

Triffin's dilemma and the instability of the International Monetary System by Roberto J.A. Kalauz

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Argentine Central Bank BCRA

Econometrics: Professors: Tamara Burdisso, Lorena Garignani.



60th World Statistics Congress – ISI2015
Programme Committee for "Poster Presentation" in the
Scientific Programme

- Introduction : Genesis of work. The long-term relationship between gold prices and global liquidity determinants is investigated
- Historical background of the monetary system and the role of gold
- An attempt to quantify determinants of global liquidity and its relation to the price of gold
- Forescast “ The Bubble Gold ” in August 30 2011 in Thomson Reuters Webinar
- Conclusions

Dilemma, Aporía,, Irrational numbers.....

EL NACIMIENTO DE LA MATEMÁTICA EN GRECIA

CONRADO EGGER LAN



Ancient Greece and exchange

- "There sharing everything with fire and fire with all things, as gold for goods and goods for gold" Greek philosopher Heraclitus Fragment 90"
- Heraclitus notes that the exchange of goods, the exchange value is in gold and see that there is a backup at all times to these goods
- A farmer earned one drachma per day
- A class of philosophy of Anaxagoras cost 500 drachmas

Historical price of Gold



THE TRIFFIN DILEMMA

- The Triffin dilemma is rarely mentioned in the economic literature but in economic history: “
- A further problem was the “ Triffin dilemma “. Robert Triffin Belgian economist, Yale Professor, and Architect of the Europe Payment Union; had observed as early as 1947, that the tendency for the Breton Woods System to meet excess demands for reserves through the growth of foreign dollar balances made it dynamically unstable , who warned about the vulnerability of the system agreed at Bretton Woods in his book:
“ Gold and the Dollar Crisis: The Future of Convertibility (1960)”.

THE TRIFFIN DILEMMA

- The main argument held that the Bretton Woods system by having the dollar as a world reference, adjustable to \$ 35 an ounce, the US would have a permanent deficit from having to provide the dollars needed for the functioning of global trade.
- In his book “ Our International Monetary Systems: Yesterday, today and to morrow. He said
- “Half Century 1914-1965 of international monetary anarchy after World War I
- *"The economic thought in recent years forgot the story."
Robert Skidelsky JM biographer Keynes*

Summary

- This work is an attempt to quantify the determinants of global liquidity and its relation to the price of gold.
- The first part includes a theoretical overview of the economic approach.
- The second presents the econometric model.
- The third is testing of model with forecast
- The period is from the breakdown of Bretton Woods (BW) in 1971, until the recent crisis of the International Monetary System. The price of a troy ounce of gold has exceeded \$ 1,000, but 40 years ago its price was \$ 35. The theoretical assumptions include, among others Triffin's dilemma, a Belgian economist who alerted the vulnerability of the system agreed in BW.

Historical Background: The International Monetary System and the role of Gold. Periods

- Clásic Gold Standard (1870-1914)
- Interwar Gold Standard (1914-1938)
- Bretton Woods Gold-Dollar (1944-1971)
- Dollar Standard backed by gold (1971-2008)

Sub Periods :

Strong Dollar, Wolker (1987-1987)

Paza Acoord Devalue Dollar 1985

Derivatives, Crisis Sub prime G20 (2008 >

Dólar ..Yuan Euro ?? Strong Dollar ?? 2015 >

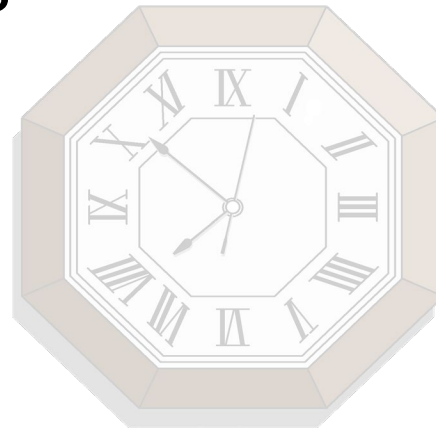
The Rules of the Game of the Gold Standard

Performance assumptions

- Automatic
- Impersonal
- Politically Symmetrical

Mechanism

- Liquidity
- The adjustment mechanism for a country's deficit, was deflation rather than devaluation
- Confidence. Trust



Gold Standard (1870-1914)

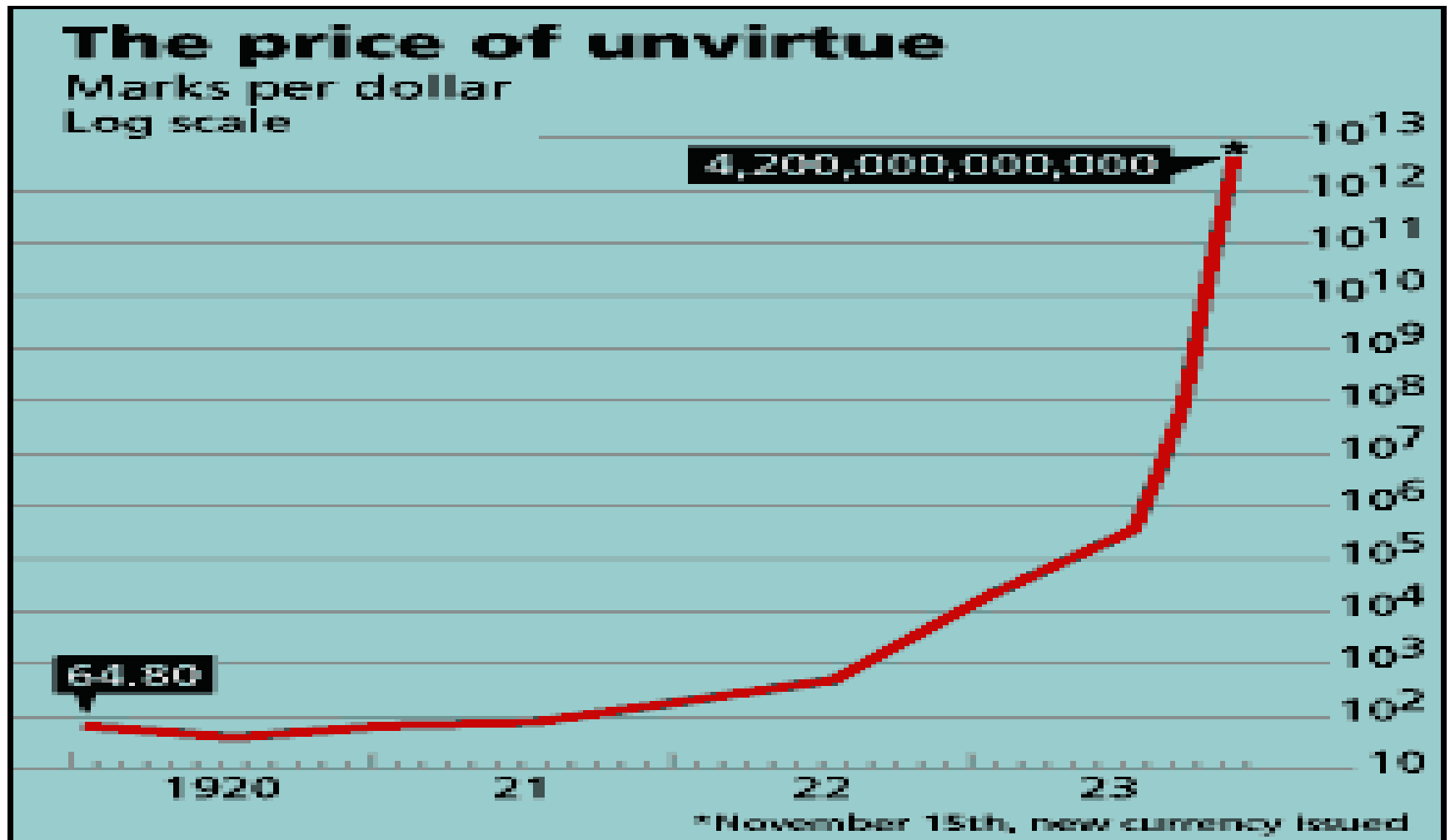
- Free flow of gold between individuals and countries, and its use as a payment mechanism. In 1717 Newton Gold recommends using preferably about Silver
- Fixed and predetermined for each currency in relation to gold stock value. Direct relationship between the money supply and the position of the balance of payments.
- Absence of an organization to coordinate actions at the international level.
- Asymmetrical relationship between deficits and un surpluses in the balance of payments.
- Deficit: $X < M$, gold output, reducing the money supply, falling prices and reduced imported goods. Increased exports, the deficit is eliminated.
- Surplus $X > M$, inflow of gold, increasing the money supply, rising prices, increased imports.

