LUND UNIVERSITY

SCHOOL OF ECONOMICS AND MANAGEMENT

Women's Financial Inequality and Economic Growth in Sub-Saharan Africa

The dynamics of inequality and growth

By

Enya Linnea Zibell
en8026zi-s@student.lu.se

Abstract: The main purpose of this paper is to examine the relationship between inequality and growth through the lens of women's financial inclusion in Sub-Sharan Africa for the period 2004-2020. Using a log-log fixed effects model on Panel data, the relationship between women's financial inclusion, measured by female borrowers per 1000, and economic growth was examined. The results show that both women's financial inclusion and economic growth have a positive and statistically significant effect on each other. However, focusing on empowering and including women in the financial, business, and the legal world is crucial in Sub-Sharan Africa. It improves economic resilience, which is key to long-term economic growth. The results continue to support the notion that there are country and community specificities that should be accounted for to strategically implement a growth and development policy.

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INTRODUCTION

Digital Financial Services (DFS) are a significant player in expanding access to essential financial services for the unbanked and underserved. DFS, easily accessible with a simple smartphone, which about 70% of the bottom fifth in developing countries own, has created immense potential for financial inclusion. Mobile phone ownership is so expansive in developing countries that more own a mobile phone than access clean water and electricity (Schou-Zibell, 2018)

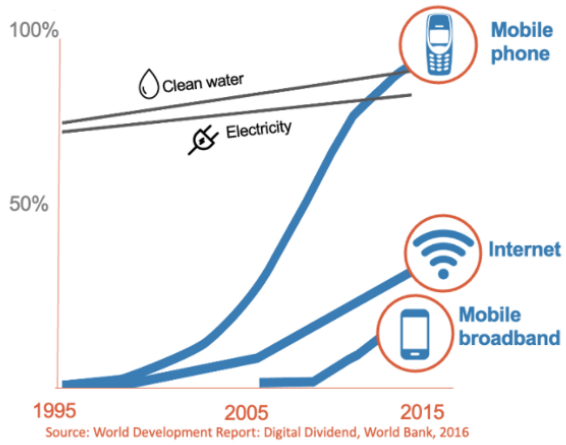

Figure 1. Mobile Phone Penetration

Financial inclusion is a precursor for increased equality and economic growth as it provides increased access to essential financial services enabling increased economic activity for the unbanked and underserved. The rampant spread of mobile phones and, consequently, the increased accessibility of DFS empowers the exploration of financial inequality and economic growth. Globally, DFS is estimated to increase the GDP of emerging markets by $3.7 trillion by 2025, creating up to 95 million new jobs (Manyika, et al., 2016). The increase in GDP and economic activity is expected to raise overall productivity and investment and increase the efficiency of government spending (Bill and Melinda Gates Foundation, 2019). With these rapid developments, the unbanked and underserved must have access to DFS. While mobile phone ownership is at an all-time high, 980 million women are still unbanked, 56% of the world's unbanked (Demirguc-Kunt, et al., 2017). Unbanked and underserved women represent an immense loss of economic growth and development that could improve the quality of life of millions.

Sub-Sharan Africa (SSA), a region that has persistently lagged in all areas of economic development, is a region that has the most to gain from increased access to DFS. The 2016 UNDP African Human Development report estimates that the SSA region loses, on average, $95 billion annually to the gender gap – losses peaked in 2014 at about $105 billion. This equates to about 6% of GDP (UNDP, 2016). Africa is the youngest and fastest-growing continent globally. It expects to host about 365 million young people in the job market, and every year, around 13 million young men and women seek jobs. Within a few decades, it will be home to the largest workforce in the world of more than one billion people (Mastercard Foundation, 2020). Furthermore, more than 400 million African adults, nearly 60% of which are female, do not have access to DFS, and there is a 13% gender gap in mobile phone ownership, where men have an ownership rate of 71% and women a rate of 58% (Demirguc-Kunt, et al., 2017).

DFS brings enormous potential to engage the increasing number of young adults entering the workforce, enabling productive use of SSA's growing human capital.

DFS and fintech are essential components of financial inequality and modern economic growth, particularly women's financial disparities. DFS and fintech may provide insight into the opaque relationship between inequality and growth in the Poverty-Growth-Inequality (PGI) triangle. The PGI triangle is a fundamental concept within development economics that describes and explains the dynamics of economic development. The unequal access to financial services between men and women is a growing concern regarding sustainable and equitable development. As DFS and financial technologies are becoming increasingly vital in everyday life, it is essential to understand if, how and to what extent it impacts overall economic growth. Hence the main research question is:

How does increased women's financial equality impact economic growth in Sub-Saharan Africa?

KEY TERMS

Financial Inclusion	Digital Financial Services (DFS)	Fintech
Financial inclusion is the extent to which a population can access financial services, the degree to which they can use financial services, and their quality and cost (Barajas, et al., 2020).	DFS are financial services and payment solutions that rely on digital technologies for their delivery and use. These services include payments, credit, savings, remittances, insurance, and includes mobile financial services (Pazarbasioglu, et al., 2020; Svarer & Moffat, 2020).	"**Fintech** refers to digital technologies that transform the provision of financial services spurring the development of new business models, applications, processes and products" (Pazarbasioglu, et al., 2020).

Table 1. Key Terms

Sub-Saharan African Nations	
Angola; § Benin; Botswana; Burkina Faso; Burundi;§ Cameroon; Central African Republic;* Chad; Comoros;†† Democratic Republic of Congo; Republic of Congo; Côte d'Ivoire;† Ethiopia;† Gabon; Ghana; Guinea; Kenya; Lesotho;* Liberia;* Madagascar; Malawi; Mali; Mauritania; Mauritius; Mozambique;‡ Namibia;† Niger; Nigeria; Rwanda; Senegal; Sierra Leone; Somalia;‡‡ South Africa; South Sudan;‡ Sudan;§ Swaziland;†† Tanzania; Togo; Uganda; Zambia; Zimbabwe	* Excluded in 2014 data only. † Excluded in 2011 data only. ‡ Excluded in 2011 and 2014 data. § Excluded in 2017 data only. ** Middle East and North Africa average suppressed in 2014 data. †† Excluded in 2014 and 2017 data. ‡‡ Excluded in 2011 and 2017 data.

Table 2. Countries in SSA (World Bank Group, 2018)

BACKGROUND

DIGITAL FINANCE SERVICES AND FINANCIAL INCLUSION

Access to affordable financial services is one of the most critical steps to poverty reduction and economic growth. DFS accessed through various technologies such as smartphones, are widely accessible in almost all communities, making them practical for increasing financial inclusion. Expanded financial inclusion facilitates daily transactions, remittances, paying bills, and receiving wages. Instead of dealing with less efficient cash requiring more face-to-face interactions, which due to covid-19, has been made more difficult, risker, and, in some instances, even prohibited (Pazarbasioglu, et al., 2020). At the macro level, countries with deeper developed financial systems can more efficiently allocate capital, risks and, as a result, experience greater economic growth, reductions in poverty, and income equality. At the micro-level, financial inclusion reduces poverty, increases resilience, and improves the quality of life for the poor.

Globally 1.7 billion adults lack access to essential financial services – *Why is this lack of access an issue?* When low-income families lack access to basic financial services, they: (FINCA, n.d.)

- Don't have a secure place to save money
- Don't have access to small loans or credit lines and can fall victim to shark lenders
- Cannot build a credit score
- Have no way to receive money (customer payments or remittances)
- Have no safe, reliable, and easy way to make payments

When low-income families have access to essential financial services, they can earn more, build assets, increase security, reduce vulnerability, and create jobs (FINCA, n.d.). Firstly, financial services enable higher household earnings by providing needed financing for business activities and helping families save, manage cash flows, and reduce the need to sell assets in times of crisis. Second, financial services help families acquire land, build homes, purchase livestock and consumer goods, or expand their businesses. Third, financial services provide a safe and reliable place to store, grow and utilise their funds. Currently, only a fifth of the developing world uses financial institutions to store money; many instead store cash under floorboards or under mattresses where it can be easily found and stolen. Fourth, financial services help low-income families transition from everyday survival to planning by increasing earnings and savings. For example, parents can pay for school tuition, health care services, and more nutritious food. By providing the ability to tap into savings, loans, or insurance, families are better prepared to deal with potential financial crises caused by illness, natural disasters, or other calamities common in developing countries. Lastly, financial services create jobs, providing entrepreneurs with the opportunity to expand their businesses, and create jobs that others in the community can access (FINCA, n.d.).

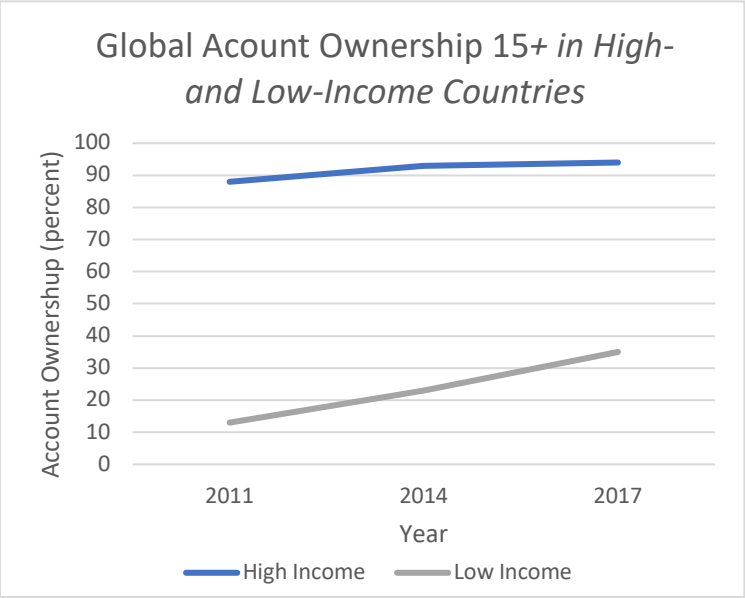

Figure 2. Global Account Ownership

While progress has been made, low-income countries still lag, and the ongoing Covid-19 pandemic has not made things easier. The pandemic has highlighted the importance of functioning, accessible and affordable digital financial services. Without such tools, most economies would have collapsed entirely, as individuals would have been unable to receive wages, pay bills, engage in simple daily transactions, and much more. DFS has seen a vast expansion over the past decade, but not all economies are sufficiently advanced to benefit from DFS. As seen in figure 2, both HICs and LICs show increasing account ownership rates, especially in LICs, starting at a substantially lower starting point. While there are bounds of positive effects of DFS, there are risks when increasing reliance on digital technologies, risks that poorer and less educated populations are more susceptible to. These risks of using DFS can even, at times, inhibit financial inclusion; however, with the proper implementation, education, and awareness, many of these risks can be mitigated. A few examples of risks include:

Exclusion: if technology infrastructure is inequal, it will lead to unequal access to DFS, increasing the digital divide.

Over-indebtedness: Late repayments and defaults in poorer populations because of digital credit (e.g., Kenya and Tanzania)

Discrimination: Underlying data biases may not be removed even if DFS tools (e.g., credit scoring) are used.

Unfair practices: vulnerable to abuse, fraud, and operational failures, which may reduce trust in DFS and undermine their adoption

Data-protection related risks: some customers may be more vulnerable to compromises of data privacy, identity theft, and fraud. This is particularly the customers with low financial capabilities, which are often poor (Pazarbasioglu, et al., 2020).

