

# Is a stable financial system possible?

Shann Turnbull PhD\*  
[sturnbull@mba1963.hbs.edu](mailto:sturnbull@mba1963.hbs.edu)

## Abstract

Three conditions are suggested for establishing a stable financial system: 1. Only digital money is used. 2. The Internet of Things uses a sustainable service of nature essential to maintain the well being of the environment and humans in each region of the planet to automatically establish an index for determining the value of money in each region. 3. Currencies are only used as medium of exchange and not also as a unit of value nor a store of value. It is recommended that trialling these conditions be initiated to also provide alternatives facilities in a financial crisis.

**Key Words:** Financial system, Regional currencies, Negative interest, Tethered money, Traceable money

**EFM Classifications:** 560, 610

\* Principal: International Institute for Self-governance  
PO Box 266, Woollahra, Sydney, Australia, 1350  
Cell: +61418 222 378, Skype & Google ID: shann.turnbull  
Bibliography and academic CV:  
<https://independent.academia.edu/ShannTurnbull/CurriculumVitae>

# Is a stable financial system possible?

## 1. Introduction

The motivation for this paper arises from views being expressed by respected commentators on the prospects of another financial crisis. The former Governor of the Bank of England in his 2016 book states that another crisis “is certain” (King 2016b). The senior economics writer of the London *Financial Times* has stated that there: “will be another huge financial crisis” (Wolf 2016).

These views provide an incentive for identifying and trialling alternative systems as a contingency plan. The economic and political stakes are large. Local crises as occurred in Greece in 2015 could provide opportunities for multinational agencies like the International Monetary Fund or the European Commission to test alternative approaches as outlined in Turnbull (2016). The costs and risks could be negligible in a local crisis situation.

However, it can be difficult for Central Bankers, government officials and political leaders to consider alternative systems as they are committed to providing trust and protecting the current system. The emergence of crypto currencies provides an excuse for official agencies to consider alternatives in the name of modernising the current system. As outlined below some countries have already established, or are planning to establish, much of the digital infrastructure required to create alternative types of money to allow a financial system better fit for purpose to evolve. A contribution of this paper is to consider some innovations, practices and configurations that could lead to reduce systemic instabilities in the financial system.

While central bankers in Brazil and Canada are testing crypto currencies, others are warning the public against them (Eyers and Sier 2017: 21). Crypto currencies are less fit for purpose as money than official currencies for reasons presented in Turnbull (2016, 2017a). Some Central Bankers have recognised that the current system is not optimal. For example the Governor of the Bank of England stated in a speech that: “Of all the many ways of organising banking, the worst is the one we have today” (King 2010). China provided another example. Lord King obtained the “inspiration” to write his 2016 book when he was the guest of a Central banker in Beijing in 2011 who informed him: “I don’t think you’ve quite got the hang of money and banking yet” (King 2016a). On November 4<sup>th</sup> 2017, the governor of the central bank of China wrote about accumulated risks that were: “hidden, complex, sudden, contagious” (*The Economist* 2017b). There is currently intellectual turmoil as to how best improve and/or manage the existing system (Goodfriend 2016, Rogoff 2017). There is little discussion on how a more stable, resilient lower cost system might be established.

There are systemic problems in the way official currencies have evolved (Turnbull 2009, 2011, 2014, 2015, 2016). A fundamental problem is that value of all official forms of money has become self-referential. The interdependency of currencies means that central banks have lost their independence with a crisis in one currency able to infect another. No official currency can have its value defined by any one or more real things. This disconnect between the value of money and reality means that there is no rational basis for believing that market prices can allocate resources efficiently, let alone sustainably. Lord Stern (2006) explicitly recognised the sustainability problem when he stated that climate change was: “The biggest market failure the World has ever seen”.

Digital technology has introduced new ways for creating and managing money as illustrated by Bitcoin (Nakamoto 2009). There are now hundreds of competing crypto currencies with various features. Orthodox knowledge, learning and practices concerning money offer little guidance in a digital age. We need to think afresh and go back to common sense basic principles as to why we need money, to do what, and what are the new types of money that can now be created that are “best fit for purpose?” (Turnbull 2014).

Surprisingly the word “digital” appears only six times in all the twelve articles published in the 2016 September issue of *Cambridge Journal of Economics* (CJE) dedicated to considering “‘Cranks’ and ‘Brave Heretics’: Rethinking Money and Banking after the Great Financial Crisis”. Contributors Lucarelli and Gobbi (2016) used the word “digital” three times, North (2016) only once while the two other mentions only occurred in references. This is after the journal had published an article on Bitcoin earlier in the same year. As noted by Lucarelli and Gobbi (2016): “Digital money systems (electronic & virtual money: mobile money systems—online payment platforms—peer-to-peer money systems)

## Is a stable financial system possible?

have their own logic and focus primarily on economic goals.” The neglect of digital money in the September 2016 edition of CJE suggest that authors writing about digital money are not considered as “Cranks and brave heretics” or academe has not kept up with technological progress? Alternatively, is it because theorists are yet to take into account how technology has its “own logic and focus”.

Additional contributions of this article are to consider even more fundamental gaps in discussion about money such as: (i) how should the value of money be determined? (ii) Should the value of money be concerned about sustaining the environment and human wellbeing in perpetuity? (iii) Should the value of money be determined locally and/or globally? (iv) Who should create and control money? (v) Should money possess multiple functions like being a unit of value, store of value and a medium of exchange? (vi) How might technology make money better fit for purpose?

For example, the Internet of Things (IoT) makes it possible for the value of money to be automatically tethered to a local sustainable service of nature. Digital money can be made to be self-terminating from a negative interest rate paying for its redemption. So anybody could be allowed to attempt to issue such self-terminating money because excessive issue of such money would become self-limiting. Digital money can also be made optionally traceable. These possibilities could be used to create “3T” money that is locally Tethered, Terminating and Traceable.

The following section considers the need for a monetary tether. Section three considers how a stable and predicable anchor of value could be established. Details on how the Internet of Things (IOT) could automatically establish an anchor of value is presented in section four. Rethinking the role of money in digital form is considered in section five with comments in the concluding section six.

