



CIRIEC-España, Revista de Economía Pública, Social y Cooperativa, n° 93, Agosto 2018, pp. 265-291

Social Currencies and Cryptocurrencies: Characteristics, Risks and Comparative Analysis

Graciela Lara Gómez
Michael Demmler

Autonomous University of Querétaro

How to cite this article: GÓMEZ, G.L. & DEMMLER, M. (2018): "Social Currencies and Cryptocurrencies: Characteristics, Risks and Comparative Analysis", *CIRIEC-España, Revista de Economía Pública, Social y Cooperativa*, 93, 265-291, DOI: 10.7203/CIRIEC-E.93.10978.

CIRIEC-España, revista de economía pública, social y cooperativa
ISSN edición impresa: 0213-8093. ISSN edición online: 1989-6816.

© 2018 CIRIEC-España

www.ciriec.es www.ciriec-revistaeconomia.es

Social Currencies and Cryptocurrencies: Characteristics, Risks and Comparative Analysis

Graciela Lara Gómez
Michael Demmler

ABSTRACT: This article deals with the concepts of social currencies and cryptocurrencies. The objective of the present paper is to identify similarities and differences between two currency systems which represent a new generation of money that exists alongside the official and legal money system. The paper includes an analysis of the major characteristics of both currencies, their operating mechanisms in global and local contexts, as well as their risks and challenges for the financial markets. The article uses a mainly documentary research method and presents selected contributions of experts on the topics of social currencies and cryptocurrencies. Furthermore, empirical evidence is presented to highlight some important characteristics of the Bitcoin currency. The principal result of the paper is that, indeed there exist similarities between social currencies and cryptocurrencies, as for example the absence of a central bank, a lack of regulation and a limited minting process. However, because of aspects like their different origins, their local vs. global character and their inherent financial risks, the two money systems need to be interpreted as fundamentally different. Especially with reference to globally operating cryptocurrencies, given that there does not exist any public cover of the currency nor sufficient regulation, risk management mechanisms need to be improved in order to diminish the speculative tendencies inherent to this currency.

KEYWORDS: Social currencies, cryptocurrencies, Bitcoin, risks, characteristics.

ECONLIT DESCRIPTORS: A13, E5, F3, O3, P1.

How to cite this article: GÓMEZ, G.L. & DEMMLER, M. (2018): "Social Currencies and Cryptocurrencies: Characteristics, Risks and Comparative Analysis", *CIRIEC-España, Revista de Economía Pública, Social y Cooperativa*, 93, 265-291, DOI: 10.7203/CIRIEC-E.93.10978.

Correspondence: Graciela Lara Gómez and Michael Demmler, Autonomous University of Querétaro, Cerro de las Campanas S/N Col. Centro Histórico, C.P. 76016, Querétaro, Mexico.

E-mail de contacto: michael.demmler@uaq.mx.

RESUMEN AMPLIO

Monedas Sociales y Criptomonedas: Características, Riesgos y Análisis Comparativo

El dinero es una creación social, que ha evolucionado a lo largo de la historia para convertirse en el medio de pago más aceptado en todo el mundo y cuya creación y administración es responsabilidad del Estado. Además, es un medio de cambio que no todos poseen y por su conducto es posible conseguir satisfactores que de otra manera difícilmente se obtendrían. A pesar de que es un instrumento generalmente aceptado, son evidentes los múltiples inconvenientes que ocasiona su uso, tales como, la acumulación, la oxidación, la inequidad, entre otros de igual importancia, con lo que se pone de manifiesto la ineficacia del Estado para regular los fallos de mercado que tienen su origen principalmente en la actividad económica del sector privado, con lo que se replican escenarios de desigualdad en la redistribución de la renta y limitando el poder adquisitivo de los ciudadanos. Por lo tanto, se puede criticar que el Estado no pueda impedir un sistema monetario y bancario especulativo, inequitativo y fluctuante, que excluye segmentos de la población que no tienen acceso a servicios financieros o dinero en general. Es por ello, que han emergido otros medios de pago que actúan de manera complementaria con las monedas oficiales.

Es en la economía social que han surgido medios de intercambio alternativos que aportan soluciones a los problemas que tienen su origen en las crisis financieras y económicas. Una muestra son las "monedas sociales", instrumentos que se basan en valores como la ayuda mutua, la responsabilidad, la democracia, la igualdad y la solidaridad, así como en los propios principios del cooperativismo. En general, estos medios de intercambio buscan la inclusión económica de grupos desfavorecidos o excluidos y el empoderamiento mediante la toma de decisiones colectivas. Además, tales monedas representan un conjunto de dispositivos para el intercambio de bienes, servicios o conocimientos organizados por y para un pequeño grupo de personas a través de la creación y establecimiento de una moneda interna.

Paralelamente, en los años recientes ha evolucionado otro tipo de monedas con diferentes objetivos, las que pueden ser claramente reconocidas como una nueva generación de dinero, cuya creación ha sido favorecida por los avances tecnológicos y que se ha denominado "criptomoneda". Es el Bitcoin la más reconocida de las criptomonedas, aunque existen muchos ejemplos, como el Ethereum, el Dogecoin o el recién establecido Petro de Venezuela. En general, las criptomonedas son monedas digitales, descentralizadas y anónimas que se basan en redes y que no cuentan con el respaldo de ningún gobierno u entidad legal alguna.

Por lo planteado, con el presente artículo se contribuye al estudio de las monedas sociales y las criptomonedas, identificando las convergencias y divergencias que surgen entre dichos instrumentos de intercambio que coexisten con la moneda de curso legal y que emergen como una nueva generación de dinero. Por lo tanto, el objetivo general del presente estudio fue identificar las similitudes y diferencias entre las monedas sociales y las criptomonedas. Para tal efecto se empleó principalmente el método de investigación documental, presentando contribuciones seleccionadas de expertos sobre los temas de las monedas sociales y criptomonedas, incluyendo fuentes primarias tales como artículos de revistas científicas, revistas especializadas y páginas web, además de evidencia empírica para destacar las características del Bitcoin.

El documento contiene una extensa revisión de literatura relevante en temas de economía y finanzas, que da cuenta de cómo han emergido ambas formas de intercambio y su complementariedad con la moneda oficial. Es así que con un marco comparativo, se analizaron las características de ambas monedas, sus mecanismos de operación en contextos globales y locales, además de los riesgos y desafíos que representan para el mercado financiero.

Entre los resultados destaca que en ambos sistemas se persigue una desintermediación intencionada, es decir, reemplazar a los intermediarios financieros tradicionales (principalmente bancos comerciales); aunque ninguno de ellos parece poseer el potencial para sustituir a los sistemas bancarios tradicionales en el corto o mediano plazo, por lo que solo se logra la complementariedad. Se estableció que existen similitudes entre las monedas sociales y las criptomonedas, por ejemplo, la ausencia de un banco central, la falta de regulación, la coexistencia con los sistemas monetarios y bancarios tradicionales y un proceso de creación de dinero limitado. Sin embargo, aspectos como la esencia de su creación, su carácter local vs global, sus principios de cohesión social vs anonimidad, además de sus riesgos financieros inherentes, hacen de los dos sistemas monetarios, instrumentos fundamentalmente diferentes.

Especialmente, con referencia a las criptomonedas se tiene que destacar que operan mundialmente y no cuentan con respaldo del Estado, ni regulación suficiente que garantice su operación. En consecuencia, se requiere de perfeccionar los mecanismos de administración de riesgos para disminuir las tendencias especulativas inherentes a la moneda. Con respecto al Bitcoin, se llega a la conclusión de la posible existencia de una burbuja financiera que se encuentra actualmente en su fase de estallamiento, recordando así periodos de turbulencias financieras, como la crisis financiera después de la burbuja puntocom (entre 2000 y 2002) y la crisis de las hipotecas subprime (entre 2007 y 2009). En contraste, las monedas sociales como un sistema que se basa en la solidaridad, la ayuda mutua y fuertes relaciones de confianza entre los participantes; se exteriorizan como sistemas altruistas e informales, que fomentan la inclusión financiera de personas que no pueden acceder a servicios financieros tradicionales, por lo que su introducción responde a los esfuerzos de estimular el desarrollo local, social y humano.