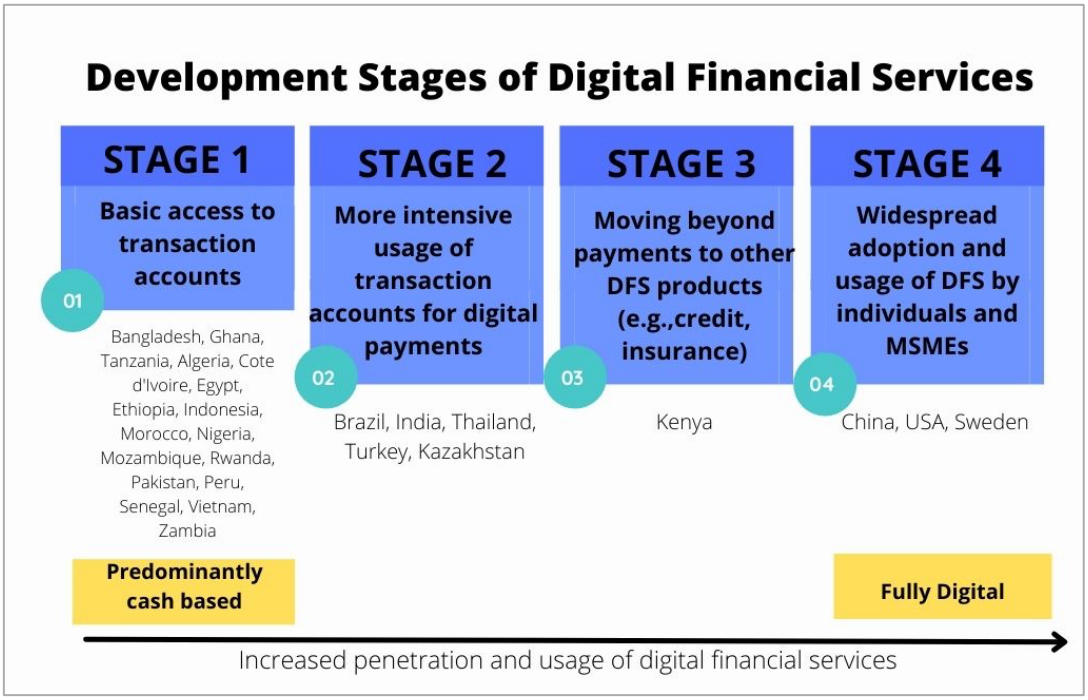

Figure 3. Four Stages of DFS Development

Figure 3 illustrates the four stages of DFS expansion from predominantly cash-based to fully digital economies. Many low-income countries, such as in SSA, leapfrog development. They are leapfrogging from stages 1 to 3 and 4 because mobile phone penetration is so high that DFS can quickly be adopted amongst local populations. Innovative digital financial technologies expand financial opportunities and create faster, more cost-effective ways of reaching low-income households, enabling the possibility to leapfrog development — skipping non-essential and expensive steps that are no longer necessary in the development process.

M-Pesa is an excellent example of a financial service that increased financial inclusion and enabled specific communities to leapfrog development. Launched in 2007 in Kenya and Tanzania, M-Pesa has expanded to Afghanistan, South Africa, India, Romania, and Albania. Initially, M-Pesa was a DFS designed to improve access to financial services; however, as it grew, M-Pesa became an essential tool for remittances used by the overseas worker and businesses to avoid robberies and digitally and safely deposit money. Today, M-Pesa is a branchless banking service that allows users to deposit, send, transact, and redeem deposits from their mobile phones. Over time, these types of services are likely to increase, expanding financial inclusion and the possibility of leapfrogging development.

AIM AND HYPOTHESIS

This paper explores the ever so elusive dynamic between inequality and economic growth in SSA regarding women's access to financial services. DFS has immense potential to lift women and enhance their economic freedom and social mobility, which following a rational economic theory, suggests positive gains to economic growth.

In addition to discussing the main research question, a few sub-research questions will be addressed to dissect the entangled relationship between growth and inequality and determine the nature of their relationship.

MAIN RESEARCH QUESTION:

How does increased women's financial equality impact economic growth in Sub-Saharan Africa? And in which direction does the relationship flow?

Sub-research questions:

Is it most effective to focus on growth or inequality development policies in Sub-Sharan Africa? Which factor should be prioritised?

Is the relationship between women's financial inclusion and economic growth similar in low, middle, and high-income countries?

LITERATURE REVIEW

THE POVERTY- GROWTH-INEQUALITY TRIANGLE

The Poverty-Growth-Inequality (PGI) Triangle is an economic theory illustrating the intertwined relationship between those core development concepts. At its core, it demonstrates the idea that these variables all interact and impact each other. For example, inequality and growth would decline if poverty were to increase. If poverty were to decrease, the consensus is that inequality and growth would improve. Poverty has an assured role in the triangle, with clear micro and macro-level data supporting how it impacts growth and inequality. However, the relationship between inequality and growth is more elusive. One reason for this may be that both inequality and growth are umbrella terms that can be measured and defined in many ways. This paper focuses on inequality and growth, specifically, women's financial inequality and economic growth as GDP per capita. GDP per capita is the heart of macroeconomic analysis and policymaking as it enables cross-country comparisons of living standards and offers a point of reference for other economic variables (Hu & Yao, 2019). Women's financial inclusion is a relatively new area within economic development and vital for long-term sustainable development.

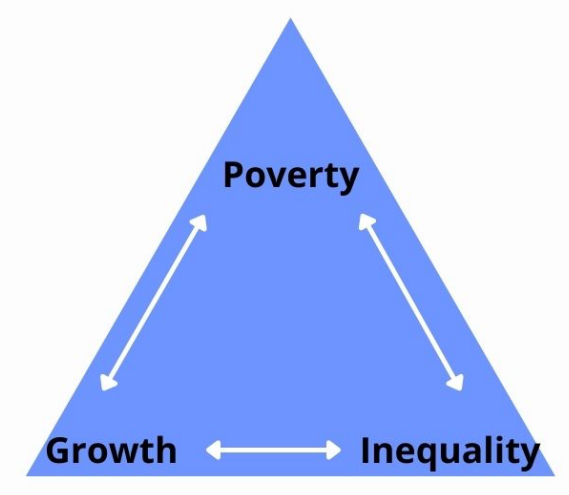

Figure 4. PGI Triangel

Bourguignon (2003) argues that the PGI triangle "poses a false dilemma", implying "that there is too much country specificity in the way that growth affects distribution for any generalisation to be possible" (Bourguignon, 2003). In other words, the country-specificity required when investigating inequality and growth only enables micro-level analysis as too many generalisations are made at the macro level. However, although not perfect, many scholars view the PGI triangle as a benchmark tool that encapsulates core elements of inclusive economic development.

The econometrics and case studies point toward a positive relationship between economic growth and women's finances; however, GDP per capita may not be the best indicator of change in a region with widespread poverty and a large informal market. GDP and GDP per capita are commonly used indicators of economic growth even though it excludes activities in the casual market where many activities occur, especially in low-income countries. Therefore, it is argued by some that GDP per capita is an insufficient and ineffective measure of economic growth. The IMF report, *Illuminating Economic Growth,* argues that combining GDP and pictures of light at night from outer space better indicates economic growth and development. The idea behind the outer space pictures of communities during the night is that affluent communities will have light at night, whereas poorer communities will not. Studying these pictures over time can provide data on access to electricity, a proxy for economic development. These satellite images in figure 5 confirm that Sub-Saharan Africa and Africa as a continent have made little progress in development, especially when compared to China and the USA, which have experienced rapid growth over the past few decades. While the econometric results point towards a positive effect on economic growth, the reality is less certain. Africa has made some strides but continues to lag in many areas

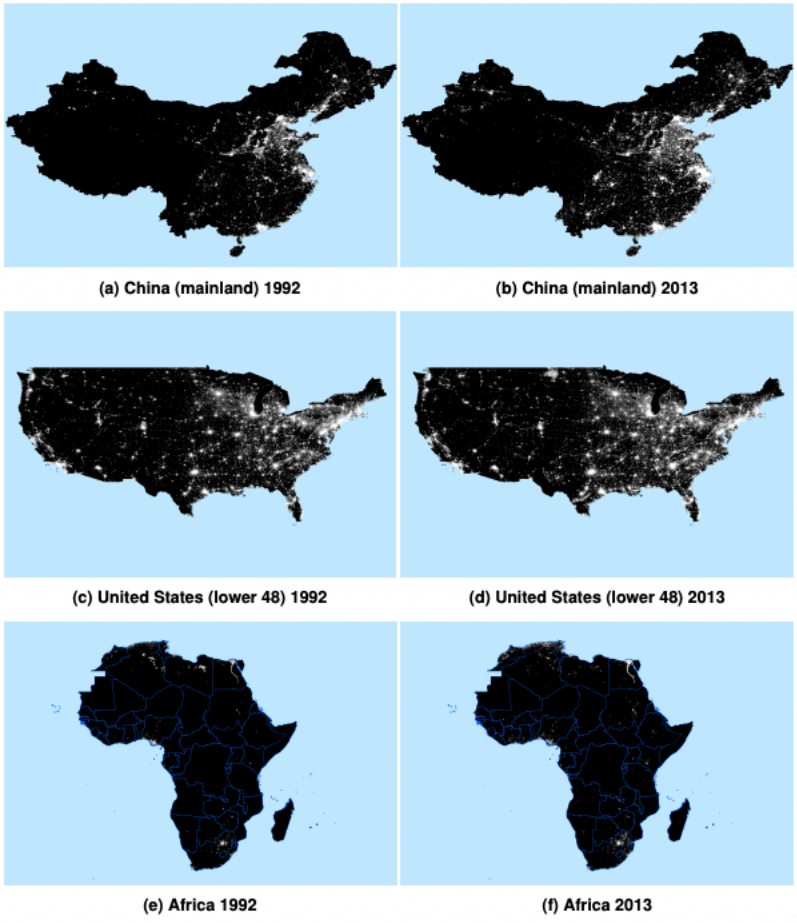

Figure 5. Light Infrastructure Expansion (Hu & Yao, 2019)

MODERN ECONOMIC GROWTH AND INEQUALITY

A dominant view today is that inequality plays a central role in determining the rate and pattern of growth; this view was pioneered by scholars such as Alesina and Rodrick (1994), who were the first to point out that initial inequality seems to be empirically associated with lower growth rates (Bourguignon, 2003). Growth, in itself, is opaque, but a modern definition of economic growth, as defined by Kuznets (193), states that it is "a long-term rise in the capacity to supply increasingly diverse economic goods to its population, this growing capacity based on advancing technology and the institutional and ideological adjustments that it demands" (Kuznets, 1973).

Kuznets theory of modern economic growth rests on six pillars: (1) High rates of per capita growth; (2) the rate of rising productivity is high; (3) the rate of structural transformation is high and is shifting away from agriculture to non-agricultural pursuits; (4) rapid social change (5) economically developed countries reach out to the rest of the world through their increased power of communication and transport technology; and (6) the spread of economic growth (Kuznets, 1973). These six pillars build to form the explanation that "growth demands stable, but flexible, political and social framework capable of accommodating rapid structural change and resolving the conflicts that it generates while encouraging the growth-promoting groups in society" (Kuznets, 1973). Like Kuznets idea that growth demands stable socio-economic conditions the World Bank Report, *Governance, and Law*, suggest that long-term growth is dependent on an "economies ability to withstand shrinkage in times of economic crisis and violent conflicts;" this idea is illustrated in figure 6 (López-Calva & Zhou, 2017). This is in line with the consensus that the significant difference between rich and developing nations is not growth but their ability to reduce shrinkage. Aside from times of crisis, economies seem to shrink because the growth process is either not transformative, not broad-based (inclusive), or mismanaged, thus limiting their resilience.

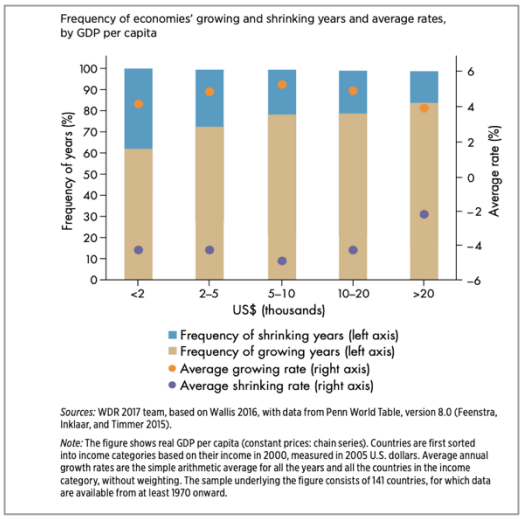

Figure 6. Economic Resilience (Demirguc-Kunt, et al., 2017)

There are two primary schools of thought concerning the relationship between inequality and growth: the Kuznets and Lewis models. On the one hand, the Kuznets model believes that growth leads to increased equality, whereas the Lewis model believes growth leads to increased inequality. The Kuznets model is linked to the neoclassical view on growth and inequality, where growth is seen as a mechanism to increase equality as it breaks down 'old' systems, spreads wealth, empowers low-income earners, and enables progressive taxation, which strengthens the welfare state (Perkins et al., 2013:165-200). On the

other hand, the Lewis model views growth as a cause for increased inequality as growth agglomerates in leading sectors with weak linkages where productivity and wages rise, leaving other subsidiary sectors behind (Perkins et al., 2013:165-200). Bourguignon's (2003) World Bank Report, investigating the PGI relationship, and specifically the dynamics between growth and inequality, found that when pooling together a regression of the Gini Coefficient over income per capita and the inverse of income per capita; there is a clear inverted U-curve. However, the curvature loses significance as the time frame increase, for example, on a decadal basis. The results are more robust on a micro-level, whereas there is no significant relationship between inequality and growth at the macro level. This does not imply that there is no significant impact of growth on inequality but indicates too much country specificity to make any generalisations possible (Bourguignon, 2003). The 2003 report confirms Kuznets's theory. Like the 2003 World Bank report, the IMF working paper: *Financial Inclusion and Inequality* found there to be Kuznets shaped curve when exploring GINI coefficients and financial inclusion index using 2014 data seen in figure 6 below.

