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Cryptocurrency-Remittance Transfers Futuristic Technologies & Poverty Alleviation

Michael Reeves
Skidmore College

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Cryptocurrency-Remittance Transfers
Futuristic Technologies
&
Poverty Alleviation

Michael Reeves

This thesis is submitted in partial fulfillment of the requirements for the course Senior Seminar (EC 375), during the Spring semester of 2017

Name: Michael Andrew Reeves

Signature: _____

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I. Abstract

The methodologies used to transfer remittances to Sub-Saharan Africa are currently predisposing their citizens to be dealt unethically large surcharges which are relatively greater than any other location in the world. These African nation's average remittance transaction fees were greater than 13% in 2006 and could become the greatest benefactor if a more efficient methodology of remittance currency transferring were to be created. For instance, if Sub-Saharan African citizens began to utilize cryptocurrencies instead of standard transfer companies like Western Union and MoneyGram; transfer fees could be reduced to as little as (.025%) which would directly send more funds to the people that need it the most. The methodologies within this paper consist of a semi-log poverty regression that utilized an econometric structure similar to the previous literature. In addition to previous regression analyses conducted by Gupta (2009), Giuliano (2008), Adams & Page (2005), and Ravallion (1997); I attempt to include variables in attempt to determine the role that technological integration has towards poverty mitigation. My econometric semi log regression analyzes 18 nations with Africa. These nations were specifically chosen in reference to their relatively large association with remittance transfers. Within this analysis of poverty within Sub Saharan Africa, a strong correlation between remittance transactions and poverty reduction is found. More specifically, the results also suggest that remittances transactions directly assist the most impoverished citizens within a nation most efficiently and that an increased technological infrastructure played a significant role within poverty mitigation. These conclusions should further incentives developing nations across the world to investigate how cryptocurrencies could effectively mitigate poverty.

II. Introduction

Financial Effects of Remittances, Bitcoin, & The Unbanked Individual:

The methodologies used to transfer remittances to Sub-Saharan Africa are currently predisposing their citizens to be dealt unethically large surcharges which are relatively greater than any other location in the world. These African nation's average remittance transaction fees were greater than 13% in 2006 and could become the greatest benefactor if a more efficient methodology of remittance currency transferring were to be created. Within table 1, the fees associated with remittance transactions towards Sub-Saharan Africa in relation to the rest of the world provide incentives to adopt a new methodology of remittance transfers within these impoverished regions. Even though table 1 states that South Asian nations pay 42% less than Sub-Saharan Africans throughout remittance transactions, there is still much room for all forms of remittance transaction efficiencies to be bolstered.

When considering alternatives to commonly utilized remittance transaction methodologies, cryptocurrencies could be the most ideal solution. Cryptocurrencies, specifically Bitcoin, have the potential to decrease remittance transaction fees to a rate lower than one percent. For example, if Sub-Saharan African citizens began to utilize cryptocurrencies instead of standard transfer companies like Western Union and MoneyGram; transfer fees could be reduced to as little as (.25%); which would result in billions of dollars being directly funded to the people that need it the most. Currency transferring companies which are collecting dishonorable surcharges further incentive a remittance-based-cryptocurrency integration. This methodology of remittance transaction could effectively help provide the largest possible fraction of funds towards remittance recipients within developing nations. Bitcoin also offers more benefits in addition to economic incentives when associated with remittance transactions.

The utilization of Bitcoin could also benefit the macroeconomic status of Africa's financial system which is currently lacking the necessary infrastructure needed to promote sustainable economic growth, access to modern banking, and efficiently reduce poverty. As of 2014, the total access to an account at a financial institution within Sub-Saharan Africa only amounted to 34% in comparison to the people within high income OECD countries whom amounted to 94% (Worldbank, 2014). These percentiles, which represent unbanked individuals above the age of 15, exemplify a blatant source of infrastructural inequality that cannot possibly support a nation whose population is expected to increase dramatically. By 2050, 54% of the expected global population growth is anticipated to occur within Africa. This equates to an increased population within Africa by 1.28 additional billion people (Bish, 2016). High remittance transfer fees, insufficient banking infrastructure, and increased population rates all progressively incentivize the integration of remittance-based-cryptocurrency transactions in order to alleviate poverty within Sub-Saharan Africa. According to the World Bank, more than \$592 billion dollars were distributed throughout the remittance network within 2016. If cryptocurrency-remittance transactions were to be increasingly utilized within a developing nation within Sub-Saharan Africa; transaction fees could be reduced up to tenfold. In specific, if these remittance transfers were to be conducted through a cryptocurrency, the previously quoted \$592 billion dollars could be reduced by more than 10% on average and therefore save over \$59 billion dollars in a Robin-Hood-esque manner.

The most relevant literature regarding remittance transactions and poverty have not been associated with cryptocurrency and Bitcoin Integration. The poverty and remittance based regression models utilized by Gupta (2009), Giuliano (2008), Ravallion (1997) and Adams & Page (2005), all investigate the direct poverty mitigating ability that remittances have in relation

to other circumstance such as household income, income inequality, amount of educated persons leaving the nation, and inflation in order to understand how to increase poverty reduction efficiencies within Sub Saharan Africa.

The purpose of this study to overall determine the effects of personal remittances received in relation to poverty mitigation in Sub Saharan Africa. The analyzed variables which are similar to the previously mentioned study are personal remittances received, income inequality, and inflation. These variables have all been proven within previous literature to significantly affect the rate of poverties within developing nations.

The contributions of this work are represented throughout my individually created cryptocurrency integration potential variables. In addition to personal remittances received, income inequality, and inflation, there were three additionally inserted variables used to determine how a relatively strong internet infrastructure can help mitigate poverty.

The variables which I add to the standard poverty-remittance model are the percentile of the examined nation's internet users in comparison to all of Africa, a dummy variable representing whether or not the associated nation is above or below Africa's average internet access by percent of population, and the total remittances divided by their associated gross domestic product. These variables are used in order to account for the infrastructure associative to the ability to purchase, utilize, and integrate cryptocurrencies throughout remittance transfers.

The results of this study were highly significant and made sense in comparison to the previously examined literature. Within my regression tests, the natural log of remittances was found to be negative and significant across each of the four poverty line analyses. As the analyzed poverty line decreased from \$4 down to \$1.25, the coefficient value for remittances was

negative and decreased. This data can help conclude that remittance funds assist the poorest citizens most efficiently within the 18 analyzed African nations. Additionally, I was able to make similar conclusions about the gini variable within my regression set. As the regressions decreased from \$4 down to \$1.25, the gini variable's coefficient value decreased and became less significant. Interestingly, the gini variable was found to have a negative coefficient value within the \$4 poverty line regression. This negative coefficient value states that poverty would be increased as income inequality decreases. Additionally, even though the dummy variable that represented a nation being above or below Africa's national internet use was found to be insignificant, the coefficient values still suggest that this factor could be an effective at mitigating poverty and should be further analyzed in the future. An extension to this study would consist of further analyzing this relationship between increased technological infrastructure, remittance efficiencies and poverty mitigation in order to suggest macro level policy changes within Sub Saharan Africa.

Section I includes the abstract. Section II reports introductory findings. Section III reports the overall analytical framework of poverty analyses. Section IV discusses the literature about this topic. Section V reviews the utilized methodologies. Section VI reviews the discussion of results.

III. Analytical Framework

Poverty is a difficult topic to study, especially when associated with nations which are still described as developing. When specifically analyzing the affects towards poverty that personally received remittances have, it is important to acknowledge that there are several associative factors which determine whether or not these remittances will effectively mitigate

poverty. For example, since the economic infrastructure within Nigeria is relatively stronger than Togo; it can be assumed that the remittance funds would be either spend or saved more efficiently within Nigeria. This analysis could also be created in relation to a stronger local economy which is increasing competition in the marketplace and decreasing prices. Economic infrastructure, such as access to modern banking, could help bolster remittance efficiencies and reduce poverty.

The standard poverty analysis utilizes a specific monetary threshold amount in order to analyze how many people are living above or below it. This poverty threshold analysis can be viewed within most common poverty analyses. Within Cascarilla (2015), Gupta (2009), Giuliano (2008), Adams & Page (2005), Pavallion (1997), and Freund (2008), this similar methodology of analyzing poverty can be observed.