The interwar gold standard 1918-1938

- In August 1914, started the 1st World War and the Gold Standard was destroyed. It was believed that the interruption will be momentary
- The UK maintained its parity until 1914.
- During the second half of 1920 the gold standard was again implemented in most countries.
- After the war begins inflation in Germany that it is aggravated by being defeated hyperinflation and ends in November 1923.
- The September 20, 1931 UK devalued the pound and definitely abandoning the gold standard

German hyperinflation

Loads of money

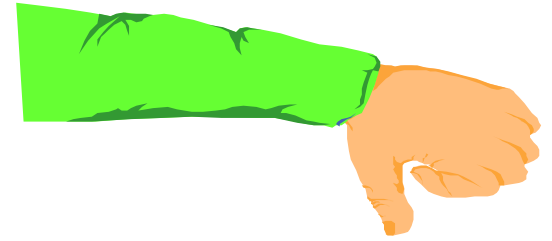


Britain Off Gold Standard 1931 September

Bankers Act, a milestone in the history of banking in England, was passed by which it breached some of the Bank's former restrictions on the establishment of joint-stock banks in towns but not within 65 miles of London. It allowed the Bank to establish branches in other cities from which it was able to increase its currency by sound note issue. In 1833, the Bank's tender for all amounts above £5, in the event of a crisis, as long as the credit of the Bank, the public would be satisfied with its assets which would consequently be safeguarded. This was the first move towards the 1844 Bank Charter Act which was also the key to the Bank achieving the monopoly of the note issue. It provided for no new issuers of notes and those who were taken over, forfeited their rights. The crucial clause of the Act was a monetary limit on the Bank's capital of £14 million, backed by gold coin or bullion. This, the gold standard which, during the nineteenth century, laid the price for standard gold, laid the basis for a worldwide and created a long period of price stability policy, in effect, on auto-pilot. This policy alone, however, was not enough. There were crises and in order to prevent systemic failures the 1844 Act had to be suspended: this occurred in 1866 when Overend Gurney, one of the great City houses failed. Walter Bagehot, the editor of the Economist wrote in 1866 about the crisis of that year that the Bank should hold and should be responsible for holding the "banking reserve of the country". If the Bank had not recognised its responsibility for financial stability in earlier cases, its reaction in 1890, when the Bank's shareholders were threatened, heralded a new era of Bank's stewardship of the Square Mile. A new operation in the form of a guarantee fund was established by the Governor of the Bank and more was promised, much of it from the new joint-stock banks. The crisis was averted but the



The Great Depression 1929



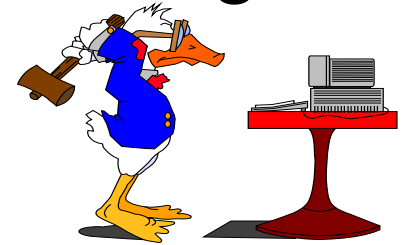
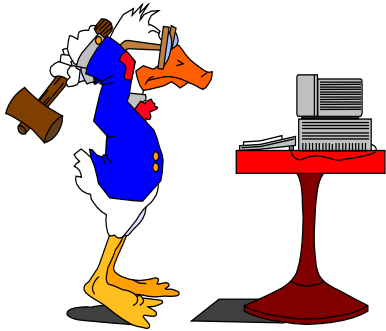
- It was the longest, deepest and devastating in modern society. It was a deflationary shock with high unemployment
- The Treaty of Versailles was signed in June 1919 ended the WW I. However the substantial repairs required from Germany worsened rather than defuse the conflicts in the post-war
- US applied a deflationary and high interest rates policy, the result was the 1929 crash in NY
- Depression led to a sharp fall in production and commodity prices and sustained and permanent increase in unemployment

Bretton Woods Accord 1944



- It was a commitment by the Allies for monetary reconstruction and trade at the end of World War II.
- USA was the only source of liquidity and reserves had to redistribute the rest of the world.
- Gold was considered the principal reserve asset in supporting the circulation of dollars. It was called Gold-Dollar Standard and countries had a system of fixed exchange rates against the dollar.
- The dollar is the currency in circulation and subject to international acceptance, convertible into gold at a value of \$ 35 an ounce.
- De Gaulle argued : It was an exorbitant privilege"
- Countries could claim the US to the gold parity

US take off the convertibility of the dollar gold



- On August 15, 1971, President Nixon announced the unilateral exit of the Bretton Woods and “closed the gold window ”
 - The floating exchange rate is announced.
 - Nixon refuses to finance the Vietnam War with tax and decides to print dollars.
 - The monetary system agreed in Bretton Woods reflected US hegemony in the economy and world politics
- Charles Kindleberger* , Theory it apply to the international monetary and financial System

When the dollar was devalued

THE ECONOMIST/AUGUST 21, 1971

53

BUSINESS

The Dollar

When the dollar was devalued

If Mr Nixon's floating of the dollar leads to a modern international monetary system, it will be well worth accepting the retrogressive import surcharge. How the ECC is reacting. What the measures mean to trade and to British industry

Nothing could take away the sheer drama of it. With a single sentence President Nixon demolished the fulcrum of the world's monetary mechanism and floated the dollar. "I have directed Secretary Connally to suspend temporarily the convertibility of the dollar into gold or other reserve assets."

Temporarily? The Canadians floated their dollar in 1950 as a temporary expedient, and it lasted a decade and more: their current refloat has already had a run of nearly 15 months. Moves that break the rules of the world's money game have to be described as temporary, but there is rarely a return to things as before. Indeed, that is just what is not intended. "In full co-operation with the International Monetary Fund and those who trade with us," Mr Nixon went on last Sunday, "we will press for the necessary reforms to set up an urgently needed new international monetary system."

It is not the Americans' intention that the new system should in any way upgrade the funding role of gold. The free London gold market reopened on Tuesday afternoon at a fixing price of \$43.05 an ounce, virtually unchanged from the pre-weekend rate and well below the near \$44 of a week before. Mr Nixon has just jibbed against living with the dollar world's outworn rules. The dollar has been the centre of the par-value system of currencies fixed in 1944 at Bretton Woods in New Hampshire, largely between the Americans and the British; it was there that the rules of the game which ended last Sunday were laid down, and the IMF set up as referee. Under the IMF's present rules, a currency's exchange rate against the dollar can fluctuate no more than 1 per cent either side of parity. The dollar is the unit of account, the currency of settlement, the intervention currency, the dominant trading currency and a major reserve asset—but, just because of what General de Gaulle called its exorbitant privilege, it has been denied room for manoeuvre on its own behalf. America was the one country that could not under the old rules devalue its currency unilaterally. Its exchange rate has been the composite result of the rates set by other countries in terms of the dollar, with exchange authorities for the world over committed to support the dollar when it



Volcker: explaining, not negotiating

touched its lower limit against their own currency, as they were busy doing throughout last week. What America has now told the world is that this composite rate overvalues the dollar in terms of purchasing power, and it has therefore taken the one step it could towards devaluing it. Nobody who holds a dollar today has any guarantee from America that he can turn it into gold or any other asset at a fixed price. Every country—or, preferably, a free market in every country—must therefore decide what it wants the value of its own currency in terms of dollars to be.

Mr Nixon, in painful echoes of Mr Wilson's excuses after the pound's devaluation, has been busy casting himself as defender of the dollar, protecting it from ever again being "a hostage to the world's money speculators." This, of course, is old-fashioned political bunk. The men at Bretton Woods lived in an age when it seemed conceivable that movements of capital could be controlled so as to compensate for the swings in trading balances. No one then envisaged that the world's financial centres could be as closely linked as they are today, making switching from one centre to another an everyday bread-and-butter business. Nor that there would be such huge sums looking for the best return on them as there are today in the hands of multinational and American corporations. The world in 1944 had hardly appreciated Walter Bagehot's thesis that money does not manage itself; and even now, in 1971, politicians still persist in calling money management speculation.