El estudio de las monedas sociales y las criptomonedas es de gran relevancia en el marco de la Economía Pública, Social y Cooperativa, dado que es un tema de actualidad que retoma las acciones guiadas desde la iniciativa de los gobiernos, de los empresarios y tecnólogos, así como de los que vislumbran en la Economía Social formas alternativas para atenuar problemáticas comunes.

Finalmente, debe indicarse que para el desarrollo de la investigación se tuvieron limitaciones que se relacionan con la ausencia de investigaciones cuantitativas que den cuenta del impacto que tienen las monedas sociales en los entornos económicos locales donde surgen. En cuanto a las criptomonedas y el Bitcoin, la principal limitación fue el acceso restringido a información sobre iniciativas o proyectos regulatorios en el contexto nacional.

PALABRAS CLAVE: Moneda social, criptomoneda, Bitcoin, riesgos, características.

1. Introduction

Money is a social creation, which has evolved throughout history to become the most accepted means of payment worldwide and whose issue is the responsibility of the State. It is through the legal currency, official or bank money, that one has the possibility to acquire products or services and to grant or receive financing. In this sense, it can be affirmed that money is evidence of economic dynamism in the most developed capitalist nations, whereas it is scarce in the least developed regions or in countries with recessional tendencies (Orzi, 2017). Although official currencies are generally accepted instruments, their disadvantages (e.g. accumulation and speculation, inequality, etc.) are more than evident. Often the state cannot respond adequately to market failures which have their origins in the economic activity of mainly private companies. Thus, possible results are inequality in the distribution of incomes and a limited purchase power of the people.

Hence, it can be criticized that often the State cannot prevent a speculative, inequitable and fluctuating monetary and banking system, which excludes segments of the population that are not provided with any access to financial services or money in general, due to for instance circumstances of crisis and poor economic performance of the country or even inefficiencies in the financial system itself. As a result, other means of exchange have emerged that act in a complementary manner with official currencies. Those concepts are based on initiatives of the private sector (cryptocurrencies), of the social economy (social currencies) and also lately of the public sector with the actions of some local or national governments (e.g. the Petro as the cryptocurrency of Venezuela). That is why the study of both concepts, social currencies and cryptocurrencies, is of great importance and relevance within the field of economic studies. Within these two mentioned monetary systems one can find the continuous work and effort of governments, entrepreneurs and technologists, as well as those who envision alternative ways of mitigating common problems in the social economy.

With respect to the social economy means of exchange emerge that provide solutions to the problems that have their origins in financial and economic crises. These so-called “social currencies” are based on values like mutual help, responsibility, democracy, equality and solidarity, as well as the very own principles of cooperativism (Alianza Cooperativa Internacional, 2018). Social currencies exist principally due to unfavorable economic tendencies within a country or region. They are means of payments that coexist with traditional money and are created mainly by the communities themselves to facilitate the exchange of goods and services in an environment of trust, equality and cooperation. In general, these means of exchange seek the economic inclusion of underprivileged or excluded groups and the empowerment through collective decision-making.

Besides social currencies, there has evolved another type of currencies with different objectives in recent years that can be clearly interpreted as a new generation of money. Technological advances have facilitated the emergence of this new form of means of payment, which is called “cryptocurrency”. Although a lot of examples for cryptocurrencies exist (e.g. Ethereum, Dogecoin or the recently established Venezuelan Petro), the Bitcoin is the most famous one.

Comparing the two concepts of social currencies and cryptocurrencies the present paper is based on the following research question: What are the similarities and differences between social currencies and the Bitcoin as the most common example of cryptocurrencies? Using a documentary research method, information regarding the operating principles, advantages, disadvantages and risks of the two concepts is presented and analyzed.

In order to answer the presented research question the paper consists of three main sections. Firstly, the concept of social currencies will be explained in general together with highlighting practical examples and their application in local contexts. Secondly, characteristics and operating principles of cryptocurrencies will be presented using the example of the Bitcoin. Finally, the analysis is completed with the comparison of both types of means of payment, highlighting their similarities and differences.

2. Methodology

The research objective of the current paper is to identify similarities and differences between social currencies and cryptocurrencies. The applied mainly documentary research method presents selected contributions of experts on the topics of social currencies and cryptocurrencies including primary sources such as articles of scientific journals, specialized magazines and webpages. Furthermore, empirical evidence is presented to highlight some important characteristics of the Bitcoin currency.

3. Characterization of Social Currencies and Cryptocurrencies

3.1. Money and its Characteristics

Money is a social concept that goes back to the origins of humanity. Without it society would not be what it is today. It was designed as a means of payment, as a commodity convertible into real assets, whose issue is the responsibility of the State who creates it practically from nothing (Daly, 2008). It is recognized as an instrument of exchange, store of value and accounting unit. But money also represents the social link that guarantees the cohesion of a society as it allows to carry out transactions and to give value to the goods within this society (Aristotle, 1928; Keynes, 2008; Orzi, 2017).

To understand the essence of money, Daly (2008) points out that money by itself does not mean wealth, but it is a symbol of indebtedness of a community or nation. Hence, it needs to be seen as an accounting unit and as a store of value that increases or decreases over time. Orzi (2017) states that legal money is controlled by national states and monopolized through central banks, which decide on their issue and circulation. Furthermore, in the more developed financial and economic systems money circulates abundantly, while in the poorly developed systems it is scarce. However, with reference to the seeming monopoly of central banks in the creation of legal money, there also exists the opinion of for example McLeay, Radia and Thomas (2014) as well as Douthwaite (1999). These authors state that actually private commercial banks who seek to maximize their profits by handing out loans to their customers are the driving force in the creation of money – an issue that certainly could affect negatively the stability of the financial sector of a country. With reference to this aspect Hirota (2017a) emphasizes that the State needs to recover the control of the money supply and proposes the 100% reserve banking for demand deposits as an option to do so. The idea of “100 percent money” (Fisher, 1936) dates back to 1933 as the so-called “Chicago Plan” – a proposal for bank reforms – was elaborated by University of Chicago economists as a reaction to the Great Depression. In contrast to the currently existing fractional-reserve banking, within the 100% reserve banking a financial institution would be required to keep the full amount of each depositor’s funds in cash what would diminish drastically the potential of the banking sector to create money. Applying the “100 percent money” – idea of the Chicago Plan to the current U.S. financial system Benes and Kumhof (2012) demonstrate in their model the potential of a significant improvement of financial stability.

Numerous other scholars also criticize the current financial system in general. Greco (1990) for example mentions important weaknesses of this traditional monetary system as for instance an increasing concentration of wealth and a contamination of social climate. Lietaer and Kennedy

(2010) mention a massive discrimination of socially weaker population groups and a tendency towards short-term speculation as disadvantages which cannot be corrected within the established financial system. Also Lietaer, Arnsperger, Goerner and Brunnhuber (2012) state that the current financial system is too fragile and obsolete.

Gisbert (2010) is of the opinion that two monetary systems coexist in the economy. The first one is based on economic and business characteristics and is operated by employers, employees and officials. This system is inflationary, volatile, subject to the economic cycle and possibly influenced by speculative tendencies. The second monetary system can be interpreted as para-economic and aims to improve regional economic perspectives. This system is based on mutual help and relationships that bring together families, residents of neighborhoods and whole societies. This system, which can be characterized as altruistic and informal, emerges mainly as a reaction to economic crises when persons affected by unemployment and with a lack of social protection need to search for alternative economic ways to subsist. Lietaer (2001) proposes that this informal currency system should cover the social needs that cannot be covered by the traditional monetary system what would make sense from a social, economic and business perspective.

