

# Rational Expectations, High Inflation and the Present Crisis

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The present monetary situation has never been experienced before:

1. Never before negative nominal interest rates have occurred;
2. Never before the monetary base M0 (banknotes in circulation and sight deposits with central banks) has risen so much except before high and hyperinflations;
3. The money multiplier  $m = M2(M3)/M0$  has except for the Great Depression never been so low in developed countries. (M2 denotes banknotes in circulation plus sight deposits at banks; M3 encompasses additionally term deposits.

These facts point to quite unusual expectations of banks, business firms and households. Can they be explained by the theory of expectations developed by Maurice Allais for high inflations decades ago, or the theory of rational expectations created by John F. Muths in the early 1960s? **Let us first look at some facts characteristic for the present situation and afterwards of high inflations .**

Figure 2

Development of M0 in USA, Euro Area and Switzerland

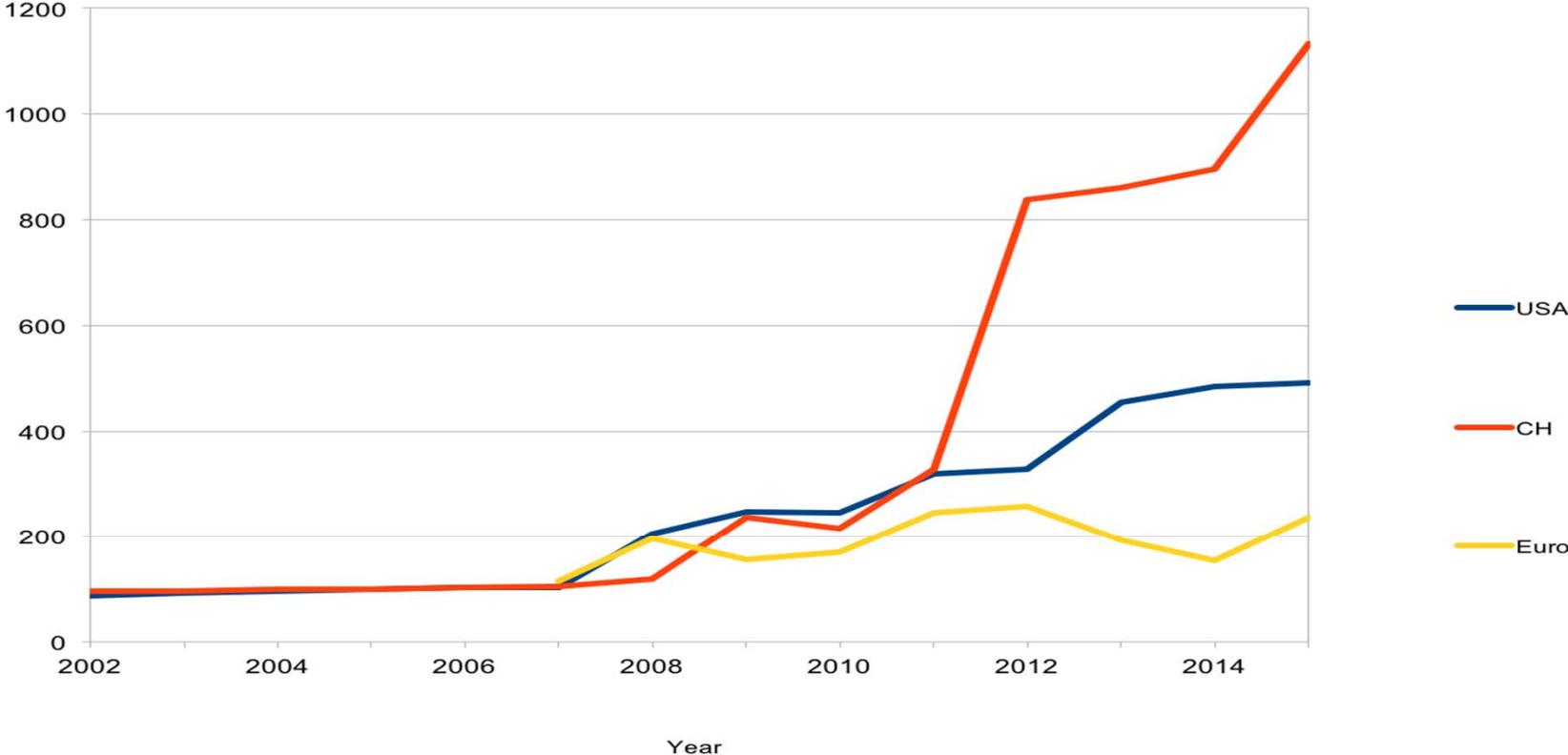


Figure 3

Growth Rates of M2, M2+ and M3 USA, Switzerland and Japan

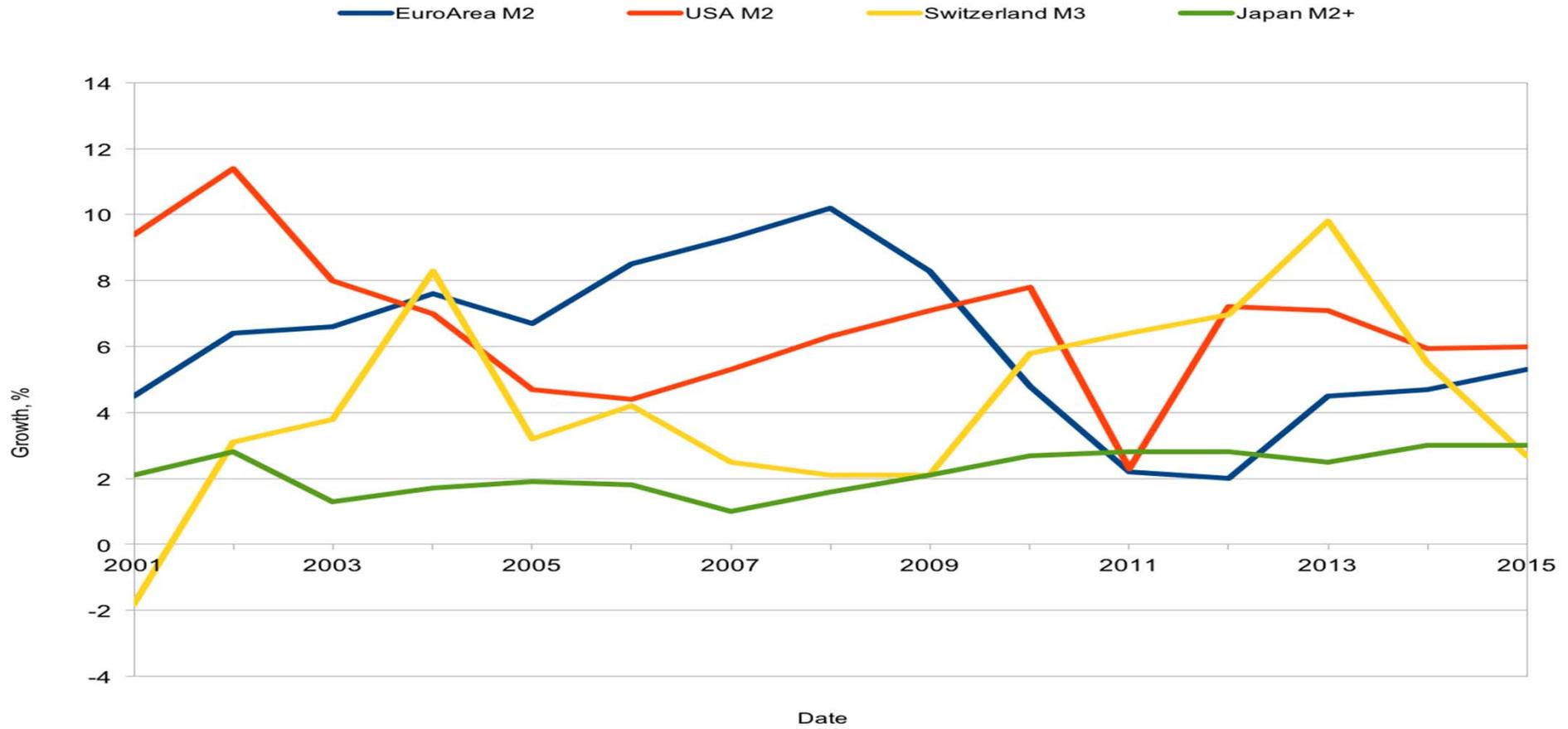
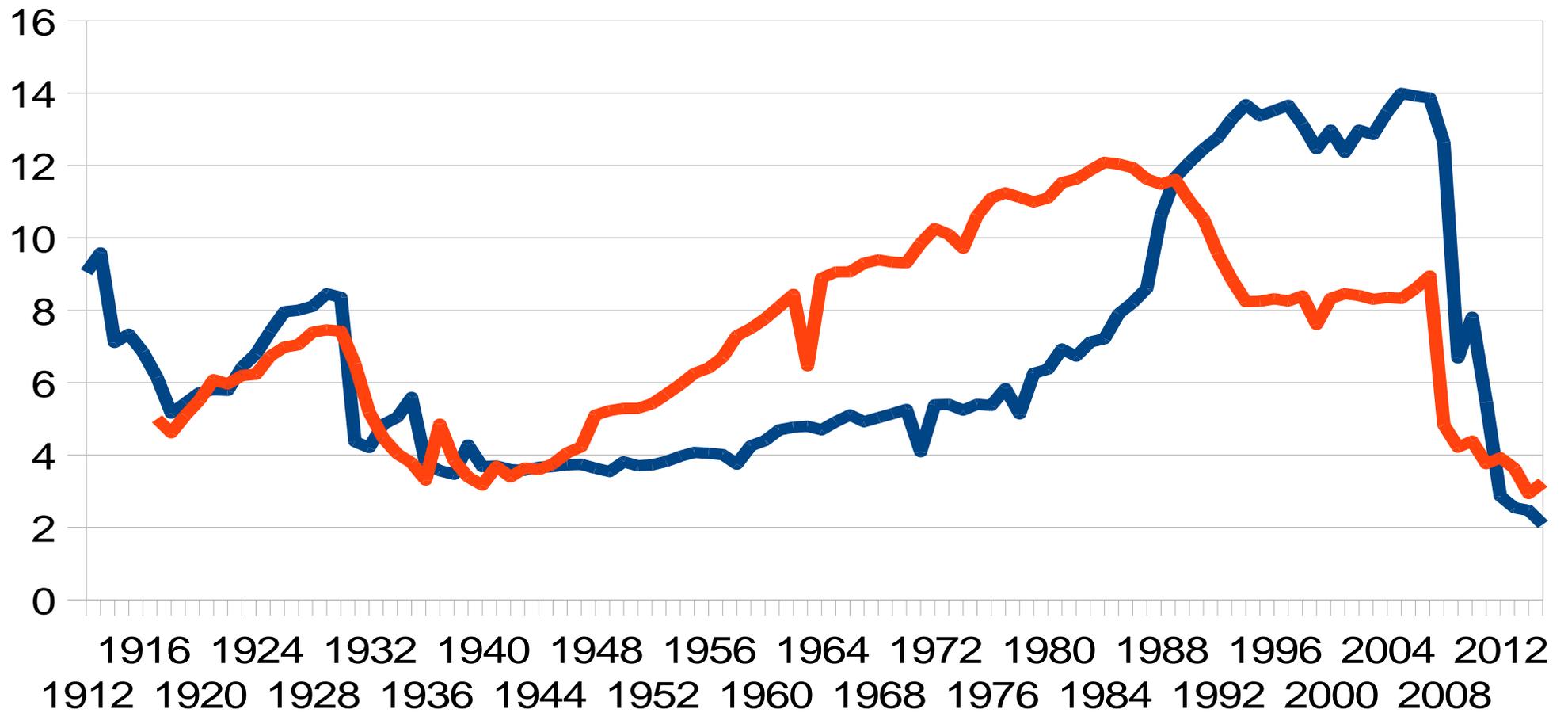
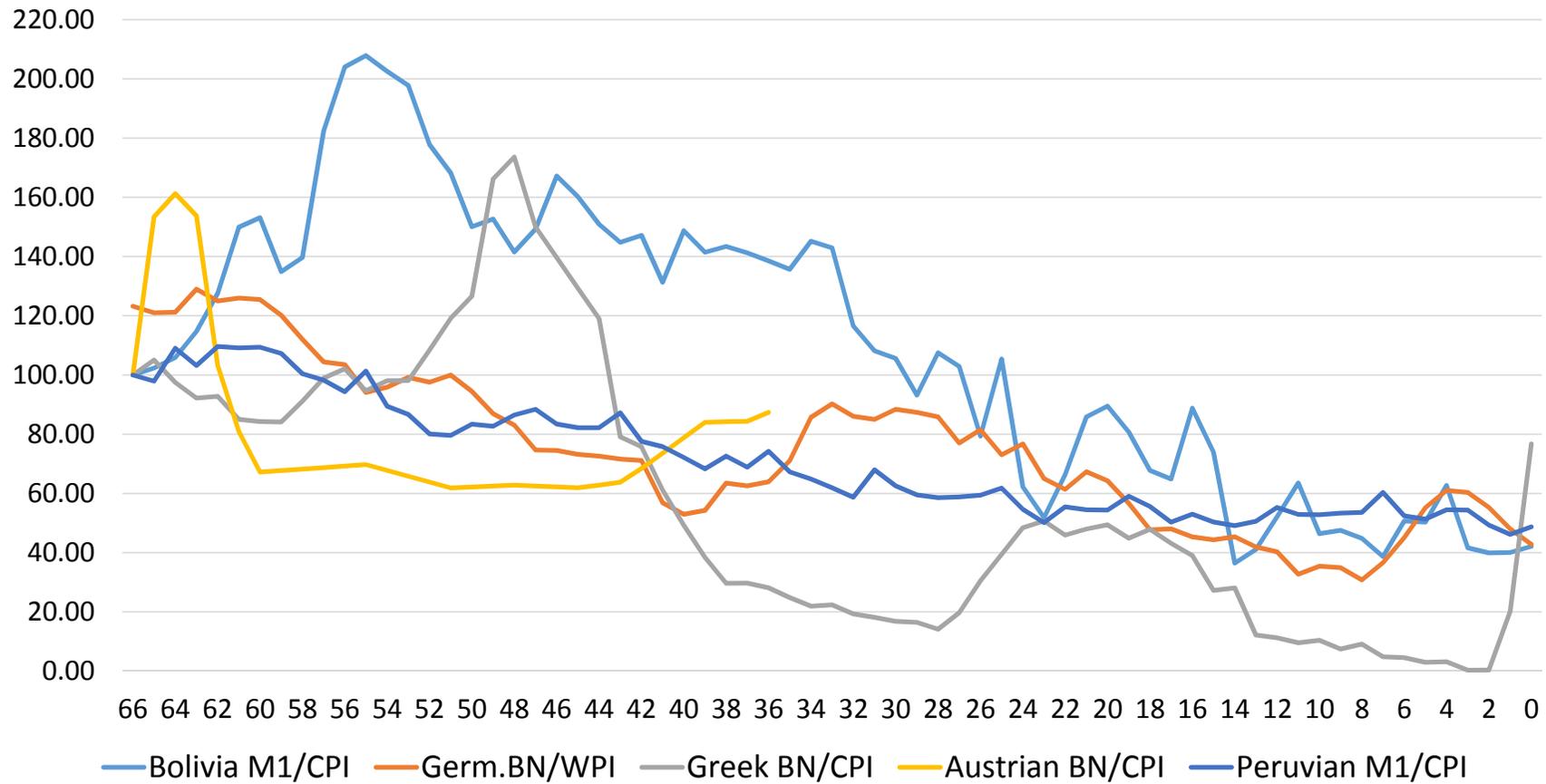