Even more relevant to today's problems, the postwar

Leaving the gold backing, major currencies begin to float in a system of interventions

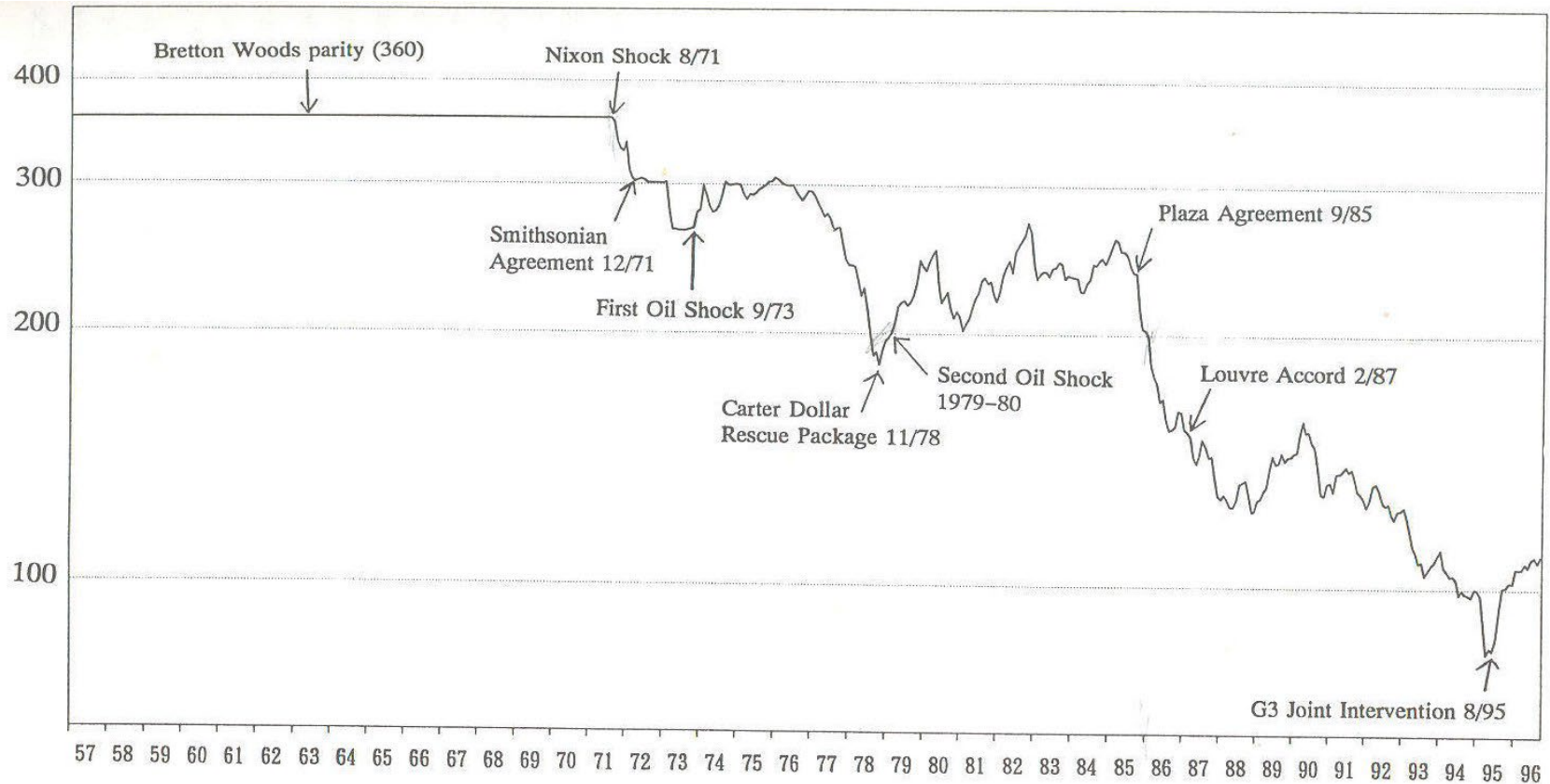
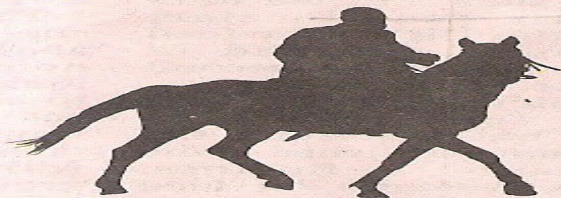


Figure 1.1

Nominal yen-dollar exchange rate, semilog scale. Source: IMF, *International Financial Statistics*, CD-ROM, December 1996.

“ To prevent pound sterling weakening ,golden pound should be introduced into the world economy” FT London 2010

THE FAST TRACK OUT OF THE CRISIS



sterligoff.com

**TO PREVENT POUND STERLING
WEAKENING, GOLDEN POUND
SHOULD BE INTRODUCED
INTO THE WORLD ECONOMY
PRIMARILY FOR PENSION FUNDS**

Why ASCENT Goldens are essential

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Corn	1 tonne	0,135

One Golden - 1 Troy Ounce of fine gold 999
Rates date: 06.08.2009

Goldens SPOT

Aluminum	1 MT	2,074
Lead	1 MT	1,968
Nickel	1 MT	21,151
Brent Crude	1 barrel	0,077
WTI Crude	1 barrel	0,076

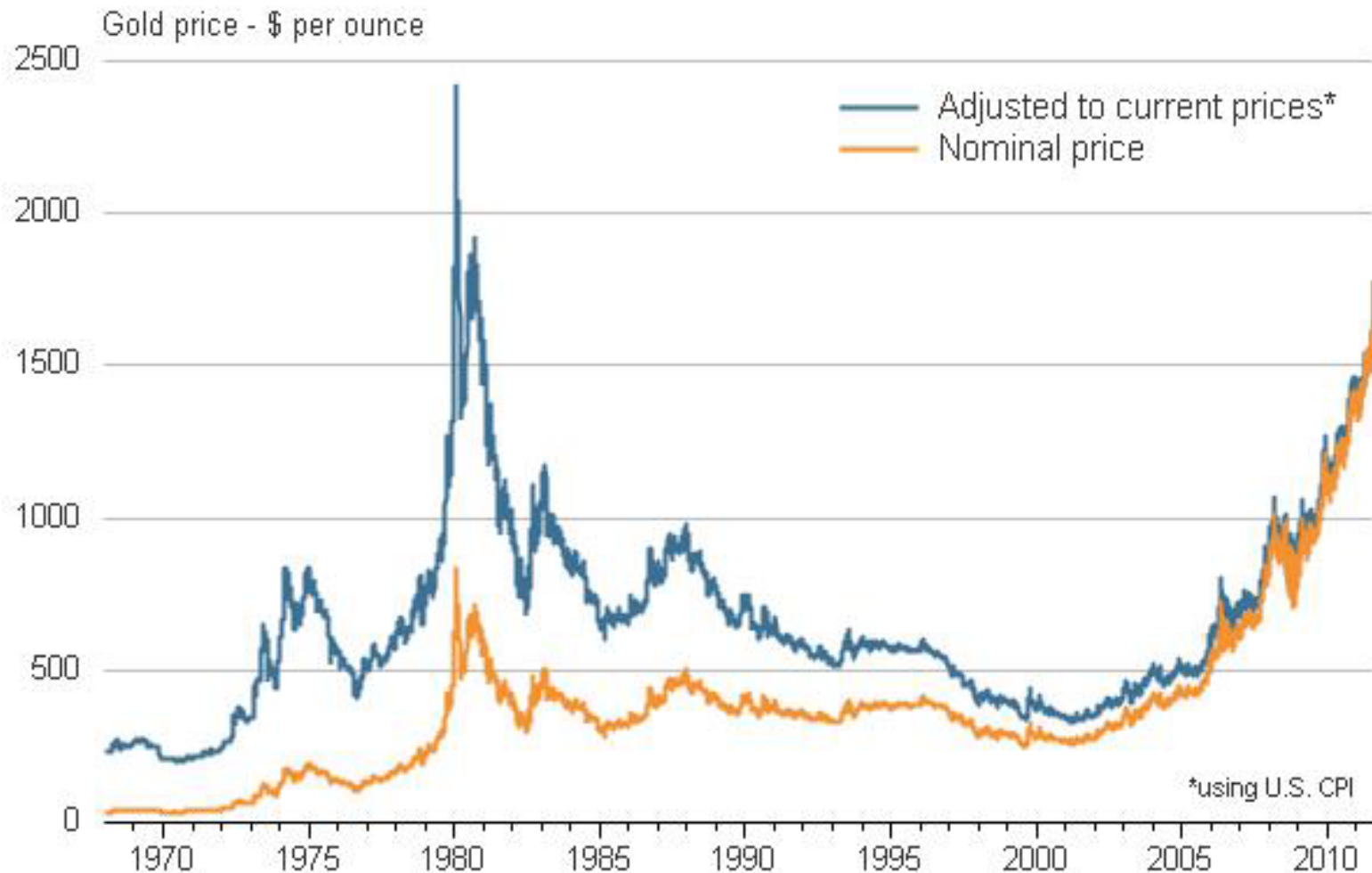
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Inflation adjusted gold price