According to Blanc (2006a) traditional currencies justify their existence by political and lucrative aspects, whereas social currencies are created in order to stimulate local, social and human development as well as according to Corrons (2015) the sustainability of the planet. Social currencies emerge with the objective to protect local economic dynamics. Furthermore, local social currency systems are only formed by the members of the respective community whose participation in the system is free and without costs.

As social currency systems generally are reactions to recessional tendencies, they are undermined (Gisbert, 2010) or even absorbed by the central banks of the traditional currency systems after the economic downturn. However, it needs to be concluded that within the international financial system the absence of social fairness persists if this system does not provide an access to financial services and money in general to everybody. Orzi (2017) is of the opinion that the State often is powerless in the face of excessive behaviors in the international financial systems and unable to ensure currency circulation in places where it is scarce.

3.2. Social Currencies

Multiple examples in the financial literature (e. g. Blanc, 2006a, 2006b; Corrons, 2017a; Hirota, 2017a; Lietaer, 2001; Torrens, 2016) mention that there have emerged means of exchange that exist alongside the traditional monetary systems. Their principal purpose is to promote local economic, social and environmental projects that contribute to the development of a community that faces insufficient supply of legal currency. These means of exchange have been referred to mainly

as: local currencies, social currencies, complementary currencies, social and complementary currencies, amongst others. While in English-speaking countries the term “local currency” is commonly used, in Spanish-speaking countries dominates the expression “social currency (moneda social)”. In fact the term “social currency” emerged in the context of the Social and Solidary Economy in Latin America (Orzi, 2017; Blanc, 2006a). The expression “complementary currency” is used principally by Bernard Lietaer and his followers.

Hirota (2016) identifies “social and complementary currencies” as tools to facilitate transactions within a limited group of persons without using official, legal currencies. Blanc (2006b) prefers the term “social currency” referring to a set of devices for the exchange of goods, services or knowledge organized by and for a small group of persons by establishing an internal currency. Corrons (2017b) uses the term “complementary currencies” as synonymous with the already mentioned definitions and interprets them as monetary systems that are created outside the official currency system of a country and whose main objective is the promotion of regional economic, social and environmental projects. Throughout the present paper the term “social currency” will be used.

3.2.1. Characteristics of Social Currencies

Lietaer (2005) points out that traditional currencies represent different values than social currencies. On the one hand, traditional currencies stand for central authority, hierarchy, competition, cause-effect, reductionism and technology. On the other hand, social currencies are based on mutual trust, equality, cooperation, synchronicity, holism and interpersonal relations. Hence, Lietaer and Kennedy (2010) mention that most of these currencies do not follow commercial objectives. Orzi (2014) argues that official currencies are eminently capitalist, as they promote a paradigm of permanent growth and competition. In contrast, social currency systems interpret economic and market aspects based on a social context and a certain logic of reciprocity and redistribution. Furthermore, it can be mentioned that one of the main functions of legal money is to be a store of value. According to Primavera (2010) social currency systems, however, try to avoid this aspect in order to eliminate its negative consequences as for example speculation, accumulation of wealth and increasing social inequality.

According to Gisbert (2010), Cortés (2008) and Blanc (2006a) social currencies can be characterized by the following aspects:

- Social currencies are complementary to official currencies.
- Social currencies hardly lose value over time as the objective within a social currency system is not the accumulation of money. In contrast, referring to the concept of inflation legal money usually loses value over the course of time.
- Social currencies emerge in the face of economic crisis scenarios as community initiatives.
- Social currencies are managed and controlled by as well as limited to a specific community, preventing like this the outflow of financial resources and wealth from the local area.

- Social currencies are based on solidarity as well as fair and ethical trade behaviors, what stimulates local, social and human development processes.
- Social currencies are considered to be altruistic and informal systems, based on mutual aid and strong interpersonal relations.
- Social currency systems encourage the financial inclusion of persons who are unable to access products and services within traditional financial systems.

3.2.2. Examples of Social Currencies

According to Lietaer (2001) and Corrons (2017b) social currencies are not a new or modern phenomenon. Their origin can be traced back to the ancient Egypt times and the feudal system. For example, European cathedrals in the Middle Ages were financed by the “breakteats” or local currencies. Later, during the Great Depression of the nineteen-thirties, various forms of social currencies were established, for example, the German Wära (declared illegal in 1931), the Austrian Wörgl and the Swiss WIR, which even nowadays still exists.

Orzi (2017) states that exact information on the number of social currency initiatives does not exist. Nevertheless, it has been estimated that there exist about 5,000 forms of social currencies used in 60 different countries. In particular, for example, in France, one can find about 30 different types of social currencies, while in Spain exist more than 100. Lietaer and Kennedy (2010) mention a large list of social currency initiatives including countries from all over the world as for instance USA, Japan, Germany, France, Austria, Sweden, Bali and Papua New Guinea. Also Hirota (2017a) presents a systematic classification of a wide range of social and complementary currency initiatives.

As already mentioned, most of the social currency systems emerge as a reaction to the scarcity of money and a lack of jobs during economic crises (Corrons, 2017b). Orzi (2017) notes that for example the governments of Venezuela and Ecuador have established social currency systems in order to promote social initiatives. Furthermore, for instance, the government of the city of Barcelona intends to improve their public policies especially for low-income families with the implementation of the three-year social currency project B-Mincome with the following objectives: reduction of poverty, social inclusion, growth in jobs and wealth (Torrens, 2016).

The Brazilian Banco Palmas is another example of the use of social currencies. The microfinance bank represents an alternative for people who cannot access financial resources in the conventional market, due to the lack of the guarantees that are commonly demanded by the banking sector (Blanc, 2006a). In the German region Chiemgau exists the local currency “Chiemgauer”, which unites more than 2000 consumers and about 600 enterprises. The “Chiemgauer” generates about 4 million Euros in purchases of goods and services per year (Asian, 2016).

Another known example of social currencies is the so-called LETS (Local Exchange and Trading System) that emerged in Canada in 1983 as an idea of Michael Linton (Corrons, 2017b). The LETS can be interpreted as a modern version of barter trade and it represents a system that promotes exchange and trade on a limited scale, based on the principles of cooperation, trust and mutual assistance. The implementation of LETS results in a parallel market and an alternative financial system, which offer local products or services that are exchanged by the system's participants, using a currency which is not subject to fluctuation and whose denomination and value is determined by common agreement. Within the LETS individual accounts that correspond to the users of the system are created. No banknotes are issued, but vouchers or checkbooks. Through this system, loans without interests can be provided to its users who accept the commitment to pay to the community. Like this, it is assured that there does not occur any outflow of wealth from the community (Gisbert, 2010).

Credits in favor of an individual user are generated within the LETS when goods or services are sold to another member of the system. This positive balance is diminished when the individual user purchases goods and services within the system in further transactions. A possible negative balance is limited to a certain amount to avoid personal debt overload (Torrens, 2016). The LETS is nowadays a commonly used system in New Zealand, United States, Australia and European countries like England and Austria (Lietaer, 2005). According to Blanc (2006a) in Australia LETS are accepted even by the government as transactions in this currency are subject to value added tax. In comparison to the LETS similar movements arose according to Corrons (2017b) and Blanc (2006b) for example in France (Système d'échange local (SEL)) and in the United States (Time Dollars).

In an interesting article Hirota (2017b) relates the concepts of social currency and cryptocurrency. Based on this idea the present paper has the research objective to identify similarities and differences between the two mentioned concepts. For this reason, in a next step the concept of cryptocurrencies using the example of Bitcoin will be presented.

