

CO-FINANCING ARRANGEMENTS USING CRYPTO-CURRENCIES

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Abstract- We use the frameworks of crypto-currencies and public-private partnership model of infrastructural development. As we speak, the crypto currency treads the path towards a time where it provides an alternative to the present currencies in a way restricting the numbers of coins which could be mined. The inclusive sustainable growth model speaks of reforms in the taxation policies pertaining to crypto currency with establishment of dedicated security and exchange board, governing and setting the norms for investment.

Following this, tapping the infrastructural gap in the country, governmental projects be launched with special bonds for crypto currency investors. This would not only increase the usage and value of crypto currency but parallel to that would engage the investors, institutions and citizens alike, in the infrastructural development of the nation. The model with robust regulatory framework for crypto currency promises to take the developing nations a way ahead with better investment opportunities and nations including India, Brazil, Indonesia, etc. appeal to be the haven for sustainable industrial growth.

Categories and Subject Descriptors: [International Private Finance]: —*Crypto-currencies, PPP, Bitcoins*

I. INTRODUCTION

Crypto-currencies like bitcoin are being used at an exponential rate as they have low inflation and low collapse risk. One of the biggest problems with currencies used around the world is inflation. Over time, all currencies lose purchasing power at a rate of few percents per year mainly because governments keep printing more money. With crypto-currencies like bitcoin, the system itself is designed to make the currency finite (21 million bitcoins can exist). The crypto-currencies do not depend on governments which fail occasionally and therefore are not regulated by any body, thus acting as a digital decentralised form of currency. Purchases using crypto-currencies are generally transaction cost free and if any cost is charged, it is quite less. Using banks and other financial institutions makes things complicated and slow, whereas using crypto-currencies to transfer money takes only a few seconds. The infrastructure for payments and the costs incurred on transferring money are quite less in crypto- currencies. Crypto-currencies are easy to carry and transactions are stored in public ledgers assigning unique identifiers to each individual. Despite the aforementioned benefits, a lot of risks also exist with the use of digitalised currencies like not being able to trace purchases through bitcoins is a point of major concern among governments with many illegal e-commerce stores rising. As of now, the problems bitcoins face are that they can be lost if someone hacks into your account and gain access of your bitcoins. Bitcoins are still in an early stage of development and are hard to trade, not accepted at many stores and too volatile with prices changing by the free market regulated at the world level.

Managing the risks associated with crypto-currencies with increased opportunities for use can act as an International Private Finance for developing nations like India to improve

business environments and attract investors. Using a Public Private Partnership (PPP) model with focus on business and development innovation in association with multi national companies can further increase Foreign Direct Investment in India through risk free, quick transactions using crypto-currencies along with low tax/tax free bonds for investing in infrastructure by people in India.

The paper aims reforms at the governmental level, primarily involving policy reforms for the usage of crypto currency along with easing the model of investments for infrastructural projects in India.

A. Why is this relevant?

Sustainable development finance requires taking into account the interplay of different financing sources and mechanisms to facilitate mobilisation of resources and their effective use. Use of digital crypto-currencies as a bond deter a major risk faced with most types of investment i.e. inflation. The major problem faced with most governments, specifically India to attract investors for investment in infrastructure is the delay in getting return on investments done and is often insignificant considering inflation in the currency. Though, the government bonds can be traded investors generally find it difficult to trade these. A person/investor can invest his funds in the following different ways:

- As savings in his/her bank account (Low interest rate which is generally even lower than the inflation rate in most developing economies)
- As fixed deposit bonds (7% - 9% interest rates in India)
- As long term low tax/tax free government bonds
- As investments in stocks (High risk and uncertainty exists)

Incorporating a new way of investment wherein citizens and investors pool in funds through the use of crypto-currencies by creating a digital wallet, specifying their unique identifier of the digital wallet and other personal details (Name, Age, Contact Details, Address, PAN Card) which are mapped in a database containing their Unique Identity Card details (Aadhar Card Number) will facilitate a fast way of collecting investments [Refer Appendix (2) and (3) for more information on PAN and Aadhar Card]. A new organisation can be formed to regulate the flow of funds through crypto-currencies maintaining a check on the same for faster management and implementation. Devising a policy having incentives for the investor in form of low tax and return in form of crypto-currencies thus removing the risk of inflation to a large extent will act as motivation to invest. These investments can act as sustainable development finance sources for countries where needs are greatest and the capacity to raise resources is comparatively weak, like India to develop smart cities, thus, putting an end to the following sustainable development goals:

- End poverty in all its forms everywhere
- Ensure healthy lives and promote well-being for all at all ages
- Ensure availability and sustainable management of water and sanitation for all
- Ensure access to affordable, reliable, sustainable and modern energy for all
- Promote sustained inclusive and sustainable economic growth, full and productive employment and decent work for all
- Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation
- Make cities and human settlements inclusive, safe, resilient and sustainable
- Ensure sustainable consumption and production patterns
- Take urgent action to combat climate change and its impacts
- Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

A crypto-currency bond would be a new way to introduce currency in a network. A bond owner invests some funds in the form of crypto-currency (say bitcoins) and gets an interest calculated monthly/annually depending on the amount invested and the time for which the bond is made (short term/long term). The bitcoins invested are sent to a master account owned by the government/security and exchange board created.

Since, the number of bitcoins are limited and their price is regulated by the free market. The number of bitcoins received during the bond pay out will automatically take into account the global inflation rate, thus, reducing the funds released by the government. If the government in the developing economy has high inflation rates, then it can release short-term bonds to increase investments and attract investors, whereas in a low inflation/deflation economy, long term investments too would attract investors.

Setting up cross cryptocurrency bonds further reduces the risk as a cross-cryptocurrency prediction market would be formed and risk minimisation can be done by switching between different cryptocurrencies, similar to the present currency hedging techniques used by multi national companies dealing with different currencies.

Use of cryptocurrencies in government bonds would give a stronger glimpse into the public opinion of the future of the cryptocurrency, and of the future of multiple cryptocurrencies in relation to each other, thus removing instability to some extent.

B. What is new about it?

Use of crypto currencies is itself quite new and cryptocurrency bonds would be a completely new concept. Crypto currencies have a lot of benefits and a few risks but have been started integrating themselves into the world finance at a growing rate. Use of cryptocurrency bonds will be a completely new start for developing nations to bolster their economic performance by quick transfer of funds from investors to them and vice versa.

C. By who, what, how and when would it be implemented?

The High Power Expert Committee (HPEC) on Investment Estimates in urban infrastructure has assessed a Per Capita Investment Cost (PCIC) of Rs 43,386 for a 20 year period. Their estimates cover water supply, sewerage, sanitation and transportation related infrastructure. Using an average figure of 1.0 million people in each of the 100 smart cities, the total estimate of investment requirements for the services covered by HPEC comes to Rs7.0 lakh crores over 20 years (with an annual escalation of 10% from 2009-20 to 2014-15). This translates into an annual requirement of Rs 35,000 crores. However, it is expected that most of the infrastructure will be taken up either as complete private investment or through PPPs. The contributions from the Govt. of India and States/ULBs/parastatal will be largely by way of Viability Gap Support (VGF).

To fully realise the potential of a Smart City, investments will also be required in smart but affordable housing, 24x7 electricity, integrated ICT services, education, cost-efficient health services, recreation and sports facilities in every neighbourhood, cultural facilities, public parks, botanical gardens etc. Cost-efficient efforts of the Ministry of Urban Development will thus be supplemented by other Ministries, such as Housing and Urban Poverty Alleviation, Health, Education, Power, Environment & Forests, ICT, Culture, Sports, Surface Transport etc.

In addition, it is expected that investments of Rs 5,000 crore may be required as an initial investment to be provided for proposed 100 smart cities to prepare Reference Frameworks based on Citizen Engagement, the City Development Plans based on GIS/Spatial Mapping, integrated ICT ecosystems, Master Plan to ensure successful implementation of the scheme. This would also include setting up of a PMU at the State and ULB level. Fragmented and project-based approach will not work as has been the experience in JnNURM. Proper planning and a holistic approach based on citizen engagement will be necessary.

To raise high amount of funds for smart cities, the government can increase investments by offering a cryptocurrency bond [Refer: Interest Rate etc calculated in Appendix (6)] but before this the government needs to form a security and exchange board to regulate the use of cryptocurrencies in India. It can then start floating government bonds in crypto currencies and draft a policy using the financial acumen of the Ministry of Finance and Reserve Bank of India to come up with appealing government bonds.