Figure 4  
Development of  $m = M2/M0$  USA and  $m = M3/M0$  Switzerland

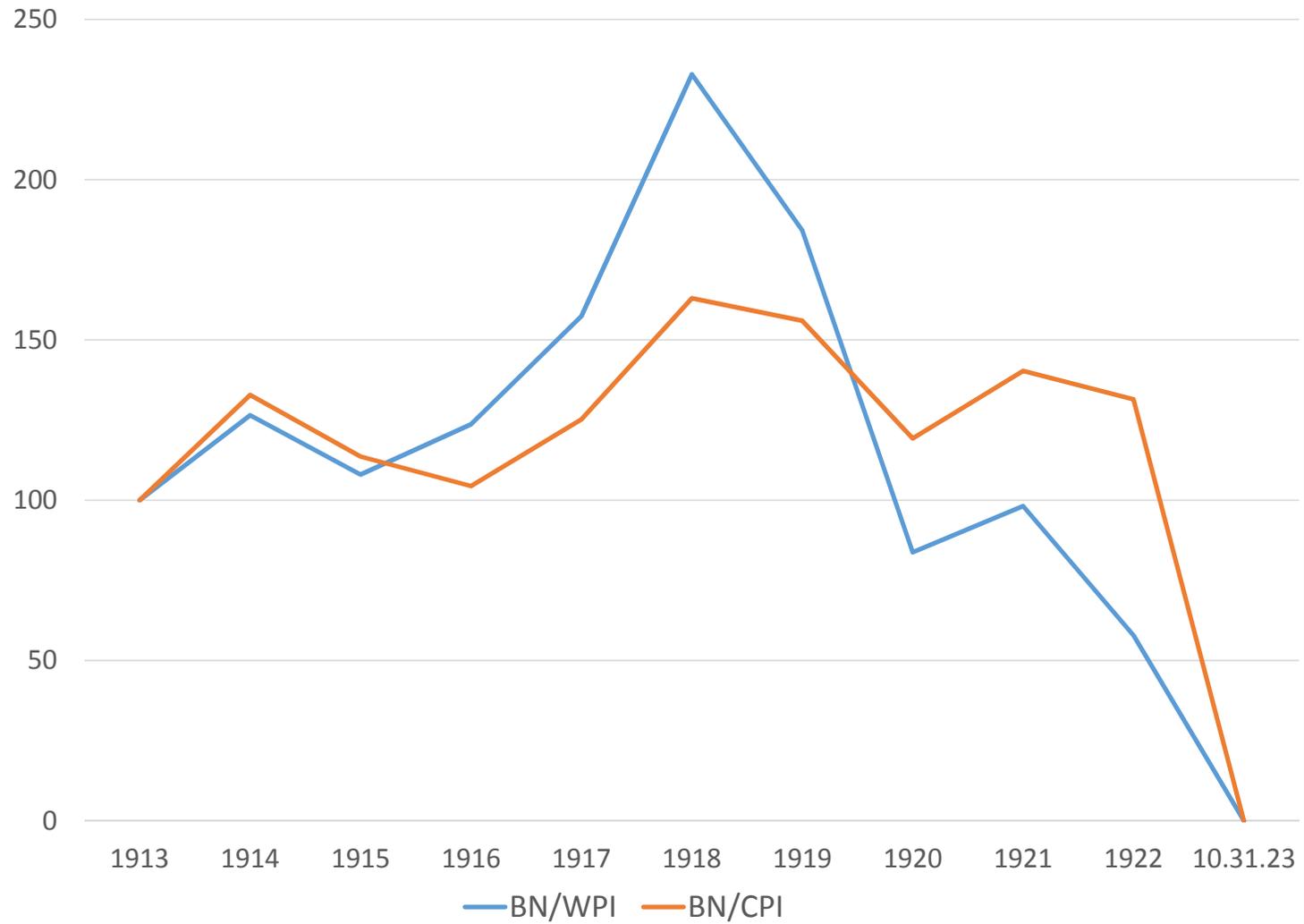


Expectations play an important role concerning economic relationships and predictions. Economic theory has tried to approach this difficult subject first by creating the concepts of **adaptive expectations** and **since the 1960s of rational expectations**. According to Wikipedia "**rational expectations**" are **model-consistent expectations**, in that agents inside the model on average assume the model's predictions are valid. According to **Thomas Sargent** "**a simple intuition motivates this idea; namely, that people do not systematically ignore readily available information that could be used to improve their decisions.**" If, however, we take the definition of Wikipedia as an important question arises: **What happens if the model's predictions are not valid? And what is readily available information** in the as mentioned by Sargent: **readily available to whom; where and when readily available; and who has to be able to understand the meaning of the information?**