### 2.0 The need for a monetary tether

A stable and predicable value of money is required to facilitate domestic or international investment. However, floating exchange rates have introduced unpredictable multiple sources of changes arising from unforeseeable political and economic factors. This systemic uncertainty is compounded by the value of official currency being self-referential and so subject to various complex sources of feedback.

In 1990 when the Euro was being proposed *The Economist* (1990b) cover story stated: “Its time to tether currencies”. *The Economist* in 1990b went on to say: “Economic historians will look back on the 1980’s as the decade in which the experiment with floating currencies failed”. The article explained how economic theories that *The Economist* had supported did not fit the empirical evidence in regards to how a floating currency should “act as a balancing mechanism”.

Three decades later, the global financial crisis of 2008 and subsequent uncertainties about the maintenance of the Euro, again provided evidence that the financial system with floating currencies did not “act as a balancing mechanism”.

To provide a guide as to the relative value of international currencies *The Economist* (2017c) established its own standard reference unit of value:

"The Big Mac index was invented in 1986 by The Economist as a light-hearted guide to whether currencies are at their “correct” level. It is based on the theory of purchasing-power parity (PPP), the notion that in the long run exchange rates should move towards the rate that would equalise the prices of an identical basket of goods and services (in this case, a burger) in any two countries. For example, the average price of a Big Mac in America in July 2017 was \$5.30; in China it was only \$2.92 at market exchange rates. So the "raw" Big Mac index says that the Yuan was undervalued by 45% at that time.

Burgernomics was never intended as a precise gauge of currency misalignment, merely a tool to make exchange-rate theory more digestible. Yet the Big Mac index has become a global standard, included in several economic textbooks and the subject of at least 20 academic studies. For those who take their fast food more seriously, we have also calculated [a gourmet version](#) of the index."

## Is a stable financial system possible?

However, when *The Economist* (1991) analyzed price distortions created by fiat money in the Soviet economy in 1991 it used energy measured in Kwhrs. A suggestion made by Turnbull (1977) and developed in Turnbull (1983). A reference unit of value like that exists for weights and measures would likewise facilitate trade. As suggested in the authors other writings it would create a basis for establishing a more efficient, stable, resilient, lower cost and sustainable financial system (Turnbull 2014, 2017b, 2018).

Today minor official currencies may be tethered to the value of a major currency but no major currency like the Euro, US dollar or the English pound has its value tethered to any one or more real goods or services. As a result the value of all official currencies have become interdependent not anchored to reality. The interdependence means a crisis in one currency can spread to others. Economic value has become a social construct not fit for the purpose of minimizing uncertainty for investors or in providing a compelling logical basis that real resources are being allocated efficiently or sustainably.

Implicit in the view of Lord Stern (2006) that climate change represents: “The biggest market failure the World has ever seen” is that markets are required to distribute resources not just on an efficient basis but one that is sustainable. It can also be implied that trade in non-renewable or non-recyclable natural resources should cease. In other words efficiency becomes a second order objective to sustainability. It also means that advanced financial decision-making tools like “Present Value” or “Discounted Cash Flow” analysis should be over ridden by criteria of sustainability. It makes no sense to obtain efficient decision-making if we, or our descendents, cannot survive to enjoy the benefits of efficiency.

### 3. Selection of an anchor of value

The criteria for selecting a basis for defining a stable unit of value therefore requires an anchor that is sustainable over the long term without creating harms or risks and whose use is essential for sustaining modern societies. While hamburgers represent a basket of commodities they do not meet the test of being essential as there are many alternatives. Any basket of commodities creates governance problems as to whom, when, and how decisions are made to change the composition according to seasons, tastes, fashions, local needs and changes in technology in their production. A concern shared with an index proposed by Lietaer (2010) to create a global supplementary currency he described as a “Terra”.

A more compelling alternative is to use a sustainable service of nature that can be used to generate electricity that is essential in all modern societies. Electricity can be used to create clean air, clean water, food, clothing, shelter, and has become essential for communications and transport. Kilowatt hours (Kwhrs) of electricity generated from benign sources of renewable energy provides a way to construct a non-volatile reasonably stable index that provides feedback from local environments on their capacity to support humanity on the planet. Money whose value is indexed to this criterion will be referred to as Sustainable Energy Dollars (SEDs=\$Z).

The word “indexed” is crucial as it means \$Z are not convertible into any fixed number of Kwhrs though of course they can be used to purchase a negotiated number. An index based on say five year rolling averages of various parameters is essential to avoid both daily changes in real production and consumption or medium term speculation in changes that could lead to instabilities.

Generation of Kwhrs from benign renewable energy sources is possible in every region of the planet. However, the resources required to generate benign Kwhrs in each region could vary considerably. This means the efficiency of sustaining humanity in each region could also vary considerably. So while \$Z could become a global unit of account their value could change in each region according to the efficiently generators provided “processes by which society expands its power to make nature yield its resources more abundantly” in each region (Moulton 1935: 11). The purchasing power of money needs to become greatest in those regions that can generate \$Z most efficiently. In this way market forces are created for the global population to occupy those regions that can best sustain humanity indefinitely.

## **Is a stable financial system possible?**

The fact that the consumption of energy may only represent a minor fraction of total expenditures in a local economy need not matter. The consumption of gold was irrelevant to it being accepted as reference unit of value. Gold has few uses in a modern economy and most uses are not essential. Electricity is essential. A comparative analysis of using gold and Kwhrs as reference unit of value is presented in Turnbull (1983). Turnbull (2016) identifies twenty-five reasons why \$Z can be designed to be better fit for purpose as a medium of exchange than official currencies.

Stability is inherent in resources required to convert renewable energy into electricity, as they possess a useful operating life of twenty years or more. The means by which “nature can yield her resources more abundantly” with hydroelectric generators is much longer. A rolling five-year average of the installed capacity of Kwhrs would change very slowly. Even with major breakthroughs in technology the legacy of existing capacity would allow future changes to be well anticipated. Decline in the installed capacity of carbon burning generators could also be expected to change at an anticipated rate.

