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A legal analysis of complementary and virtual currencies for sustainable economic development

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ABSTRACT

A monetary ecosystem has developed in recent years transforming the concept of money and its statu quo. Complementary currencies (CCs) are types of exchange media that support the creation of monetary ecosystems. CCs can contribute to sustainable economic development as they connect stakeholders, strengthen community relations, and democratize the control over exchange mechanisms. In France, CCs have developed at the local level as complementary local currencies (CLMs) aiming to favour local exchanges and revitalize the economy of French territories. At the same time, the digital revolution is influencing present dynamics by dematerializing legal money and creating new forms of value, such as virtual currencies. Nevertheless, legal issues exist with regard to this monetary diversification, such as the legal recognition, sovereignty and convertibility of these types of currency systems. This paper focuses on the legal aspects of monetary diversification both in the local and virtual realm, and analyses the legal framework and benefits.

Keywords: *Crypto-currencies, complementary currencies, sustainable economic development, digital economy, digital law.*

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1. Introduction

1.1. Background and research motivation

Our current monetary system is defined by two joint characteristics: 1) a monetary creation based on debt, whose issuance by granting loans of commercial banks represent 90% of the money supply and; 2) a monopoly held by central banks over legal money issuance, where they play the role as supervisors of the system (Blanc, 2000 & Lietaer et al., 2012). Many complementary and virtual currencies initiatives are critical of this dominant monoculture system and lay the responsibility of economic crises on the monetary creation model based on bank debt. For those reasons, diverse monetary systems have been emerging in recent years reclaiming the right over currency creation, by proposing monetary innovations (J. Blanc 2000 in Martin, 2018), including within the virtual realm.

Nevertheless, one of the main roadblocks with regard to monetary diversification is the legal recognition of other forms of money. At the European level, for instance, the monetary monoculture is protected by law from the very fundamental documents that gave origin to the European Union (EU). Articles 105 of the Maastricht treaty and 128 of the Lisbon treaty consolidate a single monetary policy in the EU by stating that “The European Central Bank shall have the exclusive right to authorise the issue of euro banknotes within the Union. The European Central Bank and the national central banks may issue such notes. The banknotes issued by the European Central Bank and the national central banks shall be the only such notes to have the status of legal tender within the Union”. In the same vein, at the national level, French law reinforces this monetary monoculture by incorporating into its national legislation the considerations established by the European legislation. Articles L.111-1 and L141-5 of the French monetary and financial code (FMC) state that “the currency of France is the euro” and “the Bank of France is the only body authorised (...) to issue legal tender notes”. By exclusion, any type of monetary creation other than the euro is not recognised by law at both European and French national level.

Emerging monetary systems reclaim the right over currency creation by proposing monetary innovations that democratize the control over exchange mechanisms. Complementary currency systems (CCs) are types of exchange media that are developed by a group of stakeholders in complement to the official legal tender (Fare & Ould Ahmed, 2018). In the same way, albeit in a contested manner, crypto-currencies are digital objects based on computer networks that allow carrying out transactions validated between two or more persons, thanks to a technology called “blockchain” (INC, 2019). Increasing monetary diversity in a given economy from a single currency monopoly to a diverse monetary ecosystem of parallel currencies can result in greater economic stability, social well-being and sustainable economic development (Lietaer et al., 2012). Yet, the so-called digital revolution is transforming social relations and creating the cross-border dynamics on the internet that are challenging existing monetary legal frameworks (ECB, 2012 & OECD, 2018).

Rethinking the monetary system as an ecosystem of parallel currencies working at the same time, may be a viable option to face some of the great challenges of our era, including the recurring financial and monetary crises that point to the fact that our monetary system also faces its own limits (Lietaer et al., 2012). Adapting legal frameworks to both CCs and virtual currencies is essential in order to promote sustainable economic development.

1.2. Research objectives

This paper focuses on two types of monetary systems: complementary local currencies (CLMs) and crypto/virtual currencies/assets. It makes use of qualitative and legal research, and analyses their legal nature,

use and recognition. A particular emphasis is given to the benefits of local monetary systems based on ethical, social and ecological principles to promote economic resilience and sustainable local communities. With respect to virtual currencies, this paper analyses the legal nature and issues with regard to the cross-border dynamics that exist on the internet. Last but not least, it explores areas of improvement for the sustainability of each one of the projects presented.

