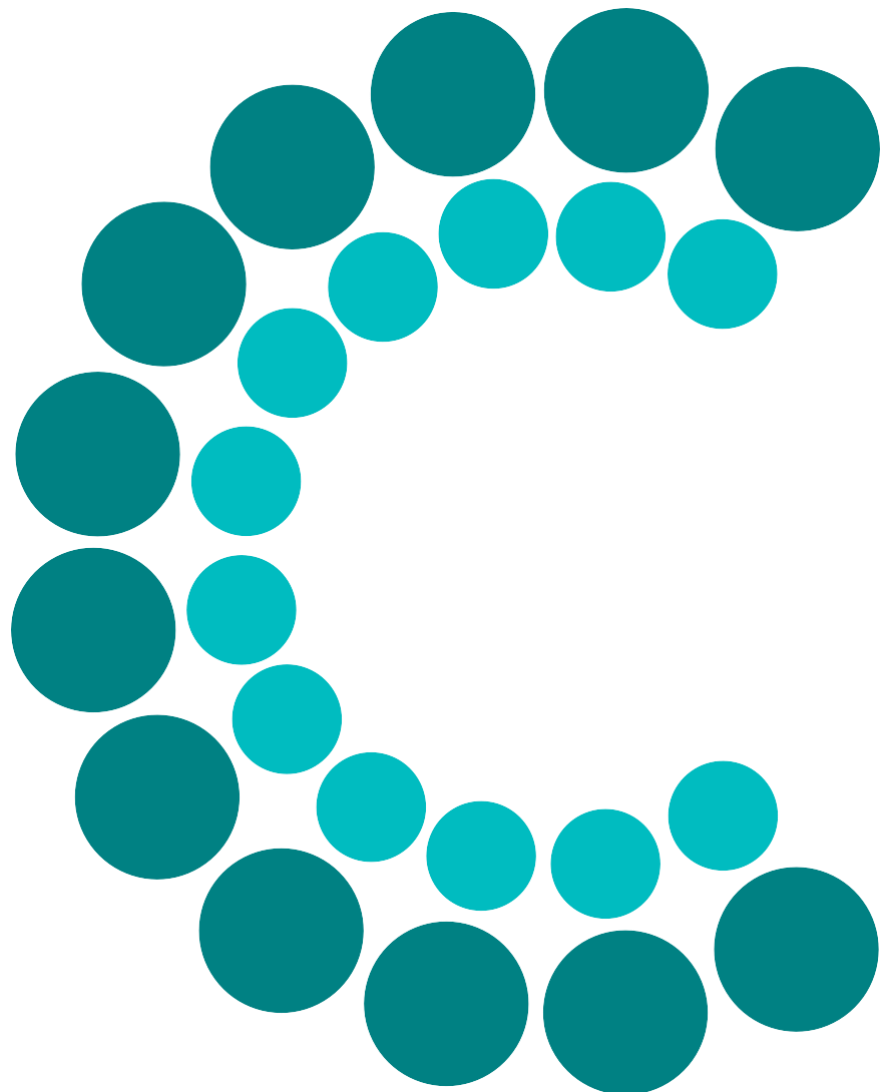


# IJCCR

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# International Journal of Community Currency Research

VOLUME 23 (SUMMER) 1

## EDITORIAL

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The International Journal of Community Currency Research was founded 23 years ago, when researchers on this topic found a hard time in getting published in other peer reviewed journals. In these two decades the academic publishing industry has exploded and most papers can be published internationally with a minimal peer-review scrutiny, for a fee. Moreover, complementary currency research is not perceived as extravagant as it used to be, so it has now become possible to get published in journals with excellent reputation.

In that context, the IJCCR is still the first point of contact of practitioners and new researchers on this topic. It offers open access, free publication, and it is run on a voluntary basis by established scholars in the field. In any of the last five years, it has received about 25000 views. The figure seems minuscule in comparison with the numbers Internet has got us used to, but it shows the importance of the IJCCR as the key outlet for research on complementary currency systems. IJCCR now counts over 190 articles with research on all continents.

The IJCCR is currently under scrutiny to be listed in Scopus, so we need to keep this effort going. We invite researchers to disseminate their work through this journal and welcome articles of scientific quality that present a well-argued proposition, an explicit dialogue with theories, and the work of other scholars in the field.

The IJCCR is the main academic publication of the Research Network on Monetary Innovation and Complementary and Community Currencies (Ramics.org), which is still working on establishing itself as the referent organisation in the field. We hope you enjoy this new summer issue.



# International Journal of Community Currency Research

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## TRANSFORMING OR REPRODUCING AN UNEQUAL ECONOMY? SOLIDARITY AND INEQUALITY IN A COMMUNITY CURRENCY

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### ABSTRACT

Building on empirical material from 6 months ethnographically inspired fieldwork in Málaga Común, a mutual credit community currency in Southern Spain, the paper uses Ostrom's (1991) theoretical framework on common-pool resources to look deeper into the provision and appropriation dynamics in the currency scheme. Particular attention is put into the sources of inequality in members' provision and appropriation capacities. Findings suggest that, embedded as community currencies are in the conventional economy, the sources of inequality from the conventional economy are also brought into the community currency. More particularly, private ownership and specialised complex skills lie behind members' unequal capacity to earn community currency in relation to their spending needs. The paper ends by outlining some elements that would need attention when designing the governance institutions of community currency schemes that aim to overcome the inequality brought in by these currencies' embeddedness in the conventional economy.

### KEYWORDS

Mutual credit currency, inequality, Ostrom, resource system vs. flow of resource units; provision/appropriation ratio, common-pool resource.

## 1. INTRODUCTION

Practitioners and researchers of community currencies praise these monetary schemes for their potential to construct “economies of solidarity” (Powell 2002). Valuing everybody’s time equally (Collom & Lasker, 2012), appreciating care and community work not remunerated in the conventional money system (Seyfang, 2010) and driven by an ethos of reciprocity (Werner, 2015), community currencies are seen as tools to mobilise the capacities of communities (Cato & Dodd, 2015), as well as to provide alternative livelihoods (Williams et al., 2001).

Without contending such solidarity and reciprocity claims, scholars critical of community currencies, however, argue that these forms of monies risk exacerbating the socio-economic inequalities they are a response to (Ingham, 2004:185; Seyfang, 2003). Local currency users, the argument goes, enter the community currency scheme under unequal economic conditions. Unequally positioned in the conventional economy, some members of community currencies are unemployed and impoverished whereas others belong to the self-employed middle-class (North, 2017; Gómez, 2009). Currency users, that is, have different access to the traditional resources of a capitalist economy: land, labour, capital (in the form of accumulated balances in the community currency). As a result, they enter the community economy under different relations of production: some can earn local currency units under the form of rent, whereas others enter a wage-based relationship. That is, the time users need to spend to earn local currency varies with the forms of production they engage in. In other words, members’ different production and appropriation capacities risk reproducing the inequality of the conventional capitalist economy inside the community economy.

While the debate on the transformational potential of community currencies for capitalism is not new (see Powell, 2002; Sotiropoulou, 2017; Ahmed, 2018), this paper aims to add some nuance. It uses Ostrom’s (1991) theoretical framework on common-pool resources to look deeper into the provision and appropriation dynamics of a community currency in Southern Spain. Empirical material comes from six months participating in *el común*, a mutual credit currency in the city of Málaga. Particular attention is put into the sources of inequality in members’ provision and appropriation capacities. Findings suggest that, embedded as community currencies are in the conventional economy, the sources of inequality from the conventional economy are also brought into the community currency. More particularly, ownership and specialised complex skills lie behind members’ unequal capacity to earn community currency in relation to their spending needs. Yet, findings also suggest that the reproduction of inequality notwithstanding, the community currency scheme also nourishes practices of solidarity among currency members. This, the paper argues, may plant the seeds for transformation to alternative forms of capitalism. The paper concludes by considering several principles that need to be attended to when designing the governance institutions of community currency schemes that aim to overcome the inequality brought in by the embeddedness of these currencies in the conventional economy.

## 2. MUTUAL CREDIT COMMUNITY CURRENCIES AND THE COMMONS

In the aftermath of the financial crisis that swept across the world in 2008, a wealth of citizen-driven initiatives are experimenting with various approaches to address economic hardship and social fragmentation. From micro-credits (Barinaga, 2014) to community currencies, from time-banks to mutual credit systems, neighbourhoods and communities are suggesting bottom-up economic and financial alternatives to give access to funding to populations that are often regarded as non-bankable. Driven by an ethos of reciprocity and valuing everybody’s time equally (Collom & Lasker, 2012), these initiatives offer solutions to the scarcity of money that traps large population groups in poverty and to the lack of access to credit that reproduces social and economic inequality.

Among these grassroots innovations, community currencies have become particularly prominent. Over 400 community currency schemes were set in Spain alone during the economic recession (Hughes, 2015) and partly funded by the EU’s Interreg project “Community Currencies In Action”, community currencies have been introduced in the UK, Belgium, the Netherlands and France (Cato & Dodd, 2015) for various economic and social purposes.

Research on community currencies has been swift in pointing at the role these kinds of monies play in developing survival strategies for the poor at the interstices of the economy, in promoting local economic development as well as in transforming the qualitative nature of economic exchanges (Gómez, 2009; Vallet, 2016). These aspects have been discussed particularly in relation to community currencies based on mutual credit systems (or LETS).

Building on the idea of time-banks, in which hours of work are credited in the worker's and debited in the receiver's accounts, Local Exchange Trade System (LETS) are mutual credit systems through which users trade not only services but also goods. When a user sells an hour of work, rents out her car, or sells a bike, the amount agreed by buyer and seller is credited in the seller's account. The same amount is debited in the buyer's account, regardless of whether she had that amount or not in her account. That is, a mutual credit system solves synchronisation constraints of monetary systems by allowing users to spend first and earn later.

The seller can then spend the accumulated credit in any service and product offered in the LETS network. If the buyer, on the other hand, bought for more than she had credit for, then her account will show a negative figure. This is however no debt to the buyer, as she has already paid for the services/products exchanged, but a sign that she has contributed to the economic activity of the network and a compromise to the community to offer services or products equivalent to the debt she has incurred.

These two traits, the possibility to buy on credit and the community compromise, necessarily build on relations of trust and proximity, and are important aspects contributing to re-embed the economy (local and limited in size as it may be) in the social relations of the community. As buyer and seller initiate a mutual credit at the moment of transaction, mutual credit currencies bind its users to the community through both relations of trust and through a shared recognition of the exchange-value of such monies. In other words, mutual credit currencies have the potential to serve as instruments to re-think and re-make the economic commons on which communities rest.

With "economic commons" I make reference to Elinor Ostrom's (1991) work on common-pool resources, "a natural or man-made resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use" (ibid., p.30). While a few scholars have explicitly used the framework of the commons to analyse community currencies (see Meyer & Hudon, 2017; Schraven, 2001), there is still much room for developing such an analysis. Indeed, Elinor Ostrom's design principles of successful self-governing common-pool resource organizations have been applied to understand Brazil's community development banks (Hudon & Meyer, 2016) as well as to think through how to overcome the risk of opportunistic behaviour in mutual credit currency systems (Schraven, 2001). Yet, as these analysis conceive the monetary units of the community currency as the common resource itself, they remain oblivious of a distinction key in Ostrom's understanding of the commons: that between resource system and flow of resource units. Elinor Ostrom points to this confusion as an usual one concerning definitions and analysis of common-pool resources. She writes:

*In regard to common-pool resources, the resource system [...] is what generates a flow of resource units or benefits over time. [...] Common-pool resource [systems] may also be facilities that are constructed for joint use, such as main-frame computers and the Internet. [...] The resource units from a complex facility like the Internet may be the data packets or the computer files. (Hess & Ostrom, 2003:121)<sup>i</sup>*

In other words, a "resource system" refers to the structure that is capable of "producing a maximum quantity of a flow variable without harming [...] the resource system itself" (Ostrom, 1991:30). In contrast, "resource units are what individuals appropriate or use from resource systems" (ibid.). This distinction is relevant, Ostrom argues. While the predictability of the flow of resource units depends on the conditions of the resource system, their relationship is not always direct. Some flows are more erratic than others, setting the requirements for how the community manages both the resource system and the flow of resource units (Ostrom, 2002).

A cultural habit to see value in money (thus stressing the function of money as storage of value) may be at the root of a confusion between resource system and flow of resource units concerning community currencies. And yet, currency users of Málaga's Común (the case here studied) did not relate to this type of money as if it was a resource in itself. They related to it because of the access the complementary currency gave them to the services and products provided in the network. That is, the mutual credit system facilitated the generation of a flow of services and products that would otherwise not be available (neither to currency users, nor to society in general). In the words of one of the founders of Málaga Común:

*The problem with 'crises' is that money doesn't move, and that jobs are lost. That doesn't mean that people without a job do not have anything to offer to society. It means that there is no money to pay for their services. Today, Internet*

*helps us there. It is a great way to get goods and services without spending money, and yet paying with all the good things that we can offer (our work, our abilities, our companionship...)*

If we apply Ostrom's distinction between resource system and flow of resource units to complementary currencies based on mutual credit systems, the resource system would be the mutual credit system itself, whereas the resource units would be the services and products thus generated. This differs from previous applications of Ostrom's framework to community currencies (see Hudon & Meyer, 2016; Meyer & Hudon, 2017; Schraven, 2001) that have seen monetary units as resource units. Instead, in this article, monetary units become tokens symbolising the value of what is exchanged (thus adhering to a chartalist theory of money). In this line, individual account balances symbolise one's relation (of debt or credit) towards the community that backs the mutual credit system. This change in perspective allows to move value away from money and return it to the products and services exchanged in the community economy.

When framed this way, the products and services traded within the complementary currency network fulfil the requirements of common-pool resources: One, resource unit subtractability, "in the sense that a resource unit withdrawn or harvested by one individual is not fully available to another individual" (Gardner et al., 1990:336). The solar oven bought by a currency user cannot be bought by another user. The massage hour consumed by a comunero cannot be consumed by another. Two, system exclusion, in the sense that "it is costly (but not necessarily impossible) to exclude potential beneficiaries from obtaining benefits from their use" (Gardner et al., 1990:335). Exclusion of members from Málaga Común was costly as it needed constant monitoring in search of users that systematically appropriated resource units (bought products or services) without providing (selling services or products) to the system to the same extent.

As we will see, the distinction between the resource system and the flow of resource units is particularly useful in connection to mutual credit community currencies based on mutual credit, where it is possible to observe the production and circulation of resource units. As long as individuals keep balanced ratios of provision/appropriation of resource units, a mutual credit currency is able to generate and sustain an economic commons over time. Further, the distinction between system and flow will allow us to observe the form the tragedy of the commons adopts in mutual credit community currencies.

### 3. METHOD

Taking place over half a year, from January to June 2016, the study used various fieldwork techniques to gain an understanding of the relational dynamics at work in a mutual credit community currency in Southern Spain. First, participation was conducted in the regular activities of the currency network. These activities ranged from the weekly communal lunch (Eco-medor) to more or less formal workshops (on community currencies, Silvio Gesell, or bike repairing). At all of these occasions I took field notes that were developed immediately after into fuller descriptions.

Further, my own use of the currency system gave me not only an everyday knowledge of Málaga Común. It also gave me access to the more intimate spheres of currency users. During the six months of fieldwork, I provided (sold) english classes and one economy workshop, and appropriated (bought), car rental, home-made food, and dance lessons. The classes, whether received or taught, offered particularly good occasions to discuss users' relation to the community currency.

Finally, I gathered written material from the currency website, newsletter with demands and offerings in the network, official presentations, blogs, newspaper's clips, meeting minutes, and a varied array of other texts.

To analyse the empirical material, I took an inductive approach, in line with Glaser's and Strauss' grounded theory (Glaser and Strauss, 1967). I proceeded in three steps (for more detail, see Charmaz, 2006). First, I meticulously read and scrutinised transcripts, written material and field notes in order to generate categories and code the text accordingly. For each category, I opened a file with all the quotes, anecdotes and descriptions coded under that category. These files were re-read several times in an attempt to confirm, reject, or modify coded categories. Many of the categories referred to debt – at times through allusions to 'balances' and 'shame' – as well as to community contribution. The second step for the analysis of empirical material implied generating a frame of interpretation. The relevant files were then read again in search of underlying themes. The provision/appropriation dynamic

slowly emerged as a central theme in which topics such as debt and provision challenges were particularly relevant. In the third and final step, I re-read still once more the categorised material looking for examples and exceptions that could help me modify, refute or nuance the frames of interpretation.

#### 4. SETTING: MÁLAGA COMÚN

With an economy based mostly on tourism and the building sector, the world-wide economic crisis of 2007-8 hit Spain with force. The property-led growth of the previous decade was brought to a sudden halt, resulting in a strong economic downturn, bankruptcies of both major companies and small enterprises, a severe increase in unemployment and mass emigration. The speed and virulence of what has been called The Great Spanish Depression took many observers by surprise. Total unemployment went from 8% in 2007 to 18% two years later, 20% in 2010 and 26% at the height of the depression, 2013. And unemployment among the youth reached incomprehensible levels: from 18% in 2007, to 38% in 2009, 42% in 2010 and 56% in 2013<sup>ii</sup>.

Málaga, a province in Southern Spain heavily reliant on tourism was hit particularly violently. Total unemployment reached 36% in 2013 and youth unemployment went up to 67% in 2013<sup>iii</sup>.

It was against this background that, in 2010, a group of friends decided to start a local community currency in the city of Málaga. David Chapman<sup>iv</sup> – an English man who had lived in Spain for the previous 20 years –, and Paco Puche – a central figure in Málaga's environmental movement –, had attended an information meeting at La Invisible, an abandoned old building in the touristy city centre that had recently been occupied by local civil society organisations. A lively discussion after the meeting and a couple of beers had helped them realise that they could combine their interest in ecology and their own economic needs through a community currency.

With the name of the new currency, Común, the founders wanted to express the spirit of solidarity – towards each other and towards the environment – that they thought was needed to reform the current capitalist system. By 2012, over 200 citizens used comunes to buy services and products as varied as solar ovens and solar driers, car and house rentals, house renovation work, bike repair, computer programming, or English and dance lessons. In mid 2016, at the time of this study, the number of registered users was around 400 and were spread throughout the whole province.

Not surprisingly, given its founding circumstances, the motivations for currency users – or comuneros, as they lovingly called themselves – to join Málaga Común varied. Many saw it as a tool to achieve the goals of the ecology and de-growth movements. "Reduce, reuse, recycle" was their leitmotif. Others, the well-educated youth and the middle-class impoverished by the economic crisis, looked for alternative ways to make ends meet. Raquel was a good example of these users:

*I learnt about Málaga Común in a very tough moment of my life. We were both unemployed and with two daughters, we couldn't see how we could do. We had lost all hope and we couldn't see a way out. Málaga Común gave me hope back. It helped me see that there are alternatives, that one can subsist without money, that there are other ways of organising and relating to each other<sup>v</sup>.*

Still, for a few, it was a way to meet different people, to enrich their social life. Despite their varied motivations, as we will see, the comuneros had an ethics of solidarity and a desire to share work, skills, hobbies, companionship and good spirits.