The IoT makes it practical to meter even highly decentralized retail generation of Kwhrs from benign renewable sources and to also meter its ultimate consumption. The word “ultimate” is used so consumption in storage facilities is not counted. Likewise the efficiency of consuming Kwhrs produced from carbon burning generators in relationship to their installed capacity can also be determined. All the measurements would be based on rolling five-year average of Kwhrs to produce a unit-less ratio. In this way an index can be created that increase the relative purchasing power of the local \$Z as the ratio of renewable to non renewable increases and as the ratio of the consumption of renewable energy increases as a percentage of the installed capacity of its generators.

As the number of householders increase with their own sources of generating benign renewable Kwhrs, tens of millions of data inputs of productive capacity and consumption could become involved. The process of collection would be automatic through the IoT not subject to discretionary adjustments as occurs when interest rates are determined for the London Interbank Offering Rate (LIBOR), or Foreign Exchange rates (ABC News 2013). Both are determined by a small group of banks with serious conflicts of interest and profit incentives. Manipulation of LIBOR involved hundreds of trillions of dollars. CNN (2012) reported MIT Professor Lo as stating that it: “dwarfs by orders of magnitude any financial scams in the history of markets.”

Perhaps the most appropriate body to determine a sustainable value money index in each currency region of the world would be the non-profit International Accounting Standards Board (IASB). Their standards are required in over 125 jurisdictions, with many others permitting their use. The mission of the IASB (2017) is “to develop standards that bring transparency, accountability and efficiency to financial markets around the world.” They also state that: “Our work serves the public interest by fostering trust, growth and long-term financial stability in the global economy”. Members of the IASB have informed the author that the reason they have not established a standard for economic value was because it was “too difficult”. But many of their standards become problematical when organizations are operating in different currency areas. This is illustrated by the need and use of the Big Mac Index.

Hopefully, the approach suggested in this article can provide a basis for the IASB to undertake the task. It is urgently required to avoid another financial crisis as anticipated Lord King and others such the Secretary General of the Basle Committee on banking supervision. The latter stated “it will be impossible to avoid a repeat of the failures that caused a near collapse of the financial system in 2008”(Drummond 2011).

With an agreed standard unit of value accepted in each region or nation their financial system would become independent of others suffering a crisis. In a region in which a crisis arose a basis would be established for anyone to enter into monetary contracts without needing money or a bank. Life would continue, perhaps on a sustainable decentralized basis without the need for carbon taxing or trading as considered or even for the need for central banks as argued in Turnbull (2010) and anticipated by Dowd (1998), Friedman (1999: 28), Gormez & Budd (2003), King (1999), Goodhart, (2000), Rahn (2000), Cronin & Dowd (2001), Capie, et. al (2003), and White 2001).

### **4. Establishing an anchor of value**

## Is a stable financial system possible?

The existence of a compellingly credible unit of value would facilitate investment and trade in a way similar way that occurred from establishing standards of weights, measures, volume, time and many other things like rail tracks, door sizes, screw threads and so on. Merchants, traders and investors may well prefer to use such an index to define their contractual relationships even if no currency had adopted such a tether, just because it reduced uncertainty. The index established in each nation could provide a way for international traders and investors to enter into contracts without needing to purchase offsetting hedges contracts against currency fluctuations.

Crucially, credible regional tethers provide a way to introduce local banking and finance to replace central banking. Central banking is but a specialised example of central planning. It requires one set of policies to be applied to all areas of a currency region whether they are fit for purpose in each particular area. Indexes of value provide a way to democratise the creation and control of money with a value that better fits local conditions.

The distortions in allocating resources that can arise from different regions sharing a common currency have been identified by Jacobs (1985: 156-181). Take for example a region like Western Australia that has 10% of the Australian population earning around 70% of the nations Foreign exchange (FX) earnings through the export of natural resources. Let us assume that the consumption of FX is proportional to the population and each region had its own floating currency. This would mean the each Western Australian is earning six times more FX than they consume while Eastern Australians earn only 30/90 or one third of the FX they need. The \$ Western would then become much more valuable than the \$ Eastern. This mind experiment illustrates how Singapore obtained international competitive advantage by being expelled from Malaysia in 1965. Its currency had previously been over valued like the Australian dollar from the export of natural resources. In the last year Eastern Australia has closed down its automobile manufacturing industry because of its currency being too high from the export of natural resources.

A monetary index for each region of the world could be automatically calculated from the IoT. The IoT would provide at least five sets of data from each currency region on a rolling five-year average. The data sets being:

A= Kwhrs consumed in the region from benign renewable energy sources.

B= Installed Kwhrs capacity of generators using benign renewable energy sources.

C= Kwhrs consumed from non-benign or non-renewable resources.

D= Kwhrs equivalent of energy consumed from non-benign and non-renewable resources.

E= Kwhrs exported from the region produced by benign renewable energy sources.

The efficiency of utilising the installed capacity for generating Kwhrs in each region would be the benign Kwhrs consumed in the region (A) plus the Kwhrs exported (E) divided by the installed capacity (B). That is  $(A+E) \div B$ . The dependency of each currency region in using benign renewable energy is A divided by total energy consumed in each currency region  $(A+C+D)$ . That is  $A \div (A+C+D)$ .

The monetary index would allow Sustainable Energy Dollars (SEDs=\$Zs) to be established in each region of the world based on the utilization of production and the dependency on consuming energy from benign renewable sources. The \$Z index in each currency region would be calculate by multiplying efficiency by dependency. So  $\$Z = (A+E) \times A \div B \times (A+C+D)$ .

In regions where  $C=D=E=0$  the purchasing power of \$Z would determined by the relative values of  $A \div B$ . In such situations \$Z would be determined solely by the utilization factor of the generators powered by benign renewable energy. Utilization factors in European OECD countries for the five years from 2008 to 2012 were: Hydro 40%, Wind 22% and Solar 11% (EIA 2015). Using these percentages for hypothetical regions without energy storage facilities that were entirely dependent upon solar their \$Z would become half the value of \$Z in regions entirely dependent upon wind. The European OECD utilization factors for Nuclear generators was 77% and for fossil fuel 42%.

## Is a stable financial system possible?

The above proposal introduces two fundamental considerations: 1. Replacing central banking with decentralised banking, and 2. Rethinking the role of money in a digital age. The introduction of an independently determined anchor of value removes one current role of money in being a unit of value. The next section considers the need for money to be both a medium of exchange and store of value.