In general, the most effective independent variables that can be utilized to determine the causation of poverty are the gini coefficient which analyzes income inequality, remittances income in order to determine their relative effectiveness in mitigating poverty, and inflation are utilized. Additional economic independent variable that are known to be utilized within poverty analyses are household income, per capita income, and the relative occupational functionality of the local citizens.

There is also another realm of poverty studies which are used to analyze how poverty is affecting the public health and other socioeconomic aspects of a community, city, or nation. This is an important aspect of poverty to consider because it reveals the non-economic problems which arise amongst increasing poverty. Variables within public health poverty analyses include educational obtainment, infancy birth rate, family size, and access to proper nutrients. Even

though these factors are important, I do not utilize these variables within my regression due to the particular niche which is being analyzed. Since I am analyzing how remittances efficiencies can be bolstered throughout remittance transactions; I need to particularly focus on factors included money transfers and internet access and utilization in order to more effectively recommend macro policy changes to mitigate poverty within Sub Saharan Africa.

IV. Literature Review

Remittance & Poverty Correlational Research:

In order to evaluate poverty within developing nations, a poverty threshold, which is decided at a specific amount of dollars earned per day is typically represented in percentile form. These rates differ across studies but most commonly reside below \$2 when regarding African nations. Within Gupta (2009), the effect of remittances on poverty and financial development in Sub-Saharan Africa was evaluated in specific regard to the impoverished community earning at or below \$1.90 USD per day. The relative amount of purchasing power differs greatly between the recipient and donor of remittance funds. This relatively greater utility and purchasing power of money is what increasingly incentivizes the reevaluation of remittance-based-cryptocurrency transfers towards developing nations.

Within 2006, the remittances sent towards developing countries alone equated to \$221 billion dollars. This an amount of funds that have increase annually by sixteen percent throughout the previous decade. The continuous annual growth in remittance transmissions provides further incentives developing nations within Sub-Saharan African to change their remittance methodologies and increase efficiencies through cryptocurrency utilization.

Within Gupta (2009), it is concluded that remittances are a stable transfer which have direct poverty-mitigating effects and promote financial development. This article specifically analyzes how remittances directly improve developing nations economies from the micro-level. Within the author's remittance analysis, 34 Sub-Saharan African countries are analyzed throughout a semi log model which analyzes poverty as the dependent variable. This specific model was utilized so the results would represent the dependent variable in a statistical format. The independent variables that were utilized within this study were the log of per capita income, income inequality, and total remittance being submitted towards a nation. This literature was very influential towards the constructed methodologies analyzed within this economics thesis.

Gupta (2009) also concluded that these transactions can alleviate poverty in recipient households particularly well when transfers are from abroad. Cryptocurrency-remittance transfers are further incentivized since the vast majority of the remittance transfers being sent to Sub-Saharan Africa are being sent internationally (Mohapatra, 2011). This can be viewed within the graph 1. In congruency with Gupta (2009); Giuliano (2008) creates a cross country series analysis over the span of 1975-2002 and concluded that remittances promote growth in less financially developed countries because they lead to cyclical financial investment. This article congruently supports the notion that remittances bolster economic growth and suggests that this form of financial aid is the most constructive in regard to economic development. These studies promote further interest towards how the rate of remittance-based poverty alleviation were later affected by the 2008 financial crisis and the creation of Bitcoin.

More recently, remittances sent towards developing nations have skyrocketed to amounts greater than \$350 billion dollars in 2011 (IFM, 2011). Remittance transactions were proven to increase throughout time periods of economic turmoil. This statistic reassures that remittance

funds are fairly stable and further incentivized the redevelopment of the international remittance infrastructure associated methodologies in order to further economically rehabilitate developing nations. In agreement, Cascarilla (2015) also states that remittances could be a vector in which could dramatically benefit from cryptocurrency-remittance transfer integration. Since cryptocurrencies have continued to increasingly grow in attention, cyber-security, and value, the associated utility towards Bitcoin have been similarly developing.

The macro-poverty model within my OLS regression has been constructed based upon multiple previously conducted analyses which identified the effects of incoming remittances towards their corresponding nation's poverty. Adams & Page (2005) analyzed the effects of remittances received, the international export of migrant laborers, as well as inequality are analyzed as independent variables in order to determine their corresponding effect towards poverty. Within this paper, which analyzes 71 developing countries, its hypothesized by the author that countries producing more international migrates or receiving more international remittances would experience less poverty.

Instead of analyzing the effects of migration towards poverty like Adams & Page (2005), the constructed regression set within my regression instead focused on variables which encompass more significance towards citizens residing within a nation instead of exported migrants. Since the rates of remittances have generally increased across all observations within my dataset, I believe that autocorrelation can be assumed when comparing increased migrant exports and increasing remittances received. The author's framework was in reference to Ravallion (1997) whom first questions how income inequality within developing nations affects their volume of experienced poverty. This analysis composes the poverty data from 23

developing nations, and concludes that gini volatility has a diverse affect towards poverty in relation to many geological, social, and political factors that are difficult to represent statistically.

Similarly, to Ravallion (1997) and Adams & Page (2005), my econometric model utilized specific monetary amounts in order to analyze poverty. Instead of utilizing just one poverty line like Adams & Page or Ravallion, my data set consists of four different poverty analyses; \$1.25, \$2, \$2.50, \$4. This addition to the traditional framework will directly show how individuals of different economic standings are effected by the incorporated independent variables. These differences in poverty lines will be interesting in relation to nations which are represented by volatily changing income inequality and extreme gini coefficients. These poverty analyses have supplied the essential econometric framework to build upon and further test my hypothesis which states that cryptocurrency accessibility and utilization should bolster remittance efficiencies and therefore further helps mitigate poverty.

Within Adam & Page (2005), it is hypothesized that poverty decreases as the mean income of a country increases. This variable reinforced the importance to analyze a nations gross domestic product when attempting to discover trends in poverty statistics. This hypothesis is in agreement with Gupta (2009), which states that increased remittance funding has strong and direct poverty mitigating effect. The second hypothesis suggests that as income inequality, which is measured through a gini index, increases similarly to poverty. The third and final theory within Adams and Page's (2005) model investigates the direct effect of remittances towards poverty. These hypotheses have been crucially developmental throughout the process of determining the

overall expected coefficient value and associated direction throughout the econometric model production process.

Remittance Dependencies in Relation to GDP:

When considering how useful a cryptocurrency will be within a nation, and how easily it could be integrated on a macro-policy level, the total valuation of remittances in comparison to a nation's gross domestic product can help determine effectiveness. If a nation's gross domestic product is more dependent on remittances, the overall savings produced via cryptocurrency integration is correspondingly relatively more effective. This increase effectiveness is cause in relation to the vast reduction of remittance fees when utilizing cryptocurrencies like Bitcoin where funds are transferred. Throughout the entirety of Sub Saharan Africa, the average ratio of remittances received to gross domestic product equates to 1.6 percent. This amount is seemingly minute in comparison to the average ratio of 3.5 percent within South Asia (Gupta, 2009). Even though Sub Saharan Africa's rate of remittances to gross domestic product is less than half in comparison to South Asia, it is still believed that remittance transfers could be effectively be integrated amongst cryptocurrency transactions and increasingly help mitigate poverty.

Interestingly enough, there are some areas within Sub Saharan Africa that appear as an anomaly to this percentile representation. Lesotho retains one of the most notable ratio of remittances to gross domestic product around 26 percent (MPI, 2011). In relation to this analysis; it is believed that a nation like Lesotho's impoverished population would more efficiently benefit from cryptocurrency-based-remittance transactions in comparison to countries whose gross domestic products are less reliant on remittances like Nigeria or Ghana (Freund, 2008).

One issue that is believed to be very pertinent regarding this discussion is the learning curve that corresponds to the time it takes to understand what cryptocurrencies are, what

differentiates them, and their associative benefits. Within a nation like Lesotho, people could transition to cryptocurrency-remittance transactions relatively easier since more than a quarter of their GDP is transferred through remittances. Lesotho is not the only nation included within this study specifically in relation to their high ratio of remittance received in comparison to their associated gross domestic product. Similarly to Lesotho; the Gambia, Senegal, Cabo Verde, Togo, Mali, and Guinea-Bissau were all hypothesized to be able to integrate cryptocurrency-based-remittances faster and more easily because their population has already become familiar with this form of monetary transfer.