1.3. Research structure

The present document starts by briefly setting the context and theoretical/conceptual framework of an emerging monetary ecosystem, highlighting the core elements and importance of monetary diversification. Afterwards, it explores the legal framework behind CLMs and crypto-currencies, in light of social dynamics that promote the development of a monetary ecosystem. Similarly, this paper cites and analyses cases in order to shed light on legal problems existing today.. Finally, it underlines areas of improvement and states concrete actions that can be considered legally in order to promote sustainable economic development.

2. Literature review

2.1. The re-emergence of a monetary ecosystem

A monetary ecosystem implies creating diversity in terms of exchange media and types of issuing institutions, including the government. Diverse and ethical monetary systems can contribute to sustainable economic development as they connect stakeholders, strengthen community relations, and democratize the control over exchange mechanisms (Lietaer et al., 2012). Notwithstanding, despite its relevance in terms of economic resilience and efficiency, monetary diversity faces the issue of legal recognition and the global cross-border dynamics in the digital age are posing an increasing challenge to existing institutional frameworks.

To begin with, monetary diversity is not a new idea. Ancient societies such as Dinastic Egypt or the Central Middle Ages in Western Europe operated under systems of parallel currencies that resulted in greater economic stability, equitable prosperity and sustainable economies, evidenced by the rich heritage known today (Lietaer et al., 2012). At the present time, the close relationship between these systems is called complementary currency systems (CCs). However, the emergence of diverse monetary systems in recent years is correlated more to the last and recurrent economic crises in search of the same principles of economic stability and social well-being (Fare & Ould Ahmed, 2018).

For instance, the emergence of CCs in the 20th century is correlated to periods of high inflation – such as the Great Depression of the 1930s in the USA, Germany, Austria and Switzerland – that resulted in the issuance of a series of community monetary certificates (Calvo & Morales, 2014). A successful example of monetary creation during the period that still exists today is the Swiss WIR, created in 1934. This CCs is an independent, dematerialized and low-interest currency, whose network presently comprises more than 60,000 small and medium-sized enterprises (SMEs) across all economic sectors, trading around 1.5 billion Swiss francs annually (Kalinowski, 2011). More recently, the emergence of the crypto-currency Bitcoin in 2009 is also perceived as a mechanism that contests the global financial crisis of 2008 (MEAC, 2016). Crypto/virtual currencies/assets are digital objects based on computer networks in which transactions are validated between two or more persons thanks to a technology called “blockchain” (INC, 2019). As of 18 September 2019, there were 2,871 Bitcoins in circulation worth €246 billion (INC, 2019).

In general, CCs attempt to respond to the systemic failures of the dominant global monetary monoculture of money by attempting to mimic diversity and interconnection in natural ecosystems. Years of study, particularly within the field of ecological economics, have led to a deep scientific understanding of the complex linkages between human and natural systems (Lietaer et al., 2012). Almost all natural systems show that higher diversity of components and denser interactions between networked components, can favour resilience within a system in periods of difficulty or change. For example, in a forest fire, a flood, or any other disaster that exerts significant pressure on the environment, makes the system to respond first by operating at the level of extreme resilience, where diversity is greatest but efficiency low; then, as the species best adapted to the new context begin to thrive, the system gradually returns to the window of viability and sustainability (Lietaer et al., 2012). CCs are inspired

on the complex functioning of natural systems where diversity and connectivity play a key role in search of the optimum balance for sustainability (between efficiency and resilience) within the economy.

Indeed, any complex system is sustainable only if balance is maintained between efficiency and interconnected diversity. This implies that when greater focus is given to efficiency, diversity is compromised and resilience is consequently affected, resulting in a systemic collapse. This is what is happening to our present monetary system. The global monetary monoculture based on the recognition of a single national currency, created through bank debt, in search of efficiency and limitless growth, is fostering a fragile and unsustainable monetary system (Lietaer et al., 2012). This includes all legal and liquid currencies that can be exchanged, such as the centralized bank fiduciary currencies that include the euro and the dollar.

Theories on monetary diversification call for a democratization of the monetary creation process and its institutions. An explosion of different monetary innovations has recently taken place, particularly since the early 2000s, in search of economic stability and sustainability. Works from Kennedy and Lietaer (2004), Bonde (2004), Blanc (2011), Schroeder (2011), Slay (2011), Martignoni (2012), Bindewald et al. (2013), Seyfang and Longhurst (2013), and Dupré et al. (2015) are evidence of this monetary diversification in recent years (see Tichit et al. 2018). Nevertheless, despite its relevance in terms of economic resilience and efficiency, monetary diversity faces the challenge of its legal recognition. In addition, the so-called digital revolution is influencing present dynamics by dematerializing legal money and bringing new forms of monetary creation, such as virtual currencies that are challenging existing institutional frameworks.

