something for silver". Despite the concerns voiced by the US Treasury about the monetary impact of this program, Pittman finally got his way. The Silver Purchase Act of June 1934 sharply drove up the price of silver.

The rising price of silver, equivalent to a stronger exchange rate for China, since most countries were on gold, reduced China's exports of goods. This by itself should not have had a very adverse impact. But silver was shipped abroad to benefit from the rising price, thereby *reducing* the stock of monetary silver in China.[38]

According to Milton Friedman and Anna Schwartz in their pioneering *A Monetary History of the United States,* this was a huge negative monetary shock for China, which pushed it into deflation. Partly due to deflation, China abandoned silver for a paper currency in 1934, officially announced in 1935. This paper currency paved the way for the hyperinflation under the Kuo Ming Tang regime from 1937 to 1949, the year when its head Generalissmo Chiang Kai-Shek fled to Taiwan, following which Communist rule under Mao Ze Dong was established. Whatever the negative impact of other Communist polices, they kept inflation in check. China emerged from Communist economic policy in 1979.[39]

8.10 FREE BANKING VERSUS INDEPENDENT CENTRAL BANKS

The history of the changing inscription on rupee notes leads to the increasingly important topic of what is called free banking. To begin with, it should be noted that China *privately* pioneered the use of paper money called *jiaozi* around the 10th century. It was introduced by private merchants to replace the bulky metallic money in use.[40] However, due to counterfeiting within a hundred years, the Government *took over* the role of issuing and printing the *jiaozi*, and banned its private issuance.

Over the centuries since then, across the world, note issuance has generally been a monopoly of the government. Central banks which took over the function of note issue from the government were generally formed much later. Many of them are not even a century old. The world's leading central bank at present, the Federal Reserve was founded in 1913. The Reserve Bank of India was founded in 1935.

People generally take for granted the powers of the central bank (or the government) to issue fiat money and accept its authority. In this free market era, most activities from steel to airlines to hospitals and even banking are private, and there would be protest if they

[38] China's net silver exports averaged Ch$ 3,165 thousand during January to May 1934. It rose about tenfold to an average of Ch$ 34,872 thousand during June to December 1934, as per data from Chang (1983).

[39] To cite from Friedman and Schwartz (1963), "Under pressure of the needs of war and then revolution, China probable would in any event have departed from silver, resorted to paper money issues, and have succumbed to hyperinflation. But there can be little doubt that the effects of US silver policy on China's monetary structure increased the likelihood of those events and speeded up their occurrence". In subsequent articles, Friedman further explored the counter factual theme that if China had switched to gold, it could have avoided the deep distress due to hyperinflation. Thereby, the hostility of the people towards the regime of Chiang Kai Shek may not have developed, and China just might not have gone communist. It is an unnoticed irony, that while Keynes in 1913 recommended China be brought onto gold (footnote 37), America's first Keynesian President, twenty years later, pushed it away from silver towards a paper currency.

[40] This great contribution of China to civilisation may not have been entirely indigenous (People's Daily, 2000).

were nationalised or run solely by government. The exception to this is currency issue, a monopoly privilege, of central banks, by and large unquestioned. Further with fiat money, central banks have full power to set interest rates, unlike under the gold standard, under which their decisions were somewhat constrained by the need to keep gold reserves.

This blind faith in, and acceptance of, the monopoly powers of the central bank changed, after the global financial crisis of September 2008, and the collapse of Lehman Brothers. Since then, there has been increasing criticism of the US Federal Reserve and other central banks too. Senators Ron Paul and his son Rand Paul called for the abolition of the Fed. Many others in the US Congress called for a considerable dilution of its powers and for the Fed to be audited.[41]In late November 2016, then US President elect Trump had a meeting with John Allison, a former CEO of BB & T, a North Carolina based bank, who was knownto be in favour of abolishing the Fed and returning to the gold standard.