Evaluation & Variable Analysis that represent access to Bitcoin:

The overall availability of Bitcoin is expected to be nearly exhausted by 2024. The current price as of May 3, 2017 is approximately valued at \$1500 per coin and is expected to increase in valuation as scarcity continues to affect the market and demand (Coinbase, 2017). This finite amount of Bitcoin is particularly important to consider in regard to the citizens of Africa and their remittance efficiencies because the coin's valuation is expected to continuously grow in relation to the corresponding finite production cap. The earning potentials are very time sensitive, and will only decrease as the valuation of Bitcoin increases. Within Darlington III (2014), the potential of integrating cryptocurrencies like Bitcoin is expressed as an intelligent method to reduce poverty. Within this paper, haste of interaction is considered to be a vital condition in order for developing nations to maximize their profits regarding cryptocurrency integration. Since Bitcoin is acknowledged to have a finite amount of coins which are expected to nearly maximize circulation by 2025, the authors note that the competition to collect this coin will drive prices up as Bitcoin becomes the world's largest and most utilized cryptocurrency.

Bitcoin's expected valuation increase is not the only associated beneficial factor that cryptocurrencies create. As more Bitcoin transactions occur, the currency becomes more difficult to steal. This increased amount of cybersecurity increases as the total blockchain of Bitcoin grows. In a very condensed explanation; individual Bitcoins are blocks of information which require an access code based “signature” specific to the owners account (Desjardins, 2014). In order to use Bitcoin and send it to another person; the associated signature access codes of every single previous transaction that has taken place on that individual coin is required to actually transfer the funds. this also blocks the ability for internet currencies to be duplicated or used multiple times. This explains why the “blockchain size” expressed within graph 4 are shown to be growing continuously. Since the rate of Bitcoin production is finite, it is important to keep this increasing rate of security in mind. As Bitcoins become more scarce, the overall security will continue to increase and increase in value.

Even Bill Gates, one of the most reputable names in the electronic community, is on board with the digital-financial revolution and has stated that “digital money has low transaction costs which is great for the poor because they need to do financial transactions with small amounts of money. Over the next 5 years I think digital money will catch on in India and parts of Africa and help the poorest a lot” (Business Insider, 2014).

In addition to the previously stated benefits of Bitcoin which were increased remittance transfer efficiencies, increased security, and its finite currency cap, there are also several other beneficial factors that should further incentivize Sub Saharan Africa to begin to utilize this currency. These additional benefits include financing, trading and virtual consumerism. Virtual currencies have the potential entirely restructure the market for remittances as well as bolster trading efficiencies.

Evaluation of the Negative Qualities of Bitcoin:

Amongst all of the positive qualities of Bitcoin, there are some unsettling qualities of Bitcoin and cryptocurrencies in general that make this form of monetary transaction less idealistic. The Silk Road, an online illicit marketplace which functions primarily through cryptocurrencies, provides people with the access to buy goods without ever meeting in person. This marketplace is commonly referred to as the eBay of illicit drugs (Martin, 2014). This illegal market place decreases the legitimacy and reputation of Bitcoins and other cryptocurrencies. Some people are often hesitant to become invested within cryptocurrencies due to the fact that they will be effectively bolstering criminal's crypto-bank valuation.

The associated criminal activity and overall price volatility creates obstacles in association to the development of macro-remittance policies that enforce the utilization of cryptocurrencies in order to reduce transaction costs. In specific regard to remittances being transferred through Bitcoin, it is noted within Balestrieri (2014) that the fear of depreciation could overcome the appeal of avoiding transfer fees from the perspective of an immigrant worker who is offered the option to utilize cryptocurrencies. This fear of depreciation is one of the most counter-productive quality of cryptocurrencies.

When considering the fear of utilizing or investing in Bitcoin, the overall volatility of cryptocurrencies often is too dramatic to have confidence in the coin's functionalities. Within Yermack (2014), the overall negative affects including volatility are analyzed in comparison to alternation currencies that rely on physical assets like gold to represent their net value. Within this article, the imposed large-short term risks are identified to make the currency not useful throughout risk management work. This is stated in relation to the overall volatility of the coin and how this constantly changing valuation makes it very difficult to understand the marketplace

and make money. Even though some negative characteristics do exist pertaining to cryptocurrencies; it seems as if the benefits highly outweigh the problems concerning cryptocurrency integration via remittances on a national scale.

Poverty Mitigation Comparison: Financial Aid vs. Remittances:

This study also analyzes the relative amount of financial aid given to a nation in comparison to their overall income via remittances. Within Africa, the distribution of funds through financial aid were much greater than their reported remittance receipts. Since 2000, the flow of aid within developing nations within Africa has increased on average by 13 percent per year (Gupta, 2009). Throughout this time, remittance transactions in USD equivalence increased annually by about 10 percent per year. Interestingly, remittances did not rise steeply in valuation throughout instances of lacking financial aid. Throughout these time periods within African nations where financial aid circulation was relatively low, the change in remittance transactions were relatively small. Remittance transaction values only decreased from about 13 to 10 percent, a standard rate of remittances in comparison to global average increased remittance transaction rate which was increasing by 16 percent annually throughout the time periods of 2000-2011(Gupta, 2009). This statistic can either represent two theorized interactions. Either the amount of financial aid is having little to no effect towards the poverty mitigation or remittance ratios do not drastically change due to the fact that people are constantly sending all they can.

In relation to the overall scope of this analysis, the fact that financial aid seemingly has little affect towards remittance transactions bodes well for a cumulative analysis of Sub Saharan Africa. In contrast to some analyses like Gammeltoft (2002) who analyzed the contrast between remittances and other types of funds like financial aid and foreign direct investment, I will be

only specifically analyze remittance funds because of their increased ability to be transmitted through cryptocurrency based transactions.

Formality of Remittances:

The formality of remittances is an important topic to address within this study because informal remittances sent to developing countries equates to about 35-65 percent of the total official remittances (Spatafora, 2005). This statistic is important because it expresses the untapped potential regarding cryptocurrency-remittance transactions within developing nations. If successfully integrated, cryptocurrency transactions could potentially absorb some of these informal remittances because of their increased transaction efficiencies. In relation to the average rate of informal remittances being sent to developing nations, Sub Saharan Africa's rate of informal remittances transferred was it is estimated to be greater and approximately 45-70 percent of the total transactions (Gupta,2009). These statistics prove that the recorded remittance transfers only equate to a fraction of funds sent to Africa. This statistic should increase the overall acceptance of cryptocurrencies because if properly integrated throughout remittance transactions, these funds which are unaccounted for could instead be circulated within the economy and recorded as part of a nation's gross domestic product. In comparison to Latin American whose projected amount of informal remittances equates to only 5-20 percent; cryptocurrency-remittance transactions seemingly improved the integration potential within Africa (Gupta, 2009). This will be interesting in regard to my proposed investigation because if proven; cryptocurrency-remittance-based integration becomes much more theoretically operative. This analysis towards the formality of remittances provides an economic towards the decision making process of only including African nations within my econometric model.

Association of Public Health Variables:

Remittances and financial growth have been a topic which have inspired large amounts of econometric analysis within the past couple decades. In relation to the previously analyzed literature, Adams and Page's (2005) create the most encompassing poverty model which analyzes remittances transactions as well as factors such as nutrition and health. Within this article, the authors are able to conclude that a 10% increase in per capita official international remittances will lead to an 3.5% decline in poverty amongst the nations' residents. This association of poverty, remittance, and public health variables creates a more depictive description of the observed nation's associated poverty.

The variables which are considered within this regression are financial consumption, education, health, nutrition, mean income, distribution of income, Gini coefficients, relative poverty, and trade openness. These variables were all utilized in order to determine that international remittances significantly relieved poverty among the poorest of households. This conclusion was very relative to my overall research goals because I specifically attempt to determine how remittances affect poverty throughout multiple different poverty regressions. My econometric model will be similarly organized in order to determine if remittances actually benefit the poorest citizens within the 18 observed nations.