#### 5. RELATIONSHIP BETWEEN USERS AND THE ECONOMIC COMMONS

Analysis of the empirical material highlights the centrality of distinguishing two types of relations between currency users on the one side and, on the other side, the economic commons enacted by the community currency. One, users' relation to the resource system: values of equality and fairness shaped this relation and were strengthened through this relation. Users' relation to the community currency system played out at the moment of getting access to the digital platform as well as during the general assemblies when discussing and making decisions concerning the governance and limits of the system. Two, users' relation to the resource units: these relations take the form of appropriation (buying) and provision (selling) of products and services through the currency system. While equality characterises users' relation to the resource system, inequality inadvertently sneaked



into the late through users' unequal capacities to provide to the flow of resource units. The different capacity of users to contribute to the flow of resource units resulted in unequal account balances; some having difficulties to get out of debt, others having difficulties in spending their steadily increasing credits. And, although solidarity practices were promoted among currency users to even out balance differences, the source of inequality at the origin of those balance differences persisted, thus making inequality endemic to the currency system.

More particularly, the unequal distribution of land and knowledge/skills in the conventional economy translated into an unequal capacity to maintain a balanced provision/appropriation ratios. Land and property owners could rent out property; that is, with no time investment, they relied on a regular flow of currency units which gave them a strong purchase/appropriation capacity in the system. Similarly, those with complex skills rare in the currency network, such as programming and IT-maintenance, had guaranteed a stream of currency units. In other words, ownership and knowledge – or land and skilled labour (scarce in the currency network) – anchored in the conventional economy and traditional sources of inequality, assured a stronger capacity to appropriate resource units without necessarily providing the same variety and number of services and products as users without property or specialised knowledge did.

### **5.1. Relationship to the resource system: Equality of access and decision-making**

Users' relation to the currency system manifested mainly at two types of events: Gaining membership into the community currency network and participating at the General Assembly. Gaining access to the community currency resource system was relatively easy. All one was required to do when registering into Málaga Común's digital platform was to: 1. fill one's contact information; 2. suggest areas of knowledge and labour skills one could offer as well as one was interested on; and 3. post an offering to the currency network. This digital demand to post a service one was already offering to provide was also a common conversation prompt when meeting, physically, new members. Indeed, "What do you have to offer to Málaga Común?" was an often heard question in informal social gatherings.

This openness and equality of access also marked decision-making processes in the currency system. Decisions concerning the community currency, whether monetary – such as the monthly fee, the entry bonus, and individual exceptions to the general debit limit –, or organisational – such as whether, when and how to organise trade fairs and training workshops –, were made by open vote in general assemblies held every two months at which all registered members were invited to participate.

Decisions regarding how to use the *comunes* accumulated in the community fund were also taken by democratic vote. Those funds came from members' monthly fees as well as voluntary donations. The community fund worked as an investment bank to boost particular projects. Although in 2016 the funds were invested in community projects (such as the recent renovation of their Eco-shop and buying equipment for the weekly communal lunch – Eco-medor), the intention was to offer micro-credits free of interest to boost the business projects of individual users.

In sum, both access to the currency/resource system and participation in its governance structures were characterised by equality (at least in principle, more research would be needed to understand the relative power positions between founders of the currency, monetary experts and users with other, more social, motivations).

### **5.2. Relationship to resource units: Renting vs Labouring**

To recall from above, in a mutual credit currency, 'resource units' refers not to the monetary units but to the flow of products and services made available through the community currency. To study a user's relation to the flow of resource units, one needs to look both at her provision capacity (her ability to gain currency units by selling products and services) in relation to her appropriation capacity (her ability to spend currency units by buying products and services) as well as to her account balance. Comparison between the provision/appropriation ratios in relation to the account balance of the various users gives us an insight into users' unequal capacity to participate in the currency system.

The following information was retrieved on January 12, 2018.

	Provision/Appropriation Ratio	Account Balance	Main source of income (provision capacity)	Main expenses (appropriation capacity)
<b>Diego</b>	$332/206 = 1.61$	883	Land – rent (of accommodation) Labour (specialised) – production of solar ovens – produce from his land (eggs, veggies)	Labour (non-specialised) – hiring manual work for repairing his property and keeping the farm, web update.
<b>Noelia</b>	$84/50 = 1.68$	-700	Labour (specialised) – massages Labour (non-specialised) – web updates	Renting accommodation (2015-6), food,
<b>Oscar</b>	$169/196 = 0.86$	257	Labour (specialised) – repair work (bike repair, electricity systems, plumbing, etc.) Labour (non-specialised) – farm work, light home repair	Labour – agricultural produce, cooked food, solar ovens, hair-dresser, cloth mending, Transportation (car pooling).
<b>Blanca</b>	$168/114 = 1.47$	-55	Labour (non-specialised) – cooking, farm work – biscuits and buns	Labour (specialised) – hair-dresser, plumbing, solar oven. Commodities – Clothes, cell phone, bike, food, back-pack, table-clothes, books
<b>Roberto</b>	$115/79 = 1.45$	186	Labour (specialised) – products from own land (almonds, honey)  Labour (non-specialised) – home-made cakes – dish-washing for communal lunches	Capital – Furniture and home utensils Labour – food (beer, bread, buns, lunch), arts and crafts, hair-dresser, cosmetic products from the common urban garden, participation in workshops (reading circle, drawing), bike repair

Some clarifications on notation. The provision/appropriation ratio gives an indication of the particular currency user's contribution to the currency system. A ratio bigger than 1 indicates that the user provides more services or products than she appropriates (consumes). A ratio inferior to 1 indicates the user consumes a larger number of services/products than she is providing the network with. Note that this measure however doesn't account for the value of the service/product provided. It only accounts the number of services provided relative to those appropriated.

It is the provision/appropriation ratio relative to the user's account balance that gives us an indication of the value of the services/products provided by the user. Comparing users with similar ratios yet different account balances (surplus vs. debt) gives us an idea of the users' different economic capacities in the community. Looking closer, such differences originate in the factor being sold. While land (or property) gives its owner a passive income – in the sense that there is no need to invest time in providing it –, a similar value of labour requires much time to produce before getting the monetary compensation.

Although all labour was sold at the same rate – one hour of work being paid at 10 comunes regardless the nature of the work – some types of labour were more rare in the network. These were skilled competences such as pro-

gramming and computer skills or, because of the scarcity of agricultural products in the network, the labour involved in producing one's vegetables and fruits for selling to the currency network. Instead, labour such as doing the dishes, moving help, or farming someone else's land was of a kind that any could offer given the need to earn comunes. As a result, those with labour skills scarce in the network guaranteed a more regular income stream than those with non-specialised labour skills, which quickly manifested in their account balances. That is, the source of their income or, in the terms preferred in this article, a user's provision capacity shaped her relationship to the flow of resource units.

Let us look closer into five currency users, as each illustrate a different relationship to the flow of resource units. These users have been selected based on the nature of the services and products they were able to provide to the system: 1. land; 2. specialised labour; 3. non-specialised labour.

#### 5.2.1. Diego: Renting land

Diego was one of the members with largest account balances. He lived in a cottage in Málaga's countryside. Renting out several rooms and selling eggs weekly from the hens in his backyard granted him a large and steady stream of comunes. This constant flow allowed him to be a frequent and strong consumer (appropriator) in the Málaga Común currency system. He invested his purchasing power to repair the rental rooms, farm the land, or update his website, all of which further secured him income in the local currency. He also used his balances to buy other services such as cloth mending or products such as computer screens.

Diego tried to use this buying position evenly, distributing comunes across many members. In an effort to ease newcomers' entrance into the system, Diego was particularly keen to buy from newcomers.

#### 5.2.2. Noelia: Labouring

One of the comuneros that needed particular assistance to generate comunes was Noelia. A tenant in Diego's cottage, the rental fee was debited to her account at a speed and regularity she had difficulties to keep up with. Although with a provision/appropriation ratio at par with Diego's – providing a larger number of services/products than she appropriated – her account balance was the opposite to his. While Diego had a sizeable credit, Noelia couldn't get out of debt.

A trained physiotherapist, she had entered Málaga Común by offering massage sessions. Soon, her challenges became visible to members of the currency network. As a response, many comuneros had started to buy weekly one-hour massage sessions from Noelia.

#### 5.2.3. Oscar: Specialised and flexible labour

Appropriating about 16% more than he provided and yet with a comfortable account balance, Oscar's economic capacity built on specialised repair and maintenance knowledge of electronic and wind energy systems as well as bike mending.

One of the first things he bought as he joined Málaga Común was a solar oven for 100 comunes (100c) that he hadn't yet earned. He was able to earn that money quickly though, repairing bikes and other electronic equipment, as well as selling food cooked in his new solar oven. He quickly understood what the network needed and easily adapted his labouring skills to those needs.

Soon he had a regular income of comunes that he spent at the network's grocery store and hair-dresser. In an effort to circulate his comunes, which he accumulated at a faster speed than he could spend, for the most benefit of the community, at times he would check on other members' accounts to see who had a negative balance (and thus needed to earn comunes). To help that member earn comunes, Oscar would then buy whatever service or product that person was offering to the network.

#### 5.2.4. Blanca & Roberto: Non-specialised vs. Specialised labouring

Blanca's case is interesting in comparison to Roberto's. With a similar provision/appropriation ratio – both providing more than they appropriated – they however had diametrically different account balances. Blanca owed the community while Roberto was in a relation of credit.

The difference in earning capacities had its source in the varied nature of the labour they provided. Blanca earned her *comunes* offering labour time that many others also readily offered. Farming was easily available in the currency network. And so did biscuits. Roberto, on the other hand, offered agricultural products from his own land, something that was scarce in the network. The labour invested in producing the biscuits compared to home-growing the vegetables was thus differently remunerated, resulting in divergent balances despite a similar degree of provision and appropriation.

A clarification is due here. Specialised and non-specialised labour refers not to skills that are seen as complex and unusual in the conventional economy. Rather, specialised labour refers to skills that are scarce in the community currency, and non-specialised refers to those that are common. As such, although web design and maintenance is often considered skilled labour in the conventional economy, given the large number of community users offering such kind of labour, it can be considered non-specialised labour in the currency network (for a more nuanced discussion of goods in a community currency, see Gómez, 2015; Sotiropoulou, 2015).

In sum, the source of the difference in Diego's and Noelia's economic capacities can be located in the conventional economy – Diego rents land in *comunes* which property he obtained in the conventional economy. Similarly happens with the difference in Blanca's and Roberto's economic capacities, Roberto providing the products of the land that he acquired in the conventional economy.

To wrap up this first analytical section, findings suggest two community dynamics at work. First, the particular resource users bring from the conventional economy to the currency system allowed them to enter the community economy under different relations of production. Ownership of land/property gave a steady stream of currency units to the owner without a proportionate time investment. Similarly with specialised skills, which provision could be charged at higher rates than non-specialised skills. That is, resources obtained in the conventional economy, land and specialised skills, were at the root of the unequal capacity to provide – renting vs. labouring – and hence appropriate services and products without incurring debt. This leads to a relational dynamic that reproduces inequality within the community currency.

Yet, and this is a second community dynamic observed, practices of solidarity flourished among currency users. We observed them in the way members used their excess balances, trying to buy from newcomers as well as from those with standing debts, some members going as far as to buy services which they wouldn't have bought had not the seller been in debt (such is the case of members sudden demand for Noelia's massages).

These two dynamics differ from the economic practices dominant in the surrounding capitalist economy. While the conventional economy accepts private property and educational inequality as a condition for economic activity and makes no effort to rein it in, the community economy plants the seeds for an economic behaviour that is aware of the disastrous consequences of inequality for the individual. That is, the debate that was the starting point of this article – whether community currencies reproduce or transform capitalist economic practices – may have been nuanced, yet it remains unsolved.

## 6. THE TRAGEDY OF THE COMMONS IN MUTUAL CREDIT CURRENCIES

In common-pool resources, individuals have an incentive to harvest the flow of resource units. There is however no parallel individual incentive to make the investments necessary to maintain the resource system. This leads to what has been called 'the tragedy of the commons' (Hardin, 1968). Typical examples include fisheries and grazing fields. Fishers have an incentive to fish yet another fish; farmers have an incentive to let yet another cow graze an open field. Yet, there is a maximum number of fishes that can be fished without over-fishing. Similarly, there is a limit to the number of cows that can graze a field beyond which the amount harvested would exceed the self-recovery capacity of the field. The tragedy of the commons happens when there are individual incentives to over-use (appropriate) the resource system, yet the incentives to invest (provide) in its maintenance are diffused to the collectivity.

In a mutual credit currency, the tragedy of the commons takes a particular form. The possibility to create money at the very moment of the transaction allows users to incur debt. There is an individual incentive to spend money that one has not yet worked for, to appropriate the products and services offered in the network. There is however not a concurrent incentive for the individual to generate (provide) an amount of services and products valued equal to the amount appropriated.

The root of this unbalance may be due to a free-rider problem, when the user never had the intention to contribute to the community to the same extent as she was benefitting from it. This is the traditional tragedy of the commons. Such kind of appropriation dilemmas were addressed in Málaga Común as they usually are in common-pool resource systems, through a combination of formal rules and cultural norms. More particularly for the Málaga Común currency system:

- A debit limit programmed into the digital platform and discussed by the General Assembly for individual exceptions.
- Strong cultural norms of reciprocity were seen in the shame members felt for having debts, even if small. As Luisa phrased it during an economy workshop organised by the network: "I registered as inactive in Málaga Común because I was in negative figures and I didn't know what to offer. I didn't like the feeling. I have to feel that I contribute."
- Solidarity norms were visible when currency members considered the account balances of those they were spending their local money in. For example, as we saw earlier, when Oscar and Diego looked into the digital record of balances to buy from those that were in debt. Or, when attendants to the Eco-medor (Wednesday's communal lunch) decided to weekly buy that lunch from Blanca, even though each had been bringing their own lunch thus far. Or, when hearing about Noelia's financial problems, currency members started spending in regular massages.

In other words, strong cultural norms of reciprocity and solidarity made appropriation (or free-rider) dilemmas a limited problem in Málaga Común. In any case, in a mutual credit system, there needs to be users in debt for other users to be in credit<sup>vi</sup>. That is the principle on which the system is based, the total of account balances adding to zero. This implies that (individual) debt, per se, is no tragedy for the system. The tragedy for individual users may lie however in 1. the individual feeling of shame when incurring large debts for prolonged periods of time, and 2. the individual frustration when identifying users making no visible effort to contribute to the community with provision of services/products. That is, the free-rider problem (an appropriation dilemma) lies at members' individual level, not at the level of the currency system.

In Málaga Común, the tragedy of the commons took instead a somewhat different slant. Less connected to an excess of appropriation (as it is traditionally discussed in common-pool resource systems), the tragedy of the commons in this mutual credit currency had its origin in a poor collective provision capacity. Most currency members had similar skills and offered similar services, resulting in a narrow range of services and products provided through the community economy. It is the diversity of offerings, as much as its quantity, that becomes interesting in a mutual credit currency system. As Oscar put it when discussing the problems of Málaga Común:

*For me, apart from an agile web or technology infrastructure, a currency that works needs to have many exchanges (Málaga Común has among the lowest number in Spain), many users (not ghost users as many in MC), and many offerings in all categories of products<sup>vii</sup>.*

While the number of members had increased steadily during the previous two years, and with them the number and variety of products and services available in comunas, basic products were still lacking. Most blatantly for a region with small but growing agricultural and farming sectors, food needs couldn't yet be covered. And although currency members had tried to organise a consumer group that could buy to local producers, they found it time-consuming to persuade enough producers.

This related to the low number of members active in Málaga Común. Sure, as of January 2018, 724 members were registered in the system, but some 500 were so-called "ghost users" either registered as inactive (404 on January 2018) or registered as active but without recording any exchange for over a year.

In an effort to enrol new users and thus increase the provision capacity of the network, active members had reached out to relatives, friends and the many networks of civic organisations and social movements in which they were involved. But as Adriana put it in one of the community currency workshops, “we are all the same in all these civic associations. We always meet the same people in all these places.”<sup>viii</sup> Shared networks among members led to few potential newcomers.

In other words, the particular tragedy Málaga Común faced related not to appropriation but to provision challenges. That is, Málaga Común’s difficulties had to do with the production and maintenance of a plentiful and varied stream of products and services offered in the network (the flow of resource units). Yet, the governance structures in place in the community currency fell short of addressing such a challenge. To attest, besides the three rules outlined above, other rules and governance systems in place to guarantee the public benefit of the goods included:

- Well-delimited boundaries: Those registered as active in the digital platform. All that was needed to be able to register as a member was to write in an ability or service one was willing to offer to the community system.
- Transparency: Information about individual and community account balances was available to all members. This deterred individual users from profiting from the system by accumulating large debits. It also allowed members to monitor each other at no-cost. When looking into the account balance of a potential buyer, the seller could choose not to sell to a buyer that had shown no will to contribute to the community. There was however no incentive for the seller to do so as she would go loss the opportunity to earn comunes.

This set of rules left outside a design principle identified by Ostrom (1991) as critical for the stability of commons’ governance institutions: Congruence between appropriation and provision rules and local conditions (see appendix for a list of Ostrom’s eight design principles for stable common-pool resources governance institutions). While there were clear rules (credit limit) and cultural norms (solidarity) regulating the behaviour of appropriators, there were no strict rules regulating the provision/appropriation ratio (for a similar reasoning, see Gómez, 2009). A broadly felt shame when incurring debt (telling of a strong sense of reciprocity) and a digital prompt to enter what a member was to offer when registering into the system was all that reminded users of their obligation to contribute. There was however no control of the ratio at which individual users provided (in terms of both number and variety of services) in relation to what they appropriated, a ratio that tells of unequal conditions to contribute to and benefit from the community economy.

## **7. SYSTEMIC INEQUALITY & FLOW SOLIDARITY: CONSIDERATIONS FOR GOVERNING A MUTUAL CREDIT CURRENCY**

In LETS systems, the free-rider problem is typically addressed by putting limits to the possibility of individual debits. However, as the analysis showed, Málaga Común’s challenge was not a simple problem of overuse (an appropriation problem). It was fundamentally a problem of provision; or rather, a problem in the provision/appropriation ratio. That is, it was related to the production of an insufficient and varied amount of products and services relative to the variety and amount of resources users wished to appropriate. Or, as others would put it, a supply problem.

And, while Diego and Oscar – as well as other users with weak provision capacity (in terms of speed and ease to which they accumulated currency units) relative to their appropriation capacity – distributed their account credits solidarily – by buying from the economically weakest members or by donating to the currency’s Community Fund, the sources of the different accumulation capacities remained. Having obtained land and specialised knowledge in the conventional economy, these were easily transferred into the community economy, thus moving the source of inequality into the currency system. This is the particular form taken by the tragedy of the commons in a mutual credit system.

As Elinor Ostrom argued after having observed many a common-pool resource being managed by communities, there is no magic formula for how to design institutions for the governance of the commons (Ostrom 2005; Ostrom and Cox 2010). The particular governance institutions of the collectively owned resources need to re-

spond to the particular commons dilemma, the characteristics of the common-pool resource, as well as to local conditions. Málaga Común, as many other mutual credit currencies, relied on a combination of formal rules and cultural norms for the governance of the currency system.

Yet, as we have seen in the case, one of the dilemmas in a mutual credit system is the difference in users' capacity to appropriate relative to their ability to provide, a difference that was based in the different access to the resources in the conventional capitalist economy: land and labour. Inequality in the community system originated from its embeddedness in the conventional economy. Individually and collectively, members tried to soften such systemic inequality by appropriating resource units solidarily. That is, while the community currency reproduced the inequality of the capitalist economy it was an answer to, it also nourished practices and norms of solidarity that may be able to plant the seeds for an alternative way to organise the economy.