3.3. The Cryptocurrency Bitcoin

According to Grinberg (2011) Bitcoin can be defined as a digital, decentralized, partially anonymous currency that relies on peer-to-peer networking and cryptography and that is not backed by any government or other legal entity. Bonneau et al. (2015) state that one person or a group of persons using the pseudonym Satoshi Nakamoto firstly announced the concept of Bitcoin and published a white paper on the topic in 2008. Bitcoin's genesis block was mined in January 2009 and it is believed that its first use as a currency occurred in May 2010 within a transaction, where one user ordered 2 pizzas from another user paying with the amount of 10,000 Bitcoins. Since then the Bitcoin community has shown amazing growth rates and the currency has become a popular topic also capturing increasing attention from the worldwide press. However, lately also critical voices arise as central bankers, academics and bloggers see the danger of disruptive implications for payments, banks and the financial system as a whole (Bech and Garratt, 2017).

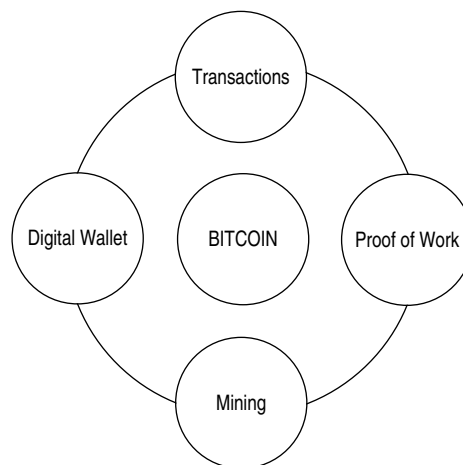
Contrary to popular opinion the concept of Bitcoin is not new. Already Chaum (1982) presented his idea of an anonymous e-cash system. Bitcoin can be classified as an application of the broader concept of financial peer-to-peer networks that try to diminish the influence of the national and international banking sectors (disintermediation) as their users realize their financial transactions directly without the use of a financial intermediary. On for example so-called peer-to-peer lending platforms on the internet like zopa.com (UK) and prosper.com (USA) that initiated operations in 2005 and 2006, or the more recently established doopla.com.mx (Mexico) lenders and borrowers meet directly and agree on personalized loan contracts. This is realized without the need of a financial institution that within the traditional banking system usually acts as contractual partners for persons who want to save money on the one side and persons who require money on the other side (Milne and Parboteeah, 2016).

Referring to Bitcoin peer-to-peer means that financial transactions (transfers) occur directly between the payer and the payee without the need for a central intermediary (Böhme et al., 2015; Jansen, 2013; Kelly, 2015). The original idea of the Bitcoin network was and is that its users can realize national and especially also international financial transfers much faster and at much lower costs than transfers within the national and international banking sector (Abramova and Böhme, 2016; Barber, Boyen, Shi and Uzun, 2012). This is the case as in the direct transfer system within the Bitcoin community costly and time-consuming operations of a financial intermediary are not required (Nakamoto, 2009; Barber et al., 2012).

3.3.1. Functioning of the Bitcoin System

The following Figure 1 presents the 4 key concepts of the Bitcoin network.

Figure 1. Key concepts of the Bitcoin Network



Esteve and Ferreira, 2013.

As already mentioned transactions (financial transfers) within the Bitcoin network occur directly between the payer and the payee, they are broadcasted through the peer-to-peer network and documented in a publicly available ledger (Esteve and Ferreira, 2013). Transactions are processed in approx. 10 minutes (Nakamoto, 2009; Barber et al., 2012). Furthermore, in general Bitcoin transactions are anonymous. This means that transactions are realized using cryptographic signatures where all transactions are publicly recorded using the payer's and the payee's public addresses. Nevertheless, comparable to e-mail addresses that use pseudonymous identities, Bitcoin public addresses do not require the revelation of the true identity of its users (Bech and Garratt, 2017; Bonneau et al., 2015).

With reference to the concept "proof of work" it can be outlined that the Bitcoin network uses a consensus-based validation procedure in which the participants of the network validate transactions in batches known as "blocks". As the ledger of activity is organized into separate but connected blocks, one can refer to this procedure as "blockchain technology" (Bech and Garratt, 2017; Swan, 2015). Challenging computational puzzles (proof of work) are the basis of this validation process. However, Bonneau et al. (2015) state that these puzzles are not a true proof of work but a probabilistic one. Hence, their solution is computationally challenging on expectation, however it is also theoretically possible to get lucky and find a solution with very little work.

According to Esteve and Ferreira (2013) the solution of a specific puzzle by a participant of the network is like winning the lottery what can be explained by the third concept called "mining". In a process called "mining" participants of the network compete in the solution of the computational puzzles, a process that is closely connected with the validation of the previous transactions (Barber et al., 2012). As a reward the winner, who solved the computational puzzle and like this validated outstanding transactions, receives newly created Bitcoins which are introduced into the system by this manner. Hence, Bitcoin miners initially receive all new currency and there does not exist any other legal mechanism for money creation. It is assured that new Bitcoins will be minted at a temporarily fixed rate which is halved roughly every 4 years (Bonneau et al., 2015; Böhme et al., 2015). This implies that with the future growth of the Bitcoin community and the total computational resources devoted to coin generation, it will become increasingly difficult to solve the computational puzzles. Hence, the system will reach the maximum amount of Bitcoins (21 million) approximately in the year 2140 and thereafter no new Bitcoins will be created. Besides the outlined mining process, miners also have the incentive to participate in the validation of transactions because they collect (optional) transaction fees in case they win the competition. Nowadays in practice, as computational puzzles are already too complicated for individual miners, they collaborate in so-called mining pools and share obtained revenues. (Barber et al., 2012; Bonneau et al., 2015; Jansen, 2013).

Referring to the last concept mentioned in Figure 1 Bitcoins can be stored in digital wallets (e.g. web services, local applications, USB drivers) from where they are taken in case of an authorized transfer. However, it is also possible to print them and deposit them for example in a bank safe. As already mentioned, Bitcoins are protected by private and public keys (Esteve and Ferreira, 2013).

Bonneau et al. (2015) highlight that there is no inherent notion of identities or individual accounts which “own” Bitcoins. Ownership simply means to know a private key with which one user (payer) can make a signature and like this transfer the currency to another user (payee) of the network.

3.3.2. Benefits and Risks of Bitcoin

Barber et al. (2012) state that Bitcoin’s favorable characteristics are its simplicity, flexibility and its decentralization. However, they also mention that it is far from being a perfect system. Table 1 presents the main benefits and risks that can be found in the academic literature about the Bitcoin currency.

Table 1. Benefits and risks of the Bitcoin system

Benefits of Bitcoin	Risks of Bitcoin
Disintermediation through decentralized peer-to-peer network	Misuse of the network for criminal intentions
Anonymity of payments	Security risks
Transaction irreversibility	Transaction irreversibility
Mining rewards	Uncertain legal and regulatory status
	Investment Risks

The present paper will first present the benefits and secondly the associated risks of the Bitcoin system will be outlined. Referring to the point “disintermediation through decentralized peer-to-peer network” it was already mentioned that within the Bitcoin community online payments can be sent directly from one user to another without going through a financial institution (Nakamoto, 2009). This implies much lower transaction costs that are currently paid on an optional basis as well as more rapid transaction process times in comparison to financial transfers in the traditional international banking sector (Barber et al., 2012). Furthermore, Esteve and Ferreira (2013) highlight that in the Bitcoin community no one can control or even freeze the participant’s money like it is possible for example with a traditional bank account.

Another advantage of the Bitcoin currency is that its payments are processed without the revelation of the user’s identities (anonymity). Referring to this Bech and Garratt (2017, p. 64) state: “Payees and payers may want to reduce the risk of identity theft, the possibility that the counterparty might follow them home and rob them.” The aspect “transaction irreversibility” is closely

connected to the anonymity of Bitcoin payments and has to be seen out of the payee's perspective. Barber et al. (2012) and Nakamoto (2009) put emphasis on the fact that Bitcoin transactions are computationally impractical to reverse what gives the seller of a product an important level of protection against credit card frauds and chargebacks.

