IMPACT OF MOBILE DEVICES ON WOMEN'S ACCESS TO FINANCE

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Abstract

Digital financial services have long been known as key tools in increasing women's financial inclusion, independence, and social mobility. However, the exact method in how these services should be most effectively deployed is still up for debate. Women have continuously been excluded from the financial sector, in large part due to restrictive cultural and gender norms inhibiting their independence. Women's exclusion impedes their personal development and leads to stagnating economic development at the local, regional and global level—women's financial empowerment is crucial for long-term economic development and growth. However, dismantling and reshaping a system that excludes women is no easy fix. It requires a plethora of factors to work together in order to achieve long-term results. In recent years digital financial services have been at the center of financial inclusion projects. The purpose of this study is to investigate how network coverage and digital devices impact women's access to finance and what other possible factors which may be crucial in women's economic empowerment. An econometric regression exploring the relationship between access to financial services and enabling factors such as network coverage, education, GDP, and banks per 100,000 is used to determine what may be an important factor in access to finance. Additionally, case studies using digital financial services to increase women's access to finance are investigated to explore the impact the econometric variables have in real life and what other factors need to be considered to maximize impact.

Keywords: digital financial services, women's financial inclusion, fintech, mobile broadband

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List of Abbreviation

ADB: Asian Development Bank
WWB: Women's World Banking
LIC: Lower-Income Countries
MIC: Middle-Income Countries
HIC: Higher-Income Countries
DFS: Digital Financial Services
FinTech: Financial Technology
GDP: Gross Domestic Product
GSMA: Global System for Mobile Communications

1. Introduction

1.1 Background

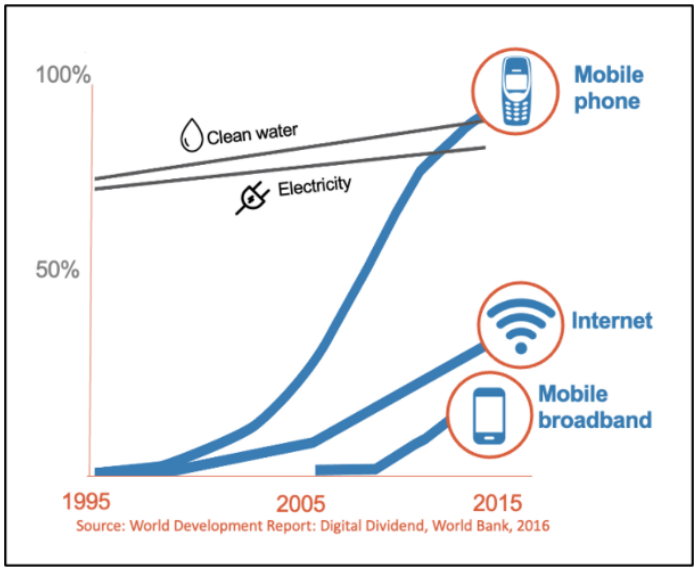

Figure 1: Rate of mobile phone, broadband and internet penetration in comparison to clean water and electricity
Source: Schou-Zibell, 2018

Digital Financial Services (DFS), such as mobile banking, is a major player in increasing access to financial services to unbanked and underserved populations, which has seen a rapid expansion over recent years. More households in developing countries own a mobile phone than have access to electricity or clean water. About 70% of the bottom fifth of the population in developing countries own a mobile phone (Schou-Zibell, 2018). McKinsey estimates that by 2025 the widespread use of digital finance can provide access to financial services for 1.6 billion people, of which 55% would be women. They also estimate that digital finance will increase the volume of loans by $2.1 trillion and reduce government leakages in public spending and tax collection by $110 billion per year. Furthermore, McKinsey estimates that DFS can boost the annual GDP of emerging economies by $3.7 trillion by 2025, which is a 6% increase and generates 95 million new jobs across the economy (McKinsey&Company, 2016).

Access to smartphones, tablets, and handheld devices are reshaping communications and creating new opportunities. They transform how we handle our finances, expand the reach of financial services and help create an enabling financial market by supporting innovation, competition, and consumer protection. These technologies can bring financial services through digital means to people and businesses much more conveniently and faster than ever before. Studies conducted by GSMA (Global System for Mobile Communications) have shown that pervasive mobile phone penetration is a determinant in economic growth (Rowntree & Matthew, 2020). Their study concluded that mobile penetration in developing countries positively affected GDP per capita and productivity. It has also improved communication, social inclusion, and economic activity, making DFS tools easier to use and more accessible.

Despite these advances, about 1.7 billion adults globally have little or no access to formal financial services such as banking or credit services (Demirguc-Kunt, et al., 2017). An additional challenge is that globally, about 1 billion people cannot prove their official identity, which means that they do not meet the basic know-your-customer (KYC) requirements required to open a bank account (Pangestu, 2020).