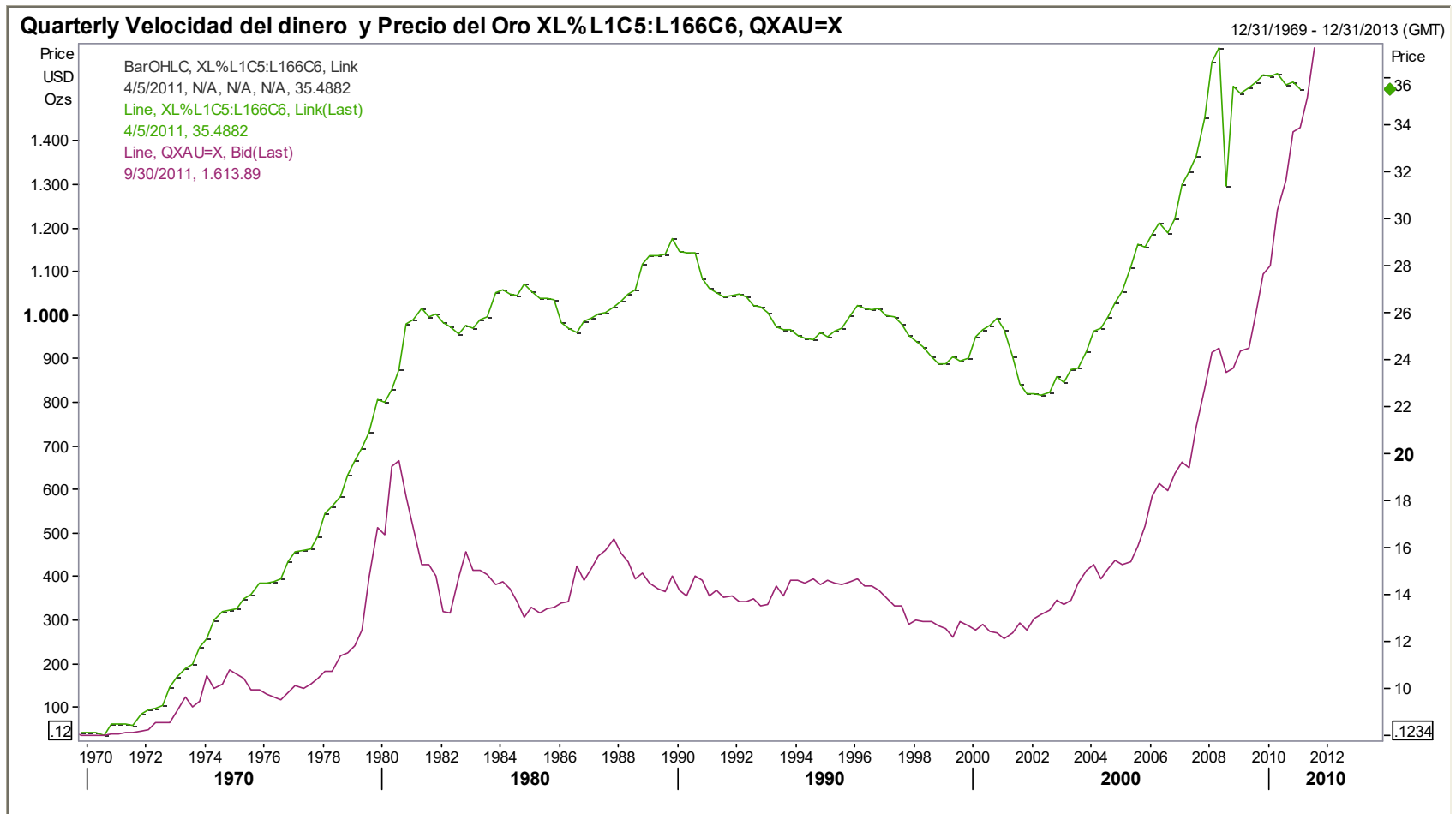
Source: Thomson Reuters Datastream

Reuters graphic/Scott Barber 12/08/2011

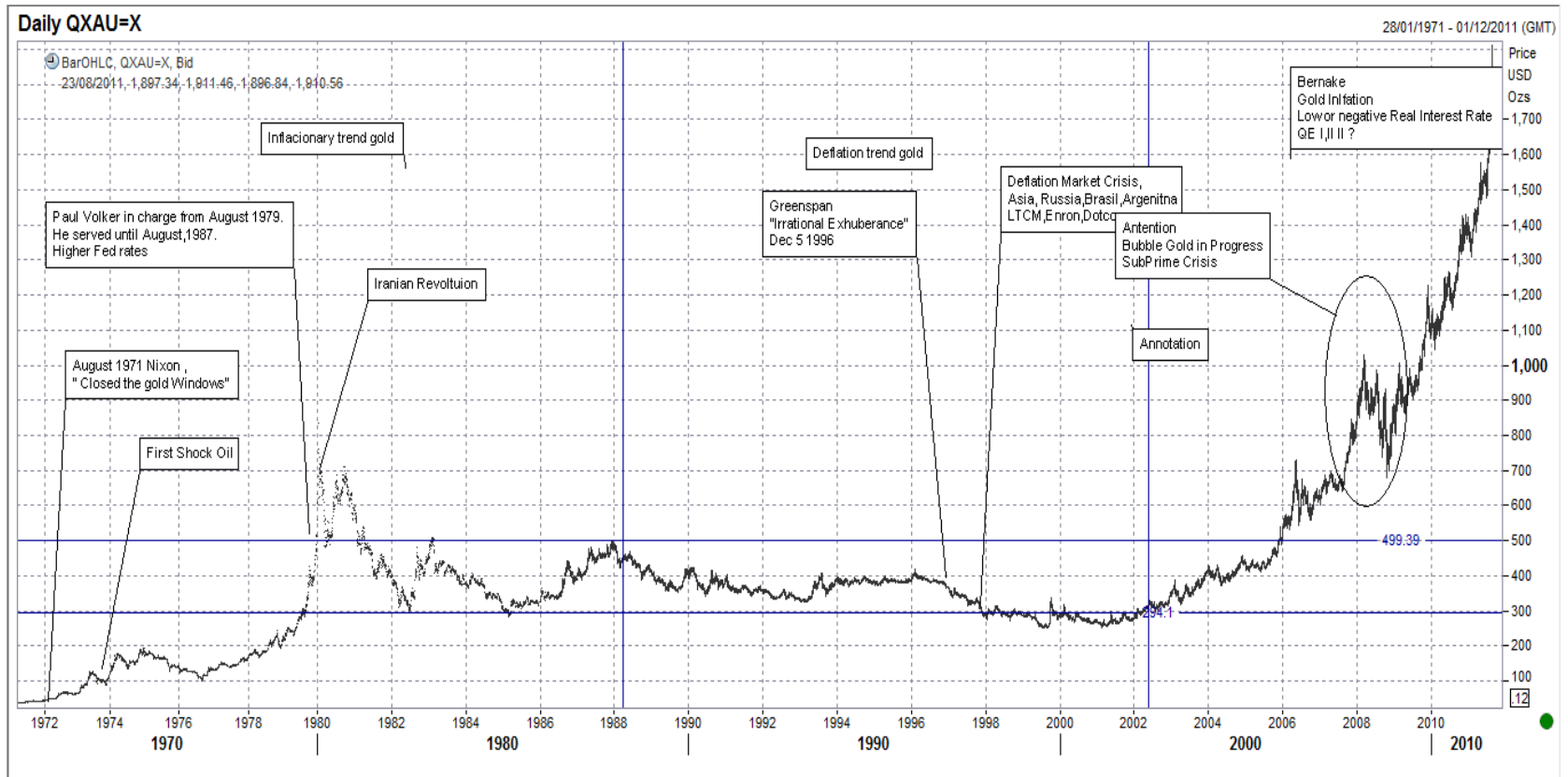
Impulse



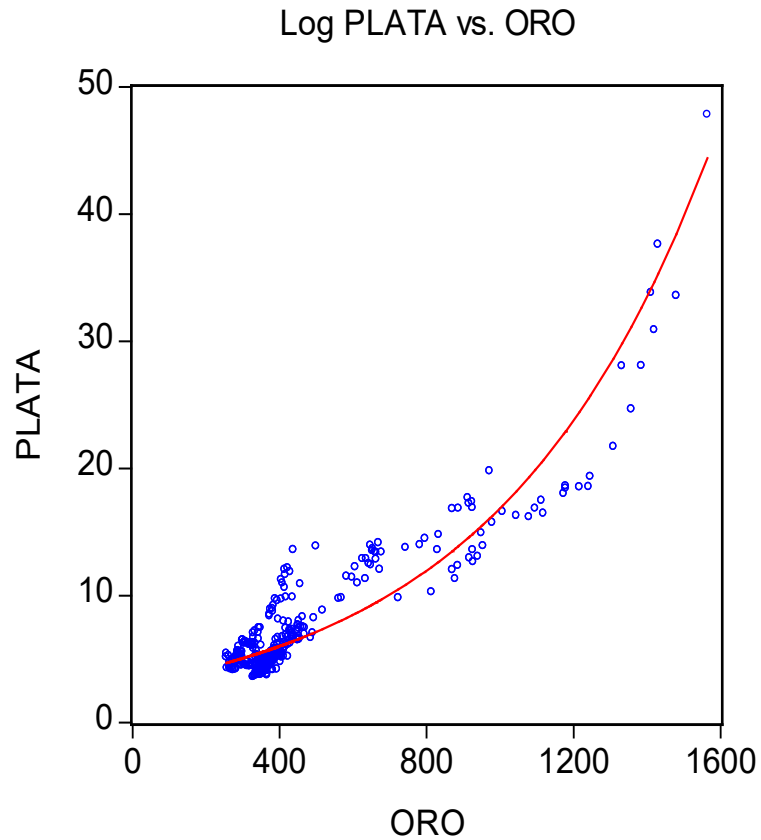
Gold and Velocity of Money in US from 1971



Price of Gold from 1960, Quaterly



Log Gold and Silver



A quantitative model for the gold price.

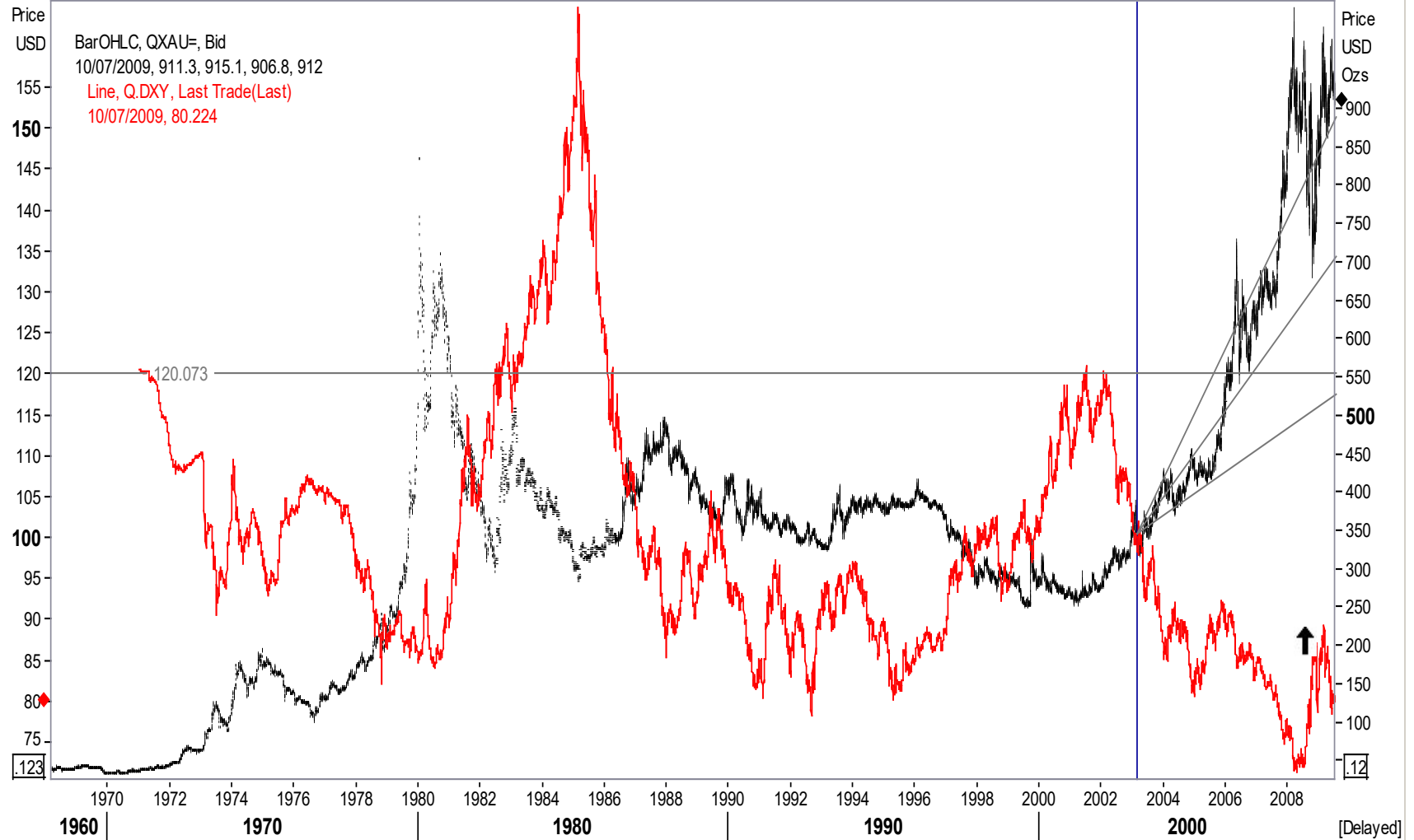
Determinants

- US monetary aggregates
- Reference interest rate
- Dollar Index
- Dummy variables speculative factors
- Shocks (1973 Petroleum., 2008 Global crisis ..)
- Situations of great uncertainty; wars, disasters, catastrophes, Iranian Revolution (1980).
- Gold scarce and valued since ancient times
- The methodology used by the systems of equations
Cointegration Johansen and Juselius