As a last important and innovative benefit potential mining rewards for the community members were already outlined. Interested and capable participants actively work on the processing of the outstanding transactions and receive like this newly created Bitcoins which are introduced by this manner into the system. Furthermore, while using sophisticated computational puzzles within the validation process of financial transfers Bitcoin community members could gain transactions fees. Currently, Bitcoin transfers do not require an obligatory payment of transaction fees. However, with optional payments payers assure a preferential processing of their transactions (Barber et al., 2012).

As well as the benefits also the associated risks are multidimensional in the Bitcoin network. First of all, a potential for using Bitcoins for criminal intentions cannot be denied. As part of the anonymity of payments several authors highlight the dangers of money laundering as well as tax evasion and terror financing (Abramova and Böhme, 2016; Bech and Garratt, 2017; Campbell-Verduyn and Goguen, 2018; Josavac, 2017). As another important disadvantage of the Bitcoin network several security risks can be mentioned that do not exist within the traditional banking systems. Bonneau et al. (2015) points out that in the last years many users' Bitcoins have been stolen or lost because of collapsed exchanges. Here, just the three incidents of mybitcoin.com, CryptoLocker and Mt Gox should be mentioned.

In 2011 the online wallet service mybitcoin.com needed to end its operations after USD 1.3 million were stolen from its users because of malware (Barber et al., 2012). In 2014 a computer virus (Trojan) called CryptoLocker with Russian origin achieved access to the security keys of millions of dollars in Bitcoins through encrypting personal files on user's computers (Barber et al., 2012). Also in 2014 the Japan-based worldwide leading Bitcoin exchange Mt Gox suspended its service after losing 774,000 Bitcoins (value of USD 409 million) of its customer due to theft (The Guardian, 2014). Another security risk can be found in the fact that the loss of private keys implies also the loss of the Bitcoins for its user just as it is the case with cash money. However, even worse also for the whole community those Bitcoins are lost forever (Esteve and Ferreira, 2013).

According to Abramova and Böhme (2016) "transaction irreversibility" can be mentioned at this point again - this time however as a risk category out of the perspective of the payer of a digital transfer. In case this person commits an error while sending Bitcoins to the wrong person, their value is lost and cannot be recovered again unless the receiver of the payment reverses the transaction voluntarily. The next risk category can be found in the uncertain legal and regulatory status of Bitcoin (Abramova and Böhme, 2016; Josavac, 2017). Clearly, the Bitcoin community ultimately has aroused the interest of international private and central banks that naturally perceive the system as a danger to them and financial stability. JPMorgan CEO Jamie Dimon for example ultimately called

Bitcoin to be a fraud (Forbes, 2017). The German central bank publicly warns of the investment risks associated with Bitcoins and their potential to worsen future financial crises. Moreover, the Committee on Economic and Monetary Affairs of the European Parliament highlights an urgent need for a stricter regulation of cryptocurrencies (European Parliament, 2016). Furthermore, plans of proper digital currencies of central banks already exist (Bundesbank, 2017; Young, 2017). In the light of this negative perception of the Bitcoin community strict and global future regulatory measures are probable and could diminish the attractiveness of Bitcoins for financial transfers and as an investment alternative. In the next section especially this aspect of Bitcoins as a (too) risky investment vehicle should be analyzed further.

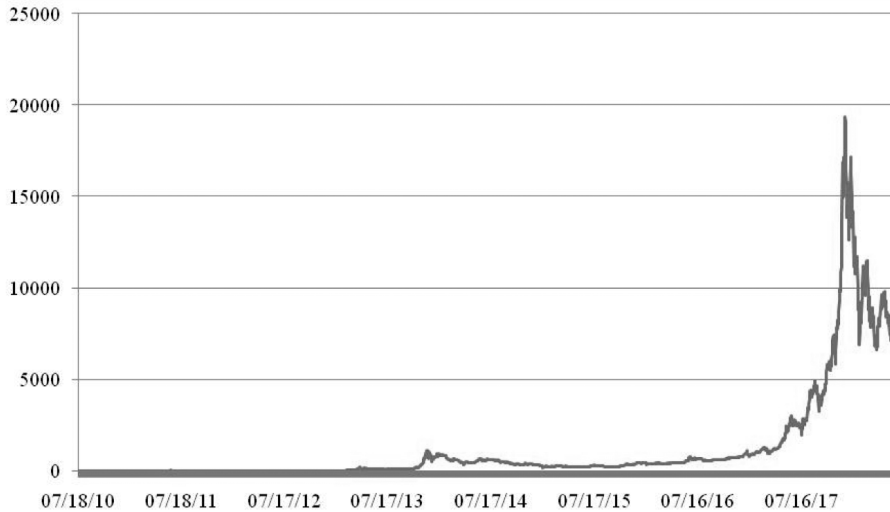
3.3.3. Bitcoin as an Investment Alternative

Figure 2 shows historical data of the Bitcoin Price Index from July 18th, 2010 until June 11th, 2018. According to CoinDesk (2018b) their Bitcoin Price Index represents an average of bitcoin prices across leading global exchanges (Bitstamp, Coinbase, itBit, Bitfinex). Starting with a value of USD 0.09 (July 18th, 2010) the Bitcoin Price Index currently quotes at a level of USD 6,786 (June 11th, 2018). The index reached its all-time high with USD 19,343 on December 16th, 2017. Focusing on the year 2017 the Bitcoin Price Index started at a level of USD 997.69 and showed a tremendous rally with a return of 1,839% in just 12 months until its all-time high (December 16th, 2017). However, within less than 4 months after its historical high the index crashed by 65.8% (USD 6,620 on April 6th, 2018). As already mentioned according to the outlined index one Bitcoin currently (June 11th, 2018) costs USD 6,786. One ounce of gold quotes currently (June 11th, 2018) at a level of USD 1,300 (Goldprice, 2018). Hence, the digital currency Bitcoin values more than 5 times as much as one ounce of gold.

Mentioning some descriptive statistics of the historical data (daily basis) of the CoinDesk Bitcoin Price Index over the almost 8 years (July 18th, 2010 – June 11th, 2018) the index shows an average daily return of 0.56% with a relatively high standard deviation of 5.89%. Hence, with the value of 10.5 the coefficient of variation shows a high level as for each unit of return investors have to accept more than 10 units of risk. Simply based on these measurements of risk Bitcoins can be classified as a high risk investment alternative. Hence, by no means it is justified to classify Bitcoins as a safe haven asset as it is done by a growing group of investors. These investors interpret Bitcoins as a “safe” investment alternative as its price does not depend on the general economy and the performance of other sectors, but solely on the Bitcoin market and investor’s demand and supply within this market (Young, 2017). However, extreme volatility of Bitcoin prices and relatively frequent negative news as for example malware attacks draw a different picture.

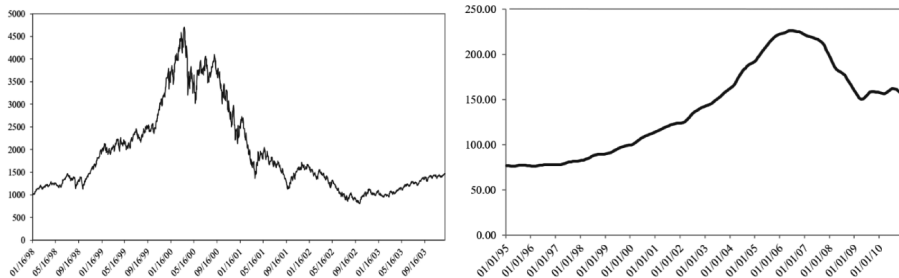
In fact, looking at the historical chart of the Bitcoin Price Index one feels at least reminded on earlier episodes on the worldwide financial markets, from which two of them are presented in Figure 3. The figure shows two popular examples of recent asset price bubbles. On the left side one can see the chart of the US technology index Nasdaq from 1998 to 2003. The formation and the

Figure 2. CoinDesk Bitcoin Price Index on a daily basis for the period 2010-2018



CoinDesk, 2018a.

