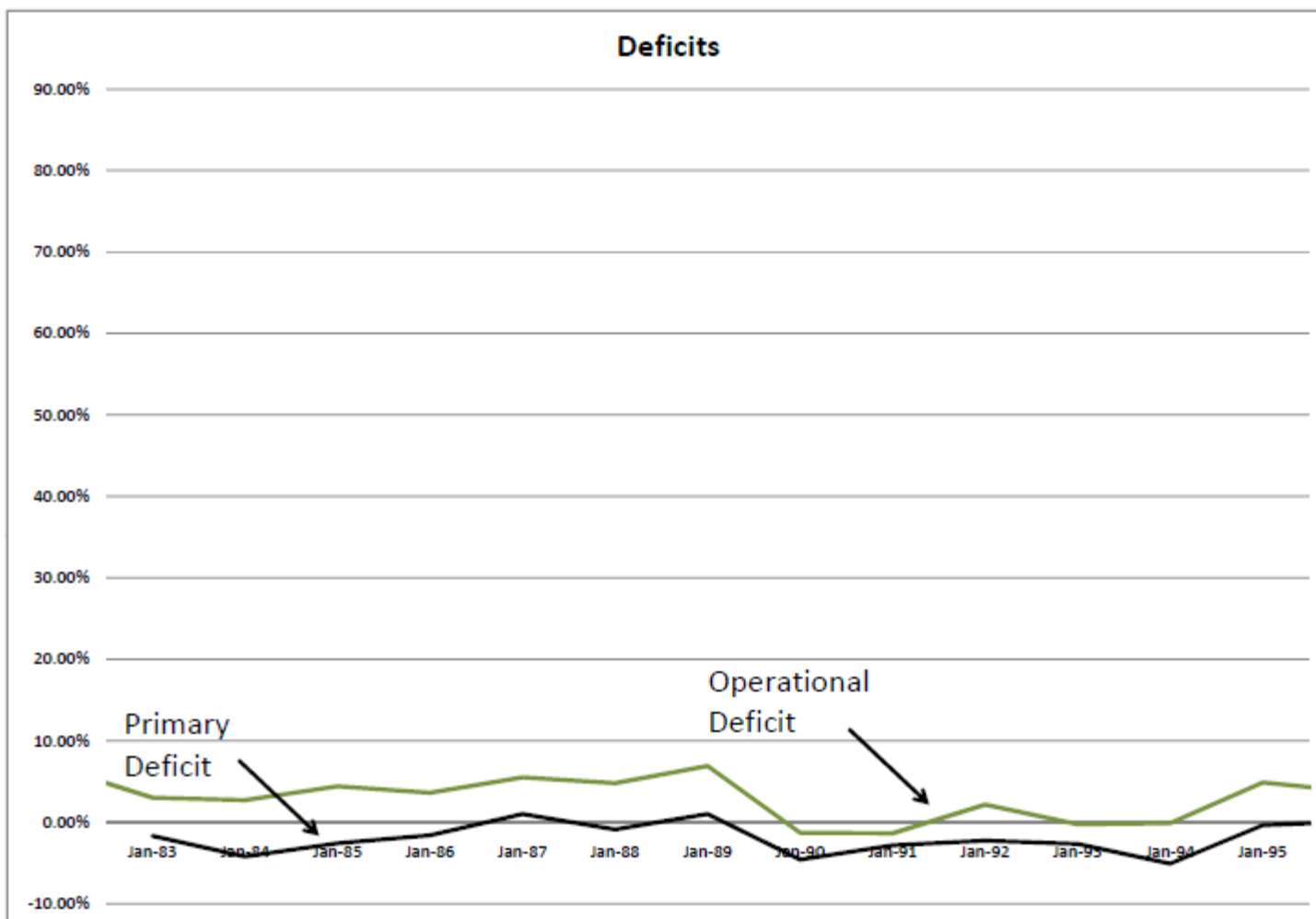
- ▶ **Nominal Deficit:** adds nominal interest payments on debt