Women are a big part of this unbanked and underserved segment. Globally, 980 million women are still financially excluded, or about 56% of the world's unbanked, and 30% are from Egypt, Mexico, Nigeria, Bangladesh, Indonesia, or India (Country Strategies 2019, 2019). Globally, roughly 170 million women own a bank account. However, the dormancy rate remains exceptionally high at 52% (Demirguc-Kunt, et al., 2017).

Why is women's access to finance so important? Why are the existing inequalities an issue? Financial inclusion is a precursor for women's economic empowerment; it is a catalyst for women to recognize their inherent rights to make their own decisions. It enables them to rule over their production and consumption, ultimately providing them with more control over their lives and access to economic opportunities (Salman and Nowacka, 2020). Women's economic empowerment has a plethora of positive externalities. In Nepal, for example, when female heads of household were provided no-fee local bank accounts, they spent 15% more on nutritious food and educational expenditures increased by 20% annually as they spent more on textbooks, school uniforms, and school fees (Gates Foundation, n.d, Prina, 2013). The Gates Foundation found that when a woman opens a savings account in Kenya, it leads to a 70-130% increase in spending on preventative health investments. In Niger, households with mobile banking had been able to eat a diet 9% to 16% more diverse than those without and ate 33% more per day (Gates Foundation, n.d). The point made is that women create positive externalities; they invest in their children, health, and future.

However, currently, there are 118 women for every 100 men aged 25-34 living in extreme poverty (USD 1.90/day), and this is expected to increase to 121 women per 100 men by 2030 (UNDP, 2020). The pandemic has and will continue to exacerbate these inequalities and increase the urgency in women's access to financial services as women are the ones taking the brunt of the pandemics' financial fallout. The UN women's report *From Insight to Action: Gender Equality in the wake of COVID-19* stated that 96 million people would be pushed into extreme poverty due to the pandemic in 2021, of which 47 million will be women (UNDP, 2020). As women are the primary caretakers, this rising inequality will create a chain of adverse effects affecting the current generation and those to come. Increasing access to DFS through

mobile phones and network coverage actively counteracts women's disenfranchisement by increasing their financial independence.

Table 1. Definitions		
DFS	**Fintech**	**Financial Inclusion**
Financial services that rely on digital technologies for their delivery and use by consumers.	Refers to digital technologies that have the potential to transform the provision of financial services spurring the development of new business models, applications, processes, and products.	Access of the population to financial services, the degree of use of these services, and their quality and cost.

Source: (Pazarbasioglu, et al., 2020)

DFS works towards overcoming barriers to enable greater access, independence, freedom and social mobility. WWB has identified three categories of barriers women face: 1) Client barriers, 2) Institutional barriers, and 3) Ecosystem barriers, see Table 2 (Country Strategies 2019, 2019). Solutions looking to overcome these barriers need to be centered around women's financial needs, catering to their specific set of circumstances, which generally point to lower levels of financial and digital literacy and restrictive gender norms which inhibit them from using DFS. These barriers require solutions spanning both the supply and demand side, meaning DFS need to be tailored to women's specific needs ensuring that they are relevant to them as well as ensuring that women have the financial and digital capability and literacy to use the tools provided. Education and the expansion of DFS need to go hand in hand.

Table 2. Women's World Banking		
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

Source: Country Strategies 2019, 2019

1.2 Aim and Hypothesis

It has been established that women's access to finance plays a critical role in improving gender equality and a decisive component in long-term sustainable economic development. However, access to financial services has not developed equally across the world. LICs and particularly women, still struggle with barriers such as the ones in Table 2, which inhibit them from expanding their financial capabilities. Financial inclusion requires solutions that focus both on the supply-side and the demand-side side of financial services; solely focusing on one side leads to imbalances and inefficiencies. Supply-side investments without regard to demand-side conditions and needs create tools that do not address the needs and concerns of the target population. Whereas demand-side strategies address education, awareness and confidence, which aid in decreasing account dormancy rates, but does little to increase the provision of appropriate DFS. These two strategies need to work in tandem. In the age of digitization, where technology is at the center of everyday life, utilizing DFS would more quickly and effectively increase financial inclusion.

This report aims to examine *how network coverage and digital devices impact women's access to financial services.* The hypothesis is that network coverage and digital devices will have a positive effect on financial inclusion. However, as network coverage and DFS only tackle the supply side, these strategies can only do so much until they need to be supplemented by demand-side policies, which increase women's ability to use the DFS made accessible to them. The empirical data is used to illustrate the effects supply-side policies may have on financial inclusion. The case studies are used to illustrate the effects of combining demand and supply-side policies. Combining demand-side and supply-side policies is hypothesized to have the most promising effect as the increased range of DFS made available will be met by women more capable and able to use the tools provided.