### 5. The role of money in a digital age

#### 5.1 *Money as a medium of exchange*

A core reason for money to exist is to remove the inconvenience and associated transaction costs of barter. The Internet provides a way to reduce both the inconvenience and costs. This led researchers at the Bank of England to consider if the Internet might also remove the reason for having central banks. However, one of their conclusions was that the cost of electronic barter was not competitive with the use of money (Capie, et. al 2003). Their analysis was based on the current institutional arrangements for creating money and deposits. Also assumed, was that money could earn interest, rather than pay interest and/or possess a carrying cost to pay for its creation and maintenance. Negative interest rate money that may also carry a cost to insure its credit worthiness to become accepted as money is considered later.

#### 5.1. *Should money be a store of value?*

Another core reason for money to exist is that it has traditionally been a store of value. This role of money made sense in earlier times when money was a life staining commodity or scarce metals. But today the nature of money has changed. Money is used to price physical goods, services, assets and liabilities. The operation of market forces to allocate goods, services and resources is dependent upon the price signals established by money. But does this make sense when no official currency has its value defined by any one or more real goods or services? How can a social construct not definable by anything real be rationally used to determine how the real world is organised?

Nor does it make sense that money itself should become an asset class competing for investment. When money becomes an asset class it competes with allocating real resources “by which society expands its power to make nature yield its resources more abundantly” (Moulton 1935: 11). In other words they are the only way humans can increase their productivity, prosperity or wellbeing without humans working harder or longer. This objective should be achievable even with a declining population and/or de-growth with a financial system fit for this purpose. Reasons why the existing system is not fit for purpose are presented in Turnbull (2009, 2010, 2014, 2016).

The misallocation of real resources is increased as the ability of money to earn interest increases. Investment in computers and energy to create and maintain crypto currencies decreases the investment available in real resources that could produce real goods and real services to *maintain* physical output. Money earning interest also decreases investment in procreative assets that *increase* output. These two examples illustrate the view of Keynes (1973: 124) that money should not be a store of value. Keynes said: “money is a mere intermediary, without significance in itself, which flows from one hand to another, is received and dispensed and disappears, when its work is done”.

With modern money becoming a social construct created by arranging digital symbols its ability to automatically grow in value from interest as time flows makes no sense. It seems ridiculous, insane, or a religious conviction. Real goods generally lose value with age. There seems no logical justification to allow a token of economic value to increase its value over time when neither it nor its owner is making a contribution to increasing value in the world? It makes interest payments an unjustified way for spreading inequality. It also justifies discounting the future to deny incentives to preserve non-renewable resources and environmental qualities. It was because real goods in shops take up shelf space and depreciate with age that Silvio Gesell (1919) proposed that money should likewise depreciate. In this way money becomes “neutral” (Suhr 1989). Keynes (1936) described Gesell as an unrecognised prophet.”

During the Great Depression many communities in Europe and the US created such “disappearing” money described as “Stamp scrip” (Fisher 1933). Stamp scrip disappeared by possessing a negative interest rate that was collected by the issuer to redeem the money issued. There were many forms of

## Is a stable financial system possible?

Stamp Scrip. A common form required a stamp of 2% of the face value of each note to be affixed to its backside every week. This resulted in the issuer obtaining revenues over a year of  $52 \times 2\% = 104\%$ . In this way the issuers could redeem the scrip after a year and make a 4% gross profit *even if the scrip was given away*.

Fisher proposed this type of Stamp Scrip in the Bill he drafted for Senator Bankhead and Congressman Pettengill that was presented to the US Congress on 17<sup>th</sup> February 1933. The Bill was to authorise the US government, not the Federal Reserve Bank (FRB), to issue \$US 1,000,000,000 to all US States in proportions to their population to fund welfare and build infrastructure. The US post office would sell the stamps and redeem all the certificates issued to make a \$US40,000,000 profit for the US government after a year. In addition, the economy would have been stimulated without government taxes or debts.

Two weeks later on March 3 President Roosevelt was inaugurated in a national crisis from State Governments closing down all their banks. Roosevelt declared a bank holiday until March 6 when he convened an emergency meeting of both houses of Congress. Because of the urgency, there was no time to print legislation to create a new deal for the FRB. So Congressman Steagall, as chair of banking committee, read out aloud the new deal for the FRB. This denied scrutiny. Roosevelt signed the Bill into law the same day. It locked the US government into borrowing money from the FRB.

The FRB had failed to meet the purpose for its creation to be a lender of last resort during the Great Depression, because it ran out of gold. Steagall had introduced legislation in 1932 to allow government securities as well as gold to be used as “reserves” (FRB 1932). But there were insufficient government securities on issue, and Bankhead-Pettengill Bill would have avoided the need to create them! As a result the US government has become encumbered with ever increasing debt and debt servicing costs by becoming committed to a form of money not best suited for the purpose of achieving a low cost stable financial system.

The reason that speed money reduces the cost of the financial system is that even with a 2% negative interest rate it reduces the cost of merchants using bank issued credit cards (Turnbull 2016). The need for citizens to incur the expense of opening and maintaining bank accounts is now being reduced. This is described in the following concluding section.

### 6. Concluding remarks

There are two ways central banking could become redundant: 1. Governments become the only source of money, or 2. Reference units of value are established to allow contracts of exchange to be created independently of any government or bank.

By accident rather than by design, Australia has now established much of the digital infrastructure required for its governments to be the only source of creating money as a medium of exchange. Development began in May 2013 when the Australian government Department of Human Services (DHS) established an Internet accessed portal called “myGov” (2017). The Parliament of Australia (2015) then amended the welfare act to allow welfare benefits to be delivered digitally on Government issued debit card. As at June 2017, 11.7 million Australians had become registered users of myGov accounts representing around 60% of the total adult population (DHS 2017). In addition, the myGov portal provided a government issued free cell phone application to access myGov accounts to receive payments from government departments, make payments to the government and/or authorised third parties. The myGov portal provides access to Commonwealth government departments involving taxation, welfare, medicare, child support, aged care, veteran affairs, disability insurance, medical records and job search. The myGov portal also provides access to State Governments. Some States provide their own free mobile phone application to access their databases like driving licences, fines, car registration and other State activities. Some State governments issue their own debit cards for their transit services that can be topped up through the Internet.