Dollar & Gold

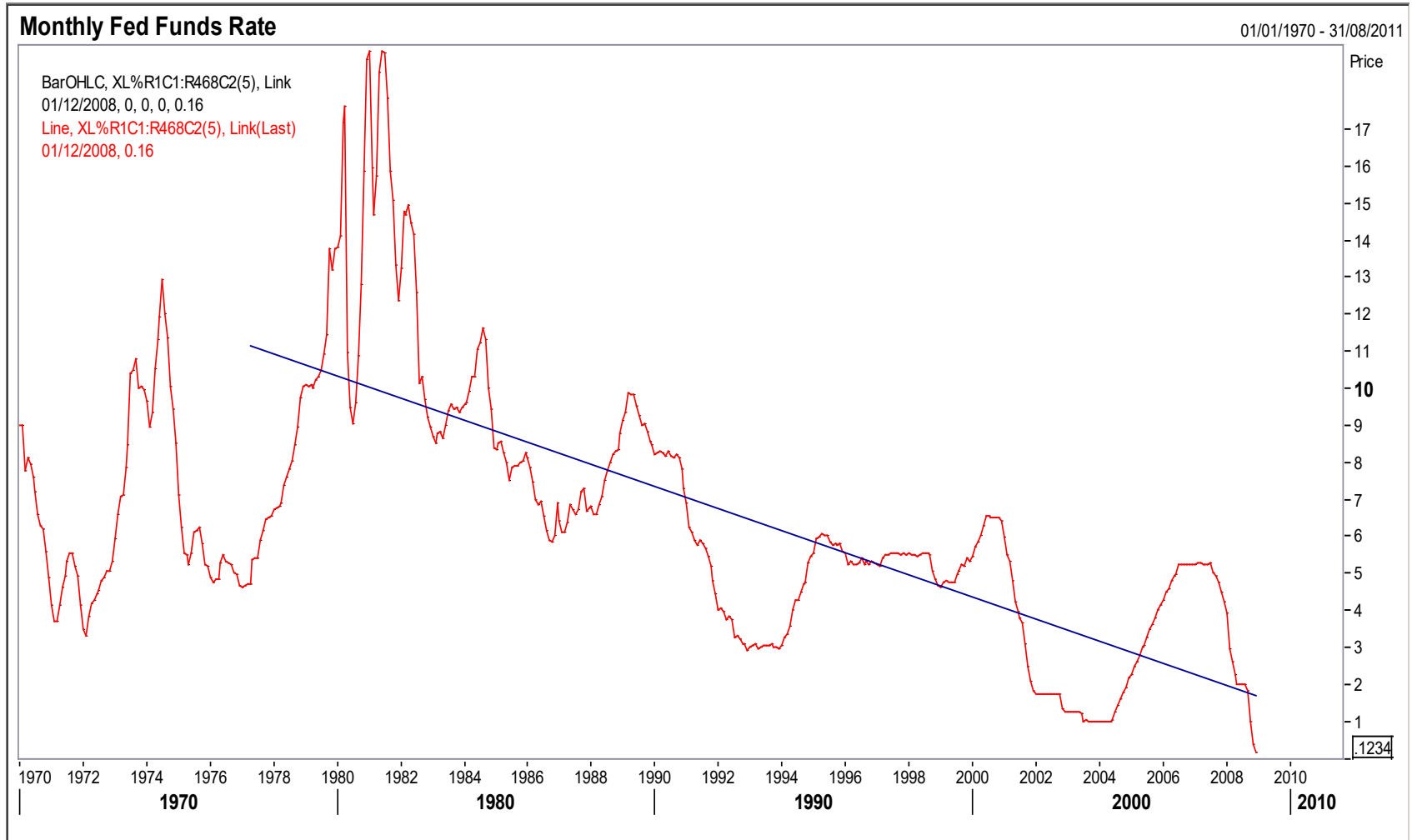
Daily QXAU=, Q.DXY

22/03/1968 - 10/07/2009 (GMT)



Monetary Policy of US

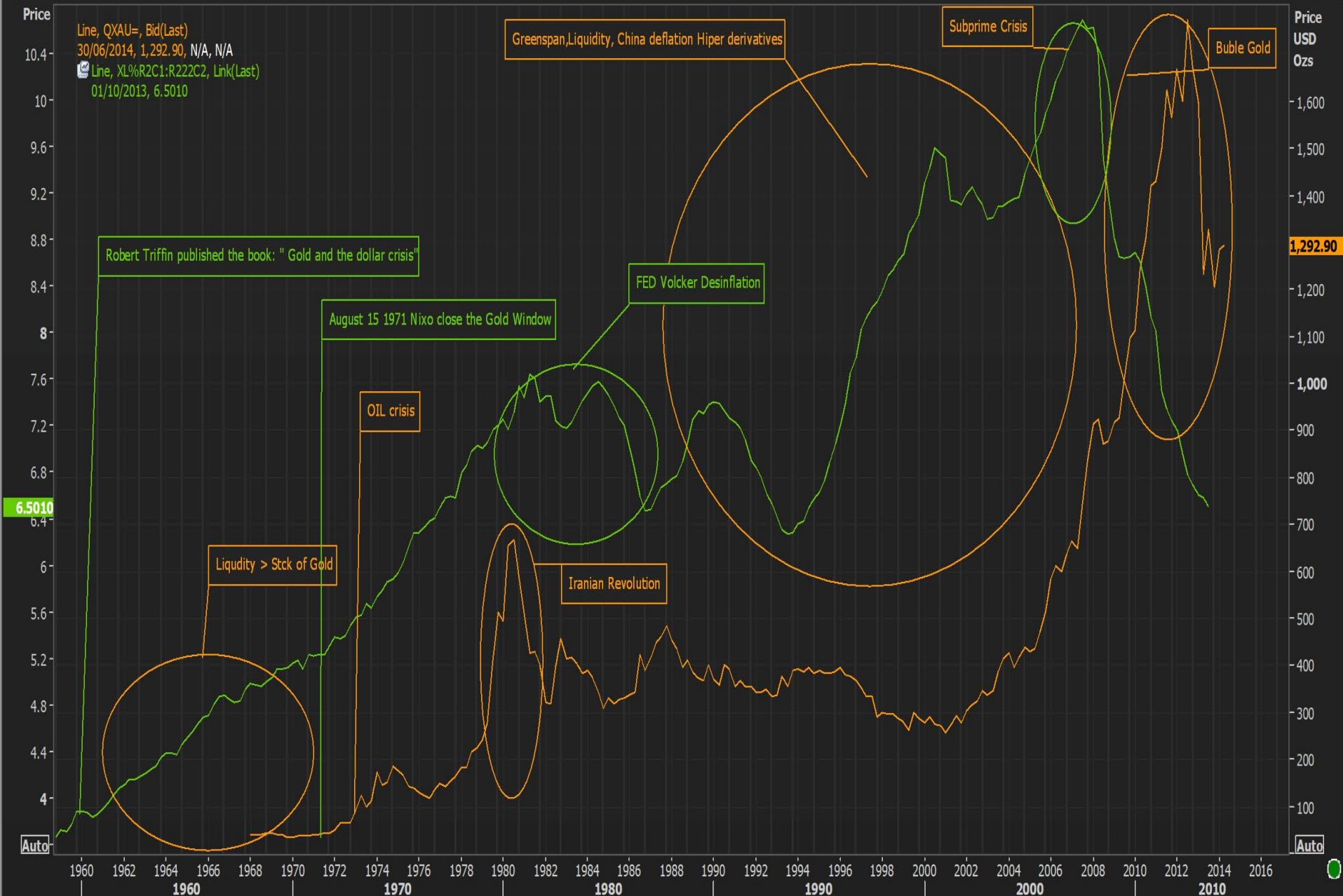
US Federal Fed Funds Rate



Price of Gold and Velocity of Money

Quarterly QXAU=, XL%R2C1:R222C2

01/01/1959 - 01/07/2017 (GMT)