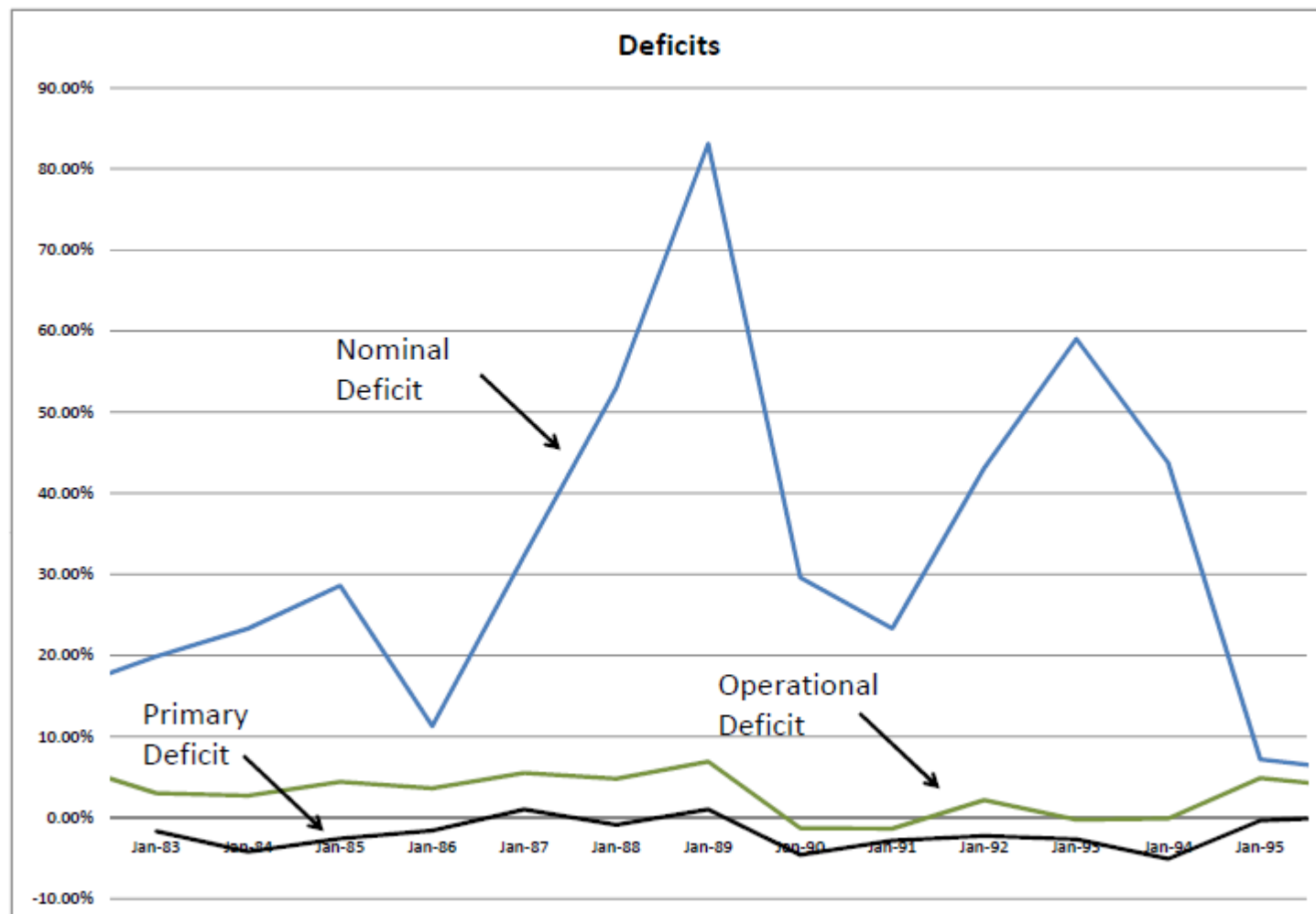
$$(r_t + \pi_t) B_t + P_{t+1} (G_{t+1} - T_{t+1})$$

- ▶ **Note:** Difference between Nominal and Operational Deficit is the payments on debt due to inflation:  $\pi_t B_t$

## Deficits







## The Fiscal Theory of Inflation: Constant Velocity

- ▶ Government budget constraint

$$B_{t+1} - B_t + M_{t+1} - M_t = (r_t + \pi_t) B_t + P_{t+1} (G_{t+1} - T_{t+1})$$