While there currently exists some limits on the use of the above infrastructure it does provide a basis for many citizens to already avoid: opening a bank account, owning a bank issued debit card or use any notes or coins.



## Is a stable financial system possible?

The Australian Government reduced its guarantee for deposits with financial institutions established in the financial crisis of October 2008 from one million to a quarter of million dollars per institutions in 2012. There is now no charge for this guarantee. There is also no need to guarantee bank deposits as the Commonwealth guarantee is automatically obtained with deposits in its myGov accounts. No change in law or infrastructure is now required to limit the creation of Australian money to the Commonwealth and State Governments. Section 51xiii of the Australian constitution protects State Banking within the State that may mean State Governments could also drop/create helicopter money into their transit debit cards? This could depend on how “legal tender” is defined in a digital age.

There is now a global trend for cell phone wallets to replace coins, notes, credit cards, and as noted above, even bank accounts. Both China and Russia announced their intention of eliminating notes and coins as a way to reduce fraud and money laundering (Prisco 2016; CCN.LA 2016). The chairman of Citigroup stated: "We know, at some point, cards are going to go away and it's just going to be digital wallet, digital payments" (Maley, 2017). Already the use of Automatic Teller Machines (ATMs) has reached a “15-year-low” (Bagshaw 2017). Electronic money has growing public support around the world (*The Economist* 2017a: 76). However, some theorists have not recognised this trend. In considering “paths to a negative interest rate policy” Rogoff (2017: 58) states:

“Eliminating cash would certainly obliterate the zero bound on interest rates because it is trivial to pay negative interest on electronic money, unlike the situation with paper money. But for reasons of maintaining privacy, providing a safety valve to regulations, and offering a backup payment mechanism during internet/power outages, moving to a completely cashless society remains too high a price to pay simply to expand the central bank toolkit.”

Acceptance of digital money has grown even though it can make every transaction traceable. However there is no reason why digital money could not be encrypted to provide privacy without using expensive and slower block chain technology. Concerns about power and Internet outages need not affect either battery powered cell phones and/or highly distributed renewable power generation that is spreading around the world quicker than the rate banks are closing their branches. In any event, when money becomes self-terminating and is no longer a store of value, the importance of its permanence becomes greatly diminished.

In the crisis of the Great Depression negative interest rate money was privately issued in many communities without involving banks or national governments. Even without a crisis negative interest rate money was been re-introduced into Germany in 2003 (Gelleri 2009, Migchels 2012). When the European Central Bank (ECB 2012) reviewed “Virtual Currency Schemes”, that included Bitcoins, it did not suggest that privately issued complementary currencies tethered to Euros were not legal, only that they introduced “uncertainties for their users”.

Just as Australia unwitting established digital infrastructure to eliminate, notes, coins, private credit cards, and bank accounts, so may market forces decentralise, denationalise and privatise the creation and management of a 3T monetary regime (Hayek 1976a, b). The Big Mac Index has shown that even with its imperfections there is acceptance and use for it as reference unit of value. Simply for policy reasons to analyse different economies, researchers or institutions like the World Bank, International Monetary Fund, International Finance Corporation or the OECD may wish to construct an index more rigorous than that produced by *The Economist* (2014). As the \$Z index is an indicator of human sustainability on the planet it could be used as metric for long-term individual wellbeing (OECD 2017).

Non profit organisations like the Sustainable Accounting Standards Board (SASB 2017) or other climate change activist organisations may wish to establish a prototype of \$Z index to meter the rate at which nations and their regions are reducing their dependency on burning carbon. The cost for global digital firms to establish a \$Z index may be trivial in comparison to the additional revenues that could be generated. Publication of the index could be expected to provide its sponsors with click bait for making a profit from the index – even if the index was not initially used to anchor new currencies. Even if new currencies did not exist many international investors and traders might prefer to anchor their forward contract in a \$Z index than add the cost and complications of acquiring hedging contracts in official “funny money” currencies (*The Economist* 1990a).

## Is a stable financial system possible?

Until an index is established, emergency liquidity in another financial crisis would be limited to using official money. In some nations this could be in digital form to allow self-terminating 2T money to be delivered by governments as self-terminating “helicopter” money. It makes more sense for governments to create helicopter money directly as this is the only way to create money without creating additional debt. In addition, as pointed out by Buiter (2014), Bernanke (2016) and McKibben (Greber 2016) any such helicopter money creation requires co-ordination with government fiscal policy. Buiter (2009) has been an advocate of negative interest rate money that can also be described as “perishable money”. Buiter (2014) stated: “dropping perishable helicopter money will make it more effective if households are liquidity-constrained.”

When an index becomes available, 3T money could be created by anyone who could obtain a creditable third party to guarantee of its self-liquidation. Self-liquidation could arise from either the collection of the negative interest rate and/or liquidation of the contract for which the money was created to finance trade or investment transactions. The cost of guarantee could be attached to the contract as an additional cost to the negative interest rate charge. This would introduce an additional limit on excessive creation of credits used as money. Regulation of decentralised money creation would then be achieved through prudential standards for entities that provided credit insurance.

Suhr (1990) described negative interest rate money as “neutral” because it could remove the bias for investing in money rather than real assets. Like Fisher (1933), Suhr lists a number of theoretical objections to negative interest money, but then states: “we can confidently leave most of them to the practitioners who, once they have understood the system, can bring neutral money to life better than monetary theory can” (Suhr 1989: 121).

Establishing a unit of value as suggested above independently of the financial system to create 3T money introduces advantages such as:

Establish a medium of exchange with a stable predictable value;

Recognizes only indirectly, over the longer-term, changes in production, consumption or technology;

Avoids manipulation by speculators;

Reduces the cost of the financial system;

Eliminates a financial crisis in one region spreading to another;

Eliminates financial instability within each region;

Eliminates inflation created by excessive money creation;

Creates incentives for investment in benign renewable energy and storage systems;

Reduces and/or eliminates the need for carbon taxing or trading;

Encourages the location and size of the population in each region to become sustainable in perpetuity

The need to reduce the size, cost and instability of the financial system has been a concern of IMF authors such as Arcan (2012) and Sahay et. al (2015). In the US, the value added to GDP by “credit intermediation”, “securities” and “insurance” was at 4% in 1929 declining to 2% in the depths of the Great Depression and growing to 4.9% in 1980 and peaking at 8.3% in 2006 (Greenwood and Scharfstein 2013). Philippon (2008) reported a ratio of less than 2% prior to 1890. Palley (2008) describes the process of real resources being diverted to the financial sectors as “financialisation”. He describes the “impacts are to: (1) elevate the significance of the financial sector relative to the real sector, (2) transfer income from the real sector to the financial sector, and (3) increase income inequality and contribute to wage stagnation. Additionally, there are reasons to believe that financialization may put the economy at risk of debt deflation and prolonged recession.”