**Figure 1**  
**Real Stock of Money in Several Countries Developing Towards Hyperinflation**  
**(Monthly increase of the price level > 50%)**



Development of Real Stock of Money, BN/CPI, during German Hyperinflation, 1913-10,1923



It is **typical for High and Hyperinflations** (Figure 1) **that the real stock of the inflating money,  $M/P$ , initially increases, whereas afterwards it decreases more and more.** I have used this fact to define high inflation as beginning at the time when  $M/P$  begins to fall. **This evolution of  $M/P$  has obviously to do with expectations, since before this time the public did not expect an acceleration of inflation.**

The French economist **Maurice Allais**, who like Philipp Cagan observed this relationship, tried to explain it by introducing an innovative theory of expectation formation (1965). He **proposed that the public changed its perception of time with the rapidity of events following each other. The more quickly relevant events follow each other, the more the memory of events is shrinking which are taken into account in forming the expectations about the future. This new approach implies a difference between calendar time and psychological time. Starting from these assumptions Allais constructed a logistic function to explain the development of  $M/P$  during the course of hyperinflations.**

His theory also implies that with a decreasing tempo of events following each other, the past period of which data are taken to form expectations about the future extends. Recently **Eric Barthalon** has used this theory to explain the events observed during the crisis since 2007 in his ***Uncertainty, Expectations and Financial Instability.***

It seems, however, as I will show, also to be important, which kind of money we consider, since a change of expectations influences the relationship among different kinds of money,  $M0$  and  $M2$ .

## Logistic Function Depicting the Real Demand for the Inflating Money Depending on the Rate of Inflation; Following Maurice Allais