- ▶ Nominal rate  $i_t = r_t + \pi_t$

$$1 + i_t = \frac{1}{\beta} \frac{P_{t+1}}{P_t}$$

- ▶ Assume constant real debt and constant real deficits

$$\frac{B_t}{P_t} = b \quad \text{and} \quad G_t - T_t = d$$

- ▶ Quantity theory of money ( $V$  constant)

$$M_t V = P_t Y$$

## The Fiscal Theory of Inflation: Constant Velocity

Seignorage revenues = real interest payments + primary deficit

$$\frac{1}{V} \left( \frac{\pi}{1 + \pi} \right) = r \frac{b}{Y} + \frac{d}{Y}$$

► Brazil:  $r = 14\%$ ,  $b/y = 44\%$ ,  $d/y = -2.8\%$ , and  $V = 25$

$$\frac{1}{25} \frac{\pi}{1 + \pi} = 14\% \times 44\% - 2.8\% = 3.36\%$$

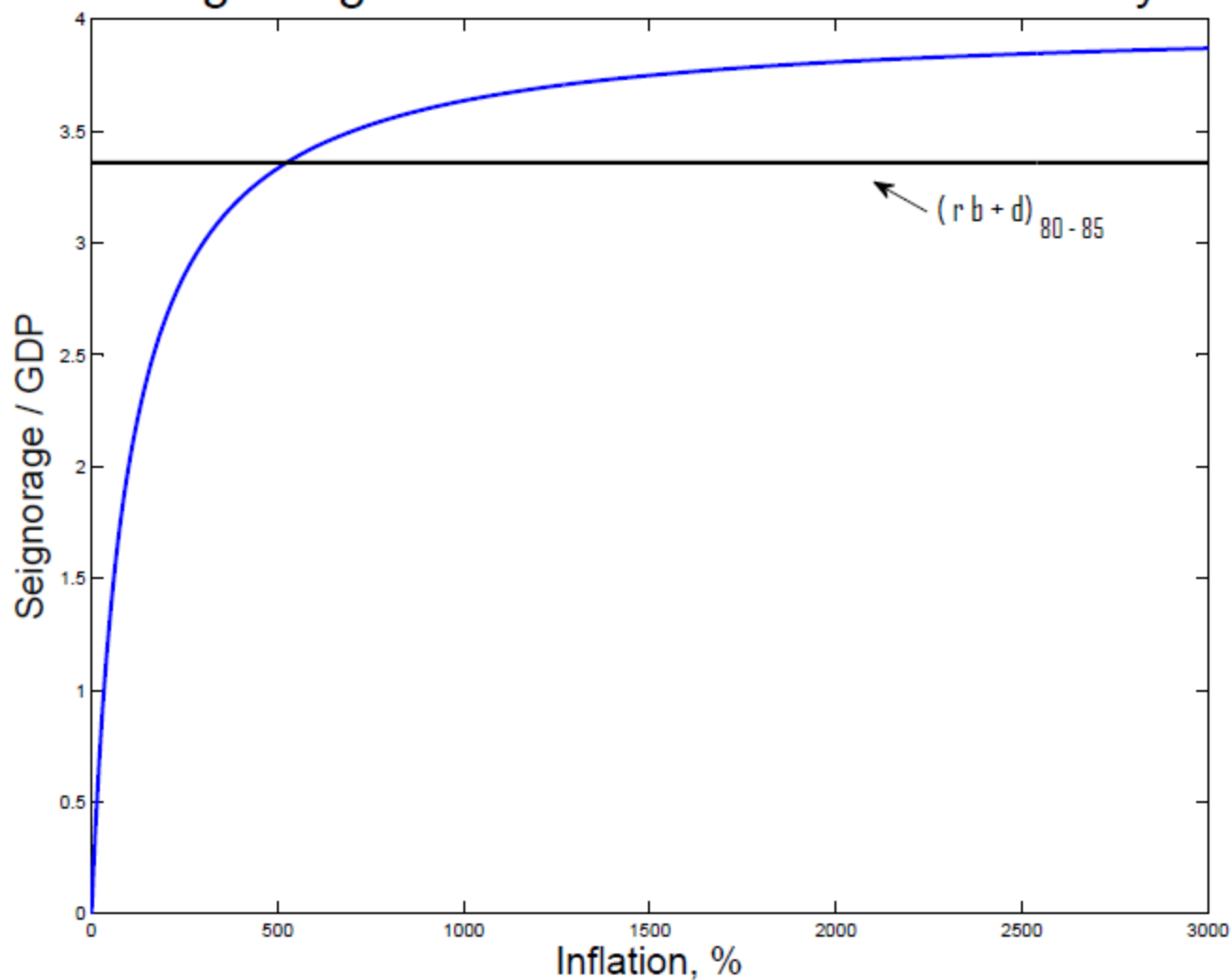
So

$$\pi = 525\%$$

With  $V = 25$  and infinite inflation can only raise 4% of GDP



## Seignorage and Inflation : Constant Velocity



## Fiscal Theory of Inflation: Puzzle 2

Why did the Real Plan succeed in bringing down inflation?