3. Content

3.1. CLMs in France: the legal recognition of an exchange media for the social and solidarity economy

CCs based on ethical, social and ecological principles can improve community relations, environmental protection, social well-being, and greater economic stability (SEE law, memorandum). In France, they have been developing at the local level and within the context of the social and solidarity economy (SSE). SSE is a concept that encompasses various economic activities that share a common understanding based on social relations (MEAC, 2016), including the culture and the environment (Sahakian, 2014). When enforced by law, SSE can be seen as a regulatory measure to correct the market failures in areas unprofitable for business (Kalinowski, 2014).

France became the first country in the world to recognize complementary local currencies (CLMs) through the promulgation of the law of 31 July 2014 on the SSE. Article 16 of the SSE law provides a legal basis for CLMs and recognizes them as payment securities, when two conditions are satisfied: a) they are issued by recognized SSE stakeholders and b) are in compliance with the legal framework laid down by the FMC. Additionally, CLMs are also to be indexed to the euro and convertible only from euro to CLMs but not from CLM to euro (MEAC, 2016). Nonetheless, the autonomous existence of CLMs in parallel to the euro can be questioned for contravening their fundamental principle of sovereignty (Tichit et al., 2018).

CLMs in France are recognized within a delimited area and are intended to promote the economic development of French territories and revitalize the local economies (MEAC, 2016). However, it should be noted that CLMs in France started to work prior to the promulgation of the SSE law on the basis of considerations already stated in the FMC, such as the private payment services of business loyalty models. This implied, and continuous to imply two considerations: 1) the use of CLMs within a determined network of users and 2) that they are not considered as payment services in the same manner as bank tenders, credit companies, currency exchange offices, etc. (MLCC, 2011). Indeed, on the one hand, article L521-3.I of the FMC states that a company “may provide payment services based on means of payment that are accepted, for the acquisition of goods or services, only on the premises of that company or, under a commercial agreement with it, in a limited network of persons accepting such means of payment or for a limited range of goods or services”. On the other hand, in terms of the article L314-1.III of the FMC, in order not to be considered as one of the payment services mentioned before, CLMS must have the character of a “service voucher” or “paper service title”. This is the reasoning in which the local currency of Toulouse “SOL Violette” was created in 2009. Originally, the project got the financial support from the Municipality and its legality was lately confirmed by the Prudential Control Authority of the Bank of France (ACPR), in compliance with those legal provisions. Its acceptance and admissibility by local authorities

was also confirmed later prior to the approval of the Treasurer General Paymaster of the Midi-Pyrénées Region (MLCC, 2011).

Therefore, SEE law can be seen as a regulatory mechanism that brings a legal basis to CLMs (article 16 SSE law), recognizing the term explicitly and regulating the stakeholders that can issue and manage this type of currency. In particular, article 1 of the SSE law recognizes as authorized issuers the private legal persons in form of cooperatives, mutuals or unions governed by the Mutual Code, mutual insurance companies governed by the Insurance Code, foundations or associations governed by the law of 1 July 1901, or social enterprises with social utility. For Kalinowski (2014), CLMs can also be seen as a tool for tackling some specific local and territorial issues, thus expanding a continuum of public instruments to address particular social and environmental concerns in the same way that taxation, bonus-malus, or exemptions do. Moreover, this type of currency can be better implemented in already established networks ready to welcome them, thus increasing their possibility of success (Kalinowski, 2014). From this perspective, it is considered that CLMs combined with ethical, social and ecological principles, can improve not only community relations and environmental protection, but also promote sustainable economic development integrally.

Furthermore, technological progress is transforming social dynamics and challenging existing monetary legal frameworks. CLMs in their electronic version are subject to the rules applicable to electronic money, which differ from virtual currencies analyzed in this paper. According to article L315-1 of the FMC, electronic money is considered as "a monetary value that is stored in electronic form, including magnetic, representing a claim on the issuer, that is issued against the delivery of funds for payment transactions [...] and that is accepted by a natural or legal person other than the issuer of electronic money". Nevertheless, the dematerialization of money also brings the implementation of more concrete measures, as for instance, complying with the banking law rules and requirements. In terms of the article L525-6 of the FMC, CLMs in electronic form require approval from the ACPR, when the total value of electronic money exceeds one million euros. The use of CLMs in their electronic form certainly has advantages when it comes to their use. For example, they can make it possible to better meet the specific needs of the network, guarantee the traceability of CLMs, accurately measure the speed of circulation and flows of exchanges, and better evaluate the legitimacy of CLMs (Martin, 2018). This is the case of the Eusko currency from the Basque Country, which became the first electronic CLM in 2017. Nonetheless, the geographical areas in which is being used, as well as its autonomous existence against the euro (as is the case of all CLMs) remain a point of debate (Tichit et al., 2018).