There is vast potential to capitalize on rapidly expanding network coverage, DFS and mobile phones which could make DFS readily available to a wider range of users. While mobile phones have a high penetration rates in most areas of the world, they do not enable the use of DFS, which is why network coverage is expected to positively impact the reach of financial services as it enables increased access and use of a broader range of more sophisticated DFS. Therefore, network coverage is a relevant area to investigate within the realm of financial inclusion as it contains vast potential to rapidly increase financial inclusion. Additionally, control variables

(GDP per capita, Education and banks per 100 000) will be used to explore other factors which may also impact financial inclusion to an extent.

2. DFS and Financial Inclusion

DFS technologies are rapidly evolving in developing countries through mobile phone-centric provision by banks and non-banks of essential financial services to the financially underserved. Many of the people reside in rural areas and exhibit high poverty levels**.** These rural areas are often predominantly cash-based; where financial, numeracy, and digital literacy among many of the population are limited; and access to affordable and reliable connectivity is inadequate.

Mobile devices such as smartphones, tablets, and handheld devices are the primary instruments to access DFS. This means that the quality and range of potential DFS available to the financially underserved is sensitive to the reach and quality of network coverage. Of the 1.7 billion unbanked globally, about 2/3rds have a mobile phone. 72% of unbanked men have a mobile phone, while 62% of unbanked women have a mobile phone (Demirguc-Kunt, et al., 2017). There is vast potential in this field due to the high penetration rate of mobile phones in almost all communities worldwide, even in the most impoverished and most isolated communities. Expanding access to network coverage is key to unlocking financial services and including the excluded. Studies have shown that the type of network coverage available has a significant effect on the user interfaces for access to DFS and the type of mobile phone used to access DFS. Faster mobile broadband technologies are optimal for smartphone use that provide superior and more intuitive graphical user interfaces and eliminate geographical constraints (Perlman and Wechsler, n.d.) However, there is no direct causation between mobile phone ownership and usage of financial services. Mobile phones are essential entry points, but other factors such as network coverage and DFS catering specifically to women need to be addressed in tandem.

Table 3. Network Coverage, Mobile Penetration, and Mobile Broadband Coverage

Countries	3G Coverage % of Population	Total mobile penetration, %	Mobile penetration rural %	Financial access % of population 15 years and above
India	76.67	84.44	66.86	79.9
Uganda	45	67.59	83.56	59.2
Colombia	92.45	105.06	23.29	45.8
Tanzania	28.1	69.05	67.68	46.8
Indonesia	60	147.55	45.53	48.9

Source: Perlman and Wechsler, n.d., and Demirguc-Kunt, et al., 2017

The lack of national 3G and higher mobile broadband data services means that many users cannot make optimal use of DFS on offer. Table 3 illustrates that the 3G coverage and mobile penetration rates in five economies demonstrate a varying degree of development. In general, mobile phone penetration as a whole and in rural areas tends to be higher than 3G coverage. What table 3 implies is that access to financial services is more dependent on the rate of network coverage (3G) than mobile penetration. In, for example, Indonesia, even though mobile penetration is 147.55%, only 48.9% of the population have access to financial services, and this may be because only 60% of the population have access to 3G (Perlman and Wechsler, n.d.). A mobile phone does not inherently make DFS readily available, instead they act as vessels for DFS enabling money to be sent via texts, for customers to call local banks, and those with smartphones can download apps and use social media platforms to take part in the flow of information. The Gallup data suggest that while mobile phones are an important entry point to DFS, a woman simply owning a phone does not directly translate into the use of mobile phones for payments (Burjorjee and Bin-Humam, 2018). Additional tools are required to enable their usage. Network coverage seems to be an essential component of DFS; without it, smartphones, DFS, and finance apps become inapplicable (obsolete).

3. Methodology

There are several ways in which the research question at hand can be explored. Most commonly, economic investigations rely on data and econometric analysis to explore the relationship between different variables. An empirical analysis illustrates whether there is a relationship between the variables in question and how they affect the dependent variable, which in this case is women's access to finance. As suggested by the theoretical framework above, DFS is proving to have a substantial impact on women's access to finance, especially with the expansion of network coverage, which is the explanatory variable in this study. In this study, lower-income countries are of most interest. These are the countries where women are most excluded and vulnerable due to various reasons, such as high levels of gender inequality, low levels of financial and digital literacy, geographical distances, and low levels of education. The data, spanning from 2007 to 2019, has been separated into three categories: high-income (HIC), middle-income (MIC), and low-income (LIC) according to their World Bank classification illustrated in Table 4 below.