There has been a resurgence of interest in the theory and practice of free banking. Free banking took place mostly in Scotland between 1716 and 1844 and in England in the early nineteenth century. Free banking ended in both places with Peel's Bank Act of 1844 that consolidated the supremacy of the Bank of England. [42]

In Section 8.6.1 the emergence of bitcoin, the best performing asset in 2016, was discussed. Based on their personal experience, people nowadays may tend to equate free banking with bitcoin and thereby digital payments. However the issue of free banking versus independent central banks should not be mixed up with that of cash based versus digital payments systems. A matrix is needed to categorize and then analyse the options.

Mode of Payment	Free Banking	Monopoly Issue
	Private Currency	Official Currency
Physical	Example: Bank of Hindostan Notes (1770-1832)	Central Bank Notes and Coins
Digital etc.	Bitcoins, Ethereum	All Banking Channel payments, including Cheques, and Electronic Payments, Mobile Wallets etc. in Official Currency.

Costs and Benefits of Physical versus Digital Payments

Much of the debate in India over going cashless has been about the costs and benefits of cash versus digital payments. These costs and benefits vary with the state of digital development of the economy, the specific types of transaction, preferences of the individual and various

[41] There is a long history of attempts to audit the Fed, but these have not succeeded to date (Binder, 2016). Ron Paul's (2009) book was titled End the Fed.

[42] Scotland's free banking experience is discussed in depth by White (1992), according to whom, it went off smoothly. America also had a short period of free banking. However, there is very little information about, let alone analysis of India's free banking era, barring the discussion of Shaikh and Srinivasan (2001) in their pictorial history of India's currency notes. During the 1970s stagflation, Hayek's (1976) views on The Denationalization of Money, in which he first formally discussed free banking, began to attract interest.

other factors. Cash may or may not be more convenient, and the transaction fees of digital payments may or may not be large.[43]

The real major benefit of physical currency, has less to do with convenience. Rather, it is a libertarian bulwark against taxes and other encroachments upon people's wealth and their privacy. Specifically, it is relatively free from potential restrictions on bank deposits and lower interest rates on official money. Since the 2008 crisis, many central banks have been paying negative interest on reserves to stimulate the economy. However the interest rate on cash, a physical asset outside the control of the Government barring legal changes such as demonetization, cannot be lowered below zero. This partly explains why technologically advanced and safe Japan has such a high cash/GDP ratio of close to 20%. Years of near zero rates have made the Japanese wary of leaving their savings in the banking system.

How Best to Maintain the Inverted Pyramid of Trust?

Leaving aside issues of transaction fees and even taxes, this sub-section discusses the pros and cons of free banking versus independent central banks, as alternative ways to maintain stable prices and to maintain trust in the currency and payments system.

Few people realize the staggering importance of the 'inverted pyramid of trust' in whatever is used as money for our daily lives, and indeed needed for our survival. Having evolved from hunting and subsistence and primitive barter to a highly specialized division of labour based on monetary exchange, if the payments system collapses, many people could die of hunger in a few days or weeks. That trust, whether in pieces of paper, or book keeping entries in banks, or digital entries somewhere, is based on a sound monetary system.[44] The current fiat money system is based on a huge amount of total money resting upon a small amount of non-metallic bank reserves, just book keeping entries. Hence it can be called an inverted pyramid of trust, which is inherently unstable or fragile.[45]

This author is sympathetic to the goal of using private currency to end government monopoly, and even to calls to go back to the gold standard, to keep the money supply out of the clutches of central bankers, or even worse, politicians. However, I am sceptical about the feasibility of either option. Historically, monopoly of note issue evolved *after* periods of free banking, and paper currency came to replace the gold standard which *broke down* because of its of its inflexibility. The three greatest macroeconomists of the twentieth century, Keynes, Fisher and Friedman all were in favour of managed money and a flexible exchange rate to ensure stable prices, instead of the gold standard.