Figure 3: Dotcom Bubble (left) and Subprime Bubble (right) as historical examples of asset price bubbles



Yahoo.Finance, 2018; Standard & Poor's, 2018.

crash of the so-called Dotcom Bubble can be seen from 1998 to 2001. The right side of the figure shows the development of US housing prices within the years 1995 to 2010. Also here the formation of an asset price bubble in the years 2000 to 2006 lead to the so-called Subprime Crisis with detrimental global consequences afterwards.

According to Kindleberger and Aliber (2005) an asset price bubble can be defined as a sharp price increase, which then collapses. Roehner and Sornette (2000) state that a (positive) price bubble emerges when market participants expect that the trend of a previously rising price trend of an asset will continue in the future. Solely based on this expectation the demand for the asset increases and with this its market price. A similar understanding shows Shiller (2005) in his Positive Feedback Theory that explains the evolution of asset price bubbles out of a behavioral perspective. According to this author an asset price bubble in a certain asset (e. g. stocks, real estate, currencies, etc.) could emerge as a result of a speculative feedback process within a market with a huge potential of expansion. Within this feedback process new investors are constantly drawn into the speculative movement as they are attracted by price increases in the past which they expect to continue in the future. Like this those new investors cause a constant growth of demand that results in the growth of the asset price bubble that possible does not stop until all potential investors are invested in the speculation (Shiller, 2005).

With reference to the Bitcoin market Figure 2 currently shows a very similar situation to the formation and crash of the New Economy Bubble in the Nasdaq index (1998 -2001) or the bubble in the US housing market (2000 - 2009). Already Grinberg (2011) mentions the possibility of the Bitcoin system to be vulnerable to speculative movements and asset price bubbles. Also Hirota (2017b) interprets the current movements in the Bitcoin market price as speculative. This *possible* financial bubble in the Bitcoin market could have been caused by the constantly growing influence of speculative investors within this new asset class. 3 aspects that support this hypothesis are:

- a) The Bitcoin market is a potential global market with almost no limits with respect to future growth of the quantity of investors - a required market characteristic according to the outlined Positive Feedback Theory of Bubbles.
- b) The Bitcoin Price Index shows the typical two phases of an asset price bubble – first the formation phase with exceptional and exponential growth rates from January 2017 to December 2017 and then the crash from December 2017 to the current date (June 11th, 2018).
- c) The growing influence of speculative investors can be interpreted as a misuse of Bitcoins with respect to the original intentions of the Bitcoin community that created this currency as a vehicle for faster and less costly financial transfers and not as an investment alternative. The same happened for example during the formation of the Subprime Bubble as a rapidly growing part of market participants used U.S. real estate for speculative purposes instead of residential purposes (original reason for building a house).

It is important to mention that *just possibly* the Bitcoin market is currently in the crash phase of a potential bubble that reached its maximum value in December, 2017. To verify this hypothesis a much more focused and detailed research study would be needed. However, the authors of the present paper are confident to say that based on the outlined simple risk measures and the comparison of the Bitcoin price movements with historical examples of asset price bubbles the Bitcoin currency should currently not be seen as an adequate investment alternative for the vast majority of market participants.

This opinion is strongly in line with the point of view of international regulatory agencies. In December 2017 the chairman of the U.S. Securities and Exchange Commission, Jay Clayton, called on the investor’s community to be extremely cautious with investments in cryptocurrencies (SEC, 2017). And in early 2018 the European Supervisory Authorities published a press release warning consumers of the risks of buying virtual currencies like the Bitcoin (ESMA, 2018).

4. Comparison of Social Currencies and Bitcoin

While comparing the two outlined concepts of systems, social currency vs. Bitcoin as an example for cryptocurrencies, the present article identifies the following list of similarities and differences shown in Table 2.

Table 2. Comparison of social currencies and Bitcoin

Similarities	Differences
Lack of central bank and regulation	Origins of currency
Coexistence with traditional money	Social cohesion vs. anonymity
Limited creation of money	Regional vs. global character
Equality and cooperation	Financial risks
	Media interest

First of all, similarities of the two systems should be highlighted and afterwards principal differences. As can be seen, social currencies and Bitcoin show a lack of a central bank and regulatory efforts. There is no central bank that controls and coordinates the minting process of new currency. The absence of a central bank also implicates that social currencies and Bitcoin are not backed by any kind of financial institutions. Regulation can be characterized as not existent or deficient for both examples. However, referring to Bitcoin there exists an international variety of regulatory efforts as principally Asia shows so far a stronger tendency to at least implement basic regulatory requirements which cannot be found yet in other parts of the world. Nevertheless, the Bitcoin community is strongly against these regulatory efforts as they are not willing to give up their independence and autonomy which they consider part of their core principles (Musiani, Mallard and Méadel, 2018).

Social currencies and Bitcoin can be considered as complements to traditional money systems. Even though both examples show clear tendencies of an intended disintermediation, that is to replace traditional financial intermediaries for example in the field of financial transactions, they do not seem to have the potential at least in the short or medium future to make obsolete traditional banking systems but search for coexistence. One can find another similarity in the limited creation of money. There is no intention of a constant minting process that implicates a continuous growth of the amount of money for social currencies as they principally circulate regionally. The participants of a social currency system agree usually on a fixed amount of money that is meant to circulate and not for accumulation. It was also mentioned for Bitcoin that its community sophisticatedly organized Bitcoin minting which will terminate approximately in the year 2140 with a maximum of 21 million Bitcoins circulating by then.

A last major similarity can be found in the value system that underlies both examples. Social currencies and Bitcoin are generally built on the values of equality and cooperation. This means that the users of both systems found their currency with the objective of establishing a market with trustful relationships between equal sellers and buyers of products or services that cooperate in order to assure the long term functioning of the system.

Besides the mentioned similarities of social currencies and Bitcoin there are also clear and significant differences that automatically lead to the result that Bitcoin is not a social currency. At first, one can mention the different origins of both currency systems. On the one hand, social currencies usually intend to economically strengthen a specific region often as a reaction to economic crisis. On the other hand, the Bitcoin system was designed to allow fast, low-cost national and international transactions between its community members. One of the main objectives of social currencies is a strengthening of social cohesion that even reaches an interpersonal and physical level. On the other side, the Bitcoin system is based on a community idea, but individual participants are highly interested of not revealing their true identity what simply results in a payment system based on anonymity. It was also outlined that even the true identity of the system's founder ("Satoshi Nakamoto") is not public knowledge.

One of the most important differences is the regional character of social currencies and the global character of Bitcoin. With their just regional use and circulation social currencies strengthen social cohesion and local communities. In contrast, Bitcoin has developed into a global payment and investment system that expands with high dynamism. In fact, Nishibe (2016) uses the term “denationalization of money” referring to the global character of the Bitcoin system. This difference is strongly related to the distinct levels of financial risks that present the two types of currency. Besides numerous other existent risks the Bitcoin system especially presents significant levels of financial risk what has been demonstrated for example by the high volatility of the Bitcoin price. With the constantly growing influence of speculative activities in the last years the Bitcoin Price Index even shows exponential growth rates and high volatility what can be interpreted as characteristics of a potential asset price bubble. Hence, the present paper already classified Bitcoin as a high risk investment alternative.

On the contrary, social currencies are local systems and its access is limited to relatively few persons and enterprises. This fact and the clear commitment of not accumulating financial resources basically eliminate the possibility of speculative tendencies within a social currency system. Moreover, within some social currency systems mechanisms are implemented that reduce drastically the tendency to use the currencies as value deposits. One of these mechanisms is the so-called negative-interest money – an idea that goes back to the studies of the German-Argentinean economist Silvio Gesell. According to Gesell (1920) negative-interest money automatically loses its value over time as a periodical negative “interest rate” is applied. Hence, a use of the currency as a value deposit is not beneficial. According to Hirota (2017a) this mechanism was / is used for example within the system of the Austrian Wörgl and the German Chiemgauer.