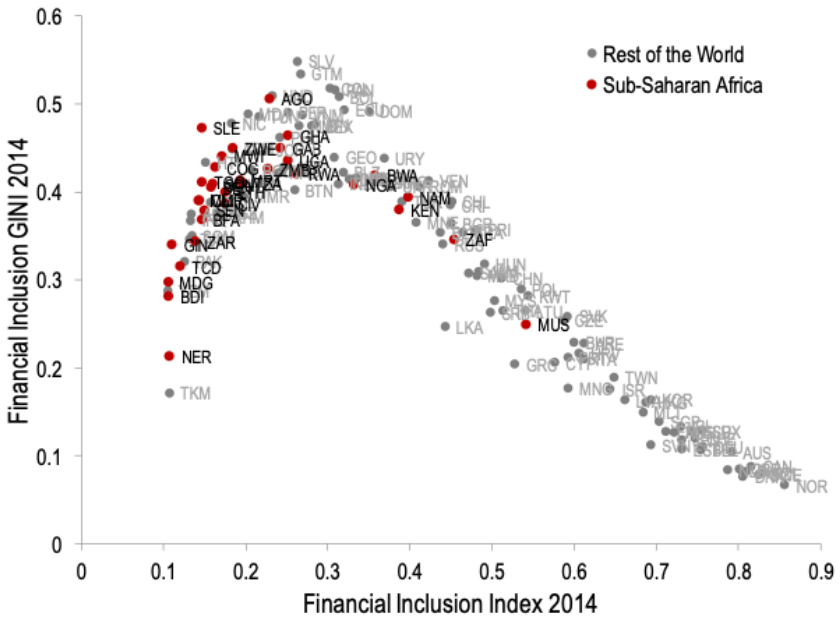

Figure 7. IMF Financial Inclusion and Inequality (Aslan, et al., 2017)

The theory of convergence, a conventional economic theory, suggests that backward countries have advantages that enable a quicker catchup process. Backward countries, such as many low-income countries in SSA can catch up by imitating HIC by trading, getting the fundamentals right (stable and dynamic institutions and infrastructure), developmental state, and luck. This is as first-come countries (HIC) are pioneers at the research frontier producing new technologies and strategies, which LIC can use to make giant technological leaps as they have a large store of unused productive potential and have greater returns to capital (which are diminishing). In other words, they can leapfrog development. While this theory suggests that backward countries such as those in SSA will catch up to HIC in the west, this has not yet happened. Instead, the gap between the rich and poor has increased over the 20th century,

and the SSA region continues to lag. This suggests that the convergence theory is flawed. One hypothesis is that a country's potential for rapid growth is best when technologically backward and socially advanced. However, technological advancements and social capabilities are generally intertwined and do not progress independently of each other.

Income, financial, and gender inequality tie into a country's level of social capability. The theory of convergence assumes that a country's potential for rapid growth is strong when it is technologically backward but well-endowed with social capabilities. SSA is a technologically backwards region with limited social capabilities, specifically with poor equity in access to financial services. The divergence between rich and developing countries concerning access to finance is a persistent issue, as demonstrated in figure 8. There is a substantial gap between rich countries (to the left) and developing countries (to the right).

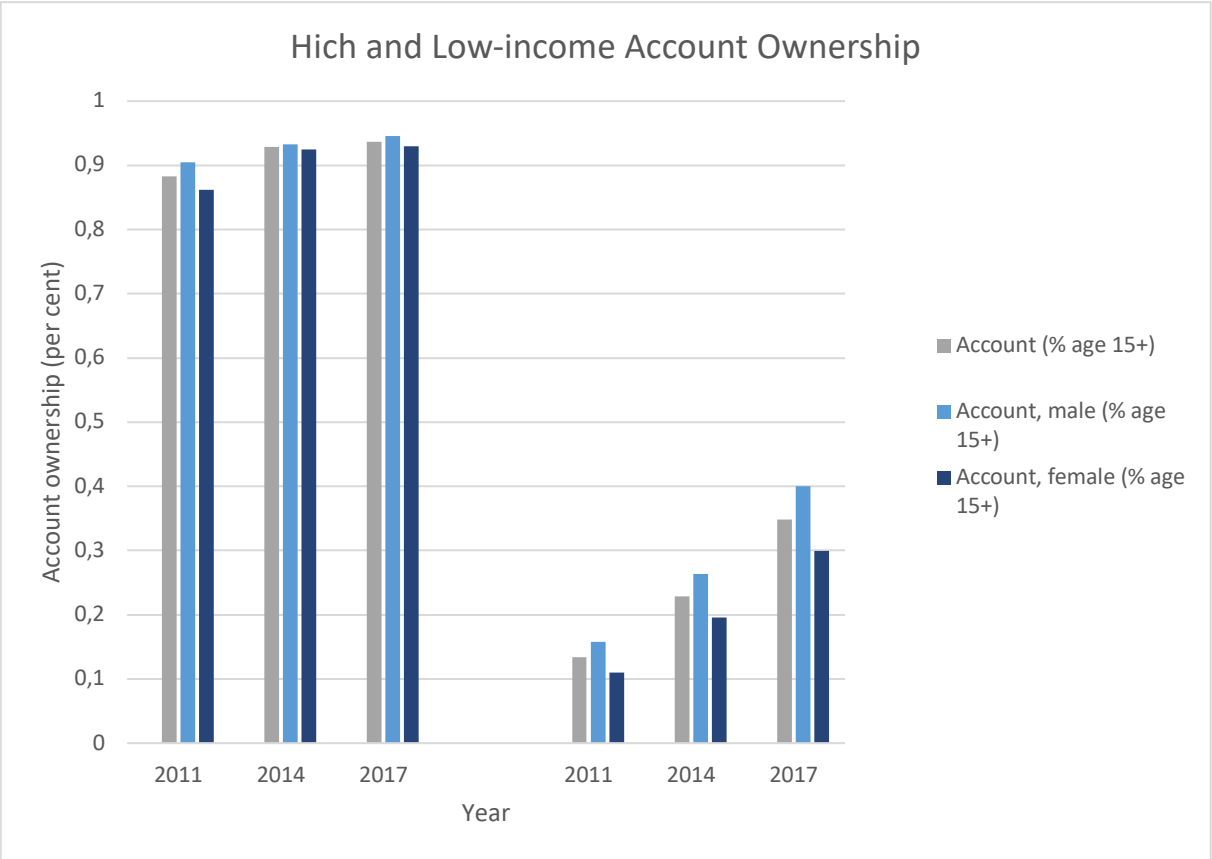

Figure 8. Account Ownership in HIC and LIC (Author's Own)

Inequality as a mechanism for convergence is explored in the OECD region, which experienced a 10% increase in income inequality from the mid-1980s to the late 2000s. In comparison, economic growth continued from the mid-1990s to the late 2000s, experiencing an 'inequality convergence' (Causa, et al., 2014). Since the 1980s, the OECD region has grown, experiencing positive GDP growth annually,

suggesting that economic growth and inequality may have a positive relationship as growth increases and inequality eventually evens out. The evidence presented in a paper published by the Swiss Society of Economics and Statistics in 2017 suggests that there seems to be a positive relationship between wealth inequality and real per capita GDP. Still, the relationship is not robust to different model specifications (Causa, et al., 2014).

The 2003 World Bank report and the OECD report point to similar conclusions. The evidence suggests a positive relationship between inequality and growth in a shorter time frame. Still, the results are less robust and not statistically significant from a long-term perspective and with different model specifications. This brings us back to the world Bank's conclusion that there are too many country-specificities to make any generalisations possible.

Outside of the OECD region the, Barrow at the National Bureau of Economic Research (NBER), examining a broad panel of countries between 1960 and 1995 separated into high- and low-income countries, found that "high levels of inequality reduce growth in relatively poor countries but encourage growth in richer countries" (Balls, 1999). Specifically, that growth decreases with greater inequality when income per capita is less than 2000 USD and rises when income per capita is more than 2000 USD. Barrow further parallels the Kuznets curve and ascertains that "eventually, as more people take advantage of the new technology, inequality falls" (Balls, 1999). The evidence from Bourguignon (2003) supports the idea that inequality has a more significant result in LICs. Bourguignon (2003) found that where inequality is initially high, a 3% annual growth rate in income would reduce poverty from its initial level of 50% to 35% in 10 years without any change in inequality. During these ten years, if inequality increases, the reduction in the poverty rate will be halved. They suggest that higher inequality reduces the reductive poverty rate and hampers growth (Bourguignon, 2003). Inequality has a varying effect on countries with different income and development levels and diverges in high-and low-income countries. Suggesting that inequality indirectly effects growth through poverty.

While the discussed papers demonstrate conflicting and, at times, insignificant results, they show that at the micro-level, there are more significant relationships between inequality and growth than at the macro level. For example, distilling the focus area even more to look at mobile penetration and economic development, GSMA found that mobile penetration, as a proxy for financial inclusion, has a significant and positive effect on GDP per capita, productivity, improved communication, social inclusion, and economic activity (Rowntree & Shanahan, 2020). McKinsey has found that DFS can include 1.6 billion individuals, generate up to 4.2 trillion USD in deposits, boost GDP by 6% ($3.7 trillion) by 2025, create 95 million new jobs, reduce government leakages by $110 billion and produce $2.1 trillion in new credit (Manyika, et al., 2016). This is in line with Kuznets's theory that increased growth leads to increased equality. However, this optimistic view presented by McKinsey may not be so straightforward. The

IMF's working paper – *Inequality Overhand and Inequality and Growth: A Heterogenous Approach* – found that the effect of income inequality on economic growth varies depending on the Gini coefficient. Countries with a Gini coefficient above 27 will begin to experience a slow down or reversal of development, whereas those with a value under 27 see an increase in Growth (Grigoli, 2017). This further supports the idea that there is too much country specificity in the relationship between inequality and growth to produce general assumptions and trends. However, other working papers created by the IMF, such as *Inequality in Financial Inclusion and Income Inequality,* found a strong association between inequality in financial access and income inequality (Aslan, et al., 2017). Similarly, the Asian Development Bank (ADB) has found that growth reduces inequality, specifically through enhancing the market participation of micro, small, and medium-sized enterprises. In more recent years, ADB and other institutions and banks have begun focusing on female empowerment, coined "smart economics." Improving women's economic opportunities enhances their own and their communities' financial and social independence, improves health, education rates, poverty, and decreases the risk of market failures (ADB, 2018; ADB, 2003).

While the literature refuses to reach a consensus concerning the relationship between growth and inequality, there seems to be a reoccurring theme of country specificity. When examining inequality and development, there is too much country specificity to create robust and accurate macro trends and assumptions. The statistical uncertainty of GDP can explain another interpretation of the lack of consensus to measure economic growth. It is not unknown that GDP, an official estimate, does not account for the existence of the informal market, which is an essential factor in many low-income countries. However, finding a better measure of economic growth that can be compared across countries is complex, and therefore GDP per capita is used.

WOMEN'S FINANCIAL INCLUSION

Financial inclusion is a catalyst for women's economic empowerment. It enables them to rule over their own decisions, production, consumption, and ultimately more control over their own lives (Salman & Nowacka, 2020). Women create positive externalities for their communities because they tend be the primary caregivers, investing more in their children, health, and future than their male counterparts. For example, in Kenya, a woman's spending on preventative health care increases by 70%–130% when she opens a savings account. In Niger, households with mobile banking ate a diet 9%–16% more diverse than those without and ate 33% more per day (Gates Foundation, n.d.). Disadvantaging women develops a chain of adverse effects on generations to come.

Women face various social, cultural, and economic barriers that inhibit them from accessing financial services. Women's World Banking (WWB) has identified three categories of barriers women face, illustrated in table 3 below: (1) client-side barriers, (2) institutional barriers, and (3) ecosystem barriers

(Women's World Baning, 2019). These barriers cover both demand and supply-side issues and cater to the specific needs of women who generally experience lower levels of social freedom, financial and digital literacy, and restrictive gender norms.