Mutual credit communities that want to manage this sort of inequality while developing transformative economic practices of solidarity need to consider measures that soften the difference between users' provision/appropriation ratios. A suggestion may be to impose a "hoarding tax", a time-based fee calculated individually as a proportion of the account balances at given points in time, similar to the demurrage proposed by Gesell (1911) and advocated by Fisher (1933). Another suggestion would be to redistribute balances in the form of basic income internal to the currency system<sup>ix</sup>. Still another may be to consider some sort of tax on earnings based on property. While the particular details and combination would require a closer study of each specific currency system, these taxing systems – varied as they may be – would further develop the collective practices of solidarity that we have seen are incipient to the community using the currency scheme.

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## APPENDIX: MÁLAGA COMÚN, OSTROM'S "DESIGN PRINCIPLES ILLUSTRATED BY LONG-ENDURING CPR INSTITUTIONS"

From Elinor Ostrom, 1990, *Governing the Commons*, p.90.

### 1. Clearly defined boundaries.

Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself.

### 2. Congruence between appropriation and provision rules and local conditions.

Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and to provision rules requiring labor, material, and/or money.

### 3. Collective-choice arrangements.

Most individuals affected by the operational rules can participate in modifying the operational rules.

### 4. Monitoring.

Monitors, who actively audit CPR conditions and appropriator behaviour, are accountable to the appropriators or are the appropriators.

### 5. Graduated sanctions.

Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offence) by other appropriators, by officials accountable to these appropriators and officials.

### 6. Conflict-resolution mechanisms.

Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.

### 7. Minimal recognition of rights to organize.

The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.

For CPRs that are parts of larger systems:

### 8. Nested enterprises.

Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

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<sup>i</sup> Entry in blog BlogSostenible in 2010 by one of the founders. Own translation.

<sup>ii</sup> Data from the International Labour Organization (ILO). Retrieved on January 12, 2018. It can be accessed [here](#).

<sup>iii</sup> Figures come from the Spanish Statistical Institute (Instituto Nacional de Estadística, INE). Retrieved on September 16, 2016. Data can be consulted [here](#).

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<sup>iv</sup> Except for the founders of the community currency, all names of currency users have been anonymised throughout the article for confidentiality reasons.

<sup>v</sup> From fieldnotes, February 20, 2016. Own translation.

<sup>vi</sup> In January 12, 2018, the number of members with negative account balance was 265, while 197 had a positive account balance, and 262 had 0 comunes in their account balances.

<sup>vii</sup> From e-mail exchange on September 8, 2016.

<sup>viii</sup> Fieldnotes from February 17, 2016.

<sup>ix</sup> As done in the Demos community currency in Las Palmas de Gran Canaria, Spain.



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## KEY FACTORS FOR THE DURABILITY OF COMMUNITY CURRENCIES: AN NPO MANAGEMENT PERSPECTIVE

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### ABSTRACT

This paper investigates key factors for the durability of community currencies (CCs) by conducting a comparative dual case study on two long lived CCs in Japan. CCs both in Japan and abroad have exhibited effectiveness in developing social capital however the literature reveals a lack of academic research on the management or operation of CCs. Therefore this paper aims to identify key factors for the durability of CCs that could contribute to the development of a best practices model for social entrepreneurs. A secondary purpose is to add to the English body of knowledge on Japanese CC systems. Two contrasting Japanese CC organizations that have operated for more than a decade are investigated in depth. This entailed gathering both qualitative and quantitative data from both organizations and analyzing the data within a Nonprofit Organization (NPO) management framework. The results reveal five key durability factors: creating value and utility for stakeholders, appealing to the local solidarity of businesses, the receptiveness of businesses towards CCs, partnering with a corporation or larger institution and solid organizational structure. The main implication of these factors is that successfully engaging external stakeholders is crucial to sustaining the operations of a CC organization.

### KEYWORDS

Community currency, durability factors, stakeholders, best practices framework.

### ACKNOWLEDGEMENTS

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## 1. INTRODUCTION

### 1.1 The current state of Japanese CCs

Japan has appreciable community currency (CC) activity despite a decline in the number of CCs since the boom period of the early 2000s. According to Izumi and Nakazato, until December 2016, there were around 204 actively operating CCs in Japan (2017, p.42). According to their data, among the CC organizations created in Japan between 1999 - 2016, around 20% (79/389) have continued operating for more than a decade. Furthermore, the 2016 survey reveals that 60.8% of Japanese CCs are run by NPOs or civic groups (2017, p.43).

Kobayashi, Miyazaki and Yoshida (2017) take a different approach, placing some focus on the number of new CC organizations created each year. According to their data there has been a dramatic decrease in the number of new CCs created each year since the CC boom of the early 2000s. Within the last 8 years the number of new CCs launched each year averages around 15. This is down from highs such as over 120 created in 2002 and around 90 created in 2005 (Kobayashi, Miyazaki and Yoshida, 2017, p.4).

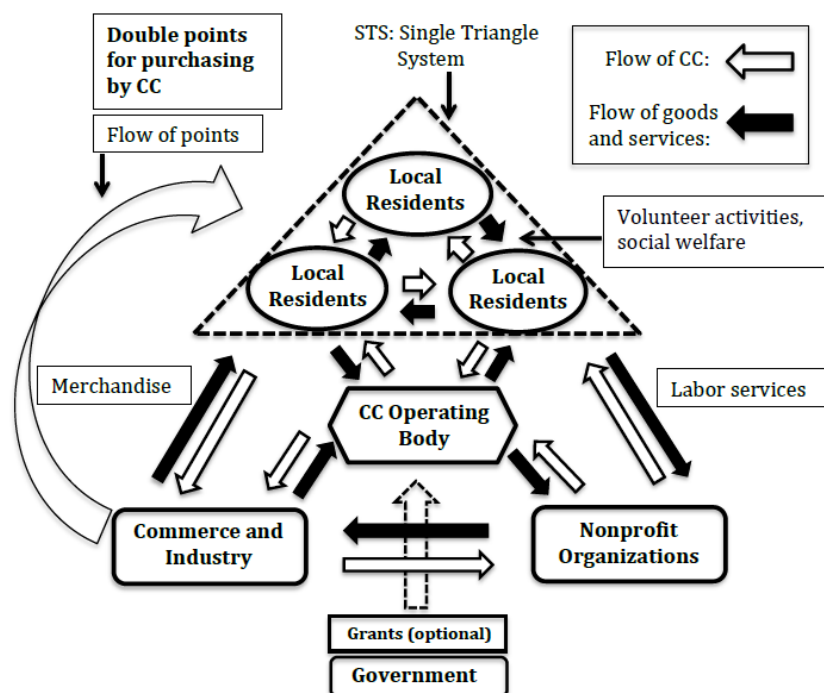
### 1.2 Research focus

Miyazaki and Kurita have divided the development of Japan's wide variety of CCs into 3 phases of evolution from the 1970s to the present day (Kurita & Miyazaki, 2018):

1. Development of the reciprocal and home economy realm (1970s – early 2000s)
2. Integration between the reciprocal and market realms (early 2000s –)
3. Recent developments (mid-2000s – present)

This paper focuses on CCs that fall into the 2nd of the 3 phases. These 2nd phase Japanese CCs came into being partly to overcome the shortcomings and limited circulation of the first phase CCs (such as Eco-money), which were not linked to market activity. The inclusion of the business community provides more places to spend the currency, which encourages smoother and broader circulation. The two CCs investigated in this paper bear some similarity to European social currencies such as Samendoen (Batterink, Kampers & Van der Veer, 2017) in that they seek to shape social change through engagement and affiliation with the business community. This type of CC was chosen because of its potential to encourage greater local economic and social development than Japan's 1st phase CCs.

The 2 CCs examined in this paper have circulation mechanisms that resemble the Double Triangle System (DTS) proposed by Nishibe (Kichiji & Nishibe, 2008, p.270).

**Figure 1: Double Triangle system**

Source: Kichiji & Nishibe, 2008, p.270.

The double triangle circulation mechanism is depicted in fig. 1. A key aspect of a DTS is that it “mediates commercial transactions of goods and services offered by businesses and industries, the municipality, civil groups, and NPOs [...] to forge a complementary relationship between commercial and non-commercial transactions in an integrated cycle of CC” (Kichiji and Nishibe, 2008, p.269). In a complete DTS, local residents can earn double points when purchasing the CC with yen and then using the CC at participating businesses. The accumulated points amount to more purchasing power, which incentivizes the use of the CC. However, this point accumulation aspect of the DTS is not present in the 2 CCs investigated in this paper.

### 1.3 CCs and Social Capital

The development of social capital is one area where CCs have shown measurable efficacy. The findings from Rich-ey, 2007; Wheatley, Younie, Alajlan, McFarlane, 2011; Izumi and Nakazato, 2013; Nakazato and Hiramoto, 2012 all support the idea that CCs play a role in developing social support and social capital. Nishide (2009, p.1) describes social capital as “social relationships such as trust, norms and networks that facilitate cooperation among members of a community.” The level of social capital is considered as an important measurement in the development of a community or society. In a World Bank paper on the measurement of social capital it is stated that, “A range of social problems – crime, health, poverty, unemployment – have been linked empirically to a community’s endowment of social capital (or lack thereof)” (Grootaert, Narayan, Woolcock & Nyhan-Jones, 2003, p.3). This link between CCs and the development of social capital is a key point regarding the utility and significance of CCs.

## 2. RESEARCH PURPOSE

Despite the above-mentioned benefits of CCs, little research has been done on the managerial and operational aspects of CCs in general (Calvo & Morales, 2014, p.60). This makes it unclear what managerial or operational factors separate long-lived CCs from the short-lived ones. For this reason the primary purpose of this paper is to identify key factors for the long-term durability of CCs, which could contribute to the development of a best practices model for social entrepreneurs.

A secondary purpose of this paper is to contribute to the English body of knowledge on Japanese CC systems by examining two CC organizations that are relatively unknown outside of Japan.

### 3. METHODOLOGY

#### 3.1 Dual Case study

In order to uncover key durability factors, a comparative research strategy in the form of a dual case study was employed. According to Bryman (2012, p.72), social phenomena are better understood when compared in relation to two or more meaningfully contrasting cases. For this reason two contrasting CC organizations, Earthday Money (EM) and Atom Currency (AC), were selected for examination. EM and AC contrast in their currency issuing mechanisms (digital currency vs. paper currency), their access to resources and organizational size. A final important contrast is that after about 12 years of circulating, EM steadily declined and no longer circulates, whereas AC still circulates and has expanded to six branches nationally on the strength of their model. Both organizations are registered as NPOs and their currency circulation connects volunteer or community events with the local business community. Furthermore, both organizations have operated for more than 10 years, making them appropriate cases for the study of durability in the field of CCs.

The dual case study entailed examining these two organizations in depth using similar data collection methods and comparative analysis within the same NPO management framework. In accordance with case study methodology, multiple data collection methods (both qualitative and quantitative) were used. An attempt was made to make the data collection from both organizations as uniform as possible for effective comparison. The corresponding data collection methods can be seen in table 1.

The distinctive differences between the two organizations necessitated a differentiation of further data collection. The main distinction is that, in 2015, AC published a book titled: 'Designing your community with Atom Currency: A future where people are connected to their town.' The book is 250 pages and extensively covers AC's philosophy, organizational structure, history, circulation mechanism and details relating to each branch. This provided a firm basis for the investigation into AC's management mechanisms. In the light of this plethora of information surrounding AC, further data was sought on EM. This was gathered through the following means:

- Extended and more in depth interviews with organizational leaders.
- A short survey on NPOs participating in EM's network (see appendix 4): 22 surveys were sent out with 11 responses and 7 completed surveys. 4 of the responding NPOs stated that their EM liaison was no longer an employee and therefore, they could not complete the survey.

Given that EM is a substantially smaller organization than AC, this extra data and the additional interview time with the EM leadership provided more balance to the data collection.

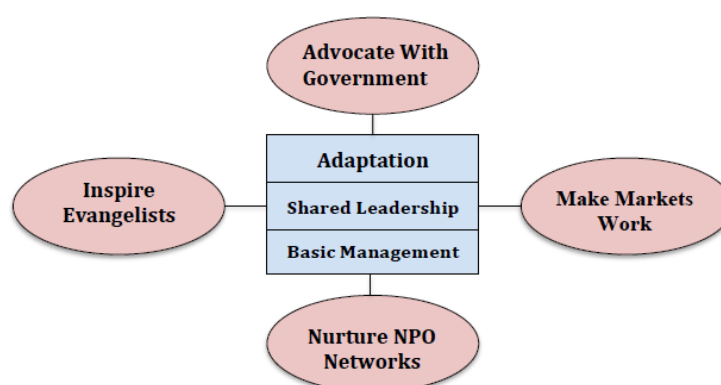
Earthday Money		Atom Currency
1.	Interviews With Organizational Leaders	
	2 qualitative interviews with the EM co-founder. The total interview time was 1 hour and 58 minutes. First interview: 26 <sup>th</sup> of March 2016. Follow-up interview: 24 <sup>th</sup> of January 2017.	A 30-minute semi-structured interview with two AC central executive committee members on March 22 <sup>nd</sup> , 2017. The interview was preceded by 2 short e-mail questionnaires.
	1 qualitative interview with an EM director on June 8 <sup>th</sup> , 2017. The interview time was 58 minutes.	A 15-minute impromptu qualitative interview with an AC committee member in Niiza City on the 19 <sup>th</sup> of October 2016.
2.	Observation Of Activities	
	Attendance and observation of a monthly EM related event in Yoyogi Park, Tokyo on the 27 <sup>th</sup> March 2016.	Attendance and participation in an AC event in Niiza city on the 19 <sup>th</sup> October 2016.
3.	Secondary Data From A Comparative Research Report On Both Organizations	
	A comparative survey by the City Planning Institute of Japan focusing on both AC and EM and their relationship to local businesses.	
4.	Secondary Data From The Websites Of Both Organizations	
	<a href="http://www.earthdaymoney.org/">http://www.earthdaymoney.org/</a>	<a href="http://atom-community.jp/">http://atom-community.jp/</a>
5.	Quantitative Data On Currency Circulation	
	A sample of 333 (out of 5,955) individual EM digital currency accounts showing the transactional behavior of EM users from 2006 to 2016. Refer to appendix 2.	Quantitative data on currency distribution and usage at the Waseda/Takadanobaba branch from 2004 to 2016. The data is taken from AC's yearly reports. Refer to appendix 3.

**Table 1: Corresponding data collection methods for both organizations.**

### 3.2 NPO Analysis Framework

An NPO management framework was used to guide the data collection. It facilitated the categorization and analysis of the data. The framework was synthesized in a 2012 book titled 'Forces for Good'. The book is the result of a two-year investigation of 12 highly impactful and successful NPOs. The results of the investigation provide seven areas of operation (6 practices in addition to basic management) where successful NPOs excel. The 'Forces for Good' framework is presented in Fig. 2. Both EM and AC are NPOs aiming to make social impact. As such, it was thought that this was an appropriate framework within which to analyse them. The framework consists of 3 areas related to internal operation (highlighted in blue) and 4 areas related to external collaboration or partnership (highlighted in pink).

**Figure 2: Forces for Good framework.**



Source: adapted from Crutchfield and McLeod Grant (2012, p.40).

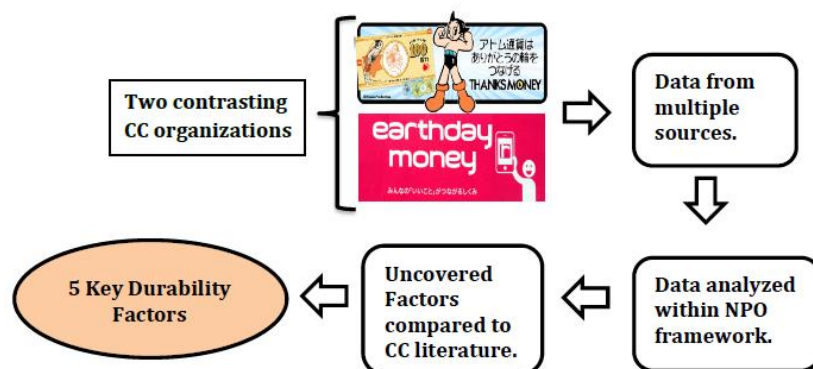
The collected data was categorized into each of the 7 areas of enquiry. The analysis of data in each area was based on three questions:

- Did operations in this area contribute to AC's or EM's durability?

- Did a deficiency in this area contribute to EM's decline?
- What were the key factors that influenced decline or durability in this area?

In the final step, the uncovered durability factors were considered in relation to some examples from CC literature to assess their broader validity. This was done to moderate the inherent limitations of case study research, which doesn't allow for the generalization of findings. Factors lacking in broader applicability or validity were eliminated, leaving 5 key durability factors which are explained in chapter 6. The summary of the methodology can be seen in fig. 3.

**Figure 3: Methodology Summary.**

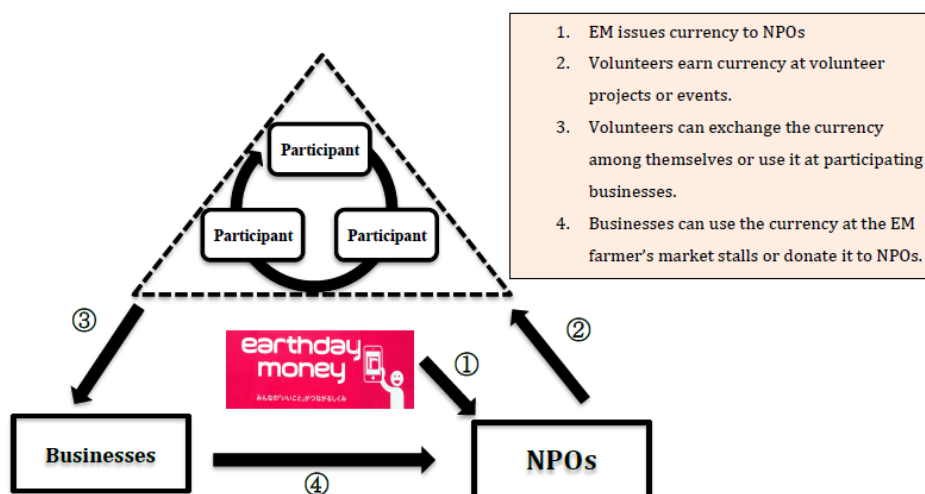


## 4. RESEARCH SITES

### 4.1 Earthday Money

EM was founded on October 23rd, 2001, as a specified nonprofit organization to promote volunteering in Shibuya. Individuals who wished to take part in the EM system could sign up to volunteer for one of 27 NPO projects listed on their website. Upon completing their participation, they received the currency, which could then be spent at one of around 150 participating stores in Shibuya. A basic representation of EM's circulation can be seen in fig. 4.

**Figure 4: Earthday Money Circulation System.**



Source: adapted by the author from EM promotional materials.