D. What is the expected impact?

Effective resource mobilisation with increased private finance for development and more inclusive and innovative sources of finance are some major points of concern for any economy and are being addressed to a significant extent through the proposal. The proposal provides a supportive framework for sustainable development using finances pooled as investments in national development through infrastructure development and growth of SMEs thus impacting development of the economy to the maximal extent. Also, the crypto-currency bond system can be used for better and smarter aid purposes in case of natural

calamities/disasters offering tax-free bonds giving higher return on investment in the form of bitcoins. A lot of Sustainable Development Goals as listed above, would be reached leading to a better quality of life for all.

II. CHALLENGES

- Crypto currency bonds are a good idea if a company/entity were to deal exclusively in BTC. Most businesses and governments do not do this and some even restrict use of cryptocurrencies.
- Tax model: Any entity that were to take out a loan denominated in BTC will risk needing to pay back a much higher amount in terms of their local currency if/when the price of BTC rises over the term of the bond though this might in most cases be less than the inflation rate as the cost is regulated by the world market and not the specific country. Also, the country can ensure that the interest rate on the bond is in line with the predicted market value of the bitcoin considering the externalities affecting its price with a safety margin of around 20%. [Refer Appendix (6) for calculated bond interest rate with reference to India]
- Security Reforms: If the country decides to create a security and exchange board managing the bonds and taking the role of the bond dealer, a lot of technical changes required in the digital currency's working would be overpowered thus reducing the additional technical and structural costs required to either create a completely new crypto-currency or amend an existing one.
- Mitigating Uncertainty Risk associated with Crypto currencies : Ensuring more coins can't be mined in the cryptocurrency being used is of utmost importance as it would have a direct impact on the value of the cryptocurrency affecting the economy of the country drastically. If however new coins are mined or new currency is developed, it should be ensured that the new coins mined be a sub- set of the present crypto currency, thus not devaluing the present one. This though would require negotiations between countries at the global level.
- Finance Flows to Developing Countries: Finance flows to developing countries are trending higher, with strong growth in private flows and remittances. However, these tend to be concentrated to a few developing economies and most low income countries

still lack access to international capital markets. Financial flows to low developed countries also depend on access to local currencies, in some places restricted by regulation.

III. SMART CITIES

Urbanisation accompanies economic development. As countries move from being primarily agrarian economies to industrial and service sectors, they also urbanise. This is because urban areas provide the agglomerations that the industrial and service sectors need. In fact, 90% of the world's urban population growth will take place in developing countries, with India taking a significant share of that.

While the urban population is currently around 31% of the total population, it contributes over 60% of India's GDP. It is projected that urban India will contribute nearly 75% of the national GDP in the next 15 years. It is for this reason that cities are referred to as the 'engines of economic growth' and ensuring that they function as efficient engines is critical to our economic development. With an urban population of 31%, India is at a point of transition where the pace of urbanisation will speed up. It is for this reason that we need to plan our urban areas well and cannot wait any longer to do so.

Smartness in a city means different things to different people. It could be smart design, smart utilities, smart housing, smart mobility, smart technology etc. Thus it is rather difficult to give a definition of a smart city. However, people migrate to cities primarily in search of employment and economic activities beside better quality of life. Therefore, a Smart City for its sustainability needs to offer economic activities and employment opportunities to a wide section of its residents, regardless of their level of education, skills or income levels. In doing so, a Smart City needs to identify its comparative or unique advantage and core competence in specific areas of economic activities and promote such activities aggressively, by developing the required institutional, physical, social and economic infrastructures for it and attracting investors and professionals to take up such activities. It also needs to support the required skill development for such activities in a big way. This would help a Smart City in developing the required environment for creation of economic activities and employment opportunities.

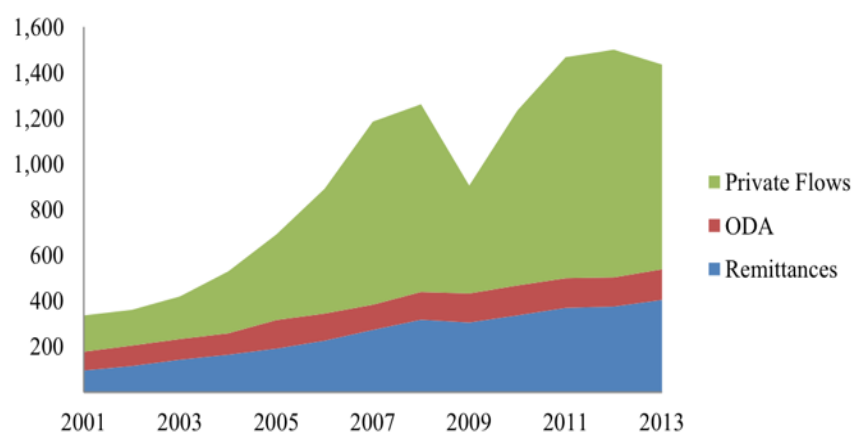


Fig. 1. Financial Flows to Developing Countries (in billions of USD)