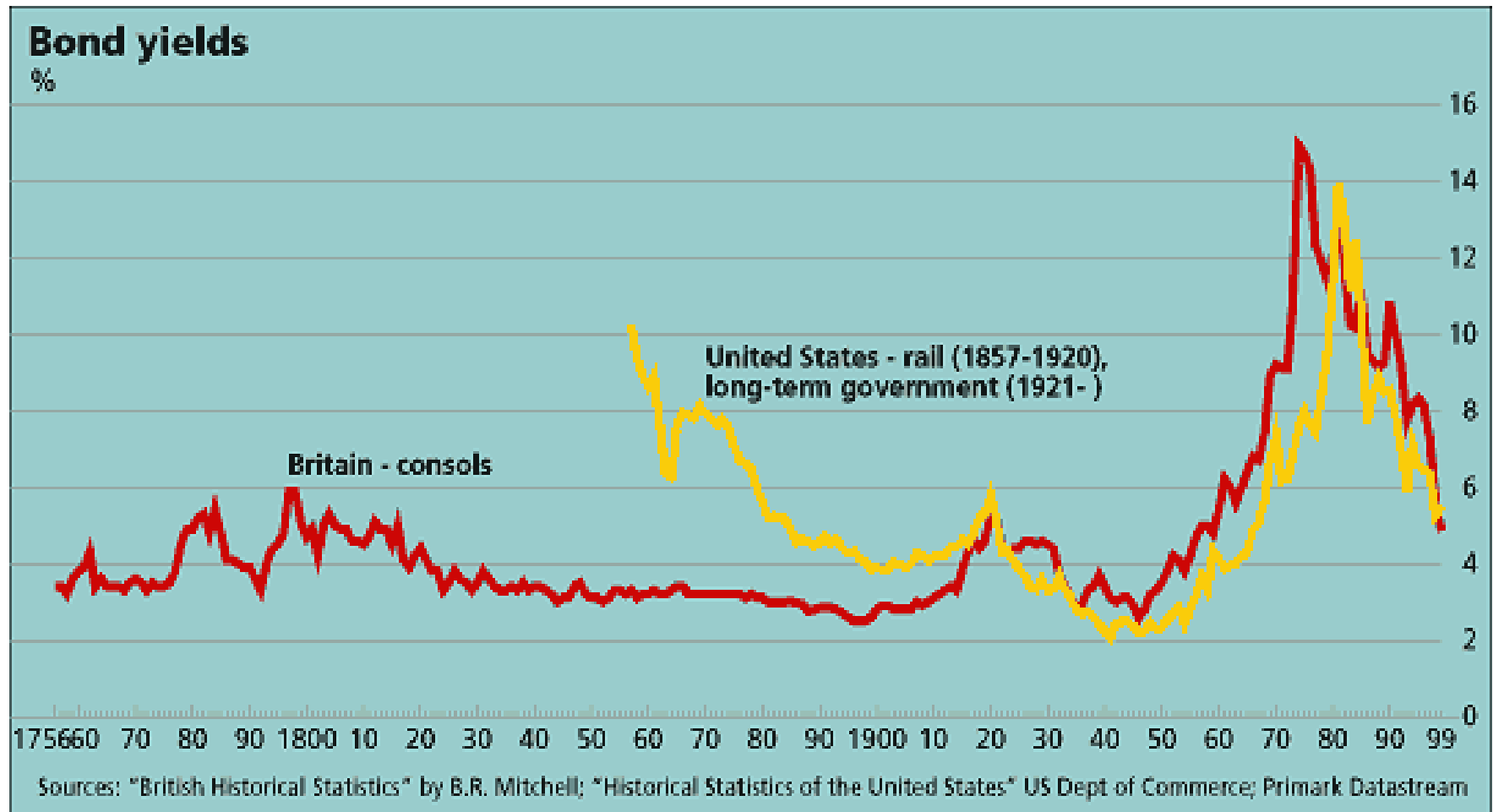


What it means velocity of money ?

- " Consumers are not spending because they do not have jobs, security and grow jobs "

Earnst and Young, " Consulting .News on Bloomberg July 2015

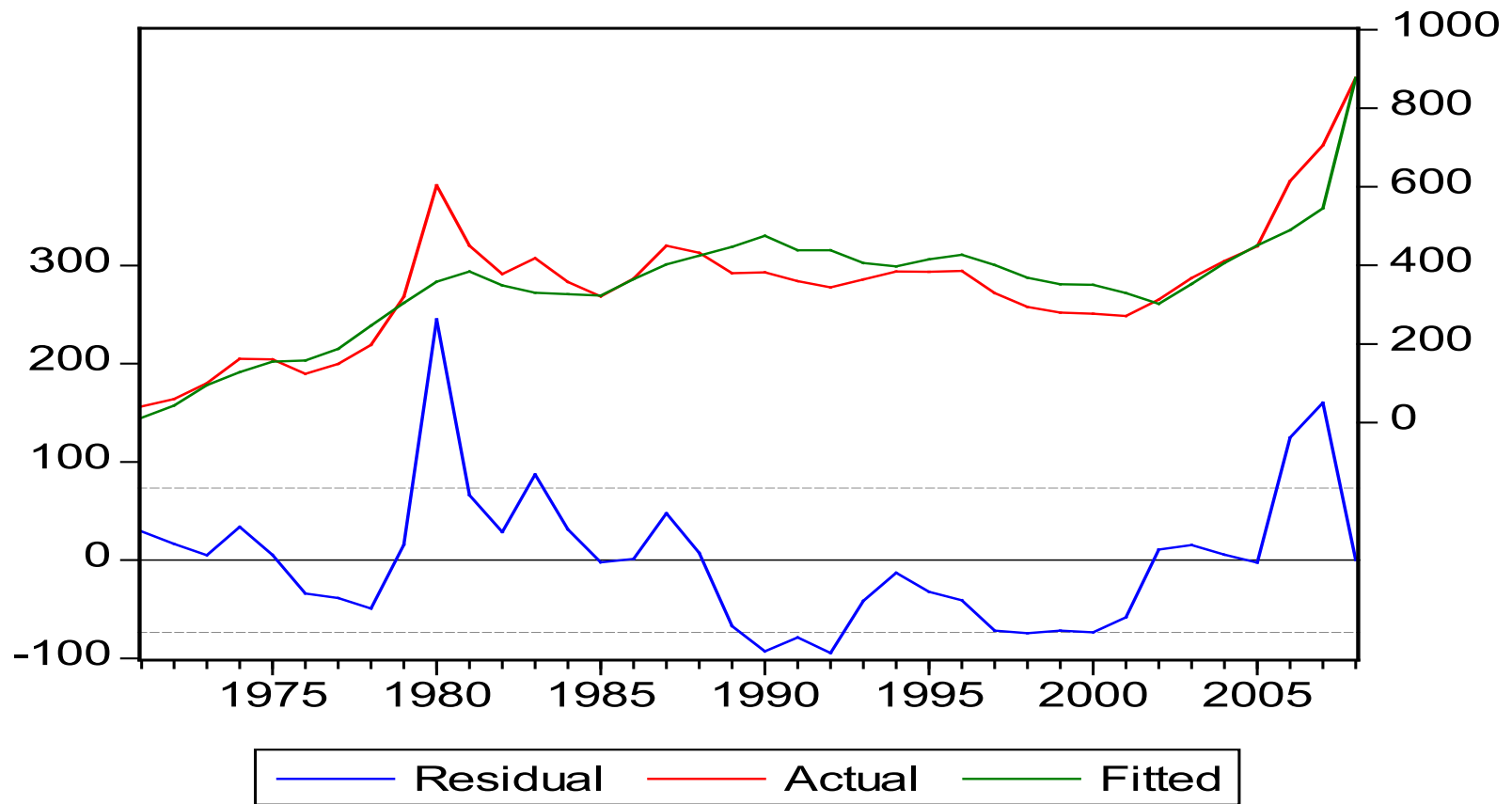
Historical long term interest rate



An attempt to model the Triffin dilemma

- While the starting point of theoretical analysis was the gold standard, the quantitative analysis covers the period after the break in 1971 until the financial crisis of late 2008.
- The price of gold and other commodities were taken from the Reuters database. The frequencies were taken monthly, quarterly and annually.
- The study of the series and its relationship aimed at finding a long-term structural relationship that was hinted at some graphics, to relate the evolution of the price of gold and the monetary aggregate M1
- Following the previous methodology was used a classical linear model, uniecuacional and static to study the long-term relationship
- $$Y_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + u_i$$

Gold price set by multiple regression



Least square

Method: Least Squares

Date: 03/28/10 Time: 04:48

Sample (adjusted): 1971Q1 2008Q4

Included observations: 152 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D1974Q1	0.447247	0.181577	2.463131	0.0149
D1980Q1	0.616510	0.179699	3.430792	0.0008
D1980Q3	0.632608	0.179956	3.515347	0.0006
LVC	1.677745	0.045518	36.85885	0.0000
LDXY	-0.671847	0.105779	-6.351434	0.0000
C	3.578583	0.539629	6.631559	0.0000

R-squared

0.919533

Mean dependent var

5.705906

Models of Integration

- Cointegration reflects the presence of a balance to long term which converges towards the economic system over time. The differences (or error term) in the cointegrating equation are interpreted as the imbalance error for each particular point of time.
- A group of time series is cointegrated if there exists a stationary linear combination and that combination has a stochastic trend. The linear combination is called "cointegration equation", which is interpreted as the relations of long-term balance between the cointegrated variables of the same order,