The currency was at parity (¥500 = 500 r) but not exchangeable with Japanese yen. It was effectively used as a coupon or voucher. EM was initially issued only as a paper currency but in 2006 the organization made the switch to a digital currency (transacted via cell phones) and discontinued issuing paper currency. EM's co-founder states



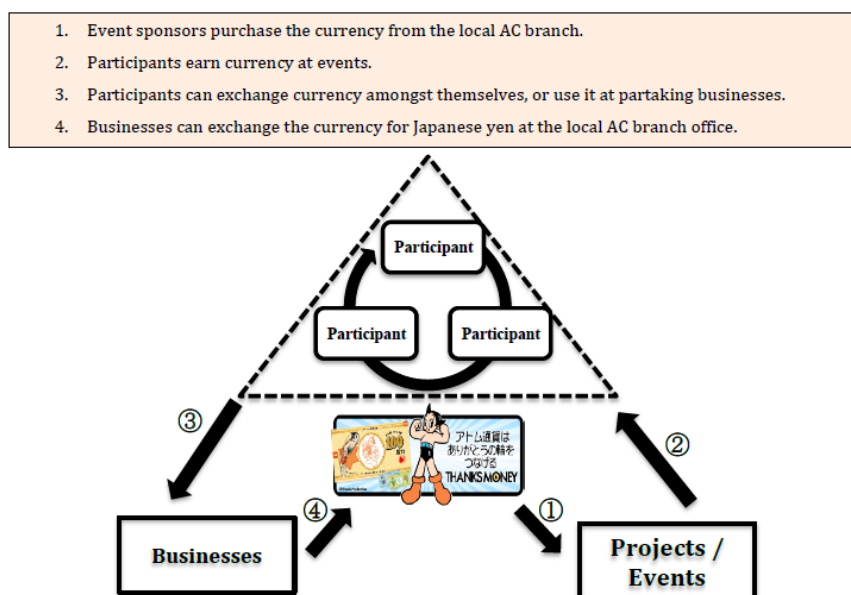
that the currency is not active now due to problems with the digital currency's technological platform (EM co-founder, personal communication, March 26, 2016).

## 4.2 Atom Currency

AC was launched on the 7th of April 2004 in the districts of Waseda and Takadanobaba in Tokyo. It is a nonprofit organization founded with the purpose of engaging in activities that contribute to society (AC executive committee members, personal communication, May 22, 2017). It is run by a central executive committee, which serves as a central administration point for its 6 branches. The currency is denominated as Bariki (馬力) meaning horsepower and is equivalent to Japanese yen in value (500馬力 = ¥500). Participating businesses can also exchange it for Japanese yen. Until 2008, AC only circulated in their Waseda/Takadanobaba branch. In 2009 AC expanded nationally and, according to its website, it currently has 6 branches around Japan. Atom Currency has two primary goals:

- To promote volunteer and charity activities within the area.
- To base this community revitalization around local businesses.

Figure 5: AC circulation system.



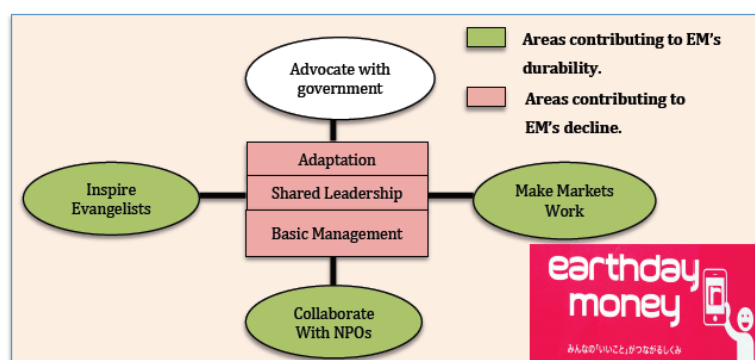
Source: adapted from AC's published book, Atom Currency Executive Committee, 2015, p.8.

The focus of this paper is on durability factors. For this reason the bulk of the analysis on AC will focus on the original branch in Waseda/Takadanobaba as it has been in operation since 2004.

## 5. RESULTS

### 5.1 NPO framework analysis summary

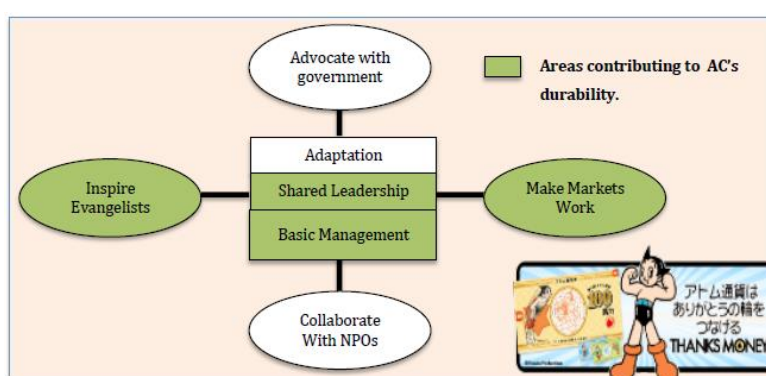
Fig. 6 and fig. 7 show a summary of the NPO framework analysis for EM and AC. A more comprehensive description for each area of analysis and the corresponding durability and decline factors can be seen in appendix 1.

**Figure 6: Areas of management contributing EM's relative durability and decline.**

### 5.1.1 Earthday Money analysis summary

A glance at EM's NPO framework summary reveals that the main areas contributing to EM's decline were related to internal management, which included a lack of funding and resources as well as a loose organizational structure. The lack of funding meant that they were unable to resolve issues that arose with their digital currency system. The issues were related to fast developments in cell phone and smartphone technology. According to EM's co-founder, the printing and delivering of paper money to distributing NPOs was quite costly. However, while the digital currency made for more convenient issuance and handling, the technological maintenance requirements proved to be equally, if not more problematic. As a pioneer in the field of digital CCs, EM's case is illustrative of the necessity of providing long term IT support to adapt to the rapid pace of technological change.

Regarding their infrastructure, EM's operations were mainly centred on the two co-founders. As a result, the organization floundered once they were unable to sustain their involvement after more than a decade of committed effort. EM's director also states that the organizational structure was quite loose due to the leadership meeting infrequently. The digital currency data suggests that less than 50% of the digital currency was actually spent after earning it. In addition to this, EM's co-founder revealed that the paper currency tended to accumulate at some businesses. This indicates that EM's circulation was not very smooth, but due to insufficient data this finding is inconclusive. Overall, it was the ability of the EM team to work well outside the boundary of their organization, including their collaboration with local businesses and NPOs that extended the longevity of their organization, despite its lack of resources and internal organization.

**Figure 7: Areas of management contributing to AC's durability.**

### 5.1.2 Atom Currency NPO framework analysis summary

AC strikes more of a balance between internal management and external collaborations. Regarding their internal management, AC has good infrastructure and especially effective shared leadership, with branches taking on much of the responsibility. AC also collaborates well with the business community. The quantitative data on the issuance and use of the currency in the home branch of Waseda/Takadanobaba shows slow yet steady growth in the amount of currency issued and the percentage of issued currency spent in stores. This kind of steady growth

over 13 years is a strong indicator of stable management. The one question mark hanging over the organization is their ability to successfully expand their model. Since expanding nationally in 2009, 6 out of 13 branches have closed down and 1 is currently on hiatus. AC acknowledges these problems and, according to the executive committee members, they are currently reforming their organizational systems. The success of these new reforms remains to be seen as they are currently being implemented.

## 6. FIVE DURABILITY FACTORS

The five key durability factors that were uncovered are:

- Creating value and utility for stakeholders (value creation)
- Engaging with the local solidarity of businesses.
- The receptiveness of business to the CC concept.
- Partnership with a corporation or larger institution.
- Well-defined organizational structure.

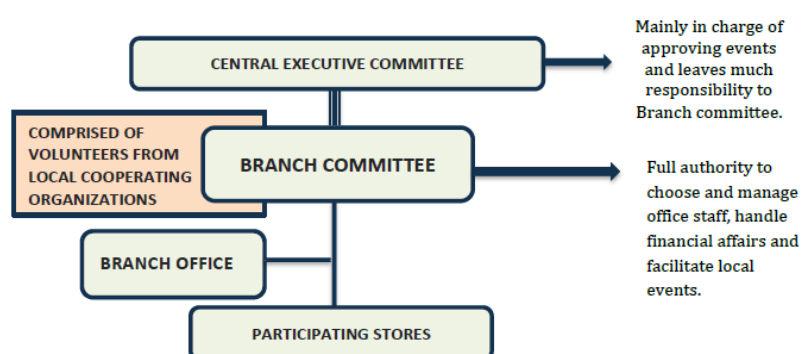
The details of each durability factor are discussed below and then summarized in table 3.

### 6.1 Creating value and utility for stakeholders (value creation)

#### 6.1.1 Atom Currency

AC designed their currency to benefit local businesses by connecting businesses to a network of community revitalization efforts and giving them an opportunity to align with a famous brand (Atom Boy). Businesses accepting AC can also realize a tiny profit by exchanging AC for Japanese yen. Thus, cooperating organizations, recognizing the value and utility offered by AC, provide the human resources needed to operate AC Branches in their area. These cooperating organizations (as seen in table 2) include chambers of commerce, shopping street associations and local municipalities amongst others. According to AC's published book: A branch committee (which consists of volunteers from cooperating organizations) "is completely responsible for the local distribution of Atom Currency, money management and problem solving in their area." (Atom Currency Executive Committee, 2015, p.23). In addition to administering the distribution and redemption of the currency, branch committees also issue yearly reports on all aspects related to branch management. All of this is done on a volunteering or pro bono basis (AC executive committee members, personal communication, May 22, 2017). The duties and tasks that these branch committee volunteers perform in running an AC branch, is simply incorporated into their daily workload at their home organizations. Thus, in exchange for the benefits of having an AC branch in their area, these organizations provide the crucial human resources necessary to operate the branch effectively.

**Figure 8: Atom Currency organizational structure.**



Source: Atom Currency Executive Committee, 2015, p.26.

### 6.1.2 Earthday Money

EM was created to promote volunteerism and support NPO's (EM co-founder, personal communication, January 24, 2017) and, in return, NPOs promoted and distributed the currency. There is evidence that suggests that EM was effective in attracting volunteers to NPO projects. 4 out of 7 surveyed NPOs indicated that their volunteer numbers increased slightly when they joined the EM network – see appendix 4. Therefore, because the EM currency could potentially work as a tool for attracting volunteers, the participating NPOs distributed and promoted the currency. As can be seen in fig.4, the distribution of the currency by participating NPOs was a crucial point in EM's circulation.

### 6.1.3 Value creation summary

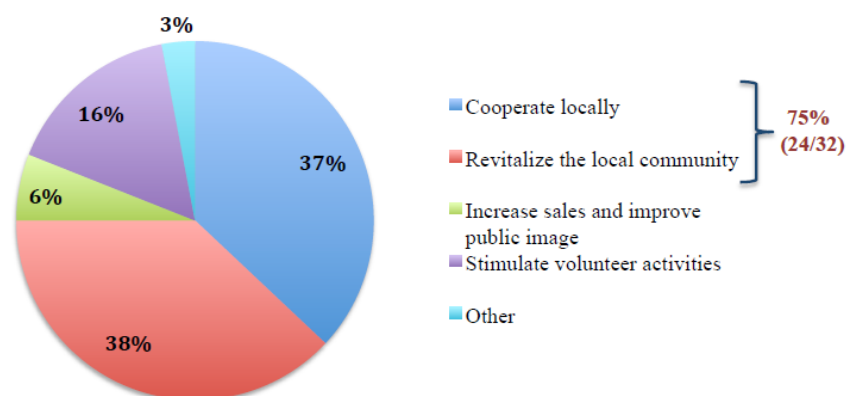
Both EM and AC designed their currencies to create value for their chief stakeholders. In EM's case, it allowed them to successfully promote and distribute their currency despite inefficient internal management. In AC's case, this strategy procures the human resources of cooperating organizations for the administration, distribution and promotion of their currency at no cost. Furthermore, in AC's circumstance, the utility provided to stakeholders incentivizes them to take on responsibility, which leads to effective shared leadership between the executive and branch committees.

## 6.2 Engaging with the local solidarity of businesses

Both organizations appealed to local stores' sense of solidarity with the community as motivation for joining the network. According to EM's co-founder, in addition to presenting a good public image, the chief motivation for local businesses joining EM was to engage with local activities and not to increase sales or profit (EM co-founder, personal communication, January 24, 2017). He raised this point in both interviews, emphasizing that EM was viewed as a non-commercial entity by these businesses. The findings of the City Planning Institute of Japan's survey in 2011 seem to align with this opinion. 23 CC participating stores (10 EM, 13 AC) were queried on their motivation for joining a CC network. 75% (24/32) of the responses were related to local solidarity. This data can be seen in fig. 9.

EM's currency was not exchangeable for Japanese yen and AC participating stores make a tiny profit - on average around ¥ 14,000 annual profit per store in 2016. This supports the notion that participating stores were more motivated by a sense of solidarity with the local community than the opportunity to increase sales or profit. Increasing the number of businesses in a CC network increases both the value and utility of the currency. Actively engaging with the local solidarity of businesses could be one way to attract more businesses to a CC network. To this end it should be viewed as a key durability factor, particularly in DTS CC systems that aim to link community revitalization with local business interests.

**Figure 9: EM and AC participating stores motivation for joining a CC network.**




Source: adapted from Kudo & Murota (2011, p.129).

### 6.3 Receptiveness of businesses to the CC concept

In the same 2011 survey of the City Planning Institute of Japan, 22 out of 23 AC and EM participating stores expressed a willingness to continue being part of their respective CC networks. These businesses also indicated an interest in expanding the usage, utility and the number of participating businesses in both CC networks (Kudo & Murota, 2011, p.129). This indicates that these businesses were quite receptive to the CC concept.

The ratio of the type of organizations affiliated with AC is further evidence of this receptiveness from the business community. Of the 30 organizations represented on AC executive and branch committees across Japan, 18 (60%) are directly related to the business community as seen in table 2. This relationship with the business community is at the heart of AC's success. It can also be speculated that a DTS CC works very similarly to a shopping coupon, easing its adoption by businesses. The relative success of other DTS CCs in gaining participating businesses supports this notion. The Toda Oar in Saitama has 106 participating stores listed and the Mu-Chu currency in Musashino City had 140 participating stores listed in 2010 (Kurita, Miyazaki & Nishibe, 2012, p.139). As previously mentioned, business participation adds value and utility to a CC network. For this reason, the potential receptiveness of businesses to the CC concept is an important key factor to be taken into consideration.

ATOM CURRENCY COOPERATING ORGANIZATIONS	
Chambers of Commerce	3
Shopping Street associations	15
Civic Groups	3
Non-profit organizations	2
Municipal bodies	5
For-profit organization (Tezuka Productions)	1
Total	30



Business community affiliates.

**Table 2: Atom Currency cooperating organizations.**

Source: adapted from data in Atom Currency's 2017 report.

### 6.4 Partnership with a corporation or larger institution

#### 6.4.1 Atom Currency

AC's partnership with the entertainment company Tezuka Productions is undoubtedly the biggest factor for its continued durability. One of AC's first executive committee members, a Mr. Matsuda, originally approached the Takadanobaba Western Shopping District Association with the idea to start a CC in the area. His proposal was not accepted. Later in the same year when Tezuka Productions approached the same shopping district association with their own proposal to start a CC in the area, it was accepted (Atom Currency Executive Committee, 2015, p.232). This anecdote reveals the obvious branding and credibility that Tezuka productions brings to AC. Tezuka Productions provides the following support (AC executive committee members, personal communication, May 22, 2017):

- 99% discount on the Astro Boy character-licensing fee. This means that branches only have to pay around ¥ 300,000 a year for use of the character, instead of around ¥ 30,000,000. This massive discount is a significant advantage as Astro Boy is an internationally recognized brand.
- Marketing and advertising support (non-monetary).
- Office and administration support.
- Advice with managing events.

This support has provided AC with strong branding and helped them to build effective partnerships with shopping street associations. The Atom Boy brand also drives each branch's income model as, unlike EM, event promoters have to purchase the currency. Most interestingly, AC provides an example of a CC being used as a tool for a company's corporate social responsibility efforts.

### 6.4.2 Earthday Money

Both EM's co-founder and director expressed the necessity of partnerships to maintain a CC. EM's co-founder believes that, for a CC to be successful, it must be combined with an existing business due to the maintenance requirements (EM co-founder, personal communication, March 26, 2016). EM's director believes that it is almost impossible to run a CC as a business by itself (EM director, personal communication, June 9, 2017). Their opinions, together with AC's success with Tezuka Productions, highlight the value of a partnership with a larger institution.

### 6.4.3 CC literature

Partnering with corporations or larger institutions is a common strategy for many long-lived CCs in Japan and abroad. The Toda Oar in Saitama prefecture has circulated since 2003 and has an association with the local municipality (Kurita, Yoshida and Miyazaki, 2015). The Calgary Dollar in Canada has been supported by the Calgary municipal government since 2000 (Wheatley, Younie, Alajlan, McFarlane, 2011). Finally, the Berkshares CC, based in Massachusetts in America, has circulated since 2006 with the support of five local banks (Nihei & O'Connor, 2013, p.47). Thus, there is strong supplementary evidence from CC literature showing how vital partnerships with supportive institutions are to a CC organization's long-term durability.

## 6.5 Well defined organizational structure

This is a basic requirement for most businesses, nonprofit or otherwise, and its importance to sustaining an organization is evident. It continues to contribute to AC's durability and its lack contributed to EM's decline. At the very least it should provide a clear division of responsibilities, which should include engaging with external stakeholders and regulated organizational processes. This is undoubtedly a key factor for durability.

DURABILITY FACTOR	FINDINGS
1. Creating value and utility for stakeholders.	The value and utility offered by both CCs incentivized their chief stakeholders to support and facilitate their continued operation.
2. Engaging with the local solidarity of businesses.	Both CCs successfully appealed to the local solidarity of businesses to attract them to the currency network.
3. Receptiveness of businesses to the CC concept.	Participating businesses in both CC networks displayed an eagerness to continue being part of their CC networks, indicating a compatibility for DTS CCs with businesses.
4. Partnership with a corporation or larger institution.	AC's partnership with a large company is the biggest factor for its durability. EM's lack of a supportive partnership was a key point in its decline.
5. Well defined organizational structure.	This factor contributed to AC's durability and its lack contributed to EM's decline.

**Table 3: Durability factor summary**

## 7. CONCLUSION

### 7.1 Limitations

#### 7.1.1 Incomplete Earthday Money Data

Unlike AC, EM does not have a published book or yearly reports. It was also in decline by the time this study took place. This situation affected two important points of data:

- Data on participating NPOs: Five participating NPOs no longer exist and four others responded that the EM liaison was no longer employed there and consequently they could not complete the survey. Thus 22 surveys were sent out, 11 were responded to and only 7 were completed. Had EM still been active, the response might have been higher, providing more definitive data on EM's relationship with their NPO network.

- Data on EM's currency circulation: There is no data on EM's paper currency circulation, which was the only means of currency issuance prior to 2006. Nonetheless, the survey responses imply that more paper currency was issued than digital currency and based on observation the paper currency circulation continued long after 2006. However, due to insufficient data it is not possible to make definitive conclusions regarding EM's circulation.

### 7.1.2 Limitations of case study research

The chief limitation of any case study research paper is the inability to generalize the results. This paper is no exception despite assessing the uncovered factors against examples from CC literature. It is therefore recommended that a broader comparative study involving a larger set of CC organizations take place; in order to clarify the key factors separating long-lived and short-lived CCs.

## 7.2 Implications of this research

### 7.2.1 External stakeholders are vital

Four of the five key durability factors are related to the engagement of external stakeholders. EM's ability to sustain their activities despite inefficient internal management was due to effective engagement with external stakeholders (NPOs and businesses). While this implication cannot be generalized, it does run parallel to the conclusions of the investigators of 'Forces for Good'. Indeed, they found that the success of an NPO "has more to do with how nonprofits work outside the boundaries of their organizations than how they manage their internal operations." (Crutchfield et.al, 2012, p.35). This was certainly true for the two CCs investigated in this paper and bears some consideration for other CC systems.