On the one hand, the purpose of CLMs is, in effect, to favour "local" economic development. Yet, the law only refers to the term "limited network of persons" in which CLMs can be used, without specifying further on its meaning. The geographical territory as a local network in which CLMs can circulate is indeed not considered expressly in the law. Notwithstanding, articles L525-3 to L525-6 of the CMF state that the term "limited network of persons" is left to the consideration of the ACPR when two conditions are satisfied: a) in the case of electronic money and b) when the amount of money is higher than one million euros. The regional use of Eusko in the Basque Country territory led the ACPR to interpret and link the terms "local" and "limited network of persons". In this case, the ACPR considered that the Basque Country as territory is considered itself a "limited network of persons", thus allowing Eusko to circulate freely within the Basque territory in that regard (Martin, 2018). This can be considered positively as it gives the freedom of adapting the network according to its acceptance. Nevertheless, in order to promote local exchanges and resilience, there is a need to establish a meaning/limit regarding the extent to which a currency can be considered local or regional.

On the other hand, the indexation of CLMs to euro currency aims at conferring a certain level of monetary stability and guarantee of use (MEAC, 2016). Yet, it should be considered that the euro, as well as any other centralized fiduciary currency, is affected by inflation and economic fluctuations that impact directly its value. In effect, backing CLMs in euros is perceived as a link used to prevent users from evading payment of VTA in commercial transactions. However, taxing community exchanges can also result in a clash between the market economy and the cooperative economy that seeks to promote SSE. Alternative backing of CLMs can avoid inflation and economic fluctuations, as well as reconcile SSE and community exchanges. Likewise, governments can collect a part of the taxes directly in CLMs to promote the sovereignty of this type of monetary systems against the euro. At the same time, this can be seen as a complementary mean within the official institutional framework to promote the development of areas of general interest (see Lietaer et al. 2012).

Presently, there are more than 50 local currencies in France and their expansion in some European countries is happening at a relatively similar rate: 60 in Germany, and 70 in Spain and Greece (Martin, 2018). Around the world until 2015, there were more than 5000 CLMs, including the Palmas of Fortaleza in Brazil and the Bristol Pounds in England in which the Mayor of Bristol is partly paid (MLETR, 2015). Nevertheless, the increasing number of CCs and modalities in which they are being implemented keeps raising questions for monetary and public authorities. In France, only those currencies with social and environmental purposes at the local level have been included in the legislation as legal tender. Indeed, the local, social and environmental approach of CLMs seems to be tolerated as they address areas that do not compromise the existing monetary framework (MEAC, 2016). Yet, many other monetary creations are still waiting to be legally treated. The cross-border expansion of these projects, especially within the internet age, is giving rise to new debates on the legality and legitimacy of other types of monetary innovations (Kalinowski, 2014), such as the so-called crypto/virtual currencies/assets.

3.2. The controversial nature and impact of crypto/virtual currencies/assets on the real world

Virtual currencies have experienced a boom in recent years, in particular after the emergence of Bitcoin in 2009. Some projects seem to be working (see the site coinmarketcap.com), others have failed (see Tichit et al., 2018), and other innovations are in process, as for instance the future virtual currency and digital financial system proposed by Facebook (see libra.org). Notwithstanding, social dynamics, boosted by technological progress, are overcoming the positive monetary legal framework and virtual currencies are being used in cross-border networks (Perrin, 2019).

Crypto/virtual currencies/assets are digital objects based on computer networks in which transactions are validated between two or more persons thanks to a technology called “blockchain” (INC, 2019). The blockchain works as a system where information is stored and transferred in a transparent and secure manner, without the need of a central control body (MEAC, 2016). Moreover, they are secured by private keys that allow opening a digital portfolio where crypto-units are stored and can be exchanged for legal money. Finally yet importantly, even when no one is obliged to accept crypto-currencies as a means of payment (INC, 2019), in practice, they are used within the market to pay real and virtual goods and services (Perrin, 2019). These last two points are raising important questions for public authorities, as crypto-currencies can be exchanged for legal money and used within the real economy, thus posing concerns in terms of taxation (Tichit et al., 2018). This has motivated some governments, like that of Germany in 2013 and that of Japan in 2017, to recognize Bitcoin as a private currency, thus being able to tax transactions made with such a type of virtual currency (Tichit et al., 2018).