These variables were also used to identify the potential multiplier effects associated with remittance funds. This multiplier effect was believed to exist because remittances are more likely to be spend on domestic goods (Adams & Page, 2005). This association between the remittance multiplier effect and domestic goods being purchased is important to consider in relation to the overall reduction in poverty of an African nation. The ability to increase domestic goods purchased and circulated throughout the economy could also alternatively function as

detrimental towards an economy. This additional demand for domestic goods could potentially lead to an prices (Dorantes, 2014).

Access to Modern Banking:

When considering how cryptocurrency integration could assist nations where access to modern banking is lacking, Sub Saharan Africa should be recognized as the cluster of nations to assist. Within graph 1, it is clearly shown that Sub Saharan African nations have a significantly smaller proportion of bank branches available per square mile (Mohapatra, 2011). This graph additionally reveals the commonality of liquid funds within Sub Saharan Africa. The demand for modern banking should further incentivize cryptocurrency integration. If Sub Saharan African citizens were able to effectively integrate cryptocurrencies within their economy, people could maintain their funds virtually instead of directly within their homes.

Within graph 2, an inequality amongst banking fees is expressed. As noted within the graph, it can be inferred that Sub Saharan African citizens pay more than four times more fees to open a savings account than citizens of the Middle East and North Africa (Mohapatra, 2011). As these forms of modern banking inequalities continue to exist, cryptocurrency integration should be further investigated. Cryptocurrency integration would not only mitigate the demand for modern banking but would also decrease the associated fees. Even though cryptocurrencies might not offer the convenience of a bank teller, they still offer non-liquid funds with very low transaction fees. These benefits along with the associated increased remittance efficiencies should stand as more than enough reason to further integrate cryptocurrencies immediately within Sub Saharan Africa.

Mobile Phone Integration Outpacing Modern Banking:

Within Comninos' (2008) article, the overall distribution of bank account access is compared to the proportion of Africans who have access to a mobile phone or active sim card. This paper very interestingly notes that African Nations, with some exceptions, have greater access to mobiles phones in comparison to bank accounts (Comninos, 2008). As seen within graph 3, the rate of cell phone access is trending positively with more affluent Sub Saharan African nations. This is extremely relevant in regard to cryptocurrency-remittance-based transactions, because these can be conducted via mobile phones; and therefore increase access to financial services which are widely unavailable within Africa (Worldbank, 2014). This statistic bodes well for cryptocurrency-integration because the more efficient form of remittance transactions, via cryptocurrencies, is also the more easily accessible than the standard banking transaction. Since the pace of Sub Saharan African citizens receiving cell phones are outpacing their access to modern banks, cryptocurrency-integration should further investigated within these areas due to the fact that cell phone access could essentially give citizens access to cryptocurrencies that could be utilized as a form of banking.

V. Methodology

A.) Nation Selection Process:

Within the four utilized regression sets, a poverty analysis within Sub-Saharan Africa is created in order to specifically investigate the effects of remittances towards poverty. This analysis analyzes 18 nations within Africa from 1993-2012. The 18 nations that were selected were Angola, Cabo Verde, Ethiopia, The Gambia, Ghana, Guinea-Bissau, Kenya, Lesotho, Mali, Mauritania, Mozambique, Nigeria, Rwanda, Senegal, Sudan, Togo, Uganda, and Zambia. These specific nations were chosen because of their associative and similar economic features.

The first specific economic features that was utilized to decide which countries to analyze was regarding whether or not the nation was one of Africa's top 8 remittance recipients. Within 2015, the top ten remittance recipients within Sub Saharan Africa were Nigeria, Ghana, Senegal, Kenya, Uganda, Mali, Ethiopia, and Sudan (World Bank, 2010). These nations were all chosen in order to determine how remittances have effected these countries rates of poverty within the past. These nations were all hypothesized to be receive the most total economic gains from integrating cryptocurrency-remittance-transfers.

The second specific economic features that was utilized to decide which countries to analyze was their nation's overall dependence on remittance funds in regard to their national gross domestic product. Within 2014, the nations which were most reliant upon remittance funds which were utilized within this study were The Gambia, Lesotho, Senegal, Cabo Verde, Togo, Mali, and Guinea-Bissau. These nations were chosen within this analysis in relation to my hypothesis which states that remittance dependence influences cryptocurrency-remittance integration efficiency. Since these nation's gross domestic product is more dependent on remittance funds, it is expected that if properly managed, cryptocurrency-remittance transfers could integrate within these regions at the fastest rate.

The third specific economic variable that was utilized to decide which countries were included was if a nation was within one of the leading remittance senders within Africa. The top remittance senders in percent of gross domestic product within Sub Saharan African in 2014 that were included within this study were Mauritania, Rwanda, Mozambique, Uganda, Angola, Cabo Verde, and Zambia. These nations were included in relation to the duel sender-recipient benefits of integrating cryptocurrency-remittance transactions. Since remittance transactions are most

commonly transmitted amongst friends and family, these capital gains achieved from increased transmission efficiency would strongly incentivize utilization from both the sender and recipient.

B.) Variable Description: Theory Based:

The utilized dependent variable within this regression set, poverty, exemplified the percentile of people living below a specific amount of funds per day. Within this investigation, four regressions are utilized to determine how the included independent variables affected poverty at different analyzed dollar amounts. The four poverty lines used within this analysis are \$1.25, \$2, \$2.5, and \$4. These different poverty lines represent the amount of people who are earning less than this amount per day. Since poverty is the dependent variable within this regression, the regression results will be able to determine precisely how each independent variable affects different classes of citizens. This variable will be recorded in the form of total percent of population in order to interpret the results more effectively.

Within Gupta (2009), poverty is used as the dependent variable in order to determine the effects that are caused in relation to remittance received. Within the author's study, the impoverished population is represented by citizens within 70+ nations that earn less than \$1.90 USD per day. Adam's & Page (2005) preform a similar poverty analysis, but utilize a natural log regression in order to transform these econometric conclusions into percentile form which are easier to interpret. These two models were very influential when determining which poverty lines to examine as well as which 18 nations to include.

The expectation within my regression set is that poverty percentiles will decrease as remittances increase. These four individual regression results will be interesting to observe as the

poverty lines transcends from a \$4 to \$1.25 monetary value. The overall expectation within this study is that people with less access to funds will benefit more from incoming remittances. This can be directly analyzed when comparing the independent variable's coefficient values. The results that were hypothesized to be most meaningful when the \$1.25 and \$2 poverty thresholds were compared in relation to Gupta's (2009) results, which analyze poverty at the \$1.90 threshold within similar nations throughout previous times periods. This comparison is particularly interesting because it relates it compares two regressions which represented the time before and after the creation of Bitcoin. These small yet relatively large changes in the poverty line are expected to reveal how the included independent variables affect different classes of African citizens.

Within my regression analysis, income inequality was also utilized as an independent variable and was represented by the gini coefficient. Gini is utilized within my econometric analysis in order to observe how a nation's status of income inequality directly affects poverty within Sub Saharan Africa. The amount of income inequality, gini, will then be analyzed across four different poverty levels in order to show how income inequality directly affects the local citizens living below a variety of different living conditions. The gini variable within this regression set represents the distribution of funds amongst all of the citizens residing within a nation. A value of 1 would resemble a situation where one person possesses all of the money within the entire nation. A gini coefficient value of 0 would illustrate a situation where all of a nation's wealth is evenly distributed amongst its citizens. This independent variable is important to observe because it will reveal how income inequality affected poverty at different monetary thresholds in association with remittance funding.

Within Barhan (1998), the gini coefficient is used in order to determine how migration and remittances effect inequality. This variable is used as a way to decompose and more descriptively analyze the income distribution within the examined nations. Similarly, I included the gini coefficient to account for income distribution amongst each of the eighteen countries comprised within this study. The anticipated coefficient value for the gini variable is expected to be positive within my regression set. This expectation was produced according to the belief that as poverty increases, the amount of income inequality would relatively grow.

This variable is very relevant when considering the demand of modern banking and the potential benefits from cryptocurrencies. When income inequality is high, it is expected that access to modern banking would decrease because the majority of citizens would have access to less funds. This reasoning states why access to modern banking is not included within this regression analysis.