Cointegration

- We note that are not stationary. We tested the non-stationarity through the Dickey-Fuller test, so we differentiate the series to be stationary to see if they are cointegrated in the order D (I) and to raise the static model to reach uniecuacional correction component errors and then test results with the VAR model (vector autoregressive) and VEC (vector error correction).
- The principle behind these models is that there is a long-term balance between economic variables and yet, in the short term there may be imbalances. With error correction models, a proportion of the disequilibrium from one period (the error, interpreted as a departure from the path of long-run equilibrium) is corrected gradually through partial adjustments in the short term:
-

$$\begin{aligned}
 \Delta Y1_t &= \alpha_{11}\Delta Y1_{t-1} + \alpha_{12}\Delta Y1_{t-2} + \dots + \alpha_{1n}\Delta Y1_{t-n} + \underbrace{\gamma}_{\text{Velocidad de ajuste}} * \underbrace{(Y1_{t-1} - \beta_0 - \beta_1 * Y2_{t-1})}_{\text{Largo Plazo ECM}} \\
 \Delta Y2_t &= \underbrace{\alpha_{21}\Delta Y2_{t-1} + \alpha_{21}Y2_{t-2} + \dots + \alpha_{2_{1n}}\Delta Y2_{t-n}}_{\text{Corto Plazo VAR}} + \underbrace{\gamma}_{\text{Velocidad de ajuste}} * \underbrace{(Y1_{t-1} - \beta_0 - \beta_1 * Y2_{t-1})}_{\text{Largo Plazo ECM}}
 \end{aligned}$$

VEC Vector Error Correction

Las variables :

$IXAU_t$ (log precio del oro) y

IVC_t (log velocidad del dinero)

son ambas $I(1)$

Si están cointegradas existe un vector $I(0)$

combinación lineal de ambas

$$IXAU_t = a_0 + a_1 IVC_t + u_t$$

$$u_t = [IXAU_t - a_0 - a_1 IVC_t] \text{ debería ser } I(0)$$

La expresión entre corchetes $[]$ se llama

vector de cointegración,

Y sus coeficientes normalizados $[1, -a_0, -a_1]$

Results of exercise cointegrating ,following the methodology of Johansen and Juselius

Long term:

Relación de Equilibrio o de Largo Plazo

$$LXAU=0,916 +2,059 LVC+0,026DLXY$$

Short Term and Long Term:

Only the equations of the variables corresponding
to the deviations of the long-term relationship
show

$$\Delta LXAU = -0,082 [LXAU_1 - 2,059LVC_1 - 0,026LDXY_1 - 0,916] + CP$$

$$\Delta LVC = 0,054 [LXAU_1 - 2,059LVC_1 - 0,026LDXY_1 - 0,916] + CP$$

Johansen

- According to S. Johansen most of the time series are not stationary and conventional regression techniques based on non-stationary data tend to produce spurious results, however, nonstationary series may be cointegrated if a linear combination of the series becomes stationary. That is, the series may wander, but in the long run there economic forces that tend to push them to a balance. Therefore, the series cointegrated not separate far from one another because they are linked in the long term

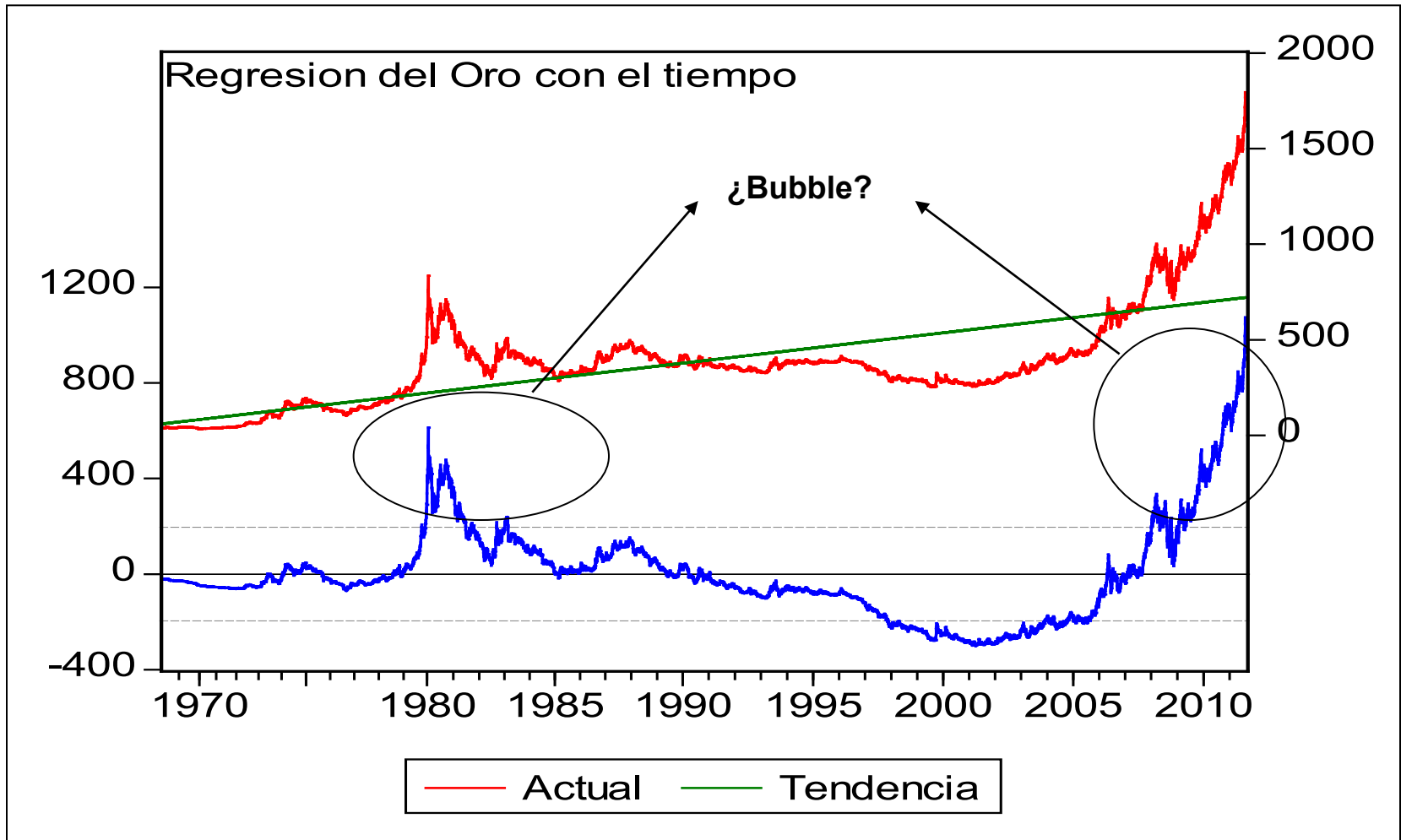
Impulso – Respuesta. Teknorama. Zurich



Conclusion

- The gold price in the long term fits the selected variables.
- The model responds to the theory that the price of gold continues to operate as the support or confidence in the currency, in our case the US dollar, as well as its long-term depreciation,
- The studied variables interest rate the Fed, the value of the dollar index, velocity of money, dummies) are statistically significant.
- Cointegration found that the endogenous variable was the velocity of money in the monetary aggregates in the US., And the dollar index (DXY) as exogenous variable
- The values of the first quarter of 2011, the velocity of money which had risen significantly in the crisis of 2008, shows signs of going slowly yielding expressed in a significant drop in the gold price.

Testing the Bubble Gold. Trend setting



Webinar Thomson Reuters:

The gold price today: a bubble? 30 August 2011



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Questions on the WebinarChat August 2011

Federico to all participants: In your opinion, then with a yes or no, we're going to a price bubble in the price today?

alfonso havoc to all participants:

The speaker said, "If I put on the ropes must say that yes, we are facing a bubble"

william lemos to All articipantes': Excellent speaker ... to weigh audio system

Maria Isabel Garcia to all participants: thank you very much, very good conference

MAURITIUS ZUÑIGA to all participants: Thanks, as always excellent

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Key Words and Definition

Economists are not prepared for times of crisis. (Willem Buitter). Default, insolvency and bankruptcy are not the usual assumptions. Hyperinflation.

Theory of Charles Kindleberger it apply to the International Monetary and Financial System

“ The death of money “ by Adam Ferguson

Inflation: a sustained and permanent increase in the general price level

Deflation: systematic and prolonged drop in the price level

Monetary base or high powered money

Why does matter velocity? Daniel L. Thornton (FED). Chapter 17 of the Book of James Parsons; "Lesson of the Great German and American inflations

Velocity of money: the relationship between stock of currency and its relationship with the product and prices

Seigniorage: .The sovereign right to issue currency changes in the monetary base. Income of the Central Bank

Inflation tax: reduction in the real value of the stock of base money