Virtual currencies differ from electronic money as the legal considerations envisaged for that purpose do not allow them to be defined as such. According to Directive 2009/110/EC of the European Parliament and of the Council of 16 September 2009 on the taking up, pursuit and prudential supervision of the business of electronic money institutions, electronic money is considered only as a “dematerialized version of legal currencies”. This means, in terms of article L315-1 of the French FMC, that the legal nature of electronic money does not change as such, but only the manner in which it is presented as “a monetary value stored in electronic form, including magnetic”. Before a legal definition was stated, the 2012 report of the European Central Bank (ECB) already pronounced itself considering virtual currencies as “a type of unregulated, digital money, which is issued and usually controlled by its developers and used and accepted among the members of a specific virtual community”. Indeed, crypto-currencies, as for instance Bitcoin, are controlled directly by individuals, without the need of intermediaries (such as banking or financial institutions) in order to carry out transactions (INC, 2019 & MEAC, 2016).

The legal definition of crypto/virtual currencies/assets was first stated in the Directive (EU) 2018/843 of 30 May 2018 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing. Later on, the French law n° 2019-486 of 22 May 2019 (PACTE law) on the growth and transformation of enterprises (article 86 on article L. 54-10-1 FMC) also defined crypto-assets in the same sense as the EU. Within both instruments, such types of currencies/assets are considered as a: “digital representation of value that is not issued or guaranteed by a central bank or a public authority, is not necessarily attached to a legally established currency and does not possess a legal status of currency or money, but is accepted by natural or legal persons as a means of exchange and which can be transferred, stored and traded electronically”. In

addition, the EU Directive 2018/843 of 30 May 2018 also states the definition of “custodian wallet provider” as “an entity that provides services to safeguard private cryptographic keys on behalf of its customers, to hold, store and transfer virtual currencies” (article 1 on the amendments to Directive (EU) 2015/849). The fact that they are not issued by any authorized banking institution, as well as that their acceptance as payment security is not granted by law, makes it impossible to consider them as legal tender (Perrin, 2019).

In fact, legal currencies such as the euro are protected by law, and the issuance of adverse securities tending to replace them is penalised by the State. Article L.111-1 of the FMC states that “the currency of France is the euro” and article 1343-3 of the Civil Code ensures that the payment of any obligation must be made in euros, or in a foreign currency when the obligation is subject of an international transaction or judgment. In turn, article L442-4 of the Criminal Code provides that “the circulation of any unauthorized monetary sign intended to replace money or banknotes, which are legal tender in France, shall be punishable by five years of imprisonment and a fine of 75,000 euros”. Similarly, article R642-3 of the Criminal Code also provides that “the refusal to receive coins or banknotes which are legal tender in France, according to the value for which they are valid, shall be punishable by a fine”. The contested nature of virtual currencies (as for instance Bitcoin) contravenes the above-mentioned provisions and make it not possible to consider them as legal money. Yet, their social acceptance and practical use seems to prevail over such considerations.

In the same manner, the contentious nature of virtual currencies does not allow them to be considered either as CCs. Indeed, even when no legal definition has been stated, CCs are considered in general as a sort of exchange media operating in networks in complement to the legal currency (Lietaer et al., 2012). The SSE law in France takes into account those elements to provide a legal basis to CCs at the local level (CLMs), thus considering them as legal tender working in parallel to the national currency (euro). Virtual currencies do not adhere to those considerations and therefore cannot be considered as complementary mechanisms. Even so, the legal nature of virtual currencies is challenged by its social acceptance and practical use as a means of payment, which transcends the geographical borders of countries and can situate them as currencies of global use (see coinmap.org).