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EM director. (2017). Skype interview with Jeremy September, June 8 (Japanese)



**APPENDIX 1: SUMMARY OF NPO FRAMEWORK ANALYSIS**

ATOM CURRENCY	EARTHDAY MONEY
1. BASIC MANAGEMENT: The focus here is on fundraising ability, infrastructure and investment in human resources.	
<p>AC has a well-defined organizational structure and division of labor. Each branch committee (consisting of representatives from participating organizations) issues an annual report detailing their activities. The branch committee members are all volunteers. AC's branding also makes it attractive to purchase the currency for distribution at events, which is an important part of their income model.</p> <p>Factors: Value creation / clear organizational structure / Partnership with a corporation</p>	<p>EM lacked reliable sources of financial support and clear organizational structure. Most of the responsibility for operations rested on the two co-founders. The lack of funding resulted in the eventual failure of their digital currency platform, as they could not afford to pay for the expertise required to overhaul the system.</p> <p>Factors: Lack of funding and resources / Lack of organizational structure / Dedication of the two co-founders</p>
2. ADAPTABILITY: The focus here is on the ability to perceive and adapt to changes in the environment.	
<p>AC is currently in the process of adapting to difficulties in national expansion. The organization has not yet conclusively demonstrated their ability to adapt to changes in the environment.</p>	<p>EM's failure to adapt when their digital platform malfunctioned resulted from a lack of resources and funding.</p> <p>Factors: Lack of funding and resources.</p>
3. SHARED LEADERSHIP: The focus here is on the distribution of leadership in an organization and the extent to which others are empowered to lead.	
<p>The AC central executive committee delegates much leadership and responsibility to the volunteers on the branch committees. The representatives on these branch committees are motivated to take leadership responsibility on an AC committee because of the value and utility the currency gives to their organizations</p> <p>Factor: Value creation</p>	<p>EM lacked the organizational structure and processes needed to effectively share leadership and responsibility. When the original co-founders were no longer invested in the organization, activities ground to a halt.</p> <p>Factors: Lack of organizational structure.</p>
4. MAKE MARKETS WORK: The focus here is on the ability to garner resources through interaction with for-profit businesses.	
<p>An essential element in AC's durability is their partnership with Tezuka productions. Other important elements are their relationships with local shopping district associations and local chambers of commerce for whom they create value.</p> <p>Factors: Partnership with a corporation / Value creation / The solidarity of businesses with the community / The receptiveness of business to the CC concept.</p>	<p>EM was successful in constructing a network of around 150 participating businesses that accepted their currency despite gaining no direct profit from the network. Their activities in running a separate business (a farmers market) also contributed temporarily to their relative longevity.</p> <p>Factors: The solidarity of businesses with the community / The receptiveness of business to the CC concept.</p>

5. INSPIRING EVANGELISTS: This refers to individuals who are inspired to help the organization to increase its effectiveness and influence.	
A key evangelist for AC was Mr. Junichiro Yasui. He was chairman of the Waseda Shopping District and also a representative of the Nationwide Shopping Street Planning Executive Committee. Mr. Yasui believes very strongly that AC creates value and utility for his shopping street organizations. He was instrumental in AC's early success and it's later nationwide expansion.	EM inspired some 'evangelists' to increase the organization's technological effectiveness through pro-bono website and application design. EM's website was instrumental in connecting to participating NPOs and currency users. These 'evangelists' came into contact with the EM through one of EM's co-founders, who had worked in the advertising field.
Factor: Value creation	Factor: Co-founder's network resources.
6. COLLABORATE WITH NPOs: The focus here is on sharing wealth, expertise, talent, and power with other NPOs.	
AC collaborates mainly with shopping street associations and chambers of commerce and only rarely with other NPOs.	Collaborating with fellow NPOs was central to EM's early success. They did this by designing their currency to create value and utility for their NPO stakeholders.
	Factor: Value creation
7. ADVOCATE WITH GOVERNMENT: The focus here is on policy advocacy with the government	
AC did no advocating with government.	EM did no advocating with government.

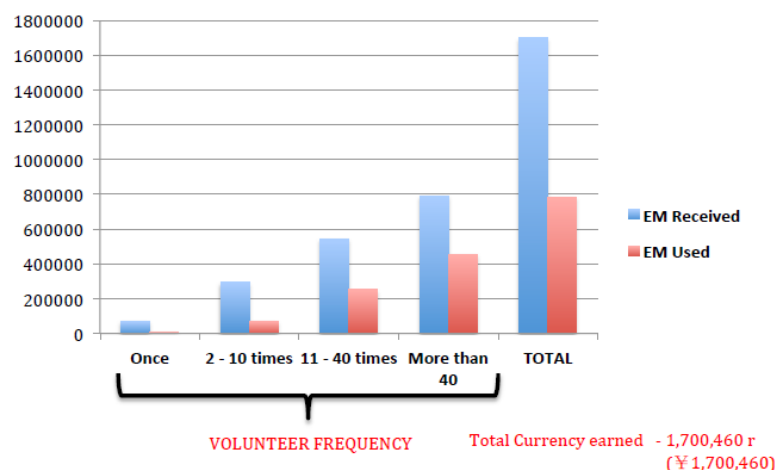
## APPENDIX 2: SUMMARY OF NPO FRAMEWORK ANALYSIS

**Table 4: Volunteer frequency table.**

Volunteer Frequency	Percentage of the sample population
Only once	37.8% (126 users)
2 -10 times	42.7% (142 users)
11- 40 times	13.5% (45 users)
More than 40 times	6% (20 users)
Total	100% (333 users)

Source: created by author from digital account sample data.

**Figure 10: Ratio between digital currency earned and spent.**



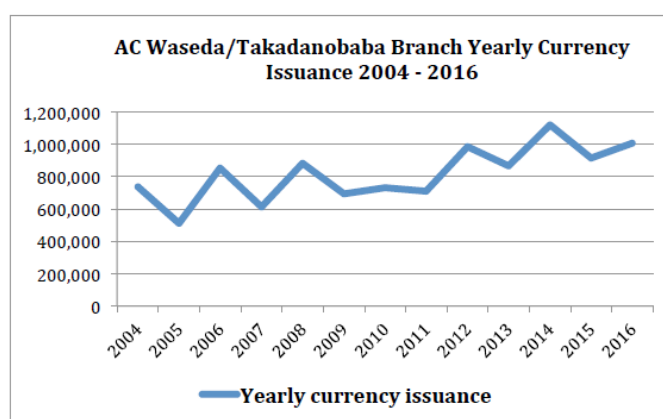
Source: created by author from digital account sample data.

**Table 5: Average, Median and Mode values of the 333 accounts.**

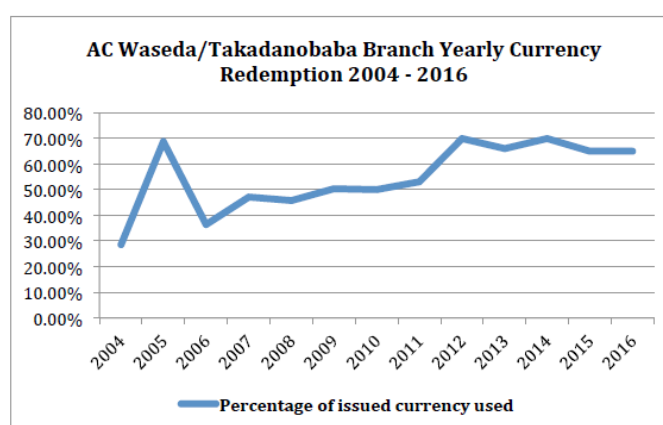
	Currency Earned	Currency Spent	Number of times volunteered	Number of times spent
MEAN	5106.49	2357.74	8.78	4.90
MEDIAN	1000	0	2	0
MODE	500	0	1	0

Source: created by author from digital account sample data.

### APPENDIX 3: ATOM CURRENCY: CURRENCY ISSUANCE AND USAGE

**Figure 11: Waseda/Takadanobaba branch yearly currency issuance.**

Source: created by author from AC yearly reports.

**Figure 12: Waseda/Takadanobaba yearly currency usage.**

Source: created by author from AC yearly reports.

**APPENDIX 4: EARTHDAY MONEY PARTICIPATING NPO SURVEY AND RESULTS**

(Translated from Japanese)

This research is related to the management of a CC organization. The goal of this survey is to clarify your organization's experience in working with EM.

### Questions

1) Influence on the volunteer numbers at your organization after becoming part of the EM network:

- No Change 3
- Slight increase 4
- Large increase 0

2) Distributing the EM paper currency to volunteers was:

- Really easy 1
- Easy 1
- Neutral 4
- Difficult
- Really difficult 1

3) Distributing EM's digital currency using the mobile application was:

- Really easy
- Easy
- Neutral 3
- Difficult 1
- Really difficult

4) Which type of currency did your organization issue more of?

- Paper currency 5
- Digital currency 2

5) The relationship between your organization and EM was:

- Really good 1
- Good 1
- Neutral 5
- Bad
- Very bad

6) EM's circulation has significantly declined. If EM was revived how strongly would your organization wish to continue being part of the network?

- Strongly wish to continue 1
- Wish to continue 2
- Neutral 3
- Wish to discontinue
- Strongly wish to discontinue 1



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## SIDCHAIN AND VOLATILITY OF CRYPTOCURRENCIES BASED ON THE BLOCKCHAIN TECHNOLOGY

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### ABSTRACT

A cryptocurrency market based on the blockchain technology is characterized by the coexistence of a steady-state supply and a volatile e-money's demand. In this study a cointegration test establishes a long-run relationship between the internal demand of Bitcoins and prices. From this result, we propose to restrain the intrinsic volatility of any cryptocurrency based on the Blockchain technology by introducing a sidechain pegged to the parent chain.

### KEYWORDS

Sidechain, Community currencies, Blockchain, Bitcoin, Demurrage.

## 1. INTRODUCTION

One of the most unusual characteristics about the economics of bitcoin is the juxtaposition of the certainty of supply and the uncertainty of demand. Cryptocurrencies based on the blockchain technology (like the Bitcoin) are not issued according a traditional money market mechanism allowing the confrontation of supply and demand. The supply of bitcoins is programmed to grow along a pre-determined path. The demand of bitcoins is volatile and subject to shocks. A shock to money demand combined with fixed money supply makes the purchasing power of Bitcoin highly volatile. Moreover, the predetermined pace of the Bitcoin creation promotes speculation. If the exchange rate Bitcoin/USD can be easily calculated, it is not the case concerning the internal value of the Bitcoin that is its level of inflation. Given a fixed supply of Bitcoins, the exchange-rate of Bitcoin in US Dollar (BTC/USD) relies strongly on the volume of transactions which is some way an expression of the demand. By focusing on the link between the external value of the Bitcoin and its internal value, we can develop a better understanding of the dynamics on the Bitcoin's demand. If the transaction volume explains partly the volatility of the bitcoin, it then becomes necessary to find a solution to stabilize such a transaction volume. The solution adopted here lies in the introduction of a sidechain pegged to the Bitcoin's blockchain (the parent chain) while adding a demurring mechanism. A sidechain pegged to a parent chain makes possible the convertibility of all the private cryptocurrencies blockchain's technology based. Furthermore, introducing a demurrage mechanism into the sidechain contributes significantly to a decrease of the speculation on Bitcoins.

The outline of the paper proceeds as follow: Section 2 presents a literature review. Section 3 reports the methodology and the data. Section 4 discusses the empirical results and propose a solution. Section 5 concludes the paper.

## 2. LITERATURE REVIEW

As Sanchez (2016) explained, an inelastic supply with a volatile demand reinforces the instability of Bitcoin. Luther and White (2014) assert that the unstable purchasing power of the Bitcoin precludes it from becoming a major currency. According to Selmi, Tiwari and Hammodeh (2018) such a volatility makes partly Bitcoin market's riskier but a more profitable market for investors. Contrary to common beliefs, Bouoiyour, Selmi, Tiwari and Olayeni (2016) demonstrated that bitcoin is not a speculative bubble. They assert that the long-term fundamentals are the major contributors of Bitcoin price variation. Gandal & al. (2018) pointed out that suspicious trading activity likely caused the unprecedented spike in the BTC/UST exchange rate in late 2013, when the rate jumped from around \$150 to more than \$1,000 in two months. Griffin and Shams (2018) raise some manipulations of the price of the Bitcoin in US dollar due to substantial distortive effects in cryptocurrencies.

There is an important and ancient literature aimed at coordinating private currencies and public currencies among themselves. We can mention the debate initiated by Adam Smith (1776, Book II, chapter II) on free banking in Scotland. Smith viewed that banks can be left free in their paper-money policies because convertibility between different private currencies was enough to prevent excessive issuance (White, 1984). With the emergence of the first private electronic currencies in the 1990s, the debate on the necessary or non-coordination between public and private currencies has been revived.

The original idea was to coordinate these different electronic currencies through a clearing house (Aglietta and Scialom, 2002). The solution of creating an international automated clearing house online has been investigated but it turned out hard to implement because of the difficulty to find a common standard measurement of value (Heller 2017). The invention of the blockchain technology, about ten years ago, has completely revolutionized the way of conceiving the coordination between private electronic currencies and their links with central banks. The central question has become of how to link together different electronic currencies running on a blockchain technology (Back and al. 2014).

## 3. DATA AND ESTIMATION METHOD

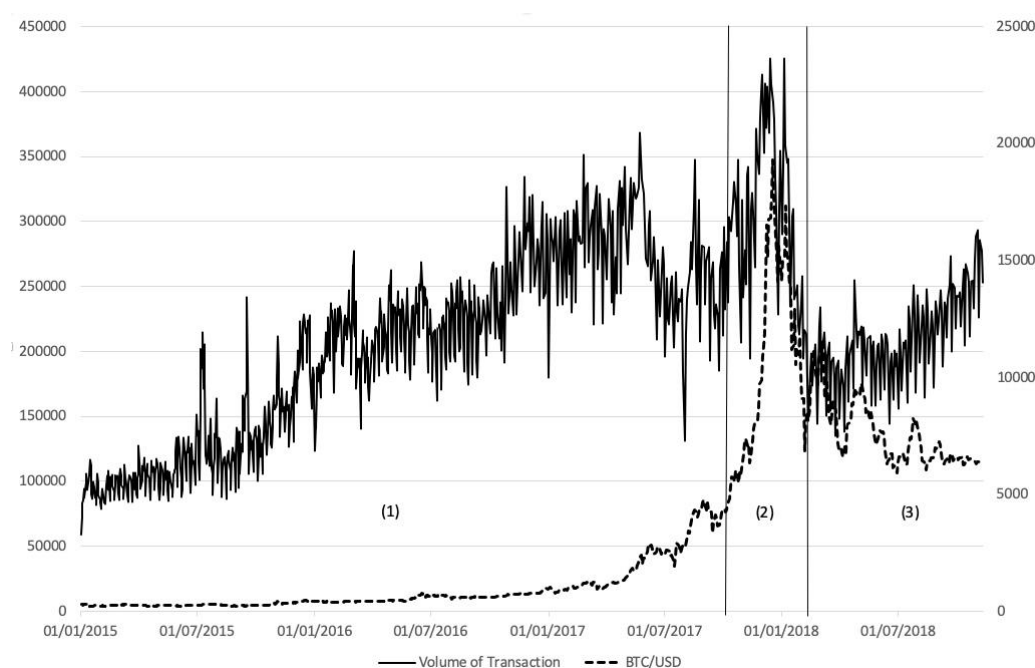
It is well-known that goods or services with inelastic supply (like the petrol or the gas) greater react to demand variations than items with elastic supply. With the Bitcoin, no supply adjustment is possible neither in the short run than in the long run. In the long-run, the pace of Bitcoin's supply slow-down slightly because the difficulty of

mining increases with the power of the network. Along with the inelastic Bitcoin supply, the community's users grows. Such a growing of the number of bitcoin's users pushes up prices that is, the internal value of the Bitcoin which can be estimate by its external value in a public money with legal tender. Therefore, it is difficult to estimate the internal value of the Bitcoin, but it is possible to consider that this value results from an arbitration between Bitcoin's internal demand - measured by the volume of transactions - and the external value of Bitcoin denominated in US dollars. By volume of transaction, we mean the total number of Bitcoin transactions confirmed in the last 24 hours. As for the BTC / USD exchange rate, we use the average market price in USD on the main bitcoin trading places exchanges.

By focusing the long-term relationship between the demand of Bitcoin and the exchange rate BTC/USD, we can divide such a relation in three periods. The first period, from the beginning of the year 2015 to the end of the year 2017, is linked with the take-off of the Bitcoin's adoption by e-money users. During this period of 836 days, the volume of transactions rose in correlation with the value of the Bitcoin in USD. The second period is related to the Bitcoin's speculative bubble from the end of the year 2017 to March 2018. During these approximately three months the speculation bubble was created and finally burst (see figure 1).

Since the bubble burst, the relation still exists but inversely changed. We can observe an inverse relation between the volume of transactions in Bitcoins and the external value of the Bitcoin in US dollar. While the rules governing the bitcoin supply, are extremely clear and measurable, bitcoin demand is rather opaque. However, there are a few quantifiable variables that we do know about bitcoin demand notably with regards of the number of bitcoin transactions performed each day. The existence of a cointegration relationship should exist between the two following time-series namely the daily volume of transactions which is an indicator of the demand and the exchange rate of the Bitcoin in US dollar which is an indicator of the external value of the Bitcoin.

**Figure 1- Exchange-Rate (BTC/USD) and Daily volume of transactions in Bitcoins during the take-off period**



Source: Blockchain Luxembourg S.A.

In the aim of testing such a relation, we perform a cointegration test following the Johansen's approach. The two studied daily time series - provided by Blockchain Luxembourg S.A. - start from the first January 2015 and end the 10 November 2018 that are 1018 observations for each series (see table 1.). By using the Brockwell-Davis methodology (1996), we transform these two-time series by the means of the Box-cox equation, with the value of lambda fixed to zero, in the aim of obtaining their log values.

Variable	Observations	Obs. with missing data	Obs. without missing data	Minimum	Maximum	Mean	Std. deviation
Box-Cox(Volume of Transaction)	1018	0	1018	10,985	12,960	12,124	0,385
Box-Cox(BTC/USD)	1018	0	1018	5,173	9,867	6,736	1,314

**Table 1 - Descriptive analysis**

### 3.1. Unit root tests

We apply two-unit root tests on the transformed series (log values Box-Cox): a Dickey-Fuller test (DF) and a Phillips-Perron test (PP). The model with an intercept is the one that best describes our data. In all cases in the table below the computed p-values are greater than the significance level  $\alpha=0,05$ , one cannot reject the null hypothesis  $H_0$  (see table 2.). There is a unit root in each of the two-time series.

	Volume of Transaction		BTC/USD	
	Dickey-Fuller test (ADF(stationary) / k: 10)	Phillips-Perron test (PP(no intercept) / Lag: Short)	Dickey-Fuller test (ADF(stationary) / k: 10)	Phillips-Perron test (PP(no intercept) / Lag: Short)
Tau (Observed value)	-3,012	0,712	-2,099	1,980
Tau (Critical value)	-3,392	-1,941	-3,392	-1,941
p-value (one-tailed)	0,127	0,869	0,548	0,989
alpha	0,05	0,05	0,05	0,05

**Table 2 - Unit root Tests**

In the aim of checking that a linear relationship between those two series  $I(1)$  that produces an  $I(0)$  series exist we perform a cointegration test following Johansen's approach. The minimum AIC value gives a VAR order estimation of 4 for our system which means 2 lags in difference for the Vector Error Correction Model (see table 3.). It then becomes possible to check that a linear relationship between those two  $I(1)$  series that produces an  $I(0)$  series exists.