One problem associated with this variable within my regression set is that the statistics for income inequality within Africa are not available. In order to create an adequate sample size of observations, a large number of African nations must to be included within this analysis. On average amongst the total 18 nations within this study, there are 51 total observations. This statistic represents that each nation within my regression set on average only has 2.83 observations. An additional concern about this variable within my regression analysis is that linear projects were needed to be used in order to calculate 9 of the overall observations. Within each of these linear projections, the projection was only utilized to create a data point no greater

than one year apart from the World Bank data source. The nations where data was linearly projected were Cabo Verde, Ethiopia, Lesotho, Mali, Mozambique, Nigeria, Rwanda and Zambia within 2002, 2005, 1993, 2010, 2009, 2010, 2006 + 2001, and 2003 accordingly. This variable was found to be extremely instrumental in regard to creating significant conclusions in past research and was included for that reason.

The next independent variable included within this regression set was the total amount of annual personal remittances received within an individual country. This value represents the overall sum of pooled remittances sent to a nation and is important, but not as significant as the overall personal remittances divided by gross domestic product in regard to cryptocurrency integration potential efficiencies. Remittances do bolster economic growth and reduce poverty but the total remittances divided by gross domestic product resemble the total dependency of a nation on towards these types of funds. If a nation is significantly more dependent on remittance funds, I hypothesize that overcoming cryptocurrency's indefinite learning curve would be more easily obtainable. Within my econometric model, I utilize both the amount of total remittances received as well as the total remittances received divided by the nation's annual gross domestic product in order to determine their relative impacts towards poverty mitigation within Sub Saharan Africa throughout 1993-2012.

The yearly gross domestic product for a nation was also considered as an independent variable within this regression set. After attempting to incorporate this variable, it was found that the gross domestic product created too much dilemma within the conducted robustness checks; and was therefore emitted from the regression set. Even though it was hypothesized within the

previous literature that the change in gross domestic product can be utilized as an indicator for a nations overall stability, it was found that the gross domestic product was found to be very multicollinearly related to the other included independent variables. I believe that a sense of national economic stability is more relevantly indicated within the utilized independent variable that analyzes the consumer price inflationary changes within these 18 included nations.

Consumer price inflation represents the overall fluctuation of prices on a very micro and personally representative scale. This value is created throughout a basket of goods analysis process where similar items are compared in order to analyze how consumer purchasing power is affected through currency inflation. Within Easterly (2001), the overall effects of inflation are analyzed from a global perspective in order to determine who is the most affected throughout times drastic changes in monetary valuations. This article concludes that the very poor are the most negatively affected population by inflationary changes due to the fact that they can no longer afford lively necessities. This belief was contradictory to the standard economic theory which states that a devaluation of currency would relatively affect the person whom had the most funds; and therefore loses the most amount of money. Alike Easterly (2001), I anticipate that increased inflationary effects will negatively affect the poorest of African citizens. Likewise, within Rousseau (2002), financial growth is expected to decrease as inflation increases beyond their threshold which was determined through the median value of 84 analyzed nations. Similarly, within my econometric model, I expect to witness a similar trend between relatively large inflation values corresponding to increased poverty amounts.

The final independent variable which was included in relation to previously conducted literature and econometric analyses was the total amount of remittances submitted towards a nation divided by their corresponding gross domestic product. This statistic is vitally important within my regression and thesis due to the fact that it essentially represents the expected efficiency of cryptocurrency integration within a country. As previously explained within the country determination section above, this variable was included specifically in relation to the hypothesis which declare that as remittances amounts and gross domestic product increase, more available funds, job opportunities, and cyclical multiplier effects become available (Gupta, 2009). Within my econometric analysis, I additionally include a nation's ratio of personal remittances divided by gross domestic product as an independent variable in order to account for a nation's dependence on remittance based transfers. Unlike personal remittances received, I expect the ratio of personal remittances divided by gross domestic product to be negatively corrected with poverty rates. I hypothesize that poverty rates will increase if a nation's gross domestic product is more dependent on remittance funds. Even though this variable was not expected to be associated with economic success, I do hypothesize that the this independent variable does represent the overall potential of integrating cryptocurrency-remittance transactions.

C.) Variable Description: Technological Infrastructure Addition:

Since crypto-currency affluence has never been econometrically analyzed in relation to remittances and poverty; several independent variables were created and utilized within in this investigation in order to account for a nation's ability to integrate cryptocurrencies while transferring or receiving remittances abroad. The included variables that have been individually created within this regression set are the total percent of internet users within a nation in

comparison to Africa's total use, a dummy variable indicating whether or not a nation is above or below the African average growth in percent internet users between 2000 and 2017, and a dummy variable which recognizes whether or not nation is above or below the average national African internet penetration by population.

The overall percent of a nation's internet use in comparison to all of Africa was utilized as an independent variable within this regression set in order to identify if how this form of technological infrastructure affects poverty. In relation to cryptocurrency-remittance-integration, internet is necessary in order to receive, send, or utilize these forms of currency. In addition, if I were to conduct this study within the future; it would be specifically interesting to investigate how this variable, when observed with a lagged effect, would effectively mitigate poverty.

The second independent variable included was to account for the development of technological infrastructure within Sub Saharan Africa. This dummy variable represented whether or not a nation was above or below Africa's average percentile of population with access to internet. Unlike the variable which represents a specific nation's internet use in relation to all of African use, this dummy represents the population penetration. This variable is important to include due to the fact that a nation with a large population could possess more overall access to internet, but less access per capita. This variable accounted for this discrepancy.

The third independent variable included within this analysis in order to account for the development of technological infrastructure within Sub Saharan Africa was the dummy variable which indicated if a nation's percentile change in internet use throughout the time period of

2000-2017 was above or below the national average. This variable, in relation to the relative changes in poverty, was hypothesized to be one of the revealing indicators of technological infrastructural change throughout the time period associated with the creation of Bitcoin and vast expansion of cryptocurrency utilization.

One additional variable which was attempted be included within this regression set was a cryptocurrency affluence indicator. This variable identified the amount of cities within the analyzed nations which supported cryptocurrency to be purchased and utilized from a provider named LocalBitcoin. After determining each nation's amount of available cities that Bitcoin could be bought and sold within, a dummy variable for this information was created in order to determine if the associated nation was above or below the average. Even though this variable was found to be vastly insignificant throughout regression analysis, it would be interesting to analyze this interaction future as more data is created.

D.) Econometric Model Analysis:

$$\begin{aligned}
 (\% \text{ Poverty}) = & \alpha_i + \beta^0 + \beta 1(GINI)_{it} + \beta 2(AFRIC.INT.USERS\%)_{it} + \beta 3(INT.POPULA.PENETRAT.)_{it} \\
 & + \beta 4(INFLAT.CNS.PRIC.)_{it} + \beta 5\left(\frac{REM}{GDP}\right)_{it} + \beta 6(Ln(REM))_{it} + \beta 7(CONST.)_{it} + \epsilon_{it}
 \end{aligned}$$

The chosen panel-based econometric model is very similar to previously conducted remittance-poverty investigations that are analyzed throughout the literature review. In addition, a few variables which are believed to account for the overall cryptocurrency integration potential within a nation are included. Four separate regressions are run in order to determine how these independent variables affect poverty within the 18 associated nations. The amount of poverty examined within this model was relative to the total amount of citizens earning less than \$1.25, \$2.00, \$2.50, and \$4.00 dollars per day accordingly.

E.) Robustness Checks:

The Hausman test within my regression set determined which effects model should be used. When associated to panel data, this test determines whether a fixed or random effects model should be utilized. Within my regression set, a random effects model was utilized. A random effects model is utilized when the data which is being analyzed are representative of different populations. Since my panel data set incorporate 18 different nations, it was previously hypothesized that a random effects model would be the correct choice for this analysis.

After conducting the Hausman test, a variance inflation factors (VIF) test was utilized in order to determine if there was any existent multicollinearity within the regressed data. A VIF value of 1 through 5 represents a moderately correlated data set. Any value below 1 represents a data set that is not correlated and a VIF value greater than 5 represents data that is highly correlational.