Client-Side Barriers	Institutional Barriers	Ecosystem Barriers
Low awareness Lack of compelling use Inadequate channels Low levels of financial literacy Low phone/sim ownership Restrictive social and cultural norms	Limited understanding of customer needs Lack of data on business cases that serve women Lack of gender-disaggregated data	Lack of uniform ID Lack of KYC Lack of regulation on new entities Poor connectivity and infrastructure

Table 3. Barriers to Financial Services; (Women's World Baning, 2019)

DFS are the way forward and have become a necessity in everyday life in high-income countries and are becoming an enabling tool even in low-income, rural, and isolated communities. While immense progress has been made in expanding DFS and financial inclusion, women are often excluded and marginalised. Globally, 65% of women have an account compared with 72 % of men, a 7% gap that has remained unchanged since 2011. Figure 8 illustrates that the most significant gap is not found within income groups but between income groups. HICs have high and equal access to financial services, whereas the opposite is true in LIC. In LIC, both men and women have poor access to financial services, and there is a slightly more significant gap between men and women. The gender disparities become more pronounced when looking at just SSA in figure 9. Figure 9 illustrates a 6%-point gap between men and women and that 50% of the region's population does not have an account.

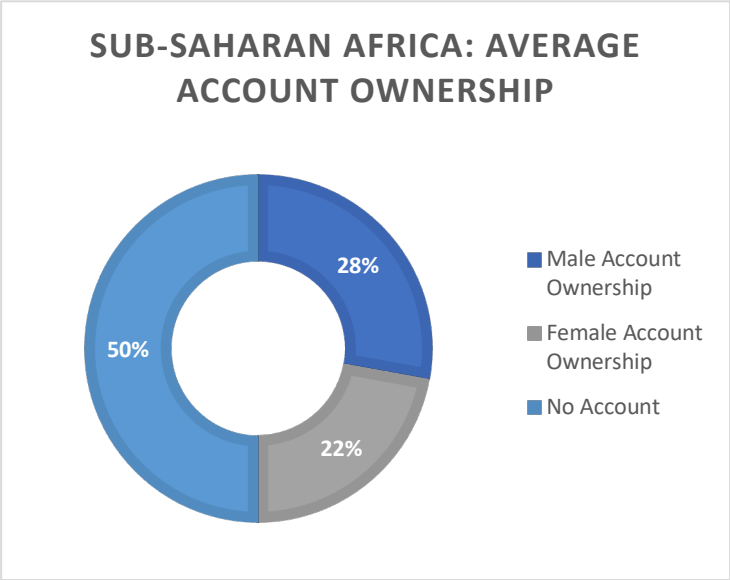

Figure 9. SSA gender disaggregated account ownership 15

Women's financial inclusion as a subdivision of inequality has an even more ambiguous relationship with economic growth than the broader term inequality. The lack of gender-disaggregated data does not make the relationship easier to investigate. However, some headway has been made in this field, which is especially important in defining women's barriers to accessing finance. This provides a starting point for finding sustainable solutions. Barrier's women face can be placed into three categories: (i) Client-side, (ii) institutional, and (iii) ecosystem barriers which more specifically can include: (i) lower levels of education and financial literacy, (ii) lower-income groups, (iii) lack of tangible assets or collateral, (iv) legal constraints, (v) time and mobility, (vi) socio-cultural constraints, and (vii) inter-role conflicts from juggling domestic and professional roles. Men also face these barriers, but women are disproportionally affected and, in some cases, specifically discriminated against because of their gender (Daniels, 2014).

The multiple dimensions of women's financial inequality make it difficult to define its impact on economic growth empirically. However, the World Bank Report *Gender Inequality and Growth: The case of Rich vs. Poor countries* collected and analysed data indicating a strong association between gender inequality and lower economic growth. The negative correlation is found only in the relatively poorer countries as no such relationship was found in the relatively wealthy countries (Amin, et al., 2015). Figures 10 and 11 below demonstrate SSA poor economic development in other regions. Figure 11 shows that SSA has the second-lowest rate of female borrowers, second to South Asia. Figure 10 illustrates the correlation between the low rate of female borrowers and low GDP per capita. High-Income countries in SSA, such as Seychelles and Mauritius are found in the upper right corner with high values of both variables. Whereas low-income nations such as Congo our located in the bottom left with low GDP per capita and rate of female borrowers. Equatorial Guinea is an outlier with a high GDP per capita but a low level of female borrowers, with less than 50 per 10,000 women. Equatorial Guineas' seemingly high GDP per capita can be attributed to its natural gas endowment, but most of the population remains poor.

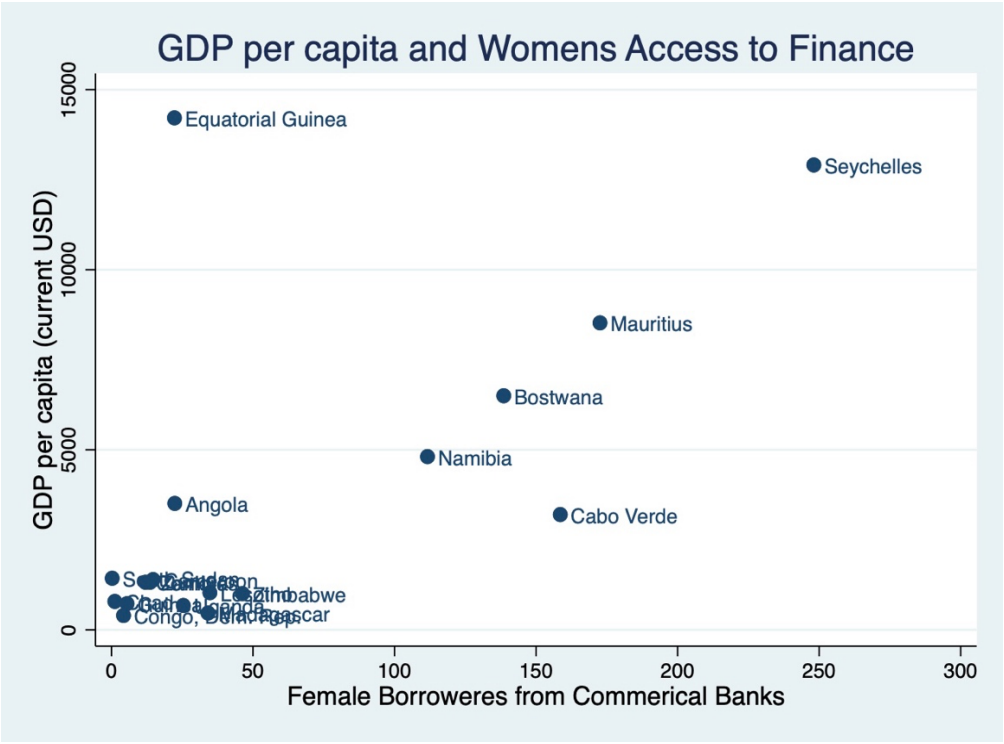

Figure 10. GDP per capita and Women's Access to Finance, SSA

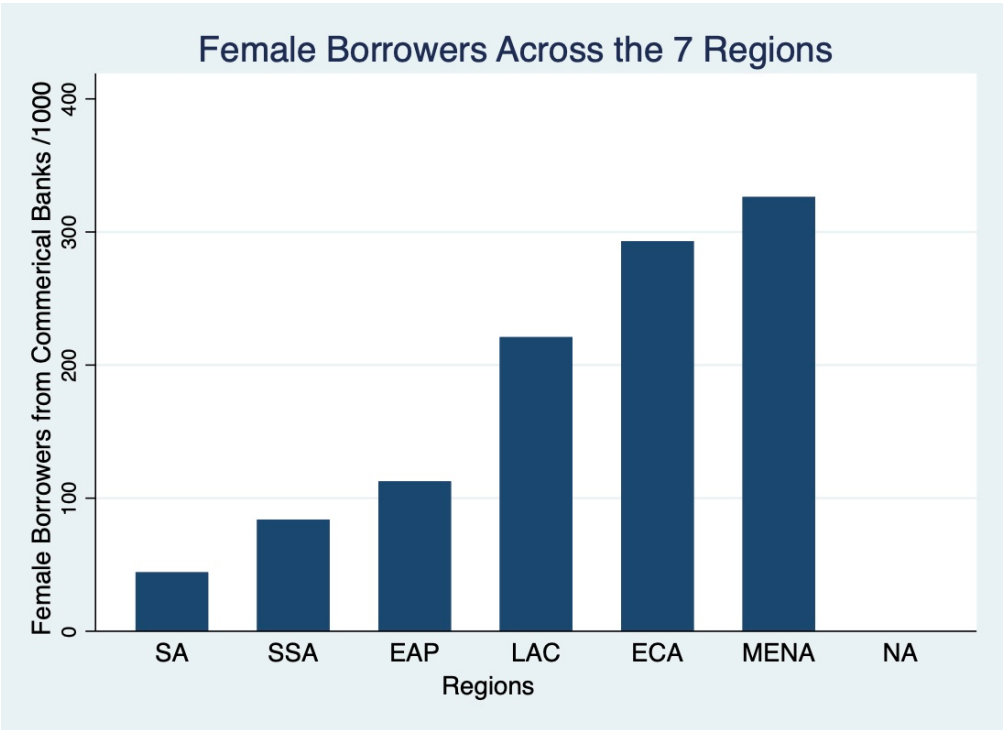

Figure 11. Female Borrowers by Region

The Bill and Melinda gates foundation has found that no one has more to gain from increased financial inclusion than women, as women and girls often shoulder the brunt of poverty. The Mastercard Foundation has found that women, particularly in LIC, are nine percentage points less likely to have a financial account than their male counterparts (Mastercard Foundation, 2020). Research shows that poverty has deprived women of health, education, and socio-economic opportunities. As a result, women earn less, own fewer assets, and are underrepresented across many economic and political platforms (Bill and Melinda Gates Foundation, 2019). For example, in 31 countries, married women cannot choose where to live in the same way as a married man can; in 18 economies, women cannot work outside the home in the same way a man can, and in 17 economies, married women cannot travel outside the house the same way a man can (Bill and Melinda Gates Foundation, 2019). While women in developed countries enjoy many freedoms and equal rights, millions of women still do not have the same fundamental rights and opportunities as men. The expansion of financial inclusion is a versatile tool that can provide last-mile customers with the financial means and opportunity to increase their social mobility and independence. Women's access to financial services varies over the seven regions illustrated in figure 10. South Asia and Sub-Saharan Africa present the lowest rates of female borrowers from commercial banks per 1,000, while Europe and Central Asia, and the Middle East present the highest rates of female borrowers.

Between 2014 and 2017, the share of adults with an account at a financial institution or mobile money service increased from 62% to 69%, and in developing countries, it rose from 54% to 63% (Mastercard Foundation, 2020). Specifically, Kenya has rapidly improved its financial inclusion rates, in large part due to the successful adoption of M-PESA mobile money. Today, more than half of Kenyan adults use M-PESA at least once a month, making Kenya the world's most mature mobile money market (Mastercard Foundation, 2020).

Refinance, a women's focused financial inclusion institution has found that women's access to financial services contributes to a family's social mobility and ability to plan for the future. Women's financial inclusion has shifted gender norms and improved women's economic participation outside the home (Shields, et al., 2018).

The HERfinance wage digitalisation project in Bangladesh aimed to increase the number of women employees receiving their wages through DFS. Digitising wage is a prime opportunity for employers to advance financial inclusion at scale and improve workers' financial autonomy. It is a more effective and safe way to pay workers as it reduces the risk of cash theft during transportation and distribution and eliminates the need for workers to queue to receive wages (HERproject, 2020).

Between 2015 and 2020, HERfinance Digital Wages Program worked with ten global buyers and 75 factories in Dhaka and Chittagong, Bangladesh. In December 2019, 148,954 workers (57% female)

across 64 factories had adopted digital wages, and more than 100,000 workers received wages via bKash or Dutch-Bangla Banko Rocket payroll account (HERproject, 2020). As a result, in Bangladesh, 1 in 2 women opened a mobile money account; 1 in 5 workers started saving regularly; 1 in 5 women started making joint decisions about using their salary, and 1 in 10 women stopped giving their compensation to others (HERproject, 2020).

While there are empirical studies investigating the effects of women's income inequality, women's equal access to financial services is a field less explored. It encompasses not just income but rather women's access to opportunities gatekept by financial services. Furthermore, quantifying the relationship between women's financial equality and economic growth is difficult due to the qualitative qualities of equality. Income inequality is a tangible variable with a clear definition, whereas access to financial services comprises a range of factors. It is a multifaceted indicator that cannot only be quantified to understand its weight.