### 3.2. Cointegration Tests

Both series have non zero means with no drift and the cointegration relationship as stated at the beginning is not expected to have a linear trend. Therefore, the deterministic trend seems suitable for our test. Again, a model with intercept seems appropriate and we use the Akaike Information Criterion (AIC). In bold, the minimum AIC value gives a VAR order of 3 for our system which means 3 lags in difference for the Vector Error Correction Model (VECM). We can check that there is a good agreement between the chosen criteria (see table 3).



Number of lags	AIC	HQ	BIC	FPE
1	-9,994	-9,986	-9,974	0,000
2	-10,094	-10,080	-10,055	0,000
3	-10,234	-10,212	-10,176	0,000
4	<b>-10,254</b>	-10,225	-10,177	0,000
5	-10,253	-10,217	-10,156	0,000

**Table 3 - VAR order estimation**

The results for both tests, the max eigen test (or lambda test) and the trace test agree on the rank(1) of cointegration of the system or equivalently on the existence of 1 cointegrating relationship between the two series (see table 4 and table 5.). P-values and critical values for both tests are estimated using the surface regression approach described in MacKinnon-Haug-Mechelis (1998).

H0 (Nbr. of cointegrating equations)	Eigenvalue	Statistic	Critical value	p-value
None	0,023	23,680	15,892	0,002
At most 1	0,003	3,452	9,164	0,500

**Table 4 - Lambda max test**

Lambda max test indicates 1 cointegrating relation at the 0,05 level.

H0 (Nbr. of cointegrating equations)	Eigenvalue	Statistic	Critical value	p-value
None	0,023	27,132	20,262	0,005
At most 1	0,003	3,452	9,164	0,500

**Table 5 - Trace test**

Trace test indicates 1 cointegrating relation at the 0,05 level.

Finally, the factorization of the cointegrating matrix is given in the form of the impact matrix (alpha) and the cointegrating coefficients (beta) following the normalization proposed by Johansen (see tables 6 and 7.).

Box-Cox(Volume of Transaction)	0,015	0,005
Box-Cox(BTC/USD)	-0,004	0,002

**Table 6 - Adjustment coefficients (alpha)**

Box-Cox (Volume of Transaction)	-3,411	-0,648
Box-Cox (BTC/USD)	0,487	-0,019
Intercept	37,849	8,956
Normalized to beta. beta = Id.		

**Table 7 - Cointegration coefficients (beta)**

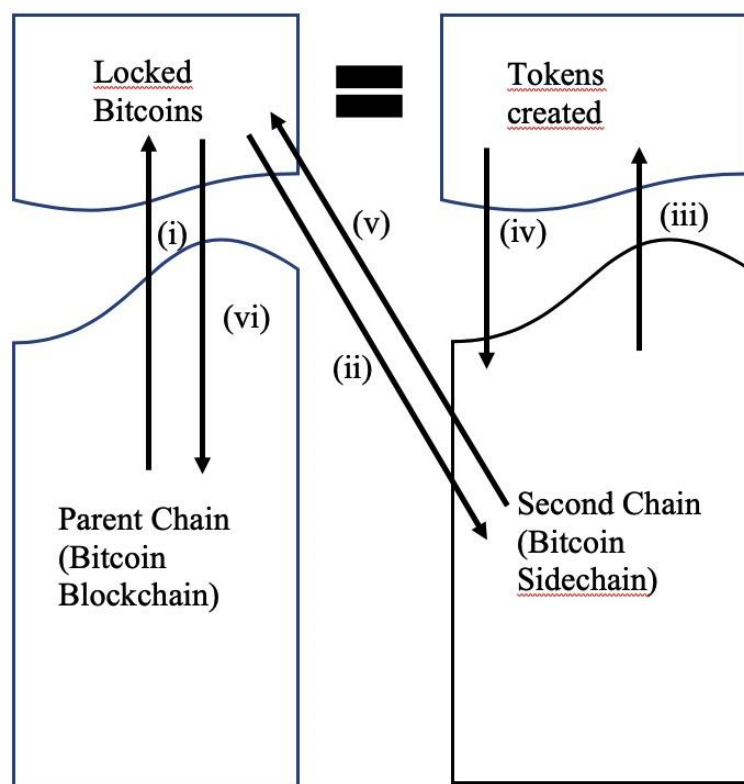
Considering an inelastic supply, the cointegrating relation found here indicate that at least in part, the bitcoin's volume transaction drives prices that is, the internal value of the Bitcoin

#### 4. VOLATILITY OF THE BITCOIN AND THE SIDECHAIN TECHNOLOGY

The cointegration test above leads us to conclude that one cointegrating relationship exists between the volume of transaction in Bitcoins and the external value of the Bitcoin. As the volume of transactions partly explains the volatility of Bitcoin, it is necessary to propose a device allowing to act on the volume of transactions. The solution proposed here lies in the implementation of the sidechain technology in the aim of seamlessly coordinating many cryptocurrencies based on the blockchain's technology.

The sidechain technology is a technology able to connect several blockchains among themselves. A sidechain is a blockchain "pegged" to the main blockchain allowing transfers of key information from one chain to the other. A sidechain is a private blockchain similar to other private blockchains but there is some control over who can send transactions. This sets it apart from open systems, such as bitcoin or ethereum, that any user can join. Instead of being a self-contained system like some other private blockchains, a sidechain is designed as a layer that sits on top or beside of the parent blockchain (for instance the Bitcoin's blockchain). The movement of tokens in the parent chain is basically on another layer within the sidechain, but users and companies have control over their funds since they're tied to the parent blockchain. The sidechain validates data from other blockchains. It is possible to promote the emergence of new gateways between different blockchains. Monetary units can be transferred from one blockchain to another and return back. For instance,  $n$  Bitcoins on a blockchain in Bitcoins can be converted into  $n'$  other digital currency into the blockchain of this other digital currency with a possibility of reversing anytime the transfer. Such gateways between different blockchains are called sidechains technologies. Sidechains are blockchains that are interoperable with each other. A sidechain can carry digital currencies, in which users are able to seamlessly transfer digital money from one blockchain to another. The sidechain mechanism appears to be the solution to a problem well known by economists namely the competition between different private currencies. With a sidechain, digital money users can import the currency of another blockchain.

With the sidechain technology the volatility character of cryptocurrencies blockchain based is cleared. Bitcoin's users are even going to save bitcoins because they know that they can convert anytime their bitcoins in other cryptocurrencies private or public. With the sidechain mechanism a blockchain cannot borrow more funds that it is engaged to do it. Consequently, the risk is cancelled. The other advantage of the sidechain is to minimize competition between blockchains because all the blockchains can rely on one or a small number of blockchains. Despite the bidirectional transferability between the parent chain and sidechains, both are isolated. As pointed out by Adam Back and al. (2014) in the case of a cryptographic break (or malicious design) in a sidechain, the damage is entirely confined to the sidechain itself. Sidechain technologies appear to be a way for the public banking system driven by public central banks to regain control on the proliferation of private digital currencies like the bitcoin. A central public blockchain denominated in a public currency like the Euro or the US Dollar could be created. Such a public and "official" blockchain could overcome the threat of digital bearer money, like the Bitcoin, on the public character of the money. One solution to transfer assets from a parent chain to a sidechain is to provide proofs of possession in the transferring transactions themselves. When moving assets from one blockchain (i.e; the parent chain) to another (i.e; the sidechain), a transaction on the first blockchain is beforehand created for locking the assets. The protocol is the following (see figure 2).

**Figure 2 - Tokens issuance protocol from the Bitcoin's blockchain towards a second sidechain**

(i) An amount of as-yet unspent Bitcoins is locked. The unspent Bitcoins must beforehand be identified because the Bitcoins are not perfectly fungible. One Bitcoin cannot be replaced by another. The locked Bitcoins holder publishes its public key and proves its property by signing with its private key. The locked Bitcoins are sent to a specially formed Bitcoin address designed for this purpose. The locked bitcoins can only be unlocked only if somebody can prove they're no longer being used elsewhere in the network. The locked Bitcoins have a demurrage fee that ensures its circulation. Demurrage is a cost associated with owning or holding the currency. Such a demurrage fee was proposed by Silvio Gesell (1929) to eliminate the privileged position held by money compared with capital goods

(ii) A message containing a proof that a fix number of Bitcoins are locked with the public key of its holder is sent to the Liquid blockchain. The message is coded by the Secure Hash Algorithm SHA-256.

(iii) Peg-in process: The sidechain creates the exact same number of tokens than the locked bitcoins and gives to the locked bitcoins holder the control of them. For every bitcoin pegged into the sidechain one token of the sidechain is unlocked or created.

(iv) The tokens holders can use them to settle transactions in the community of the Second Chain Network.

(v) Peg-out process: The transfer back on to the Parent Chain requires the Locked Bitcoin holder to go through a Federation member of the Second Chain.

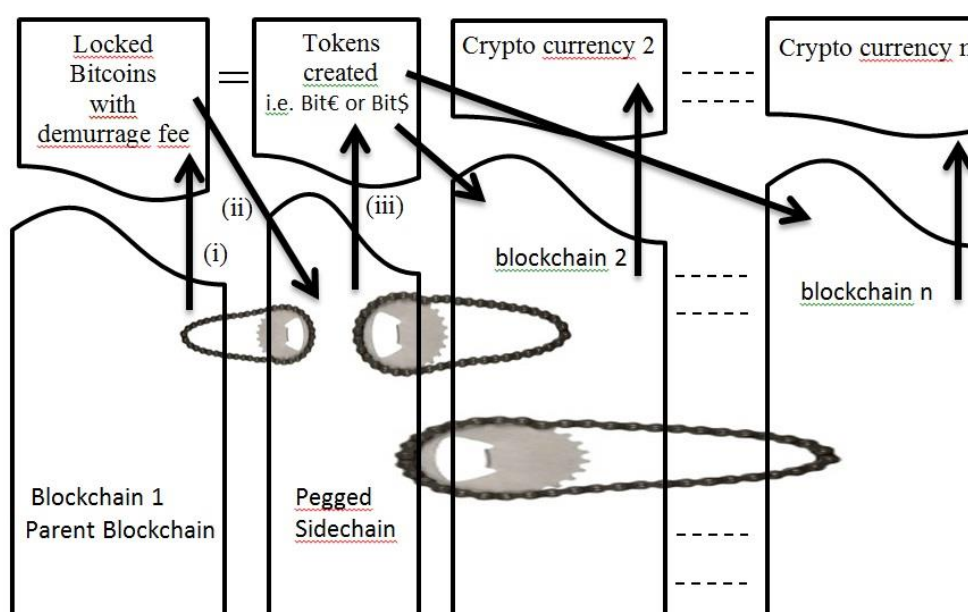
(vi) The locked bitcoins on the parent chain can be unlocked only if a federation member proves they're no longer being used elsewhere in the Second Chain.

In a symmetric two-way peg mechanism, the reverse process is also possible. The holder of newly created tokens in the second sidechain in counterpart of the locked bitcoins has to import proofs of work from the second sidechain to the parent sidechain in order to prove its property of the locked bitcoins. With such a sidechain mechanism, Bitcoins are immobilized on the Bitcoin network (parent chain). Consequently, neither new bitcoins have been created nor destroyed. What is new is the coins (tokens) created on the second chain in counterpart of

the locked number of Bitcoins on the parent chain. Sidechains transfer existing bitcoins from the parent chain rather than creating new ones. They cannot cause unauthorized creation of bitcoins. The maintaining of the security and scarcity of the assets relies on the parent chain (Bitcoin blockchain). The parent chain could be the Bitcoin's one and the sidechain could be one of many public currencies (US Dollar or Euro for instance). A new "BitEuro" or "BitUSDollar" could be created as a sidechain by central banks. If, there is a widespread consensus that the new sidechain is an improvement, it may be more used than Bitcoin. The volatility can be strengthened by the introduction of a demurring process in the pegged sidechain mechanism. The protocol of e-money creation described above is linked to an alternate mechanism of demurrage. A demurring cryptocurrency loses its value over time if unspent. The bitcoins locked depreciate over time. The main advantage of the demurring process is to counterbalance the volatility character of the Bitcoin. Demurrage keeps the currency supply stable while still rewarding miners. It also mitigates the possibility of long-unspent locked coins and creates incentives to increase monetary velocity. A demurring money, called "Freigeld" by Silvio Gessel, has two interesting characteristics for any private cryptocurrency. First, Freigeld is convertible into other currencies and second, it is localized to a certain area (Freigeld is a community currency). If the locked bitcoins on the parent blockchain, like described in the protocol above, are subject to demurrage fees, their circulation is insured and less subject to any speculation or any arbitrage between different cryptocurrencies.

Suppose for example that a certain T-shirt can only be bought with tokens issued by the sidechain at the price of 50 tokens. Such a T-shirt is only available in the "shopping arcade" of the network of sidechain users. The US dollar / token exchange rate is 1 USD for 1 token and the bitcoin exchange rate in USD is 1 bitcoin for \$ 9497.87 (July 30, 2019 price). To obtain the 50 tokens needed to purchase the T-shirt, the bitcoins holder blocks on the parent chain of Bitcoins 0.0053 Bitcoins with a demurring rate of 5.2% per year (rate recommended by Sylvio Gessel in 1929). The sidechain creates 50 token ("Peg-in Process") in exchange for the Bitcoins locked on the main chain and the T-shirt is bought for 50 tokens. Because of the 5.2% per year demurring rate, the T-shirt seller does not really have an incentive to recover the blocked bitcoins with his 50 tokens. If it does after one year ("Peg-out Process"), it will recover only 0.0050244 bitcoins or 47.72 US dollars. It will only do so if the value of Bitcoin against the Dollar appreciates more than 5.2% per year or if the goods or services sold in the sidechain network are not very attractive in terms of quality / price ratio or exclusivity. In other words, the implementation of a demurrage device on the main chain improves the buy / sell relationships within the network of the sidechain. In addition, such a device pushes all sellers in the sidechain network to be competitive and / or provide exclusive goods and services. A demurrage device continuously stimulates economic growth through consumption, reinvestment, and diminishes speculation on private cryptocurrencies.

In the protocol described above (fig 2), sidechains can issue their own tokens. These tokens can be transferred to others blockchains and traded for other assets and currencies, all without trusting a central party (see Figure 3). A parent blockchain (here the Bitcoin Blockchain) has however to play the role of a trusted party for allowing a future redemption. The parent chain is a trusted party around which a monetary coordination of different cryptocurrencies is gradually built.

**Figure 3 - Private Cryptocurrencies coordination with Blockchain of Bitcoins as a Parent Chain**

The arrows (i), (ii) and (iii) in Fig. 3 are the same that those in Fig. 2. From the pegged sidechains, numerous blockchains can be pegged in their turn. The others pegged sidechains can be for instance Litecoin, Ethereum, community currencies, loyalty programs or something brand completely new.

Once the sidechain is operational, it is possible for users to exchange tokens (coins) between blockchains, without necessarily using the peg. This possibility reduces transaction costs.

## 5. CONCLUSION

Well beyond the famous bitcoin's case, the Blockchain's technology is spreading at a very high speed in many markets and not only in the cryptocurrency market. This multiplication of markets comprising both a predictable supply and a demand which is difficult to measure, must be taken into account. By examining the long-term time series on Bitcoins, we can demonstrate that there is a cointegrating relationship between the volume of the transactions, and the external value of Bitcoin expressed in US dollars. This allows us to better understand the determinants of demand for bitcoins namely, a speculative demand due to the rarefaction of Bitcoins over time and a transactional demand related to goods and services tradable on the Bitcoin market. These two components of demand combined with a steadily increasing supply make Bitcoin relatively volatile.

This volatility could be considerably reduced by the use of a sidechain attached to the main chain and including a demurring device. The implementation of a sidechain can gradually shape a reliable private cryptocurrency coordination. This coordination even goes beyond mere use of digital monies (private or public). Create a tradeable digital token can be used as a digital money, like the Bitcoin, but also can be used as a representation of an asset, a virtual share, a diploma, a proof of membership or anything else. Nothing prevents the various blockchains to exchange between them their own tokens. A Sidechain pegged to a parent blockchain forms a reliable cryptocurrency coordination comprising bridges between the different blockchains governing the various private electronic currencies. The study of such a coordination through the use of sidechains between on one side the proliferation of cryptocurrencies based on the blockchain technology and on the other side the public currencies with legal tender, must be deepened.

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## SOCIAL REPRESENTATIONS OF MONEY: CONTRAST BETWEEN CITIZENS AND LOCAL COMPLEMENTARY CURRENCY MEMBERS

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### ABSTRACT

This article analyses the social representations of money from survey data. More specifically, it tests how organizers of a complementary currency system have a distinct perception of money compared to other citizens. The main results confirm the existence of significant differences between the two groups. The structure of their representations shows that for the local currency members money is less tied to official institutions, to the symbol of the sovereign State, to labour and to wages than for the representative population segment. This confirms a number of theoretical studies that see these social innovations as forms of protest against the standard system, questioning the sovereign State currency and close to the concept of unconditional income. Local currencies, through the different social representations of money they contain, could well be drivers of societal change.

### KEYWORDS

Social representations of money, Survey data, Abric method, Complementary currencies.

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## 1. INTRODUCTION

Since 2010, about 40 complementary local currencies have been put into circulation in France, such as the *abeille* in Villeneuve-sur-Lot and the *occitan* in Peyzenas, and a further about 30 are currently being finalised. These represent not-for-profit projects intended to revitalise the local economy, favour short distribution channels and other environmentally friendly practices, combat speculation and support solidarity-based projects and investments. They mainly develop out of civic associations and are tied to the euro (users need to exchange one euro to procure one unit of the local currency). They can only be used within a clearly defined area (usually a department or part thereof) and within a network of service providers who meet the requirements of a charter of values based on the objectives associated with the currency. According to Blanc (2015), these projects are positioned as representing a split from the current system and thereby constitute forms of protest. Menard (2002) suggests that these initiatives reject the historic model of the State currency, which they contrast with monetary localism. Similarly, Guyomart (2013: 51) describes these projects as examples of “subsidiary sovereignty”: “Complementary local currencies seize upon ‘local’ aspects and diversify the system of monetary emission as a complement to that of the sovereign State. They recompose the powers associated with currency and establish a heterotopia by creating alternatives economic spaces.” Baronian and Vercellone (2015) also draw a parallel between what they call “money of the common” and the minimum social income, thereby comparing currencies with a social vocation to movements designed to provide an unconditional income independent of employment.

Complementary local currencies are therefore established as political projects with a view to transforming society through education, communication and the changing social practices that their usage and circulation can generate. To do this, they must succeed in modifying citizens’ social representations of currency, which in turn can have an impact on their relationship with the traditional and dominant forms of commercial exchange. Because social representations constitute a functional vision of reality, they serve as “guides for action” (Abric, 1994: 15) and thereby help determine behaviours. According to Fare and Whitaker (2014), the local currency projects can act as vectors of change when it comes to social representations because they deconstruct the standard framework of values, offer experiences of new practices and lead to civic and participatory actions.