As a last difference the media interest should be analyzed. Without any doubt also social currency concepts can capture some kind of mainly regional media interest. However, especially the Bitcoin system faces a rapidly growing interest of the popular global media - a tendency that for sure intensifies the mentioned “misuse” of the currency as an investment alternative as well.

Based on the realized comparison of the concepts of social currency and Bitcoin the main result of the analysis is the following: Although some important similarities exist between them, social currencies and Bitcoin are clearly two different kind of concepts with fundamentally different origins, operational mechanisms and objectives. This opinion is also shared by various other researchers. According to, for example, Torrens (2016) cryptocurrencies are speculative and highly volatile what are not at all characteristics of social currencies. Also Hirota (2017b) reaches the conclusion that social currencies and cryptocurrencies are two different currency systems that exist alongside with traditional currency systems.

5. Concluding Remarks

Social currencies and cryptocurrencies exist alongside the official and legal money system. In comparison to this traditional system of money both systems show various advantages and disadvantages. On the one side, social currencies emerge out of an altruistic idea and try to stimulate regional, social and human development. However, examples of disadvantages of social in comparison to legal currencies are its limitations referring to the number of users and the area of use. On the other side, advantages of cryptocurrencies in comparison to traditional money can be found for example in lower transaction costs and higher transaction speed. Nevertheless, for instance risk aspects and a lack of regulation can be mentioned as disadvantages.

The research objective of the present paper was to identify similarities and differences between two currency systems – social currencies and cryptocurrencies. Both systems are instruments of exchange based on values like equality and cooperation established among their users. They coexist alongside with traditional, legal currency systems within the respective countries and are not backed or regulated by public entities. However, despite the similarities between social currencies and cryptocurrencies, there exist characteristics, which show that the two concepts are fundamentally different.

Cryptocurrencies, as for example the Bitcoin, have successfully expanded into global financial markets and even entered into a speculative dynamic that has alerted financial experts and whole governments. As a consequence, there is a growing debate on the need to nationally and internationally regulate the transactions that are made with these innovative technologies. On the other side, social currencies are limited to a local perspective and emerge in order to solve common problems generated by economic crises or scarcity of jobs. Moreover, their creation is based on solidarity, mutual help and interpersonal relationships.

As proposed for example by Hirota (2017b), it is important to take into consideration a possible adoption of blockchain technologies as well as virtual platforms to potentiate and extend the benefits and effectiveness that derives from the implementation of social currencies in regional environments. However, to avoid the detrimental effects of an unlimited, global circulation like in the case of Bitcoin, one needs to assure a solely regional application. Since within regional social currency systems money just circulates among a limited amount of participants of the system, and therefore, for instance, a speculation risk does not exist. In contrast, within existent cryptocurrency systems several risks need to be evaluated seriously. One reason for this is that currencies such as the Bitcoin operate in markets that are vulnerable to the emergence of financial bubbles due to the high level of speculation, the absence of regulation and the international circulation of the currency.

It needs to be clear that monetary systems cannot be excluded from regulation as citizens require strong institutions that offer security and clear rules on sensible financial issues – elements that ideally should be provided by the State. Problems such as the anonymity in financial transactions in the cryptocurrency system, or put differently the ignorance of the identity of the persons participating within a financial transaction in those systems, have important social implications. As was mentioned within the present article these problems could be linked to potential criminal activities such as money laundering or tax evasion. Furthermore, strong speculative tendencies, which cause drastic fluctuations in the market price of global cryptocurrencies, like the Bitcoin, could result in global financial crises, generating capital losses and serious financial, economic and social conflicts.

References

- ABRAMOVA, S. & BÖHME, R. (2016): *Perceived Benefit and Risk as Multidimensional Determinants of Bitcoin Use – A Quantitative Exploratory Study*, 37th International Conference on Information Systems, Dublin, 20 pages.
- ALIANZA COOPERATIVA INTERNACIONAL (2018): *Principios y Valores Cooperativos*, Consulted from: <http://www.aciamerica.coop/Principios-y-Valores-Cooperativos-4456>.
- ARISTOTLE (1928): *A Treatise on Government*, Translated from the Greek of Aristotle by William Ellis, A.M., J M Dent & Sons Ltd., Reprint 1928, London, Toronto.
- ASIÁN, A. (2016): *Las monedas sociales y su auge en España*, Consulted from: <https://www.muypymes.com/2016/03/17/monedas-sociales-espana>.
- BARBER, S., BOYEN, X., SHI, E. & UZUN, E. (2012): *Bitter to Better – How to Make Bitcoin a Better Currency*, Lecture Notes in Computer Science, 7397, Queensland University of Technology, 399-414.
- BECH, M. & GARRATT, R. (2017): “Central Bank Cryptocurrencies”, *BIS Quarterly Review*, September 2017, 55-70.
- BENES, J. & KUMHOF, M. (2012): *The Chicago Plan Revisited*, IMF Working Paper, WP/12/202, 71 pages.
- BLANC, J. (2006a): “A quoi servent les monnaies sociales?”. En: *Exclusion et liens financiers: Monnaies sociales, rapport 2005-2006*, Economica, 31-41.
- BLANC, J. (2006b): “Les monnaies sociales: un outil et ses limites. Introduction générale”. En: *Exclusion et liens financiers: Monnaies sociales, rapport 2005-2006*, Economica, 11-23.

- BONNEAU, J., MILLER, A., CLARK, J., NARAYANAN, A., KROLL, J. & FELTEN, E. (2015): *SoK – Research Perspectives and Challenges for Bitcoin and Cryptocurrencies*, 2015 IEEE Computer Society Symposium on Security and Privacy. Consulted from: http://www.princeton.edu/system/files/research/documents/Felten_SoK.pdf.
- BÖHME, R., CHRISTIN, N., EDELMAN, B. & MOORE, T. (2015): “Bitcoin: Economics, Technology, and Governance”, *Journal of Economic Perspectives*, 29(2), 213-238.
- BUNDESBANK (2017): *Weidmann: cashless forms of payment increasingly popular*. Consulted from: https://www.bundesbank.de/Redaktion/EN/Topics/2017/2017_05_19_payments_symposium.html.
- CAMPBELL-VERDUYN, M. & GOGUEN, M. (2018): “The mutual constitution of technology and global governance - Bitcoin, blockchains, and the international anti-money-laundering regime”. In: M. Campbell-Verduyn (ed.), *Bitcoin and Beyond - Cryptocurrencies, Blockchains, and Global Governance*, Routledge, London and New York, 69-87.
- CHAUM, D. (1982): “Blind Signatures for Untraceable Payments”. In: D. Chaum, R. Rivest and A. Sherman (eds.), *Advances in Cryptology – Proceedings of Crypto 82*, Springer, Boston, MA., 199-203.
- COINDESK (2018a): *Bitcoin (USD) Price*, Consulted from: <https://www.coindesk.com/price/>.
- COINDESK (2018b): *About the Bitcoin Price Index*, Consulted from: <https://www.coindesk.com/price/bitcoin-price-index>.
- CORRONS, A. (2017a): *Análisis de la influencia de los valores humanos y las actitudes en el proceso de adopción de redes virtuales de intercambio no monetario – Enfoques actitudinal, motivacional y panárquico*, Doctoral thesis, Universitat Jaume I – Universitat de València.
- CORRONS, A. (2017b): “Monedas complementarias: dinero con valores”, *Revista Internacional de Organizaciones*, 18, 1886-4171.
- CORRONS, A. (2015): *Monedas complementarias en pro de la sostenibilidad y el desarrollo – Un enfoque panárquico*, Trabajo de investigación, Máster Interuniversitario en Cooperación al Desarrollo. Universitat Jaume I – Universitat de València. Consulted from: <https://es.slideshare.net/gufrancesc/corrons-af-2015-monedas-complementarias-en-pro-de-la-sostenibilidad-y-el-desarrollo-enfoque-panarquico>.
- CORTÉS, F. (2008): *Las monedas sociales*, Ediciones Cajamar, Colección Finanzas Éticas.
- DALY, H. (2008): “Dinero, deuda y riqueza”, *Ecología política*, 36, 33-42.
- DOUTHWAITE, R. (1999): *The Ecology of Money*, Green Books.