METHOD

Investigating the relationship between inequality and growth can be done by focusing on empirics, theory, or a mixed approach. Empirical investigations are most popular within economic studies as they explore and quantify the dynamics between variables, illustrating trends and effects of the variables on one another. However, empirical investigations find it challenging to grasp qualitative indicators that are crucial when investigating how variables such as growth and inequality affect people and make a tangible impact. This is particularly important when examining LIC, where data tends to be inconsistent and sometimes lacking altogether.

To investigate quantitative and qualitative dimensions of women's financial inequality and economic growth, this study takes a two-pronged approach using econometric analysis to produce comparable statistics while using case studies to illustrate local impact in Sub-Saharan communities. Financial inclusion spans supply and demand-side policies, meaning financial services and products are equally important as financial literacy. Empirical data examines supply-side strategies and procedures, such as the access and provision of DFS. In contrast, qualitative data examines the demand-side – what customers need to best use DFS—exploring what women need and which strategies are most effective in providing unbanked women financial services. The case studies, BETA Savings in Nigeria and M-Pesa in Kenya, explore demand-side issues. SSA, as the youngest and fastest-growing continent, with 13 million men and women seeking jobs every year. Within the next few decades is expected to host the world's largest workforce of more than one billion people (Mastercard Foundation, 2020). The rapid growth rate makes SSA an ideal region to explore the dynamics between inequality and growth and how their relationship flows.

Table 4. Income Group Definitions as defined by the World Bank

Low Income $	**Lower Middle Income $**	**Upper Middle Income $**	**High Income $**
< 1046	1,046-4,095	4,096-12,695	>12,695
Regions	Europe & Central Asia (ECA), East Asia & Pacific (EAP), South Asia (SA), Sub-Saharan Africa (SSA), Latin America & Caribbean (LAC), North America (NA), and Middle East & North Africa (MENA)		

DATA

Quantitative Data

The main bulk of the variables is derived from the IMF financial access survey (FAS), focusing on the period from 2004-to 2020. The FAS is a supply-side dataset on access to and use of financial services and aims to provide a benchmark of financial inclusion progress, which is based on administrative data from central banks and financial regulators. The FAS dataset covers 189 countries, contains 121 time-series on financial access and use, and contains 70 normalised indicators relative to the size of the adult population, land area, and domestic product to facilitate cross-country comparison.

Another data source used is the Global Findex Database, one of the world's largest and most comprehensive data sets on how adults save, borrow, make payments, and manage risks. The data is published every three years and is collected in partnership with Gallup, Inc through nationally representative surveys of 150,000 adults in over 140 countries. So far, the three 'waves' were published in 2011, 2014, and 2017. The FAS and Findex databases include gender-disaggregated variables that provide insight into the disparities between men's and women's access and use of a range of financial services in both the formal and informal sectors and the public and private sectors. Other variables were gathered from the World Bank, such as Trade volume, Gini coefficients, primary education attainment, and GDP per capita.

Three index variables were created and used to create a complete regression that touches on causation and not just correlation. The three indexes are: (i) the Socio-economic index, (ii) the Economic Development index, and (iii) the women in business and law index created by the World Bank. Index variables are helpful when several variables are measuring the same thing. Multiple variables measure an economy's structure, policies, and financial access in this data set, and creating an index enables a more comprehensive measure and analysis.

First, the Socio-economic index is composed of infant mortality rate per 1,000 live births, primary school completion rate (% of relevant age group), and value-added of agriculture, forestry, and fishing (% GDP). This index represents socio-economic development. Infant mortality rates are a good indicator of the product as it signals the health of the mother and the child and the quality and access to health care during and after pregnancy. Primary school completion is another good indicator of development where it demonstrates access to education. Lastly, the share of agriculture as a percent of GDP is included as it signifies to what extent structural transformation has occurred.

Second, an economic development index was created, which is intended to represent the level of economic growth. This indicator is compiled of openness to trade, inflation, and percent of the rural

population with access to electricity. Inflation is a proxy for more macroeconomic management, and the rural population's access to electricity is a proxy for infrastructure development.

The last index is the *Women, Business, and the Law (WBL)* gender equality index created by the World Bank. It is a panel data set of 190 economies from 1971-to 2022 that aims to further the research into the interaction between inequality of opportunity for women and labour market dynamics. Furthermore, it strengthens insights into how women's employment and entrepreneurship are affected by legal gender discrimination and, thus, economic outcomes (World Bank Group, 2022). A complete table explaining the index variables can be found in appendix II.

Table 5. Descriptive Statistics Sub-Sharan Africa

	Mean	SD	Min	Max
GDP per capita	2300.611	3283.302	128.337	22942.61
Female Borrowers per 1000	83.957	85.564	.168	311.949
IMR	55.754	21.899	11.8	127.2
CB Borrowers female	75354.529	96439.311	547	544087.44
CB Borrowers male	141512.45	201240.25	1800	1115060.4
CB Borrowers	58.474	76.866	.02	345.84
Microfinance borrower's female	58178.076	65718.487	799	235143
Microfinance borrower's male	67011.886	60138.325	394	230735
Infrastructure	24.178	25.859	.523	100
Inflation	9.224	28.597	-8.975	557.202
primary education	69.527	19.286	23.845	115.185
Trade Openness	21.075	13.924	.893	66.033
Trade as a percent of GDP	70.61	34.136	.785	225.023
WBL Index	64.393	14.4	26.3	91.9

CB = Central Banks; IMR = Infant Mortality Rate; Women in Business and Law Index

Qualitative Data

This paper takes a two-pronged approach using both quantitative and qualitative data to explore the dynamics between women's financial inclusion and economic growth. The qualitative data complements empirical evidence as data in low-income countries and SSA are sometimes inconsistent and lacking. Qualitative data provides insight into why and why not women use DFS, which empirical data is not always able to assess. Using both quantitative and quality data enables a holistic analysis of inequality and growth, examining macro and micro trends.

The leading case study is BETA Savings, a Nigerian-based digital financial solution aimed at increasing women's access and use of formal financial services. This case study is complemented by results of M-PESA's success in Kenya.

Limitations

Empirical studies aiming to capture real-world phenomena are guaranteed to be plagued with some unpredictability and weaknesses, especially when examining LIC's with inconsistent data. SSA, a region of many LICs, who often struggle to collect accurate and consistent statistics due to political instability, war, famine, etc., may lead to some imbalances. Studying gender-disaggregated financial inclusion has not been measured for longer than two decades. Collecting such data can be tricky, so for example, the findex data is published every three years. The main issue is that when focusing on SSA and LIC's the data sample is substantially reduced. Therefore, case studies are used in this paper, as the econometric data in lower-income countries in SSA is sparse. As a result, the primary econometric regression aims to provide a general view of women's financial inequality and economic growth in Sub-Saharan Africa and the world. In contrast, the case studies aim to examine their tangible impact.

ECONOMETRIC MODEL

A mixed-method approach will answer the research question, combining quantitative and qualitative data to create a holistic view of the relationship between women's financial inequality and economic growth.

This log-log regression aims to provide a general view of the relationship between women's financial inequality and economic growth and in which way the relationship dynamic is strongest. Therefore, there are two main equations where female borrowers and GDP per capita are the dependent variables. The two equations are as follows:

$$ln(Female\ borrowers_{it}) = \beta_0 + \beta_1 ln(GDP/capita_{it}) + \beta_2 ln(econ\_dev_{it}) + \beta_4 ln(socio\_econ_{it}) + \beta_4 ln(WBL_{it}) + \varepsilon_{it}$$

$$ln(GDP/capita_{it}) = \beta_0 + \beta_1 ln(Female\_Borrowers_{it}) + \beta_2 ln(econ\_dev_{it}) + \beta_4 ln(socio\_econ_{it}) + \beta_4 ln(WBL_{it}) + \varepsilon_{it}$$

The Findex, FAS, and World Bank GDP per capita data spanning the SSA region is best suited for a panel data analysis. Panel data is a two-dimensional concept where the same individuals are observed repeatedly over different periods. It's a combination of cross-sectional data when one observation of multiple objects and time-series data when one thing is observed recurrently over time. Panel data with fixed effects cannot make concrete claims of causation between its variables. Instead, it is a more appropriate tool with which to discuss correlation. Panel data is the format used to investigate multiple

countries and multiple variables over 16 years, 2004 to 2020, and the panel is strongly balanced. The panel data is used to empirically investigate women's access to finance and its impact on economic growth in SSA.

The results of the fixed effects model, in tandem with case studies, aim to provide a more holistic and comprehensive description of the relationship between financial gender inequality and economic growth in SSA.

SPECIFICATIONS TESTS

Data sets often require alterations and estimation specifications to produce consistent and non-biased results. When working with panel data, it is essential to check for random or fixed effects, heteroskedasticity, autocorrelation, and multicollinearity.

FIXED VS. RANDOM EFFECTS

Panel data can be regressed with either fixed or random effects, and to determine which is more appropriate, a Hausman test is performed. The null hypothesis (H_0) = the individual-specific effects are random, tested to a significant value of 0.1. The Hausman test generated a p-value of 0.009, indicating that fixed products are more appropriate for this regression analysis.

HETEROSKEDASTICITY

Heteroskedasticity occurs when the standard deviations of a predicated variable, monitored over different values of an independent variable, are not constant. Testing for heteroskedasticity using the breush-pagan test showed variance within error terms. This confirmed the need for panel data and fixed effects to produce consistent and unbiased results.

AUTOCORRELATION

Autocorrelation, when error terms from one time are correlated, can skew data. To adjust for these, robust standard errors are used.

MULTICOLLINEARITY

Multicollinearity occurs when at least one of the explanatory variables has an exact linear relationship with one of the other variables; in other words, there is a strong correlation (total$> |0.8|$). Perfect multicollinearity in a model may create OLS estimators with large $\beta - parameter$ variances and produces less efficient and imprecise OLS estimates. However, a small degree of multicollinearity is typically expected and does not mean there is misspecification. In this model, the explanatory variables showed some correlation but none at a level above 0.8, indicating no variables had to be omitted.

EMPIRICAL RESULTS

This section presents the processed and analysed data through a few econometric regression variations that explore the dynamic between women's financial inequality and economic growth in SSA. To explore their dynamic, two sets of regression run; the first set uses female borrowers as the dependent variable and GDP per capita as the independent variable. The second set uses GDP per capita as the dependent and female borrowers as the independent variable. Figure 12 illustrates the value of GDP per capita and the Gini coefficient over the past decade. It confirms common knowledge that SSA lags in economic growth and development. The relatively low GDP per capita, peaking at $1,800 in 2019, and high Gini coefficient, hoovering between 45 and 55, have remained relatively stable across the region with little to no improvements in the past decade. Understanding why inequality and GDP per capita have remained almost unchanged over the past decade and what their dynamic is, is key in maximising SSA's future growth and development potential.

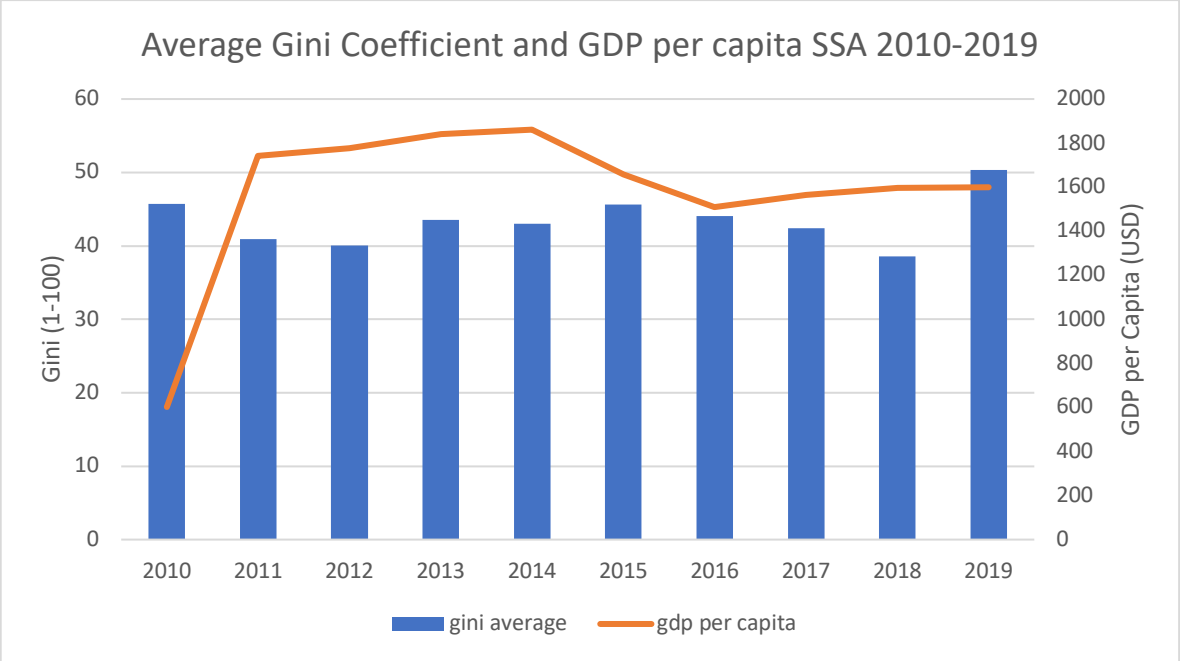

Figure 12. Data from the World Bank. Graph created by the author

Two main types of regressions were run to fully understand the dynamics between growth and inequality. The first regression used female borrowers as the dependent variable (columns 1 to 4), and the second used GDP per capita as the dependent variable (columns 5 to 8). The columns of most interest are (4) and (8) as they include all control variables and will therefore be the focus of the empirical analysis. The variable, female borrowers per 1,000 from commercial banks, is a proxy for women's overall financial inclusion as it measures women's access and their use of formal financial services.