As defined by Moscovici as early as 1961 and by Jodelet (1989: 53), a social representation “[...] is a form of knowledge that is developed and shared socially, with a practical objective that contributes to the construction of a common reality for a given group”. It can therefore be understood to have two components: content (information and attitudes) and the way this content is organised, i.e. its internal structure. So it is not only the content itself but also the arrangement of this content that must be studied. This structural definition of social representations gave rise to many methodological research studies, notably those of Abric (1989; 1994), whose primary contribution in this area was to develop the theory of the “central core” around which every representation is structured. This central core – or system – is the representation’s fundamental element as it determines both its meaning and organizational structure. It includes a limited number of elements that constitute the shared consensual basis for the collective memory and systems of norms to which a group refers.

The central core has one essential property: it is the most stable element in the representation and ensures its long-term survival in a changing and evolving context. It is the element that will most resist change. Any modification of the central core results in the complete transformation of the representation. Alongside this core is the peripheral system, whose elements are also part of a hierarchical order as they may be more or less removed from the central core: when close, they play an important role in cementing the meaning of the representation; when further away, they illustrate, specify or justify this meaning in order to adapt the representation’s core to its actual context (Abric, 2001a). Through these functions, the peripheral system covers the operational aspects of the representation and can be seen as the privileged locus of representational changes over time.

According to Moliner (2001), two main factors have an impact on the central core: social practices and communication. However, it is difficult to modify the central system, especially in the short term, and it would appear that only practices can achieve this (Flament, 2001, in Chapter 2, p. 50 of Abric’s book, notes that “Despite our efforts, we have so far failed to find any trace of a modification of a social representation under the influence of ideological discourse; only social practices seem to have such an effect”). However, the discourses can have an impact on peripheral elements and therefore progressively effect change in representations.



Some research studies have focused on social representations of currency, a fundamental aspect of the way in which human societies are organised. Currency is an extremely complex (Capozza et al., 1995) and polymorphous phenomenon (Snelders et al., 1992), so much so that it is very difficult to identify its parameters and scope. According to Mitchell and Mickel (1999), from a standard economic perspective currency is a utilitarian, ordinary, impersonal and neutral possession, whereas for sociologists and psychologists it takes on emotional and signifying characteristics. Some studies that set out to reveal the symbolic meaning of money<sup>i</sup> have demonstrated that individuals tend to associate multiple meanings with it, including power, security and freedom, which are the most common. In their literature review, Capozza et al. (1992) suggest that currency is associated with four of the most important symbolic elements for human beings: accomplishment and recognition (Kirkcaldy and Furnham, 1993; Tang, 1992, 1993, 1995), status and the respect of others (Goldberg and Lewis, 1978), freedom and control (luxury of free time, autonomy and freedom of choice: Goldberg and Lewis, 1978; Parsons, 1967), and power and access to resources (Goldberg and Lewis, 1978; Parsons, 1967). Elsewhere, Capozza et al. (1995) studied the relationships between three concepts – money, wealth and poverty – within a sample of adults aged between 40 and 60, using free associations with these three inductive terms. One of their findings is that work, which is associated with negative feelings, is a factor that is positively correlated with money and creates a bridge between wealth and poverty. Studies conducted on French samples support this. Vergès (1992) shows that money is closely linked to work and comfort/well-being, while Minibas-Poussard (2003) suggests it is strongly related to power and the objectives people set themselves. Looking at payment methods, Snelders et al. (1992) also find that the items most often associated with currency are notes and coins, which symbolise its legal value and the force of the law.

As far as I am aware, few research studies have analysed the social representations of currency across different subsections of the population or the way they change over time. One recent research avenue is the study of homogenous groups with a view to analysing the social representations that stem from their shared vision. What is striking is that the initial literature on social representations, using increasingly refined methodologies, primarily focuses on sketching the parameters and structures of these representations and how they change over time (see in particular Flament, 2001). The work of Galand and Salès-Wuillemin (2009), Penz and Sinkovics (2013) and Valence and Roussiau (2014) adopt this approach. To my knowledge, when applied to the theme of currency, only Meier and Kirchler (1998) offer endogenous definitions of the profiles of Austrian respondents in terms of their attitudes towards the future introduction of the euro, while Koiv (2012) analyses the different representations of currency by Estonian students before, during and after the introduction of the euro.

This article therefore builds on these previous studies and offers a twofold contribution. The first is theoretical: it provides a comparative analysis between the inhabitants of a particular area and a particular population segment (participants in the local currency project). At the time of writing, there does not appear to be any other study of this type, making this research highly original. This involves testing the hypothesis of Moscovici and Hewstone (1983), according to which sharing specific representations determines the formation or accentuation of a group identity. If the initiators of a local currency project have a strong sense of identity built on their currency, we should observe splits between the perceptions among project members and those of the wider public. It is this postulate that I set out to study in this article, marking its first contribution.

The second contribution is methodological and relates to the composition of the sample. One of the limitations, as I see it, of current research into the social representations of currency (or money) using survey data is that the samples used are not constructed with rigorous methods which would allow the findings to be generalised to the wider population. This is because these samples are not representative (in most cases, for reasons of convenience which are easy to understand, the respondents are psychology students and participants rarely number as many as 300). Only Meier and Kirchler (1998), in their analysis of Austria, use a representative sub-population. I see this as a major bias in the literature and one that is overcome in this article using an analysis of social representations within a representative sample.

This study focuses on a survey conducted in November 2014 in France's Puy-de-Dôme department. In order to compare social representations among the wider public to those of users of a local currency, the sample was composed partly from representative citizens and residents in the department and partly from members of ADML63 (Association pour le Développement de monnaies locales dans le 63). This association was first established in May

2013 and, on 17 January 2015, began to circulate the department's first complementary local currency, known as the doume. So far, the association has no employees and receives no subsidies.

At the end of 2014, when the survey was conducted, the association had 100 members. This number increased fourfold when the currency was put into circulation in January 2015, and the association now has 856 members, a network of 196 service providers and 80,700 doumes in circulation, which, after almost two years in existence, places it above most other local currencies. According to a 2015 report by an inter-ministerial mission to study complementary local currencies and local exchange systems, in April 2014, out of 17 such currencies, the average number of users is 414, with 86 service providers and 26,139 units in circulation. However, these averages are pulled upwards by the eusko, the local Basque currency and the most rapidly expanding in France, which boasts 22 exchange counters, almost 500,000 units in circulation, 6 employees, 2,600 members and 85 service providers. So in terms of averages across the 17 local currencies, if we eliminate the eusko effect, we find that 50% of local currencies have fewer than 150 members, 55 service providers and 11,525 units in circulation. The report also specifies that 7 out of the 17 local currencies studied have fewer than 10,000 units in circulation. Compared to other currencies, the doume is therefore among the largest in terms of the number of members, service providers and units in circulation.

Nonetheless, the doume must manage to transform the representations of as many people as possible if it wants to achieve its ultimate objective of modifying how citizens consume, produce and sell. Analysis of the survey data sheds light on the divergences between the two groups in terms of their social representations, thereby revealing the main items that can potentially serve as vectors of change.

The article is divided into three sections: the first presents the methodologies used to analyse social representations and concludes with a description of the approach adopted; the second presents the survey; and the third offers a discussion and an interpretation of the results.

## 2. SOCIAL REPRESENTATIONS STUDY: METHODOLOGY

The study of social representations raises two methodological problems: that of collecting representations and that of analysing the data obtained (see Rateau et al., 2012 for a review of the literature). There are two main approaches when it comes to collecting the components of representation. The first is interrogative (interviews, questionnaires, inductive panels, monographs) and the second is associative, i.e. based on the spontaneous associations made by respondents in relation to an inductive word. According to Abric (2003b) and Moliner et al. (2002), the associative approach presents several advantages: it allows the researcher to produce data directly based on the expressions of individuals, it is quick to implement and analyse, and it is easy to use and understand. According to Dany, Urdapilleta and Monaco (2015), it is currently the methodology used most often in the structural analysis of social representations.

According to Flament and Rouquette (2003), there are different possibilities when it comes to using associative methods. Two main categories can be identified: non-constraints and semi-constraints which limit the production of words in quantitative (generally no more than 5 words are asked for) and/or qualitative terms (in this case certain types of words are targeted based on their lexical nature, or the semantic field for association is restricted). According to Dany et al. (2015), the method most often used is free association without constraint, which, due to the freedom with which respondents can express themselves, better accounts for the symbolic world which they associate with the theme being studied. In order to understand the structure of a representation, based on a central core and peripheral elements, the data analysis is based on a measurement of the rank and frequency of induced terms; this is known as "prototypical analysis" (Vergès, 1992). Frequency corresponds to the number of times a term is mentioned by individuals, while rank relates to the order in which terms are mentioned.

While one might think that the first induced terms are the most important, here, like Abric (2003c), it is argued that the essential elements may be more likely to emerge after a warm-up period, when a certain level of trust has been established and defence mechanisms among respondents have been attenuated. It is not therefore self-evident that spontaneous rank truly corresponds to the importance of a term in individuals' representations. This is why Abric (2003b, 2003c) proposes a new method which involves asking respondents themselves to retrospectively rank the words they have used in order of importance. This came to be referred to as the "order of im-

portance" technique, as distinct from "order of appearance". The former was therefore chosen to conduct this analysis of social representations of currency. Other techniques involving ranking in pairs, scales or "bundles" have been suggested to rank items provided by respondents (see Abric, 2001 and Seca, 2001 for a review), but these have the disadvantage of being highly complex and time-consuming when it comes to conducting the survey. For an overview of the available methodological options, see Doise, Clémence and Lorenzi-Cioldi (1992). Moreover, the structure of a representation studied with a prototypical analysis should also be confronted to tests with different methods, like those developed by Moliner (1989), Guimelli and Rouquette (1992), Moliner (1993), or Lo Monaco, Lheureux, Halimi-Falkowicz (2008) for example. Nevertheless, these methods are also time-consuming when it comes to conducting the survey. Because of the context of the survey, which is presented in the next section, it was unfortunately not possible to implement such tests.

In line with Abric (2003b, 2003c) and Dany et al. (2015), a simple analysis based on importance/frequency was therefore chosen. It is also worth noting that existing research studies of social representations show that they are largely influenced by social practices (Flament, 2001). Analysis of the effect of practices is generally done by comparing group proximity between two extremes: those who regularly practice something and those who do not, based on 3 criteria suggested by Abric (2001): level of practice, degree of knowledge and degree of involvement. This article clearly shares this research perspective, given that it endeavours to determine the extent to which belonging to a local currency influences social representations of currency among participants.

Lastly, if we assume that members of the association for the development of the local currency are citizens like any others, then it is possible to interpret the differences obtained in terms of the impact of association membership on the changes in social representations by adopting a dynamic perspective of changing social representations using the kind of experiment conducted by Flament (2001).

### 3. SURVEY

The questionnaire was created in collaboration with students on the DASS (law and administration in the health and social sectors) Masters programme at the school of law in the Université d'Auvergne, as part of the "survey technique" class. This questionnaire was developed as part of a broader project with support from the Conseil Régional d'Auvergne, and as part of a call for tenders for action research on social innovation. The objective is to help ADML63 establish a communication strategy and acquire impact and monitoring tools for its local currency (doume) project. The questionnaire includes 73 questions divided into 4 main sections: currency and the economy, currency usage, lifestyle and sociodemographic questions. The analysis contained in this article focuses primarily on the first questions in the first section.

The segment of the sample made up of citizens was composed using the quota method, in an effort to most closely represent the composition of the Puy-de-Dôme population by retaining the following criteria: gender, age, socio-professional category and urban/rural place of dwelling. The 33 students on the 2014/2015 Masters programme were asked to interview 12 people and endeavour to respect the proportions of the 4 criteria cited above. A total of 392 questionnaires could be used (4 had to be rejected because they were incomplete or contained errors). Implementation of the quota method meant that the students quite intensively used family members, friends, neighbours and indirect acquaintances in order to find people who matched the required criteria. However, some students not from the region and who therefore had less substantial networks issued the questionnaire to passers-by in the street or at the Jardin Lecoq, a park in the centre of Clermont-Ferrand. A small proportion of the questionnaires was completed by allowing the respondents to take away the forms where there were time constraints, schedule clashes or other difficulties. But the vast majority of them took place either face-to-face or by telephone. This was done in November 2014.

According to INSEE (2014)<sup>ii</sup>, based on the most recent census (2011), the population of Puy-de-Dôme is 635,469. The reference population was limited to people aged 18 to 80 in order to include only those with potential financial autonomy. Eliminating these two age categories meant a reference population of around 500,000. The table below presents the sample composition in respect of the proportions represented within Puy-de-Dôme:

Criteria	Sample	Puy-de-Dôme population
Number of people	392	500,000
Men/women	52% women	51% women
Rural/urban	26% rural	30% rural
Farmers	1.53%	1.40%
Artisans/traders	4.1%	3.65%
Managers	12.2%	8.20%
Intermediary professions	17.85%	14.30%
Employees	21.2%	17%
Workers	10.5%	13.83%
Inactive	17.86%	10.70%
Retired	20%	30.94%
18-24 years old	13.26%	12.80%
25-39 years old	26.53%	24.36%
40-54 years old	28.82%	27.57%
55-64 years old	16.32%	18.43%
Over 65 years old	17.1%	16.84%

**Table 1. Comparative statistics: sample and parent population**

We can see that with the quota method the proportions of the parent population are respected on the whole in terms of the 4 criteria taken into consideration, with the exception of retirees, who are less represented in the sample. The sample also slightly under-represents the rural population. But on the whole, the 392 respondents are representative of Puy-de-Dôme residents based on the four main criteria.

In respect of the group of local currency members, the questionnaire was issued electronically in November 2014 to all members with a response deadline of 3 weeks. 52 of the association's 100 members at the time provided complete responses, a response rate of just over 50%, which is slightly higher than the rate generally obtained in remotely conducted surveys (see in particular Penz and Sinkovics, 2013, who obtained a rate of 25%).

Given that this article focuses on a prototypical analysis of induced terms (Vergès, 1992), it is primarily based on the data obtained from the following question: "If I say 'currency', what words come to mind (maximum 8)?" Respondents were then asked: "Please rank these words in order of importance: the 1st, 2nd, 3rd most important for you, etc."

The items generated by the inductive term currency, as well as the ex-post rankings of importance produced by participants, made it possible to conduct an importance/frequency analysis in order to reveal the content of the representation and its structure for each participating group.

#### 4. RESULTS AND DISCUSSION

Before analysing the social representations of currency in the two survey groups, Table 2 presents some general descriptive statistics:

	Non-members	Members	Total
Number of respondents	392	52	444
Number of words mentioned	1764	355	2119
Average number of words per respondent*	4.50	6.83	4.73
Number of distinct words	331	175	422
Percentage of distinct words	18.8	49.3	19.99
Number of hapaxes <sup>iii</sup>	198	126	260
Percentage of hapaxes compared to distinct words	59.81	72	61.61

**Table 2. Descriptive statistics of items induced by the term currency**

\*The mean difference between the two groups is statistically significant to a risk threshold of less than 1%

The first observation is that local currency members produced more words, associating an average of more than six words to the inductive term currency, compared to fewer than five in the citizens group.

Word	Frequency	Word	Frequency
money (argent)	270	Payment (paiement)	26
Coins (pieces)	159	Power (pouvoir)	23
Exchange (échange)	137	Dough (sous)	18
euro	139	Work (travail)	18
Note (billet)	61	Currency (devise)	16
Economy (economie)	46	Wallet (portemonnaie)	16
Bank (banque)	45	cash (cash)	14
Purchase (achat)	44	Poverty (pauvreté)	14
Wealth (richesse)	38	Pay (payer)	14
dollar	33	Speculation (speculation)	14
franc	32	Gold (or)	13
Trade (commerce)	28	Consumption (consommation)	12
Value (valeur)	29	Dosh (fric)	11

Expense (dépense)	27	Security (sécurité)	11
Cash (liquide)	27	Bartering (troc)	11

**Table 3. The 30 terms associated with currency most frequently mentioned by all participants<sup>iv</sup>**

The frequency of words obtained is a standard reflection of Zipf's law, as can be seen from Figure 1 in the appendices. The first items have a high frequency, which then significantly decreases such that more than half of all terms appear only once. This means that an item appearing just 4 times in the entire corpus has a very high occurrence compared to more than half of the set of words.

The following table presents the frequency analysis for the two sub-populations and shows, based on a Chi-squared test (conducted using R.Temis), that both groups display specific word frequencies when compared to the overall frequency for the corpus as a whole.

	Overall frequency	Frequency among non-members	t value	Frequency among members	t value
money	270	252	5.1***	18	- 5.1***
euro	139	133	4.5***	6	- 4.5***
coins	159	149	3.9***	10	- 3.9***
speculation	14	6	- 3.2***	8	3.2***
local	4	0	- 3.2***	4	3.2***
exchange	137	100	-3***	37	3***
expense	27	27	2.5***	0	- 2.5***
gold	13	7	-2.2**	6	2.2**
distribution	4	1	-2.1**	3	2.1**
dollar	33	32	2.1**	1	-2.1**
poverty	14	8	-2.1**	6	2.1**
franc	32	31	2**	1	-2**

desinge	2	0	-1.9**	2	1.9**
doume	2	0	-1.9**	2	1.9**
fluidity	2	0	-1.9**	2	1.9**
givechange	2	0	-1.9**	2	1.9**
time	2	0	-1.9**	2	1.9**
buy	5	2	-1.8**	3	1.8**
market	5	2	-1.8**	3	1.8**
note	61	56	1.7**	5	-1.7**
cash	27	23	1.5*	1	-1.5*
finance	10	6	-1.5*	4	1.5*
injustice	3	1	-1.4*	2	1.4*
link	3	1	-1.4*	2	1.4*
tool	5	1	-1.4*	2	1.4*
poor	3	1	-1.4*	2	1.4*
bartering	11	7	-1.3*	4	1.3*
freedom	7	4	-1.3*	3	1.3*

**Table 4. Group-specific terms with a 10% risk of error<sup>v</sup>**

Note: \*\*\* indicates that the Chi2 statistic is significant with a 1% risk of error, \*\* a 5% risk and \* 10%.

The results reveal that the items money, euro, coins, expenses, dollar, franc, note and cash are all over-represented in the citizens group. It is striking that these terms not only relate to standard liberal thinking in terms of the neutrality of currency but also to the symbol of State sovereignty (euro, dollar, franc, coins and note), in line with Snelders et al. (1992). In contrast, in the group of association members, these terms are under-represented, revealing that for them currency is much less linked to the sovereign State, in line with the perspective of Guyomart (2013). Similarly, the most significant items for currency holders are speculation, local and exchange. Looking at the other over-represented words in this group, we find poverty, debt, distribution, finance, barter and freedom. This shows that participants in the project associate the currency with social phenomena, thus departing from the idea that currency is neutral. This supports Blanc (2015), Menard (2002) and Guyomart (2013). These initial results clearly reflect the hypothesis of Moscovici and Hewston (1983), according to which a group is defined by shared social representations which, on this basis, are markers of group differentiation. The split between the two sub-populations therefore makes sense. From there, the prototypical analysis allows us to identify and compare the different elements that make up the two groups' social representations of currency. By combining the rank and frequency of the induced terms, this analysis attributes the elements potentially identified either to the central or peripheral system of these representations. This leads to a table with four boxes that depict the double representational structure and their interpretations, presented in appendices 2 (table 6).