VI. Discussion of Results

A.) \$1.25 Regression Analysis:

Within the first regression, the observed countries' total population living below the \$1.25 poverty line was utilized as the dependent variable within an OLS regression model. The Gini variable's coefficient was found to be valued at 0.975 with an associative p-value of 0. The coefficient of the variable which represented the total percentage of a nation's internet access relative to all of African internet use was found to be positive and valued 1.347 with an associative p-value of 0.069. The coefficient of the variable which represented the natural-log of a nation's yearly personal remittances received was found to be negative and valued -3.775 with

an associative p-value of 0.002. The three formerly mentioned variables were the only ones to be found significant within the first \$1.25 poverty line OLS regression set. The dummy variable used for internet penetration, consumer price inflation, and the total personal remittances received by a nation divided by their gross domestic product were all found to be insignificant with coefficient values of -11.933, 0.146, and 0.041 accordingly (table 2).

These results reveal how impactful personal remittance funds towards relieving poverty within Africa. This semi log model states that overall, the percentile of people living below the \$1.25 poverty line would be reduced by an entire percent when personal remittance received increases by 3.77%. This negative correlation between poverty and remittances should further incentivize developing nations to restructure their remittance methodologies in order to increase submission efficiencies and reduce poverty. The gini variable was also found to be significant within the \$1.25 poverty line regression. The coefficient value for the gini variable was positive and similarly reactive as previously expected from the literature. This makes sense in reference to the belief that income inequality increases poverty in a positively correlative manner. The significance of the variable defining the overall percentile of internet users within a specific nation in reference to all of Africa shows this variables associative relevance. The coefficient value was unexpectedly positive within this regression set. After thorough analysis, this positive coefficient value is believed to have occurred due because this variable merely defines the overall use of internet within a nation and does not incorporate any measure of equality; just exposure. This variable's positive coefficient value can be justified due to the fact that the overall internet access within a specific African nation is benefiting the class of people living below \$1.25 the least. This variable's inability to observe the internet access across an entire nation's population is why the dummy variable of population based internet penetration was included

within this regression set. This variable's coefficient value was found to be very large and negative with an insignificant associative p-value of 0.217. This variable's significance was concluded to increase as the regression poverty lines increase to \$2, \$2.5, and \$4 due to expectation that internet penetration would become more significant as the analyzed proportion of a nation's population increases.

B.) \$2.00 Regression Analysis:

Within the second regression, the total percentile of a nation's population living below the \$2.00 poverty line was used as the dependent variable. The gini coefficient was found to be valued at 0.360 with an associative p-value of 0.067. The gini variable within the \$2.00 regression was reported to have both a larger coefficient and p-value in comparison to the previously completed \$1.25 poverty regression analysis. The coefficient of the variable which represented the total percentage of a nation's internet access relative to all of African internet use was found to be positive and valued 1.280 with an associative p-value of 0.061. This variable within the \$2.00 regression was reported to have a lower coefficient value and p-value in comparison to the previous \$1.25 poverty line regression set. The coefficient of the variable which represented the natural log of a nation's yearly personal remittances received was -3.45 with an associative p-value of 0. The three previously mentioned variables were all found to be significant within the \$2.00 poverty line OLS regression. The dummy variable used for internet penetration, consumer price inflation, and the total personal remittances received by a nation divided by their gross domestic product were all found to be insignificant with coefficient values of -11.4, 0.05, and 0.020 accordingly (table 2).

The regression results of the \$2 poverty inquiry are very interesting when compared to the previously conducted \$1.25 analysis. First, the gini variable's coefficient value decreased by

more than half and also become less significant. This variable functioned as expected in relation to the previously written literature and it can be commonly assumed that income inequality is more detrimentally affecting to relatively poorer citizens within a nation. Another result worth mentioning is regarding the increased significance and changed coefficient value of the natural log remittance variable. It was interesting to observe that remittances were shown to be less affective at alleviating poverty of relatively more wealthy people within the \$2.00 regression. This variables' coefficient value increased from -3.775 to -3.450 and showed that remittances transferred to the poorest citizens have the most influential ability to reduce poverty within the 18 nations overserved within Africa.

C.) \$2.50 Regression Analysis:

In the third regression, the nation's total population living below the \$2.50 poverty line was used as the dependent variable. The gini coefficient was found to be valued at 0.186 with an associative p-value of 0.242. The gini variable within the \$2.50 regression was reported to have a decreased coefficient value and a more insignificant p-value in comparison to the previously conducted \$2 regression analysis. The coefficient of the variable which represented the total percentage of a nation's internet access relative to all of African internet use was found to be positive and valued 1.086 with an associative p-value of 0.058. This variable within the \$2.50 regression was reported to have a lower coefficient value and p-value in comparison to the previous \$2.00 poverty line regression set. The coefficient of the variable which represented the natural log of a nation's yearly personal remittances received was -2.729 with an associative p-value of 0. The dummy variable used for internet penetration, consumer price inflation, and the total personal remittances received by a nation divided by their gross domestic product were all

found to be insignificant with coefficient values of -9.916, 0.024, and 0.074 subsequently (table 2).

The \$2.50 poverty regression set's results were particularly interesting in specific reference to the gini and natural log of remittance independent variables. First, the gini's coefficient is shown to decrease in value and significance. This response was expected to occur due to the fact that the gini variable represents income inequality, and inequality is less pervasive when analyzing more wealthy classes of African citizens. Second, the natural log of remittances' coefficient value was found to increase once more as the poverty line being analyzed was increased. This reaction was anticipated to occur due to the expectation that remittance funds would have a greater purchasing power when being submitted to the people in most dire need.

D.) \$4.00 Regression Analysis:

Within the fourth and final regression, the nation's total population living below the \$4.00 poverty line was analyzed. In this regression set, the gini coefficient was found to be valued at -0.02 with an associative p-value of 0.791. The gini variable within the \$4.00 regression was reported to have a smaller coefficient and greater p-value in comparison to the previously conducted \$2.50 poverty regression analysis. The coefficient of the variable which represented the total percentage of a nation's internet access relative to all of African internet use was found to be positive and valued 0.59 with an associative p-value of 0.048. This variable within the \$4.00 regression was reported to have a lower coefficient value and p-value in comparison to the previous \$1.25, \$2.00, and \$2.50 poverty line regression analysis. The coefficient of the variable which represented the natural log of a nation's yearly personal remittances received was -1.32 with an associative p-value of 0.001. The dummy variable used for internet penetration, consumer price inflation, and the total personal remittances received by

a nation divided by their gross domestic product were also found to be insignificant with coefficient values of -5.71, 0.01, and 0.050 accordingly (table 2).

E.) Robustness Checks:

The Hausman test was utilized in order to determine which effects model, fixed or random, to use. After completion, the resulting Prob>chi2 value was relatively large (0.9224) and therefore recommended that a random effects model would be most effective (Table 3).

Next, the variance inflation factors (VIF) test was utilized in order to determine if the independent variables within my regression set were multicollinear. The results of this test were that the natural log of remittances, African internet use percent, internet penetration dummy, gini coefficient, consumer price inflation, and remittances divided by gross domestic product were 2.16, 2.08, 1.50, 1.58, 1.16, and 2.02 accordingly. These values all averaged to 1.75 and represent that there is an insignificant amount of multicollinearity within these independent variables (Table 4).

F.) Discussion of Results in Entirety:

These results were interesting in particular reference to four specific independent variable OLS regression outcomes. Firstly, the gini coefficient functions as anticipated throughout all four of the regression sets. This variable, which was found to be positive and extremely significant within the \$1.25 poverty analysis, changed drastically. As the analyzed poverty price level within the regressions was increased, the gini variable continually decreased in coefficient value and significance. This outcome makes sense because income inequality is expected to have less of an effect towards poverty when associated with increasingly economically affluent classes of people within a nation. This variable was found to exhibit the greatest amount of change throughout the four regression sets.

Secondly, the variable which accounts for the percentage of a nation's internet access relative to the total rate of uses within all of Africa was interestingly found to become more significant as the analyzed poverty rate regressed was increased. This occurrence was believed to have occurred because this variable becomes more relevant when a greater proportion of a nation's population is analyzed. The relative poverty lines utilized within these regression sets are known to encompass large quantities of African Nation's citizens in relation to the known fact that over forty percent of Sub-Saharan Africans are living under \$1.25 per day (Our-Africa, 2017).