To counter financialization Palley suggests greater government intervention and the need to change corporate behaviour. This article sees the problem as money being used as a store of value to create virtual assets with real liabilities many orders of magnitude greater than the capacity of the global economy to produce real goods and services. This is a topic that requires more research. A contribution of this paper is to consider new ways of thinking about how to design the nature and role

## Is a stable financial system possible?

of money and banking. Ways that have the potential to significantly reduce the size and cost of the financial system but also its efficiency to improve individual wellbeing and that of the global environment in perpetuity.

### 7. References

ABC News (2013) JPMorgan admits wrongdoing in 'London whale' trading scandal, fined more than \$900m, <<http://www.abc.net.au/news/2013-09-20/jp-morgan-fined-920-million-usd-in-london-whale-trading-scandal/4970068>>.

Arcand, J., Berkes, E., and Panizza, U. (2012), *Too much finance?* International Monetary Fund Working Paper, WP/12/161, June, <<https://www.imf.org/external/pubs/ft/wp/2012/wp12161.pdf>>.

Bagshaw, E. (2017), "ATM use hits 15-year-low as shift to cashless society gathers momentum", *Sydney Morning Herald*, March 13, <<http://www.smh.com.au/business/atm-use-hits-15yearlow-as-shift-to-cashless-society-gathers-momentum-20170313-guwsry.html>>.

Bernanke, B.S. (2016), What tools does the Fed have left? Part 3: Helicopter Money, Ben Bernanke Blog, Brookings, April 11, 10:00am <http://www.brookings.edu/blogs/ben-bernanke/posts/2016/04/11-helicopter-money>

Buiter W. H. (2009) Negative nominal interest rates: Three ways to overcome the zero bound, *NBER Working Paper Number 15118*, June. Retrieved from [bit.ly/1ocaUDi](http://bit.ly/1ocaUDi).

Buiter, W.H. (2014), The Simple Analytics of Helicopter Money: Why It Works – Always, Vol. 8, 2014-28 | August 21, 2014 | <http://dx.doi.org/10.5018/economics-ejournal.ja.2014-28>.

Capie, F. H., Tsomocos, D. P. and Wood, G. E. (2003), *E-barter versus fiat money will central banks survive?* Bank of England Working Paper no. 197, <<http://www.bankofengland.co.uk/publications/Documents/workingpapers/wp197.pdf>>.

CCN.LA, (2016) "Russian Central Bank Official talks national digital currency", April 20, <<https://www.cryptocoinsnews.com/russian-central-bank-official-talks-national-digital-currency/>>.

Champ, B. (2008), Stamp Scrip: Money that people paid to use, Federal Reserve Bank of Cleveland, <<https://www.clevelandfed.org/~media/content/newsroom%20and%20events/publications/economic%20commentary/2008/ec%2020080401%20stamp%20scrip%20money%20people%20paid%20to%20use%20pdf.pdf?la=en>>.

CNN (2012), 'Explaining the LIBOR interest rate mess', July, <<http://money.cnn.com/2012/07/03/investing/libor-interest-rate-faq/index.htm>>.

Cronin, D. and Dowd, K. (2001), 'Does Monetary Policy Have a Future?' *Cato Journal*, 21(2), pp. 227–244.

DHS (2017), *Annual Report*, Department of Humans Services, Australian Government, <<https://www.humanservices.gov.au/sites/default/files/2017/10/8802-1710-annual-report-2016-17.pdf>>.

Dowd, K. (1998), 'Monetary policy in the 21st century: an impossible task?' *Cato Journal*, 17:3, 327–31.

Drummond, M. (2011), 'Banks told to prepare for more shocks', *Australian Financial Review*, <[http://www.afr.com/p/business/financial\\_services/banks\\_told\\_to\\_prepare\\_for\\_more\\_shocks\\_OTVEyH5WrFSHbbfIJLo8XL](http://www.afr.com/p/business/financial_services/banks_told_to_prepare_for_more_shocks_OTVEyH5WrFSHbbfIJLo8XL)>.

ECB (2012), *Virtual Currency Schemes*, European Central Bank, October, Frankfurt.

EIA (2015), Energy Information Administration, US Government, September 8<sup>th</sup>, <<https://www.eia.gov/todayinenergy/detail.php?id=22832>>.