In effect, virtual currencies have power in fact, not in law, and the absence of their recognition as legal tender does not exclude their qualification as exchange media or means of payment. The sociological and not institutional approach, which defines money above all as a social consensus, is what gives support to this type of currencies (Perrin, 2019). This has led several authors to define virtual currencies as “contractual currencies”, where the security granted by the State justifying the legal tender is exchanged for a consensual agreement granted by a technical security called blockchain (see Huet, 2017). The position adopted by the European Court of Justice (ECJ) in its judgment of 22 October 2015, No. 264/14, *Skatteverket v. David Hedqvist* also reflects a pragmatic approach considering Bitcoin as “analogous to other convertible currencies as regards their use in the real world [and allowing] both real and virtual goods and services to be purchased”. The fact that virtual currencies are socially accepted as means of payment, thus having an impact on the real economy, obliges governments to adapt their legislation to regulate their use within their national territories. The PACTE law in France is an example of the adaptation of the national legal framework to regulate the use of an emerging ecosystem of virtual currencies. Nevertheless, the evolutionary nature of crypto-currencies (e.g. in terms of financing, insurance or commodities themselves) is making this legal framework expand to other areas, rather than simply to their conception as means of exchange or payment (INC, 2019).

3.3. The evolutionary framework of blockchain in the French system as regulatory measure of virtual currencies

As previously stated, the ecosystem of crypto-currencies developed and evolved rapidly after the emergence of Bitcoin. Due to its technical character, French legislation seems to focus more on the regulation of blockchain as technology, rather than on the proper recognition of crypto-currencies as legal money.

Ordinance No. 2016-520 of 28 April 2016 on savings bonds, for instance, was the first legal instrument to recognize and also define the blockchain technology as a “shared electronic recording device”. It updates the legal regime on saving bonds and allows the development of intermediation on participatory financing platforms, with the creation of the new category of minibons based on blockchain (MEAC, 2016). Article L. 223-12 of the

FMC provides that "[...] the issuance and transfer of minibons may be recorded in a shared electronic recording device allowing the authentication of these operations [...]". Additionally, this document brought the promulgation of two other legal tools with regard to minibons and blockchain. The first one is the Ordinance n°2017-1674 of 8 December 2017 on the use of a shared electronic recording device for the representation and transmission of financial securities. The second one refers to the Council of State Decree No. 2018-1226 of 24 December 2018 on the use of a shared electronic recording device for the representation and transmission of financial securities and for the issue and transfer of minibons. These legal provisions are the first bases on the specificities and conditions of the use of blockchain technology in France (MEAC, 2016). Yet, they do not make reference to virtual currencies as such.

Ordinance No. 2016-1635 of 1 December 2016 strengthening the French system to combat money laundering and terrorist financing, comes to indirectly recognize virtual currencies and regulates traders established in France as subjects to the anti-money laundering and counter-terrorist financing system (AML/CFT). Article L. 561-2-7°bis of the FMC defines the professionals involved in this sector as "any person who, as a regular profession, either acts as a counterparty or as an intermediary for the purpose of acquiring or selling any instrument containing in digital form non-monetary value units, which may be retained or transferred for the purpose of acquiring a good or service, but does not represent a receivable from the issuer". The implicit recognition of virtual currencies under this legal instrument was nonetheless not subject to any approval procedure, nor to the supervision of any regulating authority (Rapport TRACFIN, 2016), as may be the case for CLMs in French legislation.

Notwithstanding, law No. 2019-486 of 22 May 2019 on the growth and transformation of enterprises, partially rectifies previous omissions and recognizes the existence of crypto-currencies, as well as the need of State intervention in their functioning. Article 86 of the so-called PACTE law recognizes the term "digital assets" (excluding financial instruments), comprising tokens issued by Initial Coin Offering (ICOs) and virtual currencies, within the sense of the European framework. This means recognizing virtual currencies in terms of the Directive (EU) 2018/843 of 30 May 2018 previously cited. It also provides that suppliers of digital asset services (PSANs) may be authorized and placed under the supervision of the Financial markets authority (AMF) on an optional basis, and mandatorily when wishing to carry out the activity of holding digital assets on behalf of third parties or purchasing/selling digital assets against legal tender (AMF, 2019). Therefore, PACTE law comes to expand the regulation of blockchain technology in its modality of virtual currencies, as "digital representations of value" that can serve as a means of payment for the purchase of goods and services, and that have an impact on the real world and the economy. It also contributes to the recognition of an emerging monetary ecosystem taking place in the virtual realm.