- ESMA - EUROPEAN SUPERVISORY AUTHORITIES FOR SECURITIES (2018): *ESAs warn consumers of risk in buying virtual currencies*, Press Release ESMA71-99-946, 12 February 2018. Consulted from: <https://www.esma.europa.eu/press-news/esma-news/esas-warn-consumers-risks-in-buying-virtual-currencies>.
- ESTEVE, C. & FERREIRA, M. (2013): *Bitcoin – A Peer-to-Peer Electronic Cash System*. Consulted from: <https://es.slideshare.net/flaviovit/bit-coin-p2pelectroniccashsystem>.
- EUROPEAN PARLIAMENT (2016): *Report on virtual currencies, 2016/2007(INI)*. Consulted from: <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+REPORT+A8-2016-0168+0+DOC+XML+V0//EN>.
- FISHER, I. (1936): "100 % Money and the Public Debt", *Economic Forum*, Spring Number, April-June, 406-420.
- FORBES (2017): *Director de JPMorgan califica al Bitcoin de "fraude"*. Consulted from: <https://www.forbes.com.mx/director-de-jpmorgan-califica-al-bitcoin-de-fraude/>
- GESELL, S. (1920): *Die natürliche Wirtschaftsordnung durch Freiland und Freigeld*, 4. ed., Freiland=Freigeldverlag, Rehbrücke, Germany.
- GISBERT, Q.J. (2010): *Vivir sin empleo: trueque, bancos de tiempo, monedas sociales y otras alternativas*, Barcelona: Los libros del lince.
- GOLDPRICE (2018): *Gold Price History*. Consulted from: <https://goldprice.org/gold-price-history.html>.
- GRECO, T. (1990): *Money and Debt – A Solution to the Global Crisis*, 2nd edition: Tucson, Arizona, Thomas H. Greco, Jr.
- GRINBERG, R. (2011): "Bitcoin – An Innovative Alternative Digital Currency", *Hastings Science and Technology Law Journal*, 4, 159-208.
- THE GUARDIAN (2014): "The Mt Gox bitcoin scandal is the best thing to happen to bitcoin in years". Consulted from: <https://www.theguardian.com/money/us-money-blog/2014/feb/25/bitcoin-mt-gox-scandal-reputation-crime>.
- HIROTA, Y. (2017a): *Monedas sociales y complementarias (MSCs) – Sus valores socioeconómicos para distintos stakeholders*, Doctoral thesis, University of Valencia.
- HIROTA, Y. (2017b): "Bitcoin: ¿es una moneda social? Semejanzas y diferencias entre la criptomoneda y las monedas sociales", *El País*, 05/10/2017. Consulted from: https://elpais.com/elpais/2017/10/04/alterconsumismo/1507121912_438197.html.
- HIROTA, Y. (2016): "Monedas Sociales y complementarias (MSC)", *Oikonomics: revista de economía, empresa y sociedad*, 6, 35-42.
- JANSEN, M. (2013): "Bitcoin – The Political 'Virtual' of an Intangible Material Currency", *International Journal of Community Currency Research*, vol. 17 (A), 8-18.

- JOSAVAC, M. (2017): "The Bright and the Dark Side of Virtual Currencies – Recent Development in Regulatory Framework", *International Journal of Community Currency Research*, 21, 1-18.
- KELLY, B. (2015): *The Bitcoin Big Bang – How Alternative Currencies Are About to Change the World*, John Wiley & Sons, Inc., Hoboken, New Jersey.
- KEYNES, J.M. (2008): *The General Theory of Employment, Interest and Money*, Atlantic Publishers and Distributors.
- KINDLEBERGER, C. & ALIBER, R. (2005): *Manias, Panics, and Crashes – A History of Financial Crises*, John Wiley & Sons, Inc., 5th edition, Hoboken, New Jersey.
- LIETAER, B., ARNSPERGER, C., GOERNER, S. & BRUNNHUBER, S. (2012): *Money and Sustainability – The Missing Link*. Triarchy Press, UK.
- LIETAER, B. & KENNEDY, M. (2010): *Monedas Regionales - Nuevos instrumentos para una prosperidad sustentable*, España: La Hidra de Lerna Ediciones.
- LIETAER, B. (2005): *El futuro del dinero: cómo crear nueva riqueza, trabajo y un mundo más sensato*, Errepar-Longseller, Argentina.
- LIETAER, B. (2001): *The Future of Money – Creating New Wealth, Work and a Wiser World*, Random House, London.
- MCLEAY, M., RADIA, A. & THOMAS, R. (2014): "Money Creation in the Modern Economy", *Bank of England Quarterly Bulletin*, 2014 Q1, 14-27.
- MILNE, A. & PARBOTEEAH, P. (2016): *The Business Models and Economics of Peer-to-Peer Lending*, European Credit Research Institute, Research Report, 17, 31 pages.
- MUSIANI, F., MALLARD, A. & MÉADEL, C. (2018): "Governing what wasn't meant to be governed - A controversy-based approach to the study of Bitcoin governance". In: M. Campbell-Verduyn (ed.), *Bitcoin and Beyond - Cryptocurrencies, Blockchains, and Global Governance*, Routledge, London and New York, 133-156.
- NAKAMOTO, S. (2009): *Bitcoin – A Peer-to-Peer Electronic Cash System*.
Consulted from: <https://bitcoin.org/bitcoin.pdf>.
- NISHIBE, M. (2016): *The Enigma of Money – Gold, Central Banknotes, and Bitcoin*, Springer, Singapore.
- ORZI, R. (2017): "¿Otra moneda para "otra economía"? La necesidad de las monedas complementarias para el desarrollo sustentable de los emprendimientos de la economía social y solidaria", *Revista del Departamento de Ciencias Sociales*, vol. 04, 03, 155-171.
- PRIMAVERA, H. (2010): "Social Currencies and Solidarity Economy – An Enduring Bond of Common Good", *Working USA: The Journal of Labor and Society*, vol. 13, 1, 41-59.

- ROEHNER, B. & SORNETTE, D. (2000): „Thermometers“ of Speculative Frenzy”, *European Physical Journal B*, vol. 16, 4, 729-739.
- SEC – U.S. SECURITIES AND EXCHANGE COMMISSION (2017): *Statement on Cryptocurrencies and Initial Coin Offerings*, Public Statement 11 December 2017. Consulted from: <https://www.sec.gov/news/public-statement/statement-clayton-2017-12-11>.
- SHILLER, R. (2005): “Diverse Views on Asset Bubbles”. In: Hunter, W., Kaufman, G. y Pomerleano, M. (editors), *Price Bubbles – The Implications for Monetary, Regulatory, and Institutional Policies*, Cambridge, London: The MIT Press, 35-39.
- STANDARD & POOR’S (2018): *S&P Corelogic Case-Shiller 10-City Composite Home Price NSA Index*. Consulted from: <https://us.spindices.com/indices/real-estate/sp-corelogic-case-shiller-10-city-composite-home-price-nsa-index>.
- SWAN, M. (2015): *Blockchain – Blueprint for a New Economy*, O’Reilly Media, Inc., Sebastopol, California.
- TORRENS, L. (2016): “Moneda Social en Barcelona”, *Revista de Economía Crítica*, 22, 200-206.
- YAHOO.FINANCE (2018): *NASDAQ Composite – Historical Data*. Consulted from: <https://finance.yahoo.com/quote/%5Eixic/history/>.
- YOUNG, J. (2017): *Head of Bundesbank Proposes Digital Currency to Compete with Bitcoin*. Consulted from: <https://cointelegraph.com/news/head-of-bundesbank-proposes-digital-currency-to-compete-with-bitcoin>.