$$\pi = \frac{(P(t+1) - P(t))}{P(t)}$$

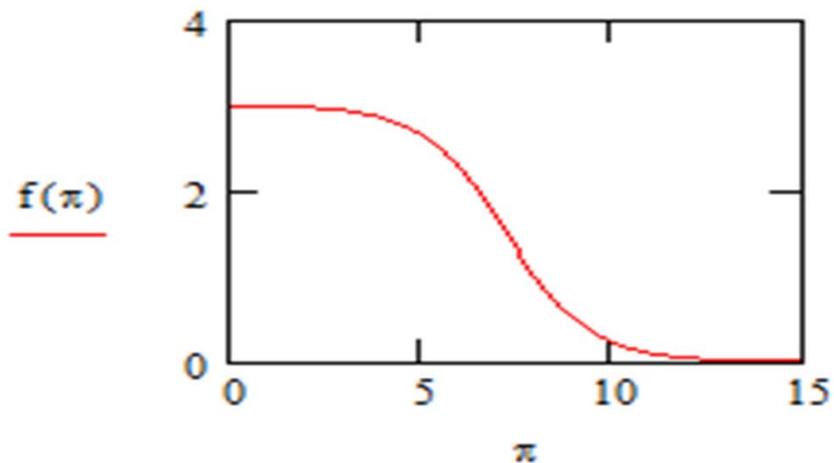
$$f(\pi) = M(t)/P(t)$$

$$\pi := 0.1, 0.2 \dots 15$$

$$b := 2$$

$$a := 0.9$$

$$f(\pi) := \frac{(1 + b)}{[1 + b \cdot e^{a \cdot (\pi - 8)}]}$$



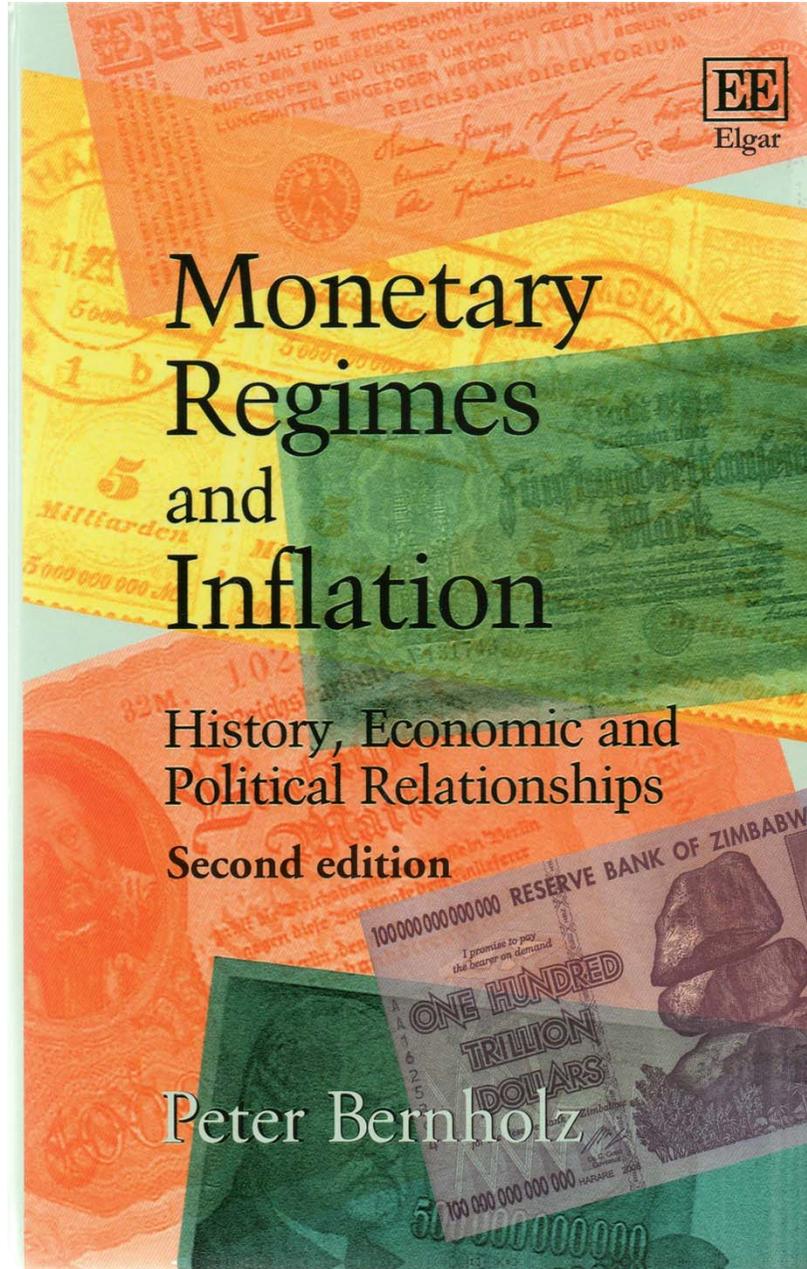


# Monetary Regimes and Inflation

History, Economic and  
Political Relationships

Second edition

Peter Bernholz

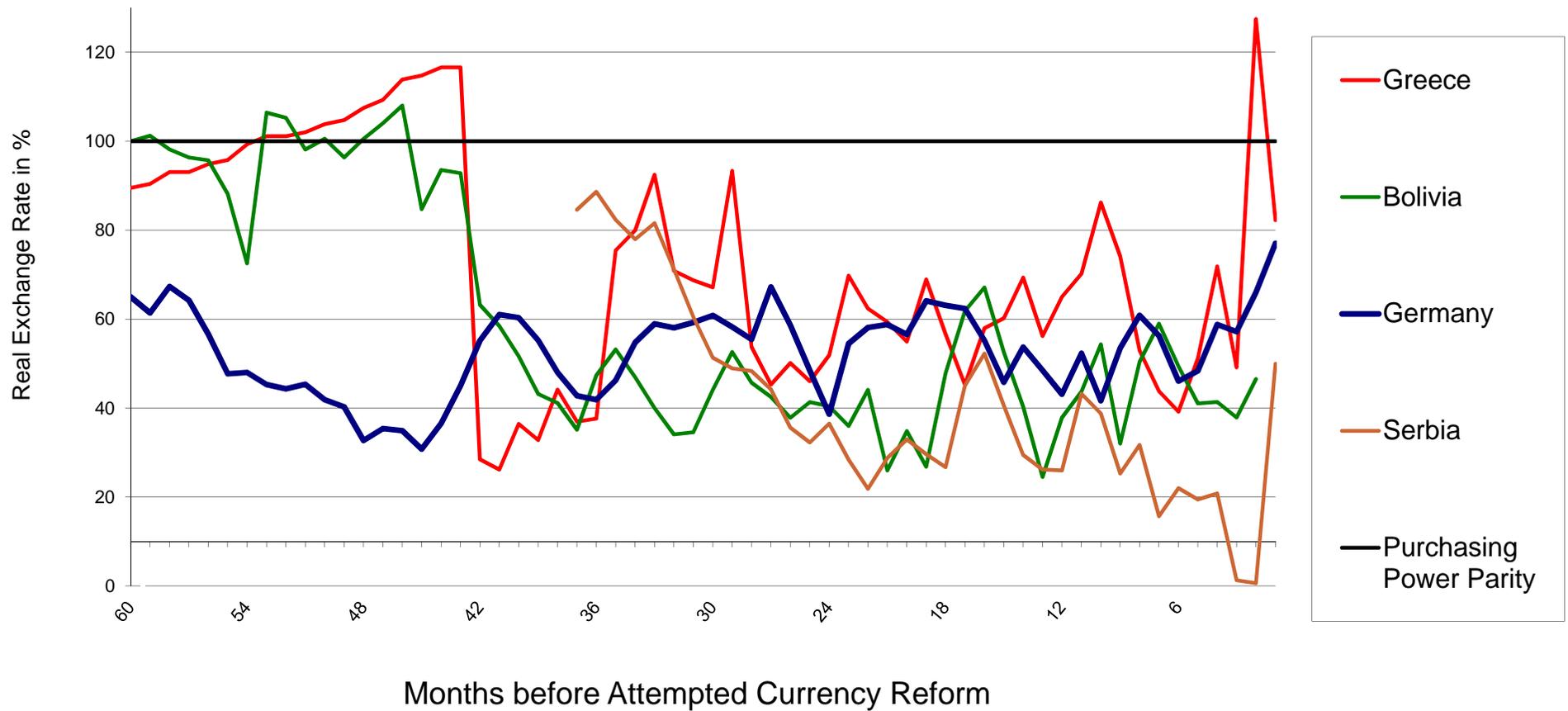


The innovative theory of expectations created by **Allais** can, however, probably also be applied to two other phenomena, because they are closely related to the shrinking amount of  $M/P$  of the inflating national money:

1. The currency substitution by which the unstable national money is substituted by stable foreign currency (usually by banknotes) or – in former times - by gold and silver coins;
2. The undervaluation arising because of this currency substitution of the inflating money in terms of the stable money.

Roman Empire	Fourth century	Aurelian reform	gold coins	Schmidt- Hofner (2008)
Ming China	1375-1448		silver bullion, copper coins (limited)	Bernholz (1993)
USA	1776-81	March 1780: new dollar bills 1 : 20	specie and state paper money	Phillipps (1972, 170 sq) Bezanson (1951, 325 sq)
France	1789-97	February 1796: mandats territoriaux 1 : 30	gold and silver specie	Thiers (1840)
Peru	1875-87	September 1880:2 incas 1:8	silver coins	Garland (1908, 58 sq)
Mexico	1913-17	June 1916: In falsifiable currency 10 : 1	gold and silver specie	Banyai (1976, 73 sq) Kemmerer (1940, 114-15)
Zimbabwe	2000-2008		US dollar & rand	Steve Hanke. e-mail, 2012

Figure 5  
Undervaluations in the Course of Four Hyperinflations, 1918-1994.



**Thomas Sargent** explains in *The Ends of Four Big Inflations* of the 1920s that these inflations and the successful reforms ending them shared important common characteristics:

- “1. The nature of the fiscal policy regime in effect during each of the hyperinflations. Each of the four countries” (Austria, Hungary, Poland and Germany) “ran enormous budget deficits on current account.**
- 2. The nature of the deliberate drastic fiscal and monetary measures taken to end the hyperinflations.**
- 3. The immediacy with which the price level and foreign exchanges suddenly stabilized.**
- 4. The rapid rise in the ‘high-powered’ money supply in the months and years after the rapid inflation had ended.”**

Sargent explains that **“The essential measures that ended hyperinflation in Germany, Austria, Hungary and Poland were, first, the creation of an independent central bank that was legally committed to refuse the government’s demand for additional unsecured credit and, second, a simultaneous alteration in the fiscal policy regime. These measures were interrelated and coordinated. They had the effect of binding the government** .... In each case we have studied, once it became widely understood that the government would not rely on the central bank for its finances, the inflation terminated and the exchanges stabilized. We have further seen that it was not simply the increasing quantity of central bank notes that caused the hyperinflation, since in each case the note circulation continued to grow rapidly after the exchange rate and price level had been stabilized. Rather, it was the growth of fiat currency that was unbacked, or backed only by government Sargent, Thomas J. (1986): *Rational Expectations and Inflation*. New York: Harper & Row, p. 44.

Bernholz (2003, 2<sup>nd</sup> ed. 2014) has shown that 9 hyperinflations were ended by such reforms.