Indeed, the technical nature of virtual currencies linked to the blockchain makes the French regulatory framework focus specifically on this technical aspect. Yet, the evolutionary nature of crypto-currencies, as financial instruments, insurance or commodities themselves, makes it essential to question to what extent it is necessary to regulate crypto-assets as a means of exchange or payment. Positions with regard to the legal nature of virtual currencies, either jurisprudential or institutional, in both French and international systems, reflect a pragmatic approach linked to their use. The process of the legal qualification of crypto-assets is then reversed in order to first define the specific use of a crypto-asset in a given situation, and secondly, to determine by analogy the applicable legal regime linked to that use (Perrin, 2019). This implies adhering to the doctrine of legal pragmatism, prioritizing the use given to digital assets in a specific context, in light of their evolving nature that gives rise to the provision of other types of services.

Given the cross-border nature of the internet, monetary and public authorities at the national, regional and international level are obliged to warn users about the risks of using crypto-currencies (OECD, 2018). In France, the National Consumer Institute (INC, 2019) warned about several situations including: a) a very volatile price that can generate potential financial losses; b) the risk of loss of investment if the blockchain is destroyed or if an ICO project does not succeed; c) the lack of supervision by a control authority that can guarantee the legality of their use; d) the possibility of being victim of fraudulent ICOs; e) the risk of liquidity issues from PSANs; f) money laundering, terrorist financing and criminal activities linked to the anonymous nature of transactions; g) the high environmental impact of transactions (in December 2017 one transaction required 215 kWh) and; h) the fact that no one can ensure that funds can be recovered. Articles 26 and 26 bis of the PACTE law comes to tackle some of these concerns by giving the possibility to consult the AMF list of scam sites related to crypto-assets, as

well as obtain permission for ICOs delivering in order to avoid scam projects. In a complementary manner, AMF also recommends not investing more than 5% of personal assets (INC, 2019).

Monetary creation enhanced by technology is clearly forcing authorities to regulate the use of crypto-currencies. However, there are still outstanding issues to be addressed in relation to their financial use, speculation and lack of consideration of social and environmental externalities. Considering these aspects can favour the development of a more stable economic environment while the integration of environmental externalities in the design of crypto-assets can contribute to reducing their environmental impact. There is similarly a need for international regulation that considers a pragmatic approach in light of the cross-border and evolving nature of crypto-assets that give rise to the provision of new services. This also implies understanding technical aspects (blockchain) that change the forms and not the substance of these services.

In addition, the regulation of crypto-assets may evolve to recognize the existence of a monetary ecosystem that differs in substance from legal money (considering a sociological approach). This includes respect for the sovereignty and democracy of virtual currencies, while establishing rights and obligations for all stakeholders, including governments (e.g. in terms of traceability, transparency, user protection, and state supervision). In the end, moving towards the promotion and regulation of a digital monetary ecosystem based on ethical, social and environmental principles within a real economy (e.g. the case of CLMs in the French system) may be a more useful tool in search of integral sustainable economic development.

4. Conclusion

Monetary diversification is an incontestable fact that is changing traditional paradigms, such as bank-debt based currency creation. This emerging monetary ecosystem is taking place in both the classic (paper and electronic money) and the digital world (through innovative technologies such as the blockchain giving rise to virtual currencies). A monetary ecosystem implies creating diversity in terms of means of exchange and types of issuing institutions, including the government. Based on the functioning of all natural systems, it is considered that increasing diversity in a given economy, from a single currency monopoly to a monetary ecosystem of parallel currencies, can result in greater economic stability. Moreover, moving towards the implementation of monetary ecosystems based on ethical, social and environmental principles, within a real economy, can also promote social well-being and sustainable economies. Regulating this monetary diversification may be a viable option to face some of the great challenges of our times.

On the one hand, France is the first country in the world to recognize the existence of a monetary ecosystem through the promulgation of Law n° 2014-856 of 31 July 2014 on SSE that gives legal bases for CLMs. These types of currencies are recognized in law as legal money. They are indexed to the euro and aim at promoting the economic development of French territories by revitalizing the local economy between citizen-consumers and local traders and producers. Nevertheless, CLMs existed and circulated before the enactment of the SSE law. Initially, CLMs were legally inspired by the provisions for private payment services of business loyalty models and began to circulate in the form of private currencies within specific networks of users and territories. The SEE law now regulates their functioning and modalities by recognizing the entities authorized to issue CLMs as well as the formats in which they can be implemented. The geographical areas in which they can circulate, as well as their autonomous existence in parallel to the euro, are nonetheless points for improvement for the promotion of local resilience and sovereignty.