Additionally, the variable which represent whether or not the nation is above or below the African average internet accessibility threshold was shown to become more significant as the regression's poverty lines increased. This is important to acknowledge because it reveals that having a relatively large internet population penetration percentage can effectively help reduce poverty across several different socioeconomic classes within Africa. Even though this variable was never found to be significant within any of the utilized regression models, it is noted that this variable should be continually analyzed because of Africa's continuous demand for increased internet accessibility.

In addition, the variable which represents the total personal remittances received within a nation divided by that same nation's gross domestic product was found to have a positive coefficient value as expected. This variable was initially presumed to produce a negative coefficient variable due to the fact that a nations increased dependence on remittance funds would increasingly raise poverty rates across all four poverty line regression analyses. This variable was found to become increasingly more significant as the regression poverty lines increased from \$2 and beyond.

Finally, the impact of the variable which represents the natural log of personal remittances received was found to more effectively support the most impoverished citizens within the observed 18 African nations. This observation must be recognized because it statistically represents that funds that are transferred through remittances directly mitigate and reduce poverty within the observed African nations. These statistical recognitions could be majorly influential when considering whether or not cryptocurrency-based-remittances transactions could reduce poverty to a greater extend in comparison to their current operations.

To conclude, utilizing cryptocurrencies like Bitcoin throughout remittance transactions could drastically alter the amount of poverty within sub-Saharan Africa. Within the four previous regression analyses, it has been proven that remittances significantly benefit the most impoverished communities that face the most severe inequalities. Since cryptocurrencies are quickly increasing in value, I personally recommend developing nations, especially within Sub Saharan Africa to create a policy which demand and enforces cryptocurrency utilization throughout remittance transfers.

VII. List of Tables

Table 1: Summary Statistics of Averaged Data - 1995-2003. (Freund, 2008)

Region	Total Remittance (million USD)	Average Remittance Fees (%) 2005-2006
Total	60,581	10.91
South Asia	13,593	7.58
East Asia and the Pacific	11,071	8.4
Latin America & Caribbean	17,064	10.07
Eastern Europe & Central Asia	8437	11.66
Middle East and North Africa	8467	11.67
Sub-Saharan Africa	1948	13.02

Table 2: Regression Results (All Four Regressions)

Variable	\$1.25	P-Value	\$2	P-Value	\$2.50	P-Value	\$4	P-Value
Gini	0.97518	0***	0.36	0.067*	0.185722	0.242	-0.02	0.791
African Int. User	1.347403	0.069	1.28	0.061*	1.085544	0.058*	0.59	0.048**
Internet pen. pop.	-11.93374	0.217	-11.4	0.206	-9.915877	0.188	-5.71	0.146
Inflation Con. Prc.	0.14607	0.156	0.05	0.543	0.023783	0.719	0.01	0.767
Rem/Gdp	0.040845	0.873	0.02	0.932	0.074292	0.664	0.05	0.582
ln(rem)	-3.775366	0.002**	-3.45	0***	-2.729435	0***	-1.32	0.001***
constant	72.71546	0.01	117	0	120.1952	0	116	0

Table 3: Robustness checks (Hausman Test Results)

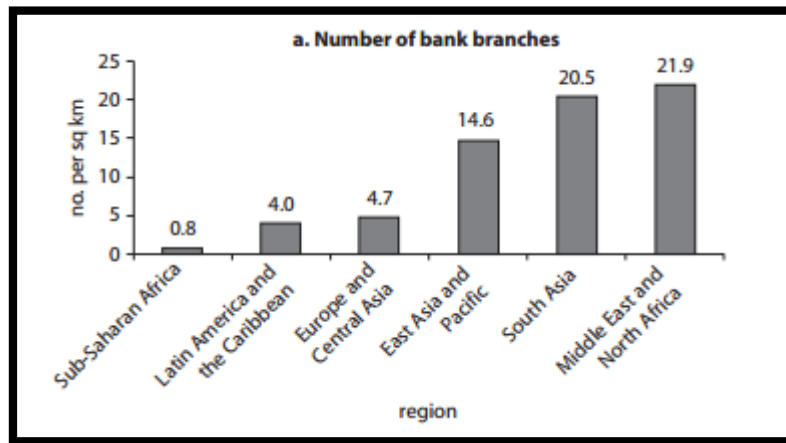
Variable	Coefficients Diference (Fix - Ran)	Sqrt. Dif.	Prob > Chi2
Gini	-0.048	0.105	0.9224
Inflat. Con. Price.	-0.011	0.03	0.9224
Rem / GDP	0.0923	0.169	0.9224
Ln(remittances)	-0.335	0.497	0.9224

Table 4: Robustness Checks (VIF Test)

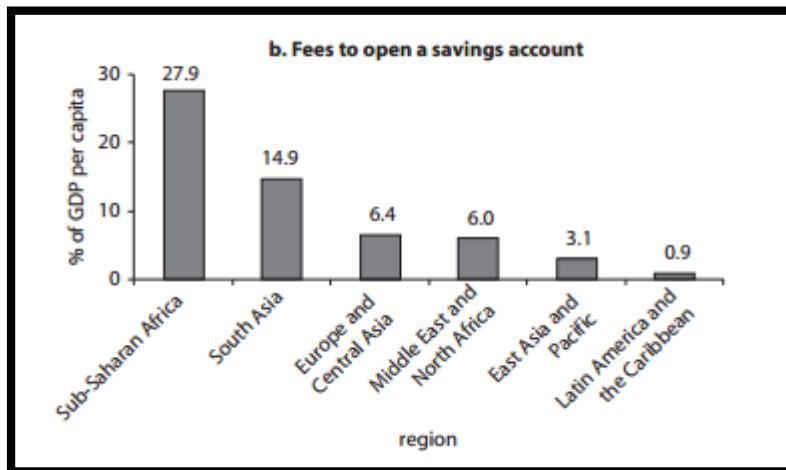
Variable	VIF Result
Ln(remittances)	2.16
% African Intern. use	2.08
Rem / GDP	2.02
Gini	1.58
Intern. Pen. Pop.	1.5
Inflat. Con. Price.	1.16

VIII. List of Graphs

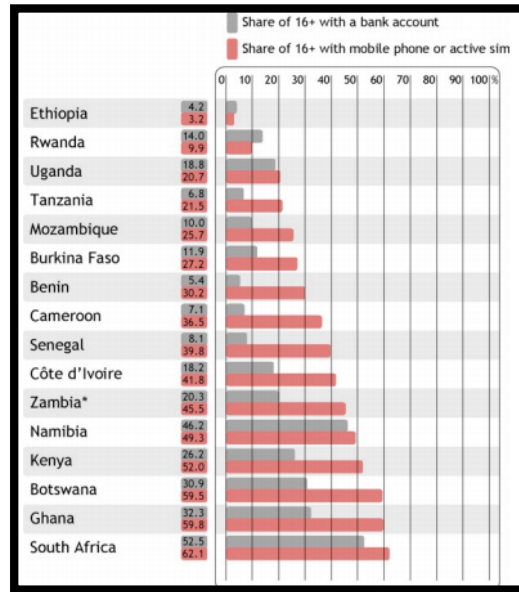
Graph 1: Number of Bank Branches Available per Sq. Mile



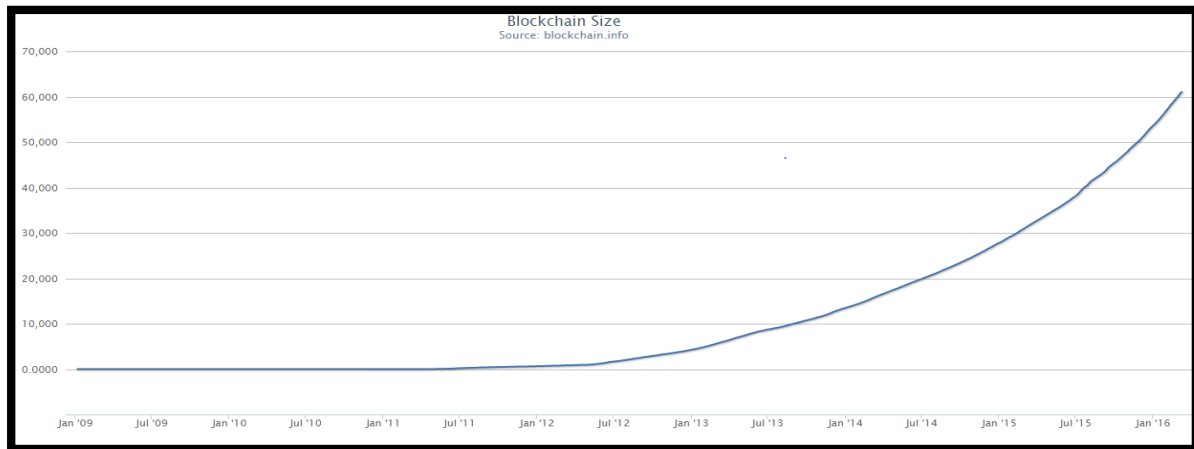
Graph 2: Associated Fees to Open a Bank Account



Graph 3: Comparison of the Share of Individual's with Bank Accounts and Mobile Phones Within Africa (Comminos, 2008).