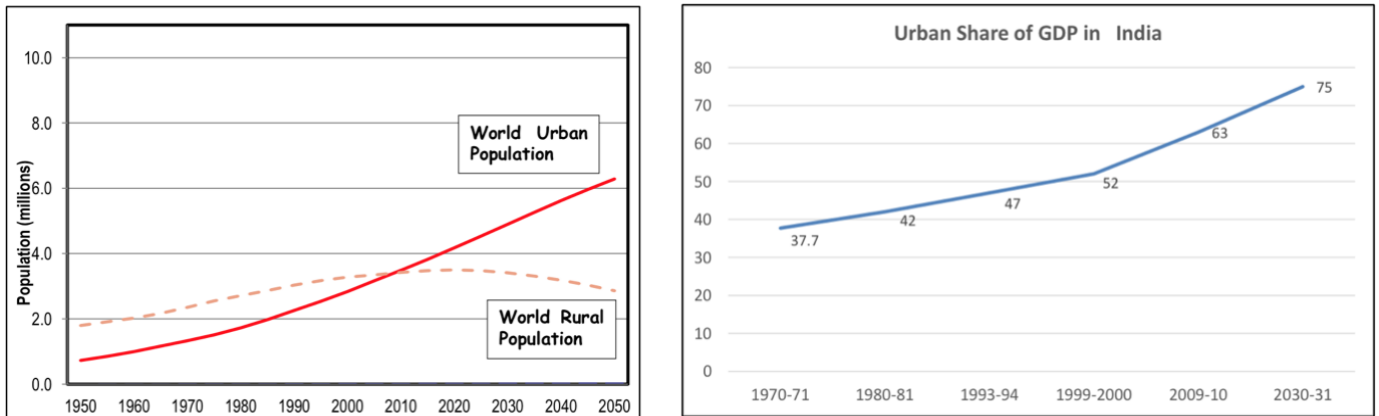


Fig. 2. Population and GDP statistics

Apart from employment, it is also important for a Smart City to offer decent living options to every resident. This would mean that it will have to provide a very high quality of life (comparable with any developed European City) i.e. good quality but affordable housing, cost efficient physical, social and institutional infrastructure such as adequate and quality water supply, sanitation, 24 x 7 electric supply, clean air, quality education, cost efficient health care, dependable security, entertainment, sports, robust and high speed interconnectivity, fast & efficient urban mobility etc

In this context, Smart Cities are those that are able to attract investments and experts & professionals. Good quality infrastructure, simple and transparent online business and public services processes that make it easy to practice one's profession or to establish an enterprise and run it efficiently with- out any bureaucratic hassles are essential features of a citizen centric and investor-friendly smart city. Adequate availability of the required skills in the labour force is a necessary requirement for sustain- ability of a Smart City. Entrepreneurs, themselves, look for a decent living and so they also look for smart housing, high level of healthcare, entertainment and quality education. Safety and security is a basic need for them as to any other resident. A city that is considered unsafe is not attractive. Besides an entrepreneur or a professional needs to be there as someone who helps a city to prosper and adds value to it rather than someone who only benefits from it.

IV. BOND INTEREST CALCULATION W.R.T INDIA

Say, a person has 100000 INR to invest. It can be assumed that if a person has 1 lakh INR to invest, he/she belong to the 30% tax bracket. At the end of 10 years, 100000 INR would be equal to 86504 INR assuming that the inflation rate for the next 10 years is similar to what it was in the last 10 years. Interest received in a saving account is generally between 5.5 - 7%, lower than the average inflation rate in India, hence not a good investment.

A government bond issued in bitcoins, as of 31st Jan 2015 will be of 7.31628444 BTC (1 BTC = 13668.14 INR) and using prediction market techniques, the value of one bitcoin would be somewhere around 40000 INR - 60000 INR, giving a return of 365,814.222 INR (365.8% return) without any interest rates and therefor giving incentives like taxation at say 20% for the amount issued in the form of a bond will attract investors and high class citizens of the country to pool in resources by buying bonds.

The interest rate though can be regulated dynamically by keeping an eye on the price of bitcoin and changing the interest rate accordingly at the time of issue keeping a safety margin of 20%.

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