Table 6. Women's Financial Inclusion and Economic Growth Globally

Variables	(1) Female Borrowers per 1000	(2) Female Borrowers per 1000	(3) Female Borrowers per 1000	(4) Female Borrowers per 1000	(5) GDP per capita (USD)	(6) GDP per capita (USD)	(7) GDP per capita (USD)	(8) GDP per capita (USD)
GDP per capita	0.677***	0.227**	0.263***	0.146				
	(0.0910)	(0.102)	(0.0929)	(0.100)				
Economic development index		2.065***	1.222***	1.011***		0.427**	0.318	0.0610
		(0.232)	(0.230)	(0.237)		(0.173)	(0.202)	(0.193)
Socio-economic index			0.815	0.774			-1.491***	-1.281***
			(0.618)	(0.606)			(0.494)	(0.460)
WBL				1.213***				1.657***
				(0.429)				(0.314)
Female Borrowers per 1000					0.258***	0.0959**	0.175***	0.0871
					(0.0347)	(0.0431)	(0.0619)	(0.0598)
Constant	-1.248*	-7.706***	-7.583**	-10.53***	7.117***	5.746***	13.15***	6.759**
	(0.750)	(1.230)	(3.674)	(3.747)	(0.151)	(0.777)	(2.861)	(2.919)
Observations	308	264	204	204	308	264	204	204
R-squared	0.175	0.318	0.225	0.260	0.175	0.099	0.177	0.296
Number of countries	46	40	35	35	46	40	35	35

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. The regressions are run using a log-log model meaning the results are in percent. The economic development index comprises three variables: rural access to electricity as a measure of infrastructure, inflation, and openness to trade. The socio-economic index is comprised of: Infant mortality rate per 1000 lives births, agriculture as a percent of GDP, and primary school completion. The WBL is the Women in Business and Law index, World Bank.

First, we begin by examining the global dynamics of women's financial inequality and economic growth, illustrated in table 6. Columns (1), (2), and (3) show that GDP per capita has a significant effect on female borrowers, where a 1% increase in GDP per capita leads to a 0.263-0.677% increase in female borrowers. However, these columns do not include all control variables, and as control variables are increased, the value of GDP per capita decreases, and in column (4), GDP is statistically insignificant. Column (4) instead highlights the statistical significance of economic development indicators (such as trade as a percent of GDP, inflation, and infrastructure), and WBL on the rate women borrow from

commercial banks. Specifically, a 1% increase in economic development indicators and WBL leads to a 1.011% and 1.213% increase in female borrowers, respectively.

Similar results are seen in columns (5) to (8), where GDP per capita is the dependent variable and female borrowers is the independent variable. The value of female borrowers decreases as more controls are added until it is statistically insignificant in column (8) where instead, socio-economic indicators (such as structural transformation, IMR, and primary education) and WBL are statistically significant. Column (8) indicates that a 1% increase in socio-economic indicators leads to 1.281% decrease in GDP per capita, and a 1% in WBL leads to a 1.657% increase in GDP per capita.

Globally, the relationship between women's financial inclusion and economic growth is weak, which is in line with much of the previous literature arguing that there is too much country specificity to draw global and macro-level generalisations. The data instead indicates that, globally, women's access to a full spectrum of legal rights and business opportunities is more critical than stimulating economic growth when aiming to increase women's financial inclusion. This indicates that countries and communities aiming to increase women's financial inclusion need to focus on stimulating economic growth and managing inflation and infrastructure, and on creating gender-inclusive business environments where women have access to a full spectrum of legal rights.

Table 7 examines SSA exclusively, reducing the sample size substantially and honing in on region specificities to gain a deeper insight into growth and inequality in SSA. In contrast to table 6, GDP per capita and female borrowers are statistically significant as independent variables. In columns (4) and (8) where all control variables are in place, GDP per capita has a more significant impact on female borrowers than female borrowers have on GDP per capita. Column (4) indicates that a 1% increase in GDP per capita leads to a 0.683% increase in female borrowers, whereas column (8) suggests that a 1% increase in female borrowers leads to a 0.131% increase in GDP per capita.

Table 7. Women's Financial Inclusion and Economic Growth in Sub-Saharan Africa

Variables	(1) Female Borrowers per 1000	(2) Female Borrowers per 1000	(3) Female Borrowers per 1000	(4) Female Borrowers per 1000	(5) GDP per capita (USD)	(6) GDP per capita (USD)	(7) GDP per capita (USD)	(8) GDP per capita (USD)
GDP per capita (USD)	0.736***	0.919***	0.892***	0.683**				
	(0.220)	(0.243)	(0.251)	(0.297)				
Economic development index		1.327***	1.572***	1.342***		-0.0161	-0.0741	-0.269
		(0.426)	(0.452)	(0.483)		(0.206)	(0.242)	(0.223)
Socio-economic index			0.988	1.130			0.107	0.282
			(1.244)	(1.241)			(0.607)	(0.546)
WBL				1.042				1.199***
				(0.802)				(0.317)
Female borrowers per 1000					0.159***	0.187***	0.210***	0.131**
					(0.0477)	(0.0495)	(0.0590)	(0.0569)
Constant	-1.937	-9.758***	-15.52**	-17.87**	7.005***	7.153***	6.814*	2.143
	(1.673)	(2.561)	(7.235)	(7.414)	(0.175)	(0.936)	(3.536)	(3.405)
Observations	102	84	70	70	102	84	70	70
R-squared	0.117	0.293	0.354	0.374	0.117	0.193	0.212	0.377
Number of c_id	17	13	12	12	17	13	12	12

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. The regressions are run using a log-log model meaning the results are in percent. The economic development index comprises three variables: rural access to electricity as a measure of infrastructure, inflation, and openness to trade. The socio-economic index is comprised of: infant mortality rate per 1000 lives births, agriculture as a percent of GDP, and primary school completion. The WBL is the Women in Business and Law index, World Bank.

Interestingly, the significance of the control variables differs between the two regressions. In column (4), female borrowers are the dependent variable, and the economic development index has the largest and most significant impact, where a 1% increase leads to a 1.342% increase in female borrowers. At the same time, economic development indicators are insignificant when female borrowers are the independent variable in column (8). This suggests that variables such as inflation, infrastructure, and openness to trade have a more significant impact on women's financial inclusion than growth in SSA. As economic growth increases, women have more economic opportunities to take up space in the job market. Furthermore, as countries become wealthier, strict and oppressive cultural and gender norms dissipate, and women have more social and economic freedoms.

Column (8), where female borrowers are the independent variable, shows that female borrowers and WBL have statistically significant effects on GDP per capita. This suggests that women's increased economic activity, participation in the job market, and access to a full spectrum of rights positively affect GDP per capita. Specifically, a 1% increase in female borrowers in SSA increases GDP per capita by 0.131%, and a 1% increase in WHL leads to a 1.199% increase in GDP per capita.

While GDP per capita has a more significant impact on women's financial inclusion than vice versa, both variables seem to impact each other. However, other underlying mechanisms are at play, such as WBL and economic development have a larger and more significant effect on GDP per capita and women's financial inclusion. Policies aiming to improve women's financial inclusion should focus on stimulating economic growth and development by managing inflation, updating, expanding infrastructure, increasing trade, and providing women with economic opportunities and legal rights. The empirics based on SSA in table 7 make it difficult to disentangle growth and inequality and instead highlight their interdependence. This supports the notion of country and community-specific specifications that are crucial to address when looking to boost growth and financial inclusion.

Further distilling the results to just LIC's in SSA, both regressions, the value of the independent variable loses significance when all control variables are in place, suggesting that they have an underlying impact on women's financial inclusion and economic growth. In column (4), all variables are insignificant, which may, in part, be due to the limited countries and observations in that regression.

Table 8. Women's Financial Inclusion and Economic Growth in LIC Sub-Saharan Africa

VARIABLES	(1) Female Borrowers per 1000	(2) Female Borrowers per 1000	(3) Female Borrowers per 1000	(4) Female Borrowers per 1000	(5) GDP per capita	(6) GDP per capita	(7) GDP per capita	(8) GDP per capita
GDP per capita	0.428	0.844***	0.883**	0.476				
	(0.265)	(0.236)	(0.271)	(0.588)				
Economic development index		1.335**	1.577**	1.046		-0.786	-1.036	-1.109*
		(0.474)	(0.548)	(0.881)		(0.485)	(0.594)	(0.459)
Socio-economic index			0.920	1.939			-0.565	1.382
			(1.623)	(2.114)			(1.444)	(1.377)
WBL				1.415				2.140*
				(1.802)				(0.891)
Female Borrowers per 1000					0.295	0.636***	0.682**	0.207
					(0.183)	(0.178)	(0.210)	(0.256)
Constant	-0.931	-9.542***	-15.34	-21.32	5.662***	8.769***	12.52	-4.816
	(1.637)	(2.455)	(8.933)	(11.93)	(0.318)	(1.947)	(8.078)	(9.534)
Observations	24	16	13	13	24	16	13	13
R-squared	0.126	0.668	0.740	0.764	0.126	0.538	0.603	0.798
Number of c_id	5	3	3	3	5	3	3	3

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. The regressions are run using a log-log model meaning the results are in percent. The economic development index comprises three variables: rural access to electricity as a measure of infrastructure, inflation, and openness to trade. The socio-economic index is comprised of: Infant mortality rate per 1000 lives births, agriculture as a percent of GDP, and primary school completion. The WBL is the Women in Business and Law index, World Bank.

In column (8), a 1% increase in WBL leads to a 2.14% increase in GDP per capita. A 1% increase in economic development indicators leads to a 1.109% decrease in GDP per capita. This suggests that in lower-income countries in SSA, as inflation, trade, and infrastructure increase and expand, it has an inverse effect on economic growth. This is not unlikely as many of these countries have high rates of corruption where a large portion of government funds are invested into private pockets rather than the country. Economic growth and activity agglomerated with societal elites do not generate inclusive growth. The convergence theory states that economic growth and development are most effective when a country is socially advanced and technologically backward. Women's poor standing in business and society across SSA indicates societal backwardness and poor capabilities, making it difficult for such countries to adopt new technologies and catch up to HICs. This theory explains why WBL has a positive and significant effect on GDP per capita, where a 1% in WBL increases GDP per capita by $\approx 2\%$. Women's financial and societal inclusion improves social capabilities leading to social advancements, which improves a country's ability to adopt new technologies and catch up.

Tables 7 and 8 indicate a relationship between GDP per capita and women's financial inclusion; however, other factors such as economic development variables and WBL carry more significance. Economic development indicators, such as inflation, infrastructure, and trade openness, substantially impact the rate at which women borrow from commercial banks, as shown in table 7. As women's rights and freedoms increase, more women enter the workforce and demand rights and respect within the labour market. This increases countries social capabilities, and as the convergence theories suggest, countries with successful growth stories started out being socially advanced but technologically advanced nations. Improving women's financial inclusion is a way to boost social capabilities and this economic growth.

As explained by Kuznets (1973), economic growth requires flexible but robust financial institutions that can adapt to changing circumstances. Without that, economies have poor resilience to challenging and uncertain times, which is an issue as long-term growth is more about withstanding shrinkage than rapid growth.

Overall, the results do not completely disentangle growth and inequality but indicate that boosting social capabilities to become more socially advanced through women's rights and inclusion is a crucial step in boosting inclusive growth, which in the long-term growth.

CASE STUDIES

The empirical results provide overarching insight into the relationship between women's financial inequality and economic growth. Overall, the empirics suggest that economic growth has a larger and more significant effect on women's financial inclusion than vice versa. However, women's financial inclusion is a field of limited data. Therefore, results, although unbiased and consistent, may not provide complete insight into the dynamic between economic growth and financial inclusion in SSA. Thus, this section complements the empirical results with two case studies and alternate ways to measure economic growth and financial inclusion. The case studies are BETA savings Nigeria and M-Pesa Kenya.