The results obtained using this methodology, for each group, are presented in the appendices in Tables 7 and 8. These show that the central core of the representation of currency in the citizens group comprises 14 terms; in

the members group this figure is just 12. So even though on average members associated more words with currency than citizens, their central core is just as dense.

A systematic comparison was then carried out, looking for the presence or absence of shared words between the two groups in the different sections of their social representations of currency. An overview of this is provided in the table below:

Citizens	Members
1. Central words common to both groups' representations	
money, exchange, pay	
2. Words central to one group and completely absent from the other	
dosh, Banque de France, happiness	local, nothing for nothing
3. Words on the near periphery of one group and completely absent from the other	
expense, change, travel, country, Europe, inflation, investment, portfolio, abba, stock exchange, cheque, shopping, cost, yen	
4. Words central to one group and on the near periphery of the other	
coins, euro, payment, cash, security, work, salary, need	trade, power, consumption, bartering, freedom, finance, buy
5. Words on the near peripheries of both groups	
note, economy, bank, purchase, wealth, value, currency, wallet, cash, poverty, gold, speculation, savings, inequality, purchasing power, live, independence, means, tool, distribution, metal	

**Table 5. Presence/absence of words shared by the social representations of both groups**

The first section in Table 5 reveals that only three words are present in the central cores of both groups: money, exchange and pay. These terms essentially refer to the exchange function of currency. Of these three items, money was mentioned the most frequently. This is a more “concrete” term than currency and can, I believe, therefore potentially induce more feelings and opinions<sup>vi</sup>. So it is probable that the two sub-populations do not associate the same meaning or the same values with this item. A multiple choice question was therefore given to participants: “What essentially does money represent for you?” Respondents were asked to choose 2 words from the following list comprising 4 words with mostly positive connotations and 4 with mostly negative connotations:

- |              |         |              |            |
|--------------|---------|--------------|------------|
| - Fulfilment | - Power | - Security   | - Success  |
| - Injustice  | - Harm  | - Corruption | - Conflict |

For 70% of respondents in the citizens group, money was associated with security, while 33% associated it with success. These mostly positive associations were only found among 42% and 4% respectively of members. This reinforces one of the findings of the prototypical analysis, which revealed that security is in the central core of the citizens' representation, but in the near periphery of that of the members group. Wealth and security are items regularly found in the results of the literature: Vergès (1992) found wealth to be in the central core and security in



the distant periphery; Minibas-Poussard (2003) found these two terms to be in a zone of ambiguity. In my results, wealth can also be located in the near periphery for both groups.

In contrast, 38% of the local currency holders associated money with injustice and 37% with corruption (compared to 17% and 18% respectively in the citizens group). These results suggest that ADML63 members have a much more negative opinion of money and therefore of currency since they associate it with much darker phenomena (corruption and injustice) than other citizens, who more closely link it to security and success. This is reinforced by the fact that, like Vergès (1992), we find happiness at the heart of the citizens' representation, a term that is completely absent from that of the members group. This also corroborates the findings of Kirkcaldy and Furnham (1993) and Tang (1992, 1993, 1995), who show that currency has a symbolic value of accomplishment and recognition, values that were also absent from the representations of ADML63 members. The presence of the term power in the central core of the members' representation is also in line with the findings of several studies, in particular Capozza et al. (1995), Minibas-Poussard (2003), Goldberg and Lewis (1978), Wernimont and Fitzpatrick (1972), Goldberg and Lewis (1978), Parsons (1967) and Vergès (1992).

The second and third sections of Table 7 presents the elements of the citizens group's central core and near periphery (2), which are completely absent from the representation of the other group. These include Banque de France, country, Europe, inflation, investment, portfolio, stock exchange and yen, all of which clearly relate to official State institutions. These results support Snelders et al. (1992), who found that the items most associated with the word currency were coins and notes, symbols of State sovereignty, and which are also found in the two groups in this study (coins and euro in the central core of the citizens group and near periphery of the members group, and note in the near peripheries of both groups). For ADML63 members, currency therefore seems to symbolise a sense of attachment to a nation and its institutions. In contrast, only the term local is completely absent from the social representation of non-member respondents, while it is at the heart of that of the local currency holders. So while currency continues to be a symbol of State sovereignty for citizens, it becomes a symbol of joint ownership for ADML63 members. This supports the findings of Menard (2002) and Guyomart (2013), who show that local currency initiatives challenge the State monopoly over monetary sovereignty and lend currency a dimension of proximity. According to Menard: "Contrary to the dream of monetary sovereignty controlled by and constituent of the State, the idea of local currency most often [...] addresses concerns of proximity" (2002: 12). For Guyomart: "Complementary local currencies seize upon 'local' aspects and diversify the system of monetary emission as a complement to that of the sovereign State" (2013: 51).

Similarly, it is interesting to note that among the central words of Puy-de-Dôme residents and those on the near periphery of ADML63 members' representation, we find work and salary<sup>vii</sup>. This supports a certain number of research studies. In Vergès (1992), work was found to be in the central core and salary in the ambiguous zone, while in Minibas-Poussard (2003) income/work was present in the zone of ambiguity. However, it is likely that the results depend in part on whether or not respondents are in employment. The sample was therefore divided into employed and unemployed respondents in order to compare the social representations of the two groups across the overall sample but also those of employed/unemployed members and employed/unemployed non-members.

In the two categories (employed/unemployed), across the entire sample, work is found in the central core. It would therefore appear that the difference is between members and non-members rather than between the employed and unemployed when it comes to the place of work in their representations of currency. In contrast, the distinction between employed and unemployed seems relevant for the item salary. For respondents in employment, it is central to their representation, but only appears on the distant periphery in the case of unemployed respondents. When a further subdivision between members and non-members is used, salary appears in the central core of non-members in employment, but in zone 3 for members in employment, which seems to reveal a particular difference. Similarly, for unemployed non-members, salary is in the distant periphery and is completely absent from the representation of unemployed members. It therefore emerges that salary and work lie more on the periphery of the representations of members than in the case of citizens, even when employment status is taken into account. If one supposes that at the outset members shared the same representation as citizens who were uninitiated to the local currency, then it is possible that the words work and salary, which initially belonged to the central core, shifted towards the periphery in the case of members. Members can therefore be said to have

somewhat dissociated work and salary from currency. This structural difference in a social representation can also be constituent of the group (Doise, 1985). This is a particularly interesting aspect given that complementary currency projects are close to the values of those who advocate for basic income levels (Bresson, 1984), universal dividends (Foucher, 2012), the relative theory of currency (Laborde, 2010) or the guaranteed social income (Monnier and Vercellone, 2007; Mylondo, 2010, 2011; Baronian and Vercellone, 2015). These are concepts designed to disconnect monetary means of survival from the need to work. Our results therefore show that for participants in the complementary currency project the items work and salary are of less central importance in their representation than in that of other citizens. This characteristic makes them potentially more likely to be sympathetic towards the values inherent in initiatives to provide a basic income.

The fourth section of Table 7 reveals that the terms trade, power, consumption, bartering, finance, freedom and buy<sup>viii</sup> are central to the social representation of members and on the near periphery (zones 2 or 3) of that of the citizens group. Referring to Abric (2001), and considering that the words in zones 2 and 3 are likely to cause a shift in social representations, the items bartering, finance and freedom can lead to changes in the social representations of the greatest number. And if we adopt a dynamic analytical approach like that of Flament (2001), then it is likely that those who placed the terms bartering, finance and freedom in their ambiguous zone can be encouraged to support the local currency (which identifies with the concept of bartering and advocates freedom) and/or change their social representations of currency.

Similarly, the final section in Table 6 lists the words that are common to zones 2 and 3 in each group. Of these, distribution and independence appear as values that are defended by local currencies, poverty and inequality as phenomena to which such currencies are sensitive, and speculation as an economic activity which they combat. This suggests that more intensive use of these words in the association's communication strategy could attract more people to the project, since they are also found in the social representations of the citizens group. The term speculation is particularly noteworthy. Even though this word appears to be specific to the members group (see Table 4), it lies only on the periphery of their social representation (in zone 2, i.e. highly frequent but of little importance). These are not contradictory findings, since the specificity analysis does not take into account importance but only frequency. Speculation is not at the centre of the social representations of local currency holders but rather in zone 2, as in the case of citizens. However, it is once again worth asking to what extent this term represents the same value for these two sub-groups. To address this, the study included a closed question with just one possible answer: "What do you think of speculation?"

- It's a good thing, it rewards risk-taking
- It is normal for each individual to seek profit
- Unfortunately, there is no alternative
- It's scandalous, there should be no such thing

87% of members gave the response, "It's scandalous, there should be no such thing", whereas 65% of citizens believe it is a "good thing" or "normal" or "there is no alternative", and only 33% consider it scandalous. So while speculation is an important item in the social representations of both groups, it is not seen in the same light.

## 5. CONCLUSION

This article makes a twofold contribution. First, it provides a study of social representations of currency among citizens based on a survey of a representative sample of residents in France's Puy-de-Dôme department and on a prototypical analysis (Vergès, 1992). It therefore builds on the tradition of structurally analysing social representations, which so far has paid little attention to monetary objects and has rarely used representative samples.

In the citizens group, the core of their representation of currency contains terms that essentially refer to official institutions (money, coin, euro, Banque de France) and to the functions of currency (trade, payment and pay). These items are also symbolic of State power and official institutions. These results support those of Snelders et al. (1992). It would therefore appear that standard economic thinking, which presents currency as a neutral veil and as a symbol of State sovereignty, has been widely adopted by civil society. The presence of the terms security,

happiness, need and work in the central core of this group's representation is also a standard finding in the literature (see in particular Vergès, 1992 and Minibas-Poussard, 2003).

Second, the article studies the extent to which members of ADML63 who carry the complementary local currency (doume) perceive it in a way that is distinct from the wider public. The results obtained revealed a certain number of perceptions specific to the group and support previous theoretical research on the values and beliefs underpinning complementary currency initiatives.

Three salient facts emerge in particular. The first is that members mention many more words with symbolic content or which express certain values (e.g. speculation, distribution, poverty, freedom and injustice) when compared to other citizens. They also have more negative opinions of money, which they more widely associated with injustice and corruption; the same is true of speculation, which they see as scandalous, while most respondents in the citizens group see it as a "good thing", "normal" or that "there is no alternative". This is in line with the findings of Blanc (2015), who showed that local currencies are a form of protest against the standard system. Furthermore, the term local is central to the representation of members, while items symbolising attachment to the nation and its institutions (e.g. Banque de France, country, Europe, inflation and stock exchange) – central to the representation of citizens – are completely absent. Similarly, coins and euro are found in the central core of the citizens group's representation, but only on the near periphery in the case of local currency holders. This supports Menard (2002) and Guyomart (2013), who argue that local currency initiatives challenge the State monopoly over monetary sovereignty and lend currency a dimension of proximity.

Finally, the results of this study show that for participants in the local currency project the items work and salary lie on the periphery of their representation, while the same terms are found in the core of that of the citizens group. This appears to suggest that members somewhat disconnect currency from the fact of having a job, thus aligning them with advocates of a basic income, as suggested by Mylondo (2010, 2011) and Baronian and Vercellone (2015).

The challenge facing local currencies is how to ensure that the wider public will gradually dissociate currency from its functions, from the symbols of the State and its official institutions, from success and happiness, from work and wages, begin to associate it with real economic and social phenomena and their "local" area, and develop a more critical view of the system. If we adopt the perspective of Flament (2001), for whom social practices have the greatest effect when it comes to changing social representations, then the challenge is to convince the greatest number possible to use the symbolic medium that is local currency. To do this, it would seem reasonable to begin with those citizens who are least removed from the values of local currency holders and ultimately extend these views to those most removed. But how can the distance between citizens and these values be measured and using which criteria?

The depth of our questionnaire, which includes 73 questions (opinions about the monetary, economic and financial system, consumption and saving practices, world vision and sociodemographic characteristics), should make it possible, in line with Galand and Willemin (2009), Penz and Sinkovics (2013) and Valence and Roussiau (2014), to sketch profiles based on specific characteristics and measure the distance separating ADML63 members from non-members. This will be the focus of a future article.

This contribution could provide socially innovative complementary local currencies with a new tool allowing them to appreciate the distance that separates them from other citizens and with indicators of their impact on how beliefs change and on perceptions of currency itself. As already pointed out, "representations are guides for action" (Abric, 1994: 13). If, as suggested by Fare and Whitaker (2014), they succeeded in shifting social representations through their various actions, local currencies could generate changes in the behaviour of citizens and therefore major changes in society as a whole.

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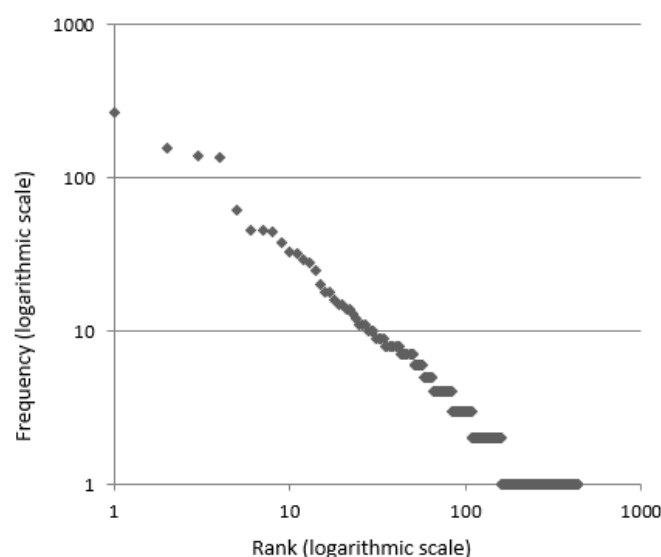
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## APPENDIX

**Figure 1. Rank/frequency analysis of words in the corpus**



It would appear that the words mentioned by participants are a standard reflection of Zipf's law (or the Pareto principle). The graph shows a linear relationship between the frequency log and rank log of each word's appearance. There appears to be a constant such as  $frq = K/rank$ . Here the first word, money, has an occurrence of 270.  $K$  therefore takes on a value of 270, such that the "law" predicts that the second word will have a frequency of  $270/2 = 135$  and the 5th a value of  $270/5 = 54$ , which corresponds overall to the findings in this sample, except that the 2nd to 4th items have a higher occurrence than predicted by Zipf's law. From the 270th item, the terms are hapaxes.

	High importance <sup>ix</sup>	Low importance <sup>x</sup>
High frequency	Central core (CC, SR1)	1 <sup>st</sup> Periphery (SR2)
Low frequency	Ambiguous zone (SR3)	2 <sup>nd</sup> Periphery (SR4)

**Table 6. Components of a social representation**

Based on this table, we can visualise four scenarios:

Box 1 – Core zone: high frequency and high importance

Box 2 – First periphery: high frequency and low importance

Box 3 – Contrasted elements (ambiguous zone): low frequency and high importance

Box 4 – Second periphery: low frequency and low importance

Box 1 is likely to contain the primary elements of the representation. Box 4 represents the distant periphery, which can be transformed without fundamentally changing the representation itself. Vergès (1994: 238) interprets the ambiguity of zones 2 and 3 as “potentially destabilising, possible sources of change in the representation”. In relation to the items in box 3, Abric (2003c: 64) says they can “reveal the existence of a minority subgroup with a different representation, one whose central core would be made up of the element (or elements) contained in this box, in addition to the central core identified in box 1”. According to Flament (1987), these peripheral elements constitute the representation’s “bumper”. The central core resists change as its transformation would result in complete upheaval. The peripheral system therefore functions as a defence system for the representation. It is in this peripheral system that contradictions can appear and be tolerated. In most cases, representational changes involve a transformation of the peripheral system: change in weighting, new interpretations, inclusion of contradictory elements, etc.

Tables 7 & 8 present the social representations of citizens and ADML63 members respectively. In order to limit the number of words presented and make the table more legible, we have removed the hapaxes from boxes 3 & 4.

<b>CC SR1: 14 items</b>	<b>SR2: 40 items</b>
money, coins, euro, exchange, payment, cash, security, work, dosh, pay, salary, banquedefrance, happiness, need	note, economy, banker, purchase, well, dollar, franc, expense, value, trade, power, though, currency, wallet, cash, change, pinkfloyd, travel, poverty, gold, consumption, price, contrary, Europe, inflation, investment, portfolio, speculation, bartering, abba, stock exchange, cheque, shopping, cost, savings, inequalities, credit, moolah, pleasure, yen
<b>SR3: 120 items, 33 non-hapaxes presented</b>	<b>SR4: 159 items, 49 non-hapaxes presented</b>
freedom, business, liquidity, purchasingpower, live, international, leisure, financialinstitutions, finance, currency, policy, independence, purchase, small-coins, fluctuation, well-off, europeancentralbank, profit, expensive, trader, commune, comfort, constraint, convert, ease, bills, fortune, bread, profit, timeismoney, endofbartering, button, monetary value	rich, exchangerate, cent, pound, transaction, collection, retailer, taxes, painter, spondoolicks, capital, crisis, exactchange, account, devaluation, dinar, state, european, imf, world, monde, louisdor, solidarity, pesos, small, yellowcoins, giveback, singe, unit, trust, debt, share, conflict, sale, future, capitalism, card, bankcard, dhiram, ecu, finance, link, global, national, paper, tips, health, piggybank, small, cashflow

**Table 7. Social representation of currency in the representative sample of Puy-de-Dôme residents**

<b>CC SR1: 12 items</b>	<b>SR2: 14 items</b>
exchange, money, trade, power, pay, consumption, bartering, finance, local, freedom, buy, nothingfor-nothing	purchase, coins, bank, speculation, economy, euro, value, poverty, gold, note, work, wealth, wallet, distribution
<b>SR3: 76 items, 13 non-hapaxes presented</b>	<b>SR4: 69 items, 13 non-hapaxes presented</b>
payment, currency, savings, rich, inequalities, capital, trust, independence, live, injustice, link, means, tool	dough, price, credit, moolah, debt, market, share, work, desinge, doume, fluidity, givechange, time

**Table 8. Social representation of currency among members of the local currency association**

<sup>i</sup> Economists use the term currency, while the other social sciences prefer money (Baumann et al., 2008). For Ould-Ahmed (2008), in reality both terms describe the same thing. This differentiation is therefore essentially a mark of distinction between disciplines. This article uses the terms money and currency indiscriminately. Furthermore, given that local currencies present themselves as currencies rather than as money, what is important is to understand what this term means for citizens and what they associate it with.

<sup>ii</sup> [http://www.insee.fr/fr/themes/donnees-locales.asp?ref\\_id=evo2011&typgeo=DEP&search=63](http://www.insee.fr/fr/themes/donnees-locales.asp?ref_id=evo2011&typgeo=DEP&search=63).

<sup>iii</sup> A “hapax” is a term that appears only once in a corpus. As a general rule, they represent more than 50% of a corpus, which is the case here.

<sup>iv</sup> Initial French word in parentheses.

<sup>v</sup> Where the value of the test statistic is greater than zero, the term considered has a frequency that is statistically higher than the overall frequency; the frequency is statistically lower when the value is negative.

<sup>vi</sup> This may also be the reason why psychologists, sociologists and ethnologists prefer this term over currency.

<sup>vii</sup> It is noteworthy that the term job was not mentioned by a single respondent.

<sup>viii</sup> The term buy is however very close to purchase, which is found in zone 2 in both sub-groups.

<sup>ix</sup> The rank of a word is considered to be of “high importance” when it is below the average rank of all words.

<sup>x</sup> The rank of a word is considered to be of “low importance” when it is above the average rank of all words.