## Is a stable financial system possible?

- Eyres, J. and Sier, J. (2017) "The future of money", *Australian Financial Review*, p. 15, October 28-29, <<http://www.afr.com/technology/cryptocurrency-speculating-on-the-future-of-money-20171025-gz831a>>.
- Fisher, I. (1933). *Stamp Scrip*, Adelphi & Co., New York, <<http://userpage.fu-berlin.de/roehrigw/fisher/>>.
- FRB (1932). *Federal Reserve Bulletin*, 18(3): 141, March, Washington D.C. <[https://fraser.stlouisfed.org/scribd/?item\\_id=20723&filepath=/docs/publications/FRB/1930s/frb\\_031932.pdf](https://fraser.stlouisfed.org/scribd/?item_id=20723&filepath=/docs/publications/FRB/1930s/frb_031932.pdf)>.
- Freidman, B. M. (1999), 'The Future of Monetary Policy', *International Finance*, 2:3, pp. 321– 338, December.
- Gelleri, C. (2009), Chiemgauer Regiomoney: Theory and Practice of a Local Currency, *International Journal of Community Currency Research*, 13, pp. 61-75, <<http://ijccr.net/2012/05/29/chiemgauer-regiomoney-theory-and-practice-of-a-local-currency/>>.
- Gesell, S. (1916), *The natural economic order*, trans. P. Pye, <<https://www.community-exchange.org/docs/Gesell/en/neo/>>.
- Goodfriend, M. (2016), 'The case for un-encumbering interest rate policy at the zero bound', presented to Jackson Hole Symposium, August, 26, <<https://www.kansascityfed.org/~media/files/publicat/sympos/2016/econsymposium-goodfriend-paper.pdf?la=en>>.
- Goodhart, C. (2000), *Can central banking survive the IT revolution?* FMG Special papers 125, Financial Markets Group, <<http://www.lse.ac.uk/fmg/documents/specialPapers/2000/sp125.pdf>>.
- Gormez, Y., and Budd, C.H. (2003), *Electronic Money Free Banking and Some Implications for Central Banking*, Working Paper, The Central Bank of the Republic of Turkey, Research Department, <<http://www.tcmb.gov.tr/research/discus/dpaper63.pdf>>.
- Greber, J. (2016), "McKibbin prefers 'helicopter' option", *The Australian Financial Review*, July 19, p. 3. <<http://www.afr.com/news/economy/monetary-policy/warwick-mckibbin-prefers-helicopter-money-over-qe-in-a-crisis-20160718-gq82r1>>.
- Greenwood, R. and Scharfstein, D. (2013), *Journal of Economic Perspectives*, 27(2): 3–28, <[http://www.people.hbs.edu/dscharfstein/growth\\_of\\_finance\\_jep.pdf](http://www.people.hbs.edu/dscharfstein/growth_of_finance_jep.pdf)>.
- Hayek, F. A. (1976a), *Choice in currency: a way to stop in inflation*, Occasional Paper 48, The Institute of Economic Affairs, London.
- Hayek, F. A. (1976b), *Denationalization of money: an analysis of the theory and practice of concurrent currencies*, Hobart Paper Special 70, The Institute of Economic Affairs, London.
- ISAS, (2017), <<http://www.ifrs.org/about-us>>.
- Jacobs, J. (1985), *Cities and the wealth of nations: Principles of economic life*, Vintage books: New York.
- Keynes, J. M. (1936), *The general theory of employment, interest, and money*, chapter 23, part VI, <<https://www.marxists.org/reference/subject/economics/keynes/general-theory/ch23.htm>>
- Keynes, J. M. (1973 [1923]), *A Tract on Monetary Reform*, *The Collected Writings of John Maynard Keynes* (1971-1989), Vol IV, Cambridge: Cambridge University Press.
- King, M. (1999), Challenges for Monetary Policy: New and Old, presented to Symposium on "New Challenges for Monetary Policy", Jackson Hole, Wyoming, August 27, <<http://www.bankofengland.co.uk/speeches/speech51.pdf>>.

## Is a stable financial system possible?

King, M. (2010), *Banking: From Bagehot to Basel, and Back Again*, The Second Bagehot Lecture, Buttonwood Gathering, New York City, October 25, p. 16, <<http://www.bankofengland.co.uk/publications/speeches/2010/speech455.pdf>>.

King, M. (2016a), “Lord Mervyn King: Why throwing money at a financial panic will lead to a new crisis”, *The Telegraph*, February 27, <[http://www.telegraph.co.uk/business/2016/02/26/lord-mervyn-king-why-throwing-money-at-financial-panic-will-lead/?WT.mc\\_id=tmg\\_share\\_em](http://www.telegraph.co.uk/business/2016/02/26/lord-mervyn-king-why-throwing-money-at-financial-panic-will-lead/?WT.mc_id=tmg_share_em)>.

King, M. (2016b), *The End of Alchemy: Money, Banking, and the Future of the Global Economy*, Little Brown: London.

Lietaer, B. (2010), *The Terra TRC: A global complementary currency to stabilize the world economy*, January 14, <http://www.lietaer.com/2010/01/terra/>

Lucarelli, S., and Gobbi, L. (2016), Local clearing unions as stabilizers of local economic systems: a stock flow consistent perspective’, *Cambridge Journal of Economics*. 40, pp. 1397–1420, doi:10.1093/cje/bew021

Maley, K. (2017), “Cards are going to go away, says Citigroup CEO Mike Corbat”, *The Australian Financial Review*, October 29, at 11:45 pm: <<http://www.afr.com/markets/cards-are-going-to-go-away-says-citigroup-ceo-mike-corbat-20171026-gz8t2j#ixzz4xFOkUlb>>.

Migchels A. (2012), ‘Regional currencies in Germany: The Chiemgauer’, *Real Currencies*, 2 February, <<https://realcurrencies.wordpress.com/2012/02/02/regional-currencies-in-germany-the-chiemgauer/>>.

Moulton, H. G. (1935), *The formation of Capital*, The Brookings Institution, Washington, D.C.

myGov (2017), <<https://my.gov.au/LoginServices/main/login?execution=e1s1>>.

Nakamoto, S. (2009), *Bitcoin: A Peer-to-Peer Electronic Cash System*, Working Paper, <<https://bitcoin.org/bitcoin.pdf>>.

North, P. (2016), ‘Money reform and the Eurozone crisis: panacea, utopia or grassroots alternative?’ *Cambridge Journal of Economics*, 40, pp. 1439–1453, doi:10.1093/cje/bew022.

OECD, (2017), ‘Better policies for better lives’, Measuring wellbeing and progress: Wellbeing research, <<http://www.oecd.org/statistics/measuring-well-being-and-progress.htm>>.

Palley, T. I. (2008), *Financialization: What it is and why it matters*, Working Paper No 525, The Levy Economics Institute, NY, <<http://ssrn.com/abstract=1077923>>.

Parliament of Australia (2015), Social Security Amendment (Debit Card Trial) Bill, Bills Digest no. 27 October, <[http://www.aph.gov.au/Parliamentary\\_Business/Bills\\_Legislation/bd/bd1516a/16bd027](http://www.aph.gov.au/Parliamentary_Business/Bills_Legislation/bd/bd1516a/16bd027)>.

Philippon, T. (2008), ‘The future of the financial industry’, *Stern on Finance*, November 6, New York Stern school of Business at New York University.

Prisco, G. (2016), ‘ChinaCoin: People’s Bank of China plans national digital currency’, *Bitcoin Magazine*, January 28, <<https://bitcoinmagazine.com/articles/chinacoin-people-s-bank-of-china-plans-national-digital-currency-1453995450>>.