Graph 4: Blockchain Size (Blockchain.info, 2016)



IX. Reference List

1. Abdelbagi, E (2016). Migration, Remittances, Trade Openness and Economic Growth in Africa; GMM technique. Journal of Global Economics. Retrieved From: <https://www.esciencecentral.org/journals/migration-remittances-trade-openness-and-economic-growth-in-africagmm-technique-2375-4389-1000193.pdf>
2. Adams & Page. (2005). Do International Migration and Remittances Reduce Poverty in Developing Nations? Journal of World Development. Vol. 33. Pp. 1645-1669. Retrieved From: <http://ac.els-cdn.com/S0305750X05001270/1-s2.0-S0305750X05001270-main.pdf>
3. Internet within Africa (2017). Relative rates of internet use, facebook logs, and percent increase in activity. Retrieved from: <http://www.internetworldstats.com/stats1.htm#africa>
4. Aggarwal, Reena (2006). Do Workers' Remittances Promote Financial Development? World Bank Policy Research. Retrieved from :<https://openknowledge.worldbank.org/bitstream/handle/10986/8418/wps3957.pdf>
5. Balestieri, Filippo. (2014). Bitcoin as a Monetary Issue. Research Gate. Retrieved From: https://www.researchgate.net/profile/Bernardo_Huberman/publication/266202015_Bitcoin_as_a_Currency_Issue/links/5429ccf80cf277d58e86feba.pdf
6. Barham, Bradford (1998). Migration, remittances, and inequality: estimating the net effects of migration on income distribution. Journal of Development Economics. Vol. 55. pp. 307-331. Retrieved From: http://ac.els-cdn.com/S0304387898900384/1-s2.0-S0304387898900384-main.pdf?_tid=2212bdb8-1caa-11e7-8eba-00000aab0f01&acdnat=14916904_50_3b8e73c245082c92c53f44465602cbc6
7. Bish, Joseph. (2016). Population growth in Africa : grasping the scale of the challenge. The Guardian Editorial. Retrieved From : <https://www.theguardian.com/global-development-professionals-network/2016/jan/11/population-growth-in-africa-grasping-the-scale-of-the-challenge>.
8. Blockchain.info (2017). Blockchain Size. Digital image. Blockchain.info. N.p., 2016. Web. Retrieved From: https://blockchain.info/charts/blocks.size?timespan=all&showDataPoints=false&daysAverageString=1&show_header=true&scale=0&address=>.
9. Cascarilla, Charles. (2015). Bitcoin, Blockchain, and the Future of Financial Transactions. CFA Institute Publications. Third Quarter 2015. Vol. 32. Iss. 3. Retrieved From : <http://www.cfapubs.org/doi/pdf/10.2469/cp.v32.n3.5>

10. Comninou, Alex (2008). M-banking the Unbanked. Towards Evidence-Based ICT Policy and Regulation. Vol. 1. Policy Paper 4. Retrieved From: https://www.researchictafrica.net/publications/Towards_Evidence-based_ICT_Policy_and_Regulation_-_Volume_1/RIA%20Policy%20Paper%20Vol%201%20Paper%204%20-%20M-banking%20the%20Unbanked.pdf
11. Coinbase. (2017). Valuation of Bitcoin. Retrieved from: www.coinbase.com
12. Desjardins, Jeff. "How Secure Are Bitcoins? - Visual Capitalist." Visual Capitalist. N.p., 13 Aug. 2014. Web. Retrieved From: <http://www.visualcapitalist.com/secure-bitcoins/>
13. Easterly, William (2001). Inflation and the Poor. Journal of Money, Credit and Banking. Vol. 33. No. 2. Part 1. pp. 160-178. Retrieved from: <http://www.jstor.org/stable/pdf/2673879.pdf>
14. Business Insider (2014). "Bill Gates Says Digital Currencies Could Be Huge." Business Insider. Business Insider, Inc, 10 Feb. 2014. Web. Retrieved From: <http://www.businessinsider.com/bill-gates-bitcoin-2014-2>.
15. Freund, Caroline. (2008). Remittances, transaction costs, and informality. Journal of Development Economics. Vol. 86. Iss. 2. Pp. 356-366. Retrieved From: <http://www.sciencedirect.com/science/article/pii/S0304387807000818>
16. Giuliano, Paola. (2008). Remittances, Financial Development, and Growth. Journal of Development Economics. Vol. 90. Iss. 1. Pp. 144-152. Retrieved From: <http://www.sciencedirect.com/science/article/pii/S0304387808001077>
17. Gupta, Sanjeev. (2009). Effect of Remittances on Poverty and Financial Development in Sub-Saharan Africa. Journal of World Development. Vol. 37. Iss. 1. Pp. 104-115. Retrieved from: <http://www.sciencedirect.com/science/article/pii/S0305750X08001903>
18. IMF (2011). International Monetary Fund. Remittance Transfer Quote. Retrieved from: <http://www.imf.org/external/pubs/ft/fandd/basics/remitt.htm>.
19. Martin, James (2014). Lost on the Silk Road: Online Drug Distribution and the 'cryptomarket'. Journal of Criminology and Criminal Justice. Vol. 14. pp. 351-367. Retrieved From: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.838.8982&rep=rep1&type=pdf>
20. Migration Policy Institute, MPI. (2011). Remittance Profiles : Top receiving Countries. Retrieved From: <file:///C:/Users/mreeves/Downloads/World.pdf>

21. Mohapatra, Sanket (2011). Remittance Markets in Africa. World Bank Journal of Directions in Development. Retrieved from: http://siteresources.worldbank.org/EXTDECPROSPECTS/Resources/476882-1157133580628/RMA_FullReport.pdf
22. Our Africa (2017). Percentage of Sub-Saharan African Population Residing Under \$1.25 Poverty Line. Retrieved From: <http://www.our-africa.org/poverty>.
23. Rousseau, Peter (2002). Inflation thresholds and finance-growth next. Journal of International Money and Finance.
24. Spatafora, Nikola. (2005). Remittances: Transaction Costs, Determinants, and Informal Flows. International Monetary Fund (IMF). Retrieved From: <http://library1.nida.ac.th/worldbank/fulltext/wps03704.pdf>.
25. World Bank. (2014). Financial Inclusion Data - Sub Saharan Africa. Retrieved From: <http://datatopics.worldbank.org/financialinclusion/region/sub-saharan-africa>
26. World Bank. (2016). Personal Remittances Recieved (% of GDP) - Lesotho, Ghana, Nigeria. Retrieved From: <http://data.worldbank.org/indicator/BX.TRF.PWKR.DT.GD.ZS?locations=GH-NG-LS&start=2000>
27. World Bank. (2016). Personal Remittances Received (Ghana, Nigeria, Lesotho). Retrieved From: <http://data.worldbank.org/indicator/BX.TRF.PWKR.CD.DT?locations=LS-GH-NG>
28. Yelowitz, Aaron. (2015). Characteristics of Bitcoin Users : An analysis of Google Search Data. Journal of Applied Econometric Letters. Vol. 22. Iss. 13. Pp.1030-1036. Retrieved from: <http://www.tandfonline.com/doi/abs/10.1080/13504851.2014.995359>.