[43] When digital development is limited (low Internet penetration, limited availability of electricity and unpredictable shutdowns as in India), cash is vastly superior. Further, cash has overall lower transactions costs than digital payments, since the cost of issuing currency, borne by the Government, is a one-time charge, unlike digital transactions in which there is a charge for every transaction, recouped in the price of the product. These charges are high in emerging economies, relative to developed economies, where digital volumes are high and hence merchant fees are negligible.

[44] The Depression involved runs on banks leading to a one third drop in US money supply. First analysed by Friedman (1979), this 1930s episode is summarized in The Anatomy of Crisis in Chapter 3 of, Free to Choose (1979).

[45] In 2016, for USA, on a monetary base of $4.5 trillion, broad money supply or M2 was $ 80.9 trillion, a ratio of about 18. The monetary base itself had expanded hugely from about $1 trillion before the 2008 financial crisis due to quantitative easing. In India in March 2015 M3 was Rs 116.54 trillion and Bank Reserves were Rs 5.01 trillion, a ratio of about 23.5.

In a classic article, Should There be an Independent Central Bank, Friedman (1962) analysed the inflation bias inherent in a paper money economy. The problem of inflation bias is evident from comparing the price level under the gold standard versus post war period. Between 1776 and 1913, despite huge swings, the price level in UK was the same as in 1776, about a 150 year period. This was truly remarkable. By comparison, between 1960 and 2000 the price level in UK was about 13 times higher. Even in Germany, known for its inflation control, under fiat money, the price level rose 2.7 times between 1960 and 2000.

Inflation bias arises when politicians, who have short term horizons and wish to get elected or re-elected, have control over money supply.[46] Friedman's view was that it was equally dangerous to let unelected central bankers make the decision. Instead he recommended a money growth rule, legally enacted, to ensure sound monetary policy and to keep inflation in check.

As it turned out, when the Federal Reserve implemented a money growth rule in the early 1980s, it failed. Since then central banks have been experimenting with alternate formulae to guide monetary policy – such as a nominal GNP growth rule, a (direct) inflation targeting rule, and the Taylor rule. Yet as Fed Chairman Paul Volcker who switched away from money growth targeting and successfully killed inflation (Section 3.9.1) repeatedly stated, there is no rule or formula that can work in a complex, changing economy.

Does that mean we are back to square one and monetary policy should be left to the discretion of central bankers or, worse still, the politicians who appoint them? A huge amount has been written on central bank autonomy and independence and inflation since the 1980s, building on Friedman's pioneering work. However there is neither consensus nor clarity in the literature. Nor have there been clear changes in economic policy, apart from central banks moving to inflation targeting, which in turn was abandoned after the 2008 financial crisis. In India, there is a perennial spate of articles on the need for more RBI autonomy, and RBI Governors make similar statements. Nothing has resulted from all this talk.

According to this author, the broad sweep of history suggests that there is no option but to make do with central banks. Free banking is not a viable option.[47] Free markets work well for physical products like food and steel. For an intangible product like trust, where private players will try to game the system and herding effects can arise, there is no sound alternative to a central bank. To extend Adam Smith's famous metaphor of the benefits of the invisible hand, if one baker supplies bad bread, the consumer can switch to another baker. But if one private bank performs poorly and becomes insolvent leading to a run on the bank, the bankrupt depositors may not have any deposits left to switch to another bank.

Winston Churchill said that democracy is the worst form of government, except for all the others. To paraphrase that statement, in my view, an independent central bank is the worst possible arrangement, except for all the others.

[46] The benefit of an independent central bank can be deduced from the Macroeconomic Welfare Function (MEW) in Section 2.7.1. This sub section draws heavily on Chapter 3, Central Bank Independence and Inflation Bias, in Financial Macroeconomics: A Policy Rate Approach, underway (see Schematic).

[47] The scope for Bitcoin to develop was discussed in Section 8.5. Bitcoin, as a share of US money supply, was only about 6 basis points in 2015, and is very unlikely to supplant the global reserve currency, the US dollar.