Rahn, R.W. (2000), *The Impact of Digital Money on Central Banks*, Presented to the Cato Journal Institute’s 18<sup>th</sup> Annual Monetary Conference, <<http://www.cato.org/events/money/papers/rahan.pdf>>.

Roghoff, K. (2017), ‘Dealing with Monetary Paralysis at the Zero Bound’, *Journal of Economic Perspectives*, 31(3): 47–66, <<https://doi.org/10.1257/jep.31.3.47>>.

## Is a stable financial system possible?

Sahav, R., Cihak, M., N'Diaye, M., Baraja, A., Ayala Pena, D. B., Bi, R., Gao, Y., Kyobe, A. J., Nguyen, L., Saborowski, C., Sviryzdenka, K., Yousefi, R. (2015), *Rethinking financial deepening: Stability and growth in emerging markets*, Staff Discussion Notes No. 15/08, <<http://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2016/12/31/Rethinking-Financial-Deepening-Stability-and-Growth-in-Emerging-Markets-42868>>.

SASB, (2017), Sustainable Accounting Standards Board, <[https://www.sasb.org/about-the-sasb/the\\_sasb/](https://www.sasb.org/about-the-sasb/the_sasb/)>.

Stern, N. (2006), *The Economics of Climate Change: The Stern Review*, Cabinet Office, HM Treasury: London, <<http://www.sternreview.org.uk>>.

Suhr, D. (1989), *The capitalistic cost-benefit structure of money: An analysis of money's structural nonneutrality and its effects on the economy*, Springer: Berlin, Heidelberg, New York.

Suhr, D. (1990), *The Neutral Money Network: A Critical Analysis of Traditional Money and the Financial Innovation "Neutral Money"*, (NewMoNe), Paper presented April 30, Brussels, University of Augsburg.

*The Economist*, (1990a), 'Currency Reform: A brief history of funny money', January, 6<sup>th</sup>, pp. 17-19, 22, <<http://trove.nla.gov.au/work/42447842?q&versionId=55328393>>.

*The Economist*, (1990b), 'Time to tether currencies', January 6, pp. 10-11, <<https://www.highbeam.com/doc/1G1-8271275.html>>.

*The Economist*, (1991), 'When the Price is Wrong', February 2.

*The Economist*, (2014), 'The Big-Mac index: Currencies to go', January 23, <<http://www.economist.com/content/big-mac-index>>.

*The Economist*, (2017a), 'A yen for plastic: In Japan the move from cash to plastic goes slowly', <<https://www.economist.com/news/finance-and-economics/21730925-fragmented-market-imposes-costs-retailers-and-consumers-alike-japan>>.

*The Economist*, (2017b), 'Caveat comrade: Close to retiring, China's central bank chief warns of financial risk', November 9<sup>th</sup> <<https://www.economist.com/news/china/21731180-zhou-xiaochuan-trying-burnish-his-legacy-close-retiring-chinas-central-bank-chief-warns>>.

*The Economist*, (2017c), 'The Big Mac Index', July 13, <<http://www.economist.com/content/big-mac-index>>.

Turnbull, S. (1977), 'Let the Market Correct Itself', *The Australian*, Op. Ed. p.8, May 25.

Turnbull, S. (1983), 'Selecting a local currency', *Options*, June, The Australian Adam Smith Club, Sydney.

Turnbull, S. (2009), 'Mysteries of a failed financial system and how failure can be avoided', April 19, 2009, *Ethical Markets*, <<http://www.ethicalmarkets.com/2009/04/19/mysteries-of-the-financial-system/>>.

Turnbull, S. (2010), 'Money, Renewable Energy and Climate Change', *Financiële Studievereniging Rotterdam*, (*FSR Forum*), 12:2, pp.14-17, 19-22, 24, 25, 28-29, February, Erasmus University, Rotterdam, <<http://ssrn.com/abstract=1304083>>.

Turnbull, S. (2011), 'Options for Reforming the Financial System', *The IUP Journal of Governance and Public Policy*, 6(3): 7-34, September, <<http://ssrn.com/abstract=1322210>>.

Turnbull, S. (2014), 'Which digital currencies are best fit for purpose?' Presented to 13<sup>th</sup> Annual conference of the Society of Heterodox Economists, December 9-10, University of New South Wales, Sydney, <<http://ssrn.com/abstract=2518020>>.

## Is a stable financial system possible?

Turnbull, S. (2015), 'Might supplementary tethered currencies reduce financial system risks?' Presented to 17<sup>th</sup> Annual Conference of Association of Heterodox Economists, Southampton Solent University, July 2-4, <<http://ssrn.com/abstract=2417826>>.

Turnbull, S. (2016), 'Terminating currency options for distressed economies', *Athens Journal of Social Science*, 3(3): 195—214, <<http://www.athensjournals.gr/social/2016-3-3-3-Turnbull.pdf>>.

Turnbull, S. (2017a), 'Do Bitcoin and Digital Currency Have a Future?' Harvard Business School Working Knowledge, October 2, comment number 26, <<http://hbswk.hbs.edu/item/do-bitcoin-and-digital-currency-have-a-future>>.

Turnbull, S. (2017b), 'Sustainable Value Money: Why it's needed, how to get it?' (Forthcoming) in: Boubaker, S. and Nguyen, D. (eds.), *Ethics, ESG and Sustainable Prosperity*, World Scientific Publishing: Singapore, <<https://ssrn.com/abstract=3022277>>.

Turnbull, S. (2018), 'Renewable Energy Stabilising Money and Society,(Forthcoming) in: Droege, P. (ed.), Urban Energy Transition – Handbook for cities and regions, *Elsevier Science Publishers: Oxford*, <<https://ssrn.com/abstract=3051587>>.

White, L. H. (2001), 'In what respects will the information age make central banks obsolete?' *Cato Journal*, 21(2): 219–24

Wolf, M. (2016), 'Martin Wolf: Will there be another huge financial crisis?' *The Irish Times*, June 1, <<https://www.irishtimes.com/business/economy/martin-wolf-will-there-be-another-huge-financial-crisis-1.2668834>>.

oooOOOooo  
7939/20112017