Empirical evidence is crucial, but it cannot capture qualitative data that explicitly demonstrates how projects and initiatives impact local communities and improve living standards. Therefore, qualitative data is necessary to shed light on the tangible impact financial inclusion can have on women's everyday lives and economic growth and development in the long run.

NIGERIA: A BETA WAY TO SAVE AND M-PESA

BETA savings account was piloted in 2013 by Diamond Bank and Women's World Banking in Nigeria. BETA is a digital financial service that mainly targets female market entrepreneurs and traders to help them save towards their goals (CGAP, 2020). In 2012, about ≈64% of Nigerians were unbanked and had never accessed formal financial services or products. For women, this number was a staggering 73% who had never accessed any financial service or product (Women's World Banking, 2014).

Through surveys, Women's World Banking and Diamond Bank found that 80% of Nigerian women take financial advice from friends or family. To target women, the savings product was named BETA Friends – Beta (meaning "good" in pidgin English) – to entice women, service agents visited female shop owners frequently to build rapport. Furthermore, Women's World Banking found that women value confidence, convenience, and safety, so BETA friends made it possible to open an account in less than five minutes with no minimum balance and no fees. This product targets self-employed women and men who want to save frequently (daily or weekly). Some key features of BETA savings that make it easy and convenient to use are:

Table 9. BETA Features

BETA Features
No minimum balance
No forms, ID, or signature requirements
No monthly fee or deposit fee
Reward Scheme with cash prizes
Starter pack with ATM card
Interest paid on balances
Pays 3.6% interest per annum

The BETA project aims "*to understand women's financial behaviour, financial pressures, their savings propensity, and goals and their perceptions of the formal banking sector and household money management strategies"* (Women's World Banking, 2014). In Lagos, Women's World Banking found a strong savings culture where women in the research pool stored up to 60 % of their income in savings mechanisms. These women primarily saved to build businesses, pay school fees, and invest in their children's education. This is because women are generally responsible for paying school fees and expenses related to children. There is little transparency in household finances between husbands and wives, highlighting the importance of women's financial inclusion in Lagos as women cannot always rely on their husbands to be transparent.

In the first six months of the pilot project in 2013, 38 600 accounts were opened, of which 40% belonged to women. 74% of clients transact more than once a month and the aggregated total saved by clients in the first six months equated to USD 1.5M (CGAP, 2020). The BETA savings program has been rolled out in 21 of Diamond Banks's 240 branches since March 2013.

One of the essential ingredients in long-term growth is an economy's resilience to shrinkage in times of economic crisis and violent conflicts (López-Calva & Zhou, 2017). As more individuals and women can save safely and regularly, their ability to withstand economic crises strengthens. On a micro level, local communities and families have greater financial security and can better plan for their future and investments. In Nigeria, where 73% of women were unbanked in 2012, in 6 months, BETA friends were able to open 15,440 female-owned accounts—increasing 15,440 women's economic resilience. While this project is still a microfinance project, as it expands, it is expected to impact Nigeria on a macroeconomic level as, for example, positively, M-Pesa has done in Kenya. Mobile money in Kenya has increased the efficiency of allocating consumption and distribution of labour, resulting in efficient poverty reduction in Kenya. Precisely, M-Pesa, in Kenya, is estimated to explain 14% of per capita real income growth and 3.4% of total factor productivity growth between 2006 and 2013 – a quite significant economic effect of mobile money technology. M-Pesa is also estimated to have increased per capita

consumption levels and lifted 194,000 (2%) households out of poverty. The impacts of M-Pesa are more pronounced in female-headed households where their economic resilience, driven by changes in their financial behaviour, has increased. The women head of household experience improved occupational choice, especially for women who wish to move out of agriculture and into business (Suri & Jack, 2016).

The success of M-Pesa does not predict the future success of BETA. Still, it does demonstrate the power mobile money and digital financial services have in expanding financial inclusion and women's empowerment. Most importantly, the M-Pesa example illustrates how it has increased economic resilience amongst the Kenyan population, and specifically amongst women. Improving economic resilience enables low-income households to plan, expand their business, and invest. From a micro perspective, families can lead a more finically stable life, and business expansions stimulate income generating opportunities for communities. From a macro-economic perspective, the increased economic resilience of low-income communities over time builds more robust country-level economic resilience. As demonstrated in figure 13 below, long-term growth is less about at what rate and how a country grows than resilience to economic shrinkage. Countries with a low shrinkage frequency tend to be more successful in long-term growth.

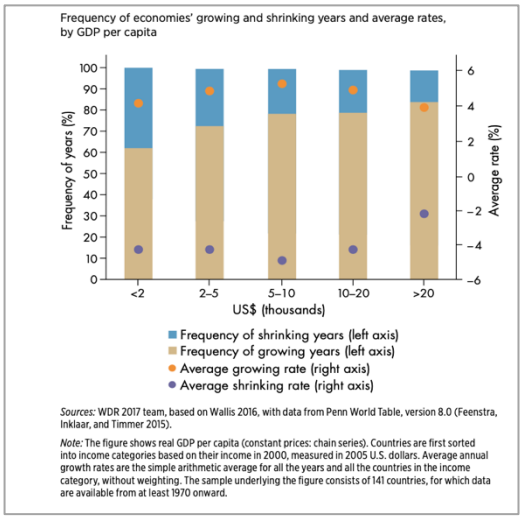

Figure 13. Long-term growth is less about how one grows than about not tripping along the way (Demirguc-Kunt, et al., 2017)

BETA and M-Pesa confirm the findings of the econometric results where the WBL index proved to have a substantial effect on both GDP per capita and female borrowing from commercial banks in Sub-Saharan Africa. The case studies cannot directly state that increased women's financial inclusion in Nigeria and Kenya have led to economic growth, but what they do show are the immediate positive impacts on these women's lives and their financial security, which in the long run enables economic resilience – a key component of long-term growth. Furthermore, M-Pesa and BETA savings emphasize

the advantages of digital solutions, which enable countries and communities to leapfrog development as these communities can skip specific steps of, for example, infrastructure expansion. This again supports the econometric results, which show that economic development indicators (infrastructure, inflation, and trade) are significant for the rate at which women access and use financial services.

The WBL index is not only a proxy for women's rights and opportunities but also their economic resilience. Women with access to financial opportunities are more autonomous economic actors and can withstand times of monetary crisis. Women's financial inequality is a barrier to developing economic resilience on the micro and macro levels, strengthening communities and countries' ability to achieve sustainable long-term growth.

DISCUSSION

WHAT DOES THE DATA SAY: THE DYNAMIC BETWEEN INEQUALITY AND GROWTH?

Women's financial inequality as a sub-category of inequality has an ambiguous and undefined relationship with economic growth. The econometric regressions aim to unravel their dynamics to gain a deeper understanding and create more appropriate development strategies for SSA. To dissect the relationship between inequality and growth, this paper set out to answer the following three questions using the econometric results and case study findings:

1. How does women's financial inequality impact economic growth in Sub-Saharan Africa? And in which direction does the relationship flow?
2. Is it most effective to focus on growth or inequality development policies in Sub-Sharan Africa? Which factor should be prioritised?
3. Is the relationship between women's financial inclusion and economic growth similar in low, middle, and high-income countries?

How does women's financial inequality impact economic growth? And in which direction does it flow?

In SSA, women's financial inclusion has a positive and significant effect on economic growth. Likewise, economic growth proved to positively and significantly impact women's financial inclusion. The data suggest a two-way dynamic where other factors, such as infrastructure, inflation, trade, and women's rights, play a large part in determining the success of growth and spread of financial inclusion in SSA.

Remembering the Poverty-Growth-Inequality triangle and Kuznets vs. Lewis model, there is a lack of consensus within economics surrounding the relationship between growth and inequality. One explanation is country and community specificity. The results indicate that the relationship between

financial inclusion and economic growth flows both ways. There are country, and community-specific factors that impact inequality and change to a greater extent than financial inclusion and GDP per capita do separately. The econometric results in table 7 revealed that a 1% increase in GDP per capita leads to a 0.683% increase in the female borrowing rate. The results also showed that a 1% in the economic development index leads to a 1.342% increase in female borrowers. This suggests that a development policy aiming to increase women's financial inclusion should primarily focus on expanding infrastructure and maintaining inflation and trade. These variables stimulate growth, open the market to foreign technology and firms, provide more opportunities for the population and enhance their need for formal financial services.

Policies aiming to increase GDP per capita should primarily focus on improving women's access to opportunities within the business world and judicial system, ensuring they have access to their full spectrum of rights. Development policies should concentrate on lifting women directly to boost economic growth and produce positive spillover effects. A 1% increase in WBL leads to a 1.199% increase in GDP per capita in Sub-Saharan Africa, whereas a 1% increase in female borrowers leads to a 0.131% increase in GDP per capita. The BETA case study highlights the importance of empowering women to make their own decisions in business and finance. Many women in Nigeria were hesitant and refused to try the BETA savings product until someone they knew had tried it. While the econometric results in SSA showed to be statistically insignificant when all control variables were inputted, the case studies testify that it is still a crucial tool to enhance economic growth and create a more inclusive economy. Altogether the evidence suggests that over time increasing, women's financial inclusion. Therefore, their opportunities and social mobility will enhance local economies as businesses expand, and they can invest more in their families and education.

Is it most effective to focus on growth or inequality development policies in Sub-Sharan Africa? Which factor should be prioritised?

The results indicate that economic growth and women's financial inclusion affect each other similarly, leading us to the following question: what is the most influential factor to focus on? Should countries focus on lifting women's financial inclusion and expect long-term economic growth to prevail, or should policies emphasise on economic growth and expect women's financial inclusion and inequality to improve over time, as Kuznets believes?

At this point, country-specificities and resources come into play as it is pertinent to play to each country and communities' strengths. SSA is a population and resource-rich geographic area with a large youthful population that will soon be the world's largest workforce. The data concerning SSA points to both GDP and financial inclusion as being adequate tools for economic growth and development; however, when

considering the large and youthful population and conservative gender norms found in many parts of Africa, it is plausible to place more importance on the WBL index and women's financial inclusion than GDP per capita. Women must be included in Africa's growth and development as long-term growth cannot be achieved when roughly half the population is excluded. Therefore, the WBL index is positive and statistically significant, and policies focusing on lifting women ensure their inclusion. It boosts social capabilities necessary to create robust institutions and economic growth.

The underlying mechanism of the WBL index of women's rights and economic opportunity is what it leads to – economic resilience. Economic resilience, specifically to economic shrinkage, is crucial for economic growth. When women have access to their full spectrum of rights, the labour and business market increases their financial and social independence and invests more into their families and communities. The consequences of this liken that of a grassroots project. The benefits are first felt at the micro-level, but as they increase in numbers and gain momentum, it starts to spill into the macro level. Overall, the evidence indicates that improving financial inclusion and gender equality is, to an extent, a result of GDP but a larger part boil down to economic opportunity and resilience.

Development policies focusing primarily on growth expect increased economic activity to sweep women into the market. As demonstrated by BETA, savings are not plausible as women tend to be careful with which financial services they engage in. With 70% of Africa's population financially excluded and women constituting most of those people, simply implementing economic stimulus policies will, in the long term, not generate sustainable growth as not everyone is included (FINCA). This will become an even more significant issue as Africa's youthful population grows and more young men and women seek work.

In other words, while the econometric results indicate a two-way and relatively similar effect of inequality and growth on each other, Africa's rapidly growing youthful population and conservative gender and cultural norms suggest that focusing on women's rights and inclusion is beneficial for long-term growth and development to ensure women's inclusion.

Is the relationship between women's financial inclusion and economic growth similar in the low-middle- and high-income countries?

There appears to be no homogenous trend amongst the different income groups except for some similarities between LMIC and UMIC, which is expected as they span the spectrum of all middle-income countries. Most important is the consistency at which WBL is statistically significant, with a value almost always above 1%. Suggesting that women's access to the law and business participation are essential determinants of financial inclusion and economic growth across income groups.

In LMIC, column (2), a 1% increase in GDP per capita leads to a 0.486% decrease in female borrowers, whereas a 1% increase in WBL leads to a 4.404% increase in female borrowers. In UMIC, column (3), a 1% increase in GDP per capita leads to a 0.486% increase in female borrowers. A 1% increase in economic development leads to a 0.936% increase in female borrowers. Most significantly, a 1% in socio-economic indicators (IMR, primary education, structural transformation) leads to a 2.851% increase in female borrowers. Similarly, a 1% increase in WBL leads to a 1.266% increase in female borrowers.