Table 2  
 Institutional Characteristics of the Most Successful Currency Reforms

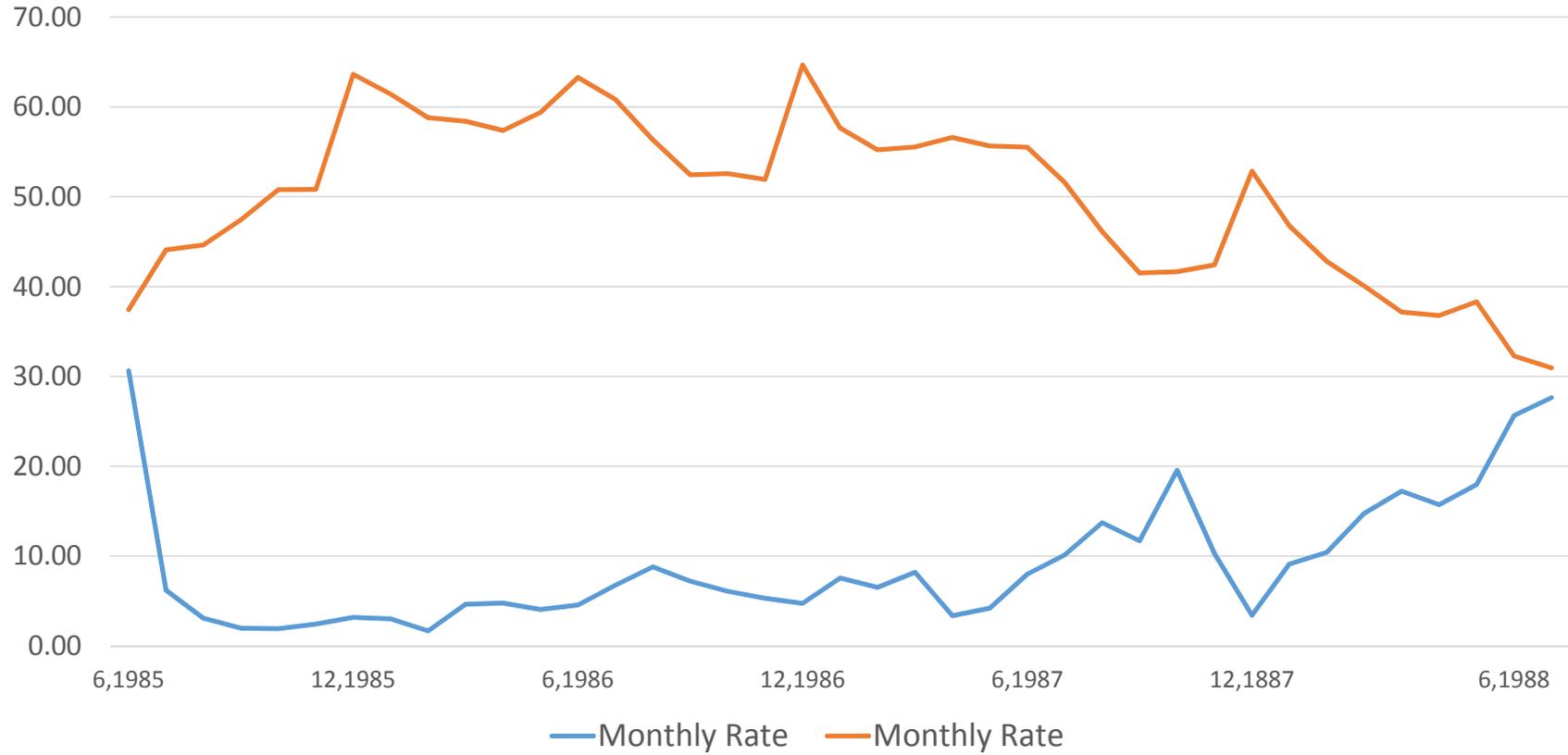
Country	New Currency Unit?	Reform Credits and Grants		Legal Safeguards	
		Domestic	Foreign	Central Bank	Budget
Austria	1 Shilling = 15000 Kronen (after success)	Yes	Yes	Yes (new and independent bank) (Control by League of Nations)	Yes
Bolivia	1 Boliviano = 10 mill. Pesos (after success)	No	Negligible	No; but management and 2/3 of personnel exch.	No
Bulgaria	no	Yes	Yes	Yes (Currency Board introduced)	Strict safeguards, Limited fiscal Reserve account
Germany	1 Rentenmark = 1000 billion Mark	No (Credit line of 1.2 billion Rentenmark at Rentenbank)	Yes (but after success)	by Law) yes (new and Independent Rentenbank)	no (but credit limitation at Rentenbank)
Greece II	1 New Drachma = 50 mio. Drachma	No (Credit line of 1 bill. New Drachma at Central Bank)	Support through grants in kind	Yes (Treaty with UK and USA) and by control	No (but credit limitation at Central Bank)

Hungary 1	1 Pengoe = 12500 Kronen (after success)	Yes?	Yes	Yes (independent Central Bank) (Control by League of Nations)	Yes	Fixed exchange rate with £, imply- ing 3800 Pengoe = 1kg 9/10 fine gold
Nicaragua	1 Gold Córdoba = 5 mio. Old Córdoba	No	Yes	Amount of dome- stic liquidity bound to foreign reserves	No	1 \$ = 5 Gold Córdobas
Poland 1	1 Zloty = 1.8 mill. Polish Mark	Yes (Credit line of 50 mill. Zloty at Cen- tral Bank for 1927)	No	Yes	Partly	1 \$ = 5.1826 Zloty, 1924, devalued to 1 \$ = 8.91 Zloty, 1926
Soviet Union	1 Gold Ruble =  50000 1923 Rubles =5 mill. 1922 R. = 50 bill. 1921 (pre- war) Ruble	Yes?	No	Yes  (by decree)	Partly  (by decree)	1 \$ = 5.14 Chervo- netz = 51.4 Gold Ruble (Foreign trade monopoly of state)

**But:** Two reform efforts to end inflations in Argentina and Brazil in 1986 had a passing success for about 1 1/2 years since the public formed unwarranted positive “rational” expectations during these high inflations.

**Moreover,** among the attempted currency reforms of 30 hyperinflations studied 7 were less successful with more than 25 % and 14 least successful with more than 100 % remaining annual inflations.

Figure 7  
Failed Currency Reform in Argentina Around 1986



Let me end with a **warning**:

We will never be able to construct a perfectly adequate theory of expectations. For this would mean that no human freedom existed. Thus only partially valid models of expectation formation seem to be possible.

A **similar position** has already been taken **by Sargent and Wallace**. They

„...describe a sense in which it might be difficult to imagine that a regime change can occur. As they discovered, thinking about regime changes in the context of rational expectations modes soon leads one to issues of free will.“ (Sargent, 1986, p. 103, fn. 10).