## Needed seignorage in two periods

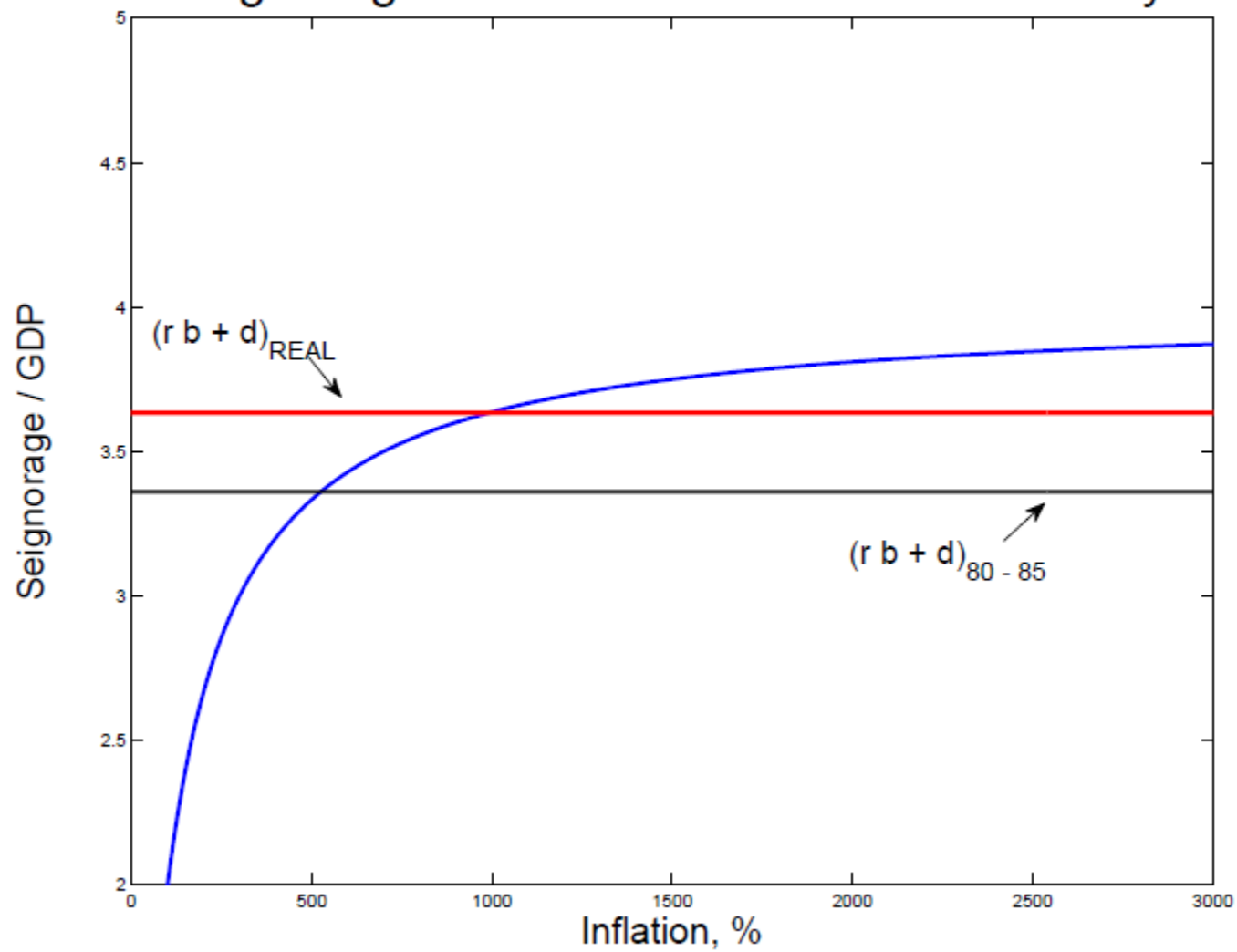
### ► Early Period

- $d/y = -2.8\%$
- $r = 14\%$
- $v=25$
- $b/y=44\%$
- needed seignorage = 3.36%.

### ► Real Period

- $d/y = -2.36\%$
- $r = 13.26\%$
- $v=24$
- $b/y=45.2\%$
- needed seignorage = 3.63%

## Seignorage and Inflation : Constant Velocity



## Conclusion

- ▶ Brazil interesting case study
  - 5 failed plan and one successful one
- ▶ Two puzzles for the fiscal theory of inflation
  - Why on wrong side of Laffer curve? (Log-linear)
  - Why did Real Plan succeed?