Indeed, legislation limits the spatial implementation of CLMs to a “limited network of persons” without going further into the meaning. This can be considered positively as it gives freedom of adapting the network according to the acceptance of CLMs, thus favouring local exchanges and promoting the economic development of French territories. Yet, the ambiguity of this concept raises questions with regard to the extent to which CLMs can be considered for local use. The case of the Basque country and its local currency, the Eusko, shows that the use of a CLM can expand from the local to the regional level, when the number of people who make up the given network accept the use of such a currency as a means of exchange. This favours the idea that these are more “private currencies” rather than “local currencies”. As a consequence, in order to promote local exchanges and resilience, there is a need to establish an interpretation on the meaning/limit of the term local/regional.

The indexation of CLMs to the euro also aims at conferring a certain degree of monetary stability and guarantee of use. However, the euro as well as any other centralized fiduciary currency is affected by inflation and economic fluctuations that have direct impact on its unit value. In fact, backing CLMs in euros is a measure to prevent tax evasion in commercial transactions. Nevertheless, taxing community exchanges can result in a clash between the market economy and the cooperative economy (which SSE seeks to promote). Alternative backing can avoid inflation and economic fluctuations of the euro, as well as to reconcile SSE and community exchanges. Governments can also collect a part of the taxes directly in CLMs to promote their sovereignty against the euro. This can work at the same time as a complementary mechanism within the official institutional framework to promote development in areas of general interest.

On the other hand, the PACTE law in France also indirectly recognizes the existence of a monetary ecosystem within the digital sphere. French law regarding crypto/virtual currencies/assets follows the essence of the European legal framework (Directive 2018/843 previously cited) as “digital representations of value” different from legal money. Nevertheless, the fact that virtual currencies are socially accepted as legal tender, thus having an impact on the real economy, obliges governments to adapt their legislation to regulate their use within their national structures. The PACTE law in France is an example of the adaptation of the national framework to regulate the use of an emerging ecosystem of virtual currencies. Yet, the evolutionary nature of crypto-currencies, as for instance to serve as financial means, provision of insurances, or commodities themselves, makes essential to question to what extent is necessary to regulate crypto-assets as means of exchange or payment. Positions with regard to the legal nature of virtual currencies, either jurisprudential or institutional, in both French and international systems, reflect a pragmatic approach linked to their use. The process of the legal qualification of crypto-assets can be then reversed in order first to define the specific use of a crypto-asset in a given situation, thus being able to determine by analogy the applicable legal regime according to the service provided.

Pending issues to be addressed include the use of crypto-assets as financial mechanisms, their cross-border nature on internet, as well as speculation and lack of consideration of social and environmental externalities. Considering these aspects can favour the development of a more stable economic environment. In light of the impact and evolving nature of crypto-assets that function as new global services, there is also a need for international regulation considering a pragmatic approach. In general, regulation of crypto-assets could consider the recognition of a monetary ecosystem (from a sociological perspective) that differs substantially from the institutional vision regarding the issuance and use of legal money. This may include the respect of sovereignty and democracy that characterizes the virtual currency governance model. It can also establish rights and obligations that guarantee the proper use and functioning of these types of currencies, for instance with regard to their traceability, transparency, protection of users, and state supervision. Similarly, integrating environmental externalities in the design of crypto-assets can contribute to the reduction of their environmental impact. Last but not least, the promotion and regulation of a digital monetary ecosystem based on ethical, social and environmental principles within a real economy (e.g. the case of CLMs in France) may be a more useful tool towards integral sustainable economic development.

In sum, the monetary ecosystem shows a tendency to keep developing further. Transforming its object into a system based on ethical, social and environmental principles can contribute positively to sustainable economic development. Further research into this field may include the study and analysis of alternative means for backing CLMs in order to strengthen the sovereignty and functioning model of these types of projects. They can also include the role of governments in the promotion, regulation and collection of part of the taxes on CLMs, thus respecting the chain of issuance, use and reinsertion of the flow of these types of currency systems. Exploring a legal framework considering these dimensions may contribute to the viability and sustainability of these sorts of projects.

As far as virtual currencies are concerned, further research may consider the rights and obligations to which all interested parties may be subject to, including the governments. Analysing these aspects can promote a more responsible virtual currency ecosystem. What is more, transforming the object and moving towards a SSE and environmental approach to respond to market failures may also be a potential line of research. This comprises the study and analysis of the integration of social and environmental externalities in the design and functioning of crypto-currencies. The analysis of monetary ecosystems considering those dimensions from a legal perspective, can contribute to favour economic stability and promote sustainable economic development integrally.

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