Results for LIC and HIC have no statistical significance, suggesting no causation or correlation of GDP per capita on female borrowers or vice versa. In LIC, this can be partly explained by the lack of consistent and accurate data. These countries tend to have several things that could be improved on to increase women's financial inclusion and economic growth, making it harder to distil the impact of specific variables.

Table 10. Women's Financial Inclusion and Economic Growth: Income Groups

VARIABLES	(1) Female Borrowers per 1000LIC	(2) Female Borrowers per 1000LMIC	(3) Female Borrowers per 1000 UMIC	(4) Female Borrowers per 1000 HIC	(5) GDP per capita LIC	(6) GDP per capita LMIC	(7) GDP per capita UMIC	(8) GDP per capita HIC
GDP per capita	0.476	-0.408*	0.486***	-0.226				
	(0.588)	(0.201)	(0.150)	(0.165)				
Economic development index	1.046	0.667	0.936***	0.419	-1.109*	-0.204	0.167	0.228
	(0.881)	(0.592)	(0.332)	(0.276)	(0.459)	(0.465)	(0.239)	(0.322)
Socio-economic index	1.939	-0.0501	2.851***	-0.618	1.382	0.00297	-3.474***	-0.0603
	(2.114)	(1.176)	(1.037)	(0.587)	(1.377)	(0.911)	(0.643)	(0.678)
WBL	1.415	4.404***	1.266*	0.116	2.140*	4.487***	0.770*	1.810***
	(1.802)	(1.606)	(0.648)	(0.418)	(0.891)	(1.149)	(0.449)	(0.320)
Female Borrowers per 1000					0.207	-0.245*	0.231***	-0.289
					(0.256)	(0.121)	(0.0713)	(0.210)
Constant	-21.32	-14.40	-22.99***	8.182**	-4.816	-9.168	19.90***	2.526
	(11.93)	(9.071)	(6.317)	(3.092)	(9.534)	(7.108)	(4.152)	(3.894)
Observations	13	51	102	38	13	51	102	38
R-squared	0.764	0.316	0.346	0.174	0.798	0.308	0.487	0.637
Number of c_id	3	10	15	7	3	10	15	7

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. The regressions are run using a log-log model meaning the results are in percent. The economic development index comprises three variables: rural access to electricity as a measure of infrastructure, inflation, and openness to trade. The socio-economic index is comprised of: Infant mortality rate per 1000 lives births, agriculture as a percent of GDP, and primary school completion. The WBL is the Women in Business and Law index, World Bank.

CONCLUSION

This paper aims to increase clarity between the ambiguous dynamic of inequality and growth by focusing on a specific sub-set within inequality: women's financial inclusion. This paper, like previous literature, confirms that the dynamics of inequality and growth are complex and multifaceted with no simple answer through research and econometric regression. The interwoven relationship of all economic, socio-economic variables and predictors makes it challenging to disentangle and examine independently. However, when focused on the specific sub-set of inequality – Women's financial inclusion – the evidence shows that women's financial inclusion and economic growth do, to an extent, impact each other in SSA. Still, a more robust trend was found within the control variables, economic development, and WBL index.

Women's financial inclusion catalyses increased social and financial independence enhancing economic resilience and enabling long-term economic growth. In SSA, this translates to increasing social capabilities, making it easier for technologically backward countries to catch up to HICs. Economic institutions and resilience are critical factors in long-term economic growth; Kuznets (1973) phrases it well when he wrote: "growth demands stable, but flexible, political and social framework capable of accommodating rapid structural change and resolving the conflicts that it generates while encouraging the growth-promoting groups in society" (Kuznets, 1973). Specifically, the econometric results indicate that while financial inclusion per se is statically insignificant in SSA, women's access to business and law, robust institutions, and economic plans are important to long term inclusive growth. This is because they strengthen communities and the economy by increasing overall economic activity and stability, the size of the workforce, the number of people financially independent, school participation and general health.

What is made clear is that enhancing women's social and financial standing in society has overwhelmingly positive effects on economic growth and development, which boils down to the fact that women tend to invest more into their families, businesses, and communities. They strengthen the economic resilience of not only their families but of their communities.

While this report cannot create a one-size-fits-all model for inclusive development, the results instead advocate for the country and community-specific approaches that address their needs and use their prerequisites. In SSA, this entails providing the upcoming large and youthful population with equal socio-economic opportunities.

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APPENDIX A.

A. Hausman test

Specification test results checking whether fixed or random effects are more appropriate when using panel data. Fixed effects are variables that are constant across individuals (countries) and do not change over time. There are variables like age, sex, or ethnicity – they are consistent for everyone. In the FE model, we assume that time-invariant factors are potentially correlated with the x variables for some or all periods – in other words, the FE model allows a correlation between $\eta_i \; and \; X_{it}$. In summary, FE lets us control certain types of omitted variables – unobserved factors fixed in some dimension. It absorbs (observed and unobserved) constant factors within this dimension and operates by exploiting variation in observed variables within this dimension but across observations. The fixed-effects model is as follows:

$$Y_{it} = \propto + X_{it}\beta + \eta_i + \varepsilon_{it}$$

X_{it} = control variables

ε_{it} = independent over time and between individuals

η_i = contains, e.g., unobserved ability (the component that does not vary over time), childhood background

The opposite of fixed effects is random effects. Random effects are when variables are random and unpredictable, for example, the price of a dinner at different locations. We assume that unobserved, time-consistent factors are independent of all observed characteristics included in the model for all periods.

It is essential to use the correct model because fixed effects, for example, sacrifice data. Data is wasted if selected products are used when random effects should be implemented. Furthermore, random effects keep more data, which means the model is more efficient, whereas fixed effect models are more consistent. Table A1 indicates that the panel data is best suited for the fixed effects model as the p-value is low. Below the significance level (0.1), the null is rejected, and fixed effects are most appropriate. This test runs the regression with both the FE and RE model and then runs the Hausman test using the two regressions.

If the p is low, the null must go if the p is high, the null will fly.

Table A1. Hausman's (1978) specification test

	Coef.
Chi-square test value	6.871
P-value	.009

APPENDIX B. CREATING THE INDEX VARIABLES

Table B1. Index Variabels
Socio_economic Index
Infant mortality rate; share of agriculture in total production, primary education rate
Economic Development Index
openness to trade, inflation (proxy for macroeconomi**c** management), infrastructure (measured by the percent of the rural population having access to electricity).
Women in Business and Law (world bank index)
World Bank created Index

Analysing the data and focusing on examining causal effects using individuals' variables was not the most efficient way of regressing the data. This is because gender-disaggregated data, especially in low-income countries, tends to be insufficient as these countries tend to have poor data collection processes. To produce more accurate variables, indexes were created. The indexes created are seen in table 2A. The three indexes in table 2A are control variables, controlling for economic, social, and cultural factors that may affect female borrowing rate and GDP per capita.

When creating indexes, the input variables must have the same scale, so they are weighted equally. The input variables do not need to be weighted equally, but I have chosen to weigh the variables equally for this data set.

The first index created was the socio-economic index which includes the variables infant mortality rate (IMR), primary education rate, and share of agriculture in total production. IMR is a good indicator of a country's general level of socio-economic development as it indicates the level of maternal care a mother can access her nutrition and post-birth care. The share of agriculture as a percent of GDP is an indicator of an economy's place in the structural transformation process. These variables are on a scale of 1-100, which means that when creating my index variable, I simply add them together:

$$socio\_economic\_index = IMR + \%agri + primary\_edu$$

The second index created is the economic_development index, a composite of indicators measuring economic activity and prosperity. The first variable is openness to trade, which measures the economy's openness to global trade and economic activity. Second, we include inflation, a proxy measurement for macroeconomic management. The last variable is the percent of the rural population with access to electricity, which indicates infrastructure expansion and sophistication. These three variables are percentage variables on a scale of 1-100 which means that, like the previous index, these can be added together on Stata:

$$economic\_development = trade + inflation + infrastructure$$

The last index variable, *Women in Business and Law,* is created by the World Bank and is a composite of 35 data points across eight scored indictors. These scores are based on the average of each economy's scores for the eight topics. A higher score indicates more gender-equal laws.

Table. B2 Women's Financial Inclusion and Economic Growth: Global Middle Income

VARIABLES	(1) Female Borrowers per 1000	(2) Female Borrowers per 1000	(3) Female Borrowers per 1000	(4) Female Borrowers per 1000	(5) GDP per capita	(6) GDP per capita	(7) GDP per capita	(8) GDP per capita
GDP per capita	0.735***	0.136	0.243**	0.138				
	(0.112)	(0.128)	(0.113)	(0.117)				
Economic development index		2.335***	1.312***	1.058***		0.552***	0.337	0.152
		(0.282)	(0.290)	(0.297)		(0.198)	(0.240)	(0.238)
Socio-economic development			1.063	1.027			-1.994***	-1.810***
			(0.794)	(0.774)			(0.593)	(0.574)
WBL				1.733***				1.550***
				(0.622)				(0.470)
Female Borrowers per 1000					0.250***	0.0496	0.145**	0.0810
					(0.0380)	(0.0469)	(0.0680)	(0.0683)
Constant	-1.700*	-8.308***	-9.037*	-14.14***	6.988***	5.144***	15.52***	9.230**
	(0.899)	(1.468)	(4.812)	(5.032)	(0.161)	(0.883)	(3.513)	(3.884)
Observations	224	195	153	153	224	195	153	153
R-squared	0.184	0.334	0.211	0.257	0.184	0.100	0.215	0.279
Number of c_id	31	28	25	25	31	28	25	25

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. The regressions are run using a log-log model meaning the results are in percent. The economic development index comprises three variables: rural access to electricity as a measure of infrastructure, inflation, and openness to trade. The socio-economic index is comprised of: Infant mortality rate per 1000 lives births, agriculture as a percent of GDP, and primary school completion. The WBL is the Women in Business and Law index, World Bank.

This paper has primarily focused on the relationship dynamic of economic growth and women's financial equality in Sub-Saharan Africa and Low-income countries. Those results showed statistically insignificant results when all control variables were accounted for in Sub-Sharan African countries. Still, significant results when looking at all Low-income countries across the entire globe and only low-income countries in Sub-Saharan Africa. When examining middle-income countries globally, the results are like that of low-income countries. GDP per capita has a small but positive effect on the rate at which women borrow from central banks. The more women that borrow, have access to, and use financial services, the greater the impact on economic growth. These results are all statistically significant.

In contrast to Low- and middle-income countries, high-income countries show statistically insignificant and even negative results, as seen in table B3. In High-income countries, the results suggest that neither GDP per capita nor female borrowing significantly affect each other. This was, however, expected, as men and women have equal access to finance in high-income countries and account ownership, as presented by the Findex data, are almost identical.

Table B3 Women's Financial Inclusion and Economic Growth: Global High Income

VARIABLES	(1) Female Borrowers per 1000	(2) Female Borrowers per 1000	(3) Female Borrowers per 1000	(4) Female Borrowers per 1000	(5) GDP per capita	(6) GDP per capita	(7) GDP per capita	(8) GDP per capita
GDP per capita	0.335***	0.348***	-0.192*	-0.226				
	(0.0977)	(0.105)	(0.107)	(0.165)				
Economic development index		0.0362	0.435	0.419		0.869*	0.978**	0.228
		(0.371)	(0.265)	(0.276)		(0.465)	(0.425)	(0.322)
Socio-economic development index			-0.616	-0.618			0.00572	-0.0603
			(0.578)	(0.587)			(0.983)	(0.678)
WBL				0.116				1.810***
				(0.418)				(0.320)
Female Borrowers per 1000					0.578***	0.592***	-0.535*	-0.289
					(0.168)	(0.179)	(0.299)	(0.210)
Constant	2.521**	2.274	8.265**	8.182**	6.434***	1.560	7.517	2.526
	(0.956)	(1.916)	(3.027)	(3.092)	(0.977)	(2.531)	(5.506)	(3.894)
Observations	60	53	38	38	60	53	38	38
R-squared	0.194	0.228	0.172	0.174	0.194	0.287	0.208	0.637
Number of c_id	10	9	7	7	10	9	7	7

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. The regressions are run using a log-log model meaning the results are in percent. The economic development index comprises three variables: rural access to electricity as a measure of infrastructure, inflation, and openness to trade. The socio-economic index is comprised of: Infant mortality rate per 1,000 lives births, agriculture as a percent of GDP, and primary school completion. The WBL is the Women in Business and Law index created by the World Bank.