What needs to be analysed is why central banks have failed and how best to make them perform better. In his memoirs, "Who Moved My Interest Rate?", the former RBI Governor Subbarao (2016) argued that his performance was hampered by lack of autonomy from the Finance Ministry. In a long book review titled" Selective Memoirs: RBI has Far More Autonomy than Scrutiny" published shortly afterwards, I analysed Subbarao's interest rate decisions in depth, and concluded they were largely due to poor judgment.

This review then went on to examine episodes of policy under three central bank heads: Burns (USA 1970-1978) Tombini (Brazil 2010-2015) and Rajan (India 2013-2016). It also briefly discussed the case of Greenspan (1987-2006), most responsible for the 2008 financial crisis, who was given three reappointments. In each case, there was clear evidence that they compromised under pressure. Arthur Burns changed his views on the efficacy of wage price controls to cure inflation after he became Chairman of the Federal Reserve in 1970 (Section 5.5, footnote 12). There is substantial evidence about how Burns pursued an easy money policy to get reappointed in 1974 by then US President Nixon. With regard to India, far more recently, shortly after a renowned Member of Parliament's letter to the Prime Minister in September 2015 criticizing the RBI Governor Rajan was publicized,

> "the RBI cut rates by 50 basis points on 29 September 2015, although the market was not even sure of a 25 basis point cut at the time, in light of the inflation target" (Moorthy 2016).

Based on those episodes and related evidence based on the obvious conflict of interest, I concluded that, to ensure sound monetary policy,

> "…it is best to give the Governor a **single, non renewable, non dismissable term**…That is the most important change to the RBI that is called for. The suggestion applies to other central bank heads too." (Moorthy, 2016)

A few weeks later, the decision taken by RBI on 8th November at its Board meeting to demonetize the bulk of the currency was of vastly greater consequence than interest changes. The consequences of the decision made on that evening will play out in the months and years to come. Let it be left it as a question to the reader: If such a rule had been enacted into the RBI Act or the Indian Constitution, would the demonetization have taken place?

In my opinion, it is not enough to have ethical and tough minded central bankers who are willing to stand upto such pressures. Even if there are such individuals, a rarity these days, they can always be replaced.

This conclusion about the appointment rule for central bankers may well be a no brainer.[48] It also applies to many other regulatory and other positions. The question still arises as to why so many renowned monetary economists, despite writing a huge amount on central bank independence and working out the algebra of various monetary policy rules, have not explicitly come to this conclusion. Nor have they attempted policy

[48] This appointment rule may need to be modified to replace the central bank head under extenuating circumstances (medical conditions, financial malpractices, criminal and other specified offences). However, procedures for such a move would need to be properly devised, as for impeachment, to ensure that it is not misused.

initiatives to enact requisite legal rules. Neither have the ex-RBI Governors in India, who based on their experience, should be acutely aware of the need for sound appointment rules. An exception was the monetary economist P.R. Brahmananda who tabled a resolution in 1990, suggesting amendments to the RBI Act to increase its powers. However, he had also advocated FULLMANGAL (Five percent Upper Linear Limit on Money's Annual Growth as per Law!) along the lines of Milton Friedman, without analysing the inconsistency between legal and formulaic rules. This inconsistency has been examined by this author in a review of Brahmananda's writings (Moorthy, 1997).

It should be noted that, shortly after US President Trump's victory, a New York Times article stated,

> "He also could work with Congress on new constraints, including some form of an old idea on the right that a formula should dictate the Fed's movements of interest rates" (Appelbaum, 2016).

The reference must be to the well-known Taylor rule or formula. To summarize, while well devised legal and appointment related rules strengthen the central bank's autonomy, formulaic rules reduce it.

Postscript: *"Nowhere do conservative notions consider themselves more in place than in currency; yet nowhere is the need for innovation more urgent."*

–John Maynard Keynes, Preface to a Tract on Monetary Reform, 1923