Table 4. World Bank Income Group Classifications

Low-Income Countries (LIC)	Middle-Income Countries (MIC)	High-Income Countries (HIC)
Countries with a GNI per capita of US$ 1035 or less	Countries with a GNI per capita of US$ 1026-$ 12 476	Countries with a GNI per capita of US$ 12 536 or more

Note: GNI = Gross National Income; Source: The World Bank, 2021

As previously mentioned, financial inclusion is an issue requiring both supply and demand-side policies, meaning both DFS and education need to go hand in hand. While the empirical data examines supply-side strategies, case studies will be used to examine the effects of demand and supply-side policies in the real world. Exploring what women need, which strategies are most effective, and provide unbanked women a platform to express their opinions on how more accessible financial services impact their lives. The case studies are taken from ADB, HERproject, and WWB. The purpose of this is to address the question from different angles.

3.1 The Data

The data being used for the econometric regression is best suited for panel data analysis. Due to limited data, the panel is unbalanced.

The global findex database, which measures women's access to finance has data points available for the years 2011, 2014, and 2017. Due to the limited data concerning women's access to financial services, as it is a relatively new area, an indicator of financial inclusion is used instead. An indicator of financial inclusion must consider both the supply and demand side of finance. This limits viable data sets and results in the use of the indicator *borrowers from commercial banks per 1,000 taken from IMF Financial Access* Survey (International Monetary Fund, Financial Access Survey., 2019). As a result, the purpose of the equation is to illustrate and examine the general relationship between borrowers per 1000 and mobile network, and women's financial inclusion through DFS will be examined through case studies the equation aims to illustrate possible general trends in higher, middle, and lower-income countries.

Mobile penetration per 100 and network coverage data were collected from the International Telecommunications Union (ITU) (Statistics, 2019) and is a part of client-side barriers as seen in table 2. However, due to the high level of correlation between mobile phone penetration and mobile broadband, mobile phones will not be part of the econometric regression; however, it will aid in the analysis.

The explanatory variable, mobile broadband coverage, was collected from ITU. Mobile phone ownership is a critical first step in increasing the use of DFS but is not a complete process on its own. Network coverage is an enabling factor that creates an enabling environment that encourages and makes using DFS more accessible.

Incorporating control variables into the econometric regression is important to ensure that the results do not create biases and are misleading. In the context of the equation concerning access to financial services, the explanatory variables may not reflect their true values, which undermines the accuracy and validity of the results without control variables. Three control variables have been entered into the equation to mitigate these inaccuracies: GDP per capita, mean years of schooling, and banks per 100,000. The GDP per capita data were taken from the World Bank database and is incorporated into this equation because an individual's income may impact their access and use of financial services. It is not unreasonable to assume that those with higher incomes have ready access to financial services as they most likely live in 'richer' areas and need a safe place to store their assets compared to someone with limited financial resources. The education data was collected from the human development report and is used in a similar way to that of GDP per capita. A person with higher educational attainment is more likely to have a higher-paying job in an urbanized area where financial services are readily available. The third control variable, banks per 100,000, is included in the equation as access

to a bank is likely to affect the rate of usage, and geographical distance to formal financial institutions has been identified as a common barrier to financial inclusion. These three variables aid in overcoming client-side, institutional, and ecosystem barriers many face in accessing financial services (Table 2), such as being financially literate, overcoming restrictive social and cultural norms, having a legal means to prove their identity, owning a mobile phone, and living in an area with mobile broadband coverage.

3.2 Limitations

Empirical studies aiming to illustrate and capture real-world phenomena are destined to be plagued with unpredictability and limitation. The choice of data, sample size, time period, and variables in this empirical study were made to minimize unpredictability by removing missing observations as it would create a model less representative and reduce the validity of the results. DFS and telecommunications are relatively new areas of interest in development, which means there is limited data available, creating a few limitations in the choice of data and sample size. Additionally, the countries of interest in this question are lower-income countries, and due to lack of resources, these countries tend to have less data of sub-optimal quality. As a result of these limitations, the data sample created includes data from 2007 to 2019 is unbalanced and contains a limited set of countries, which can be found listed in appendix A, as not all have sufficient data. These limitations largely incur due to the lack of data surrounding financial access (borrowers per 1,000). However, the data being used has been collected from reputable sources that strive to produce high-quality data. Therefore, while facing some limitations, the results of the data can still be used to draw conclusions.

3.3 Econometric Model

Due to the aim of the research question and the limited data available, a general econometric analysis will be performed to illustrate the relationship between the number of borrowers from commercial banks and network coverage for both men and women. The equation is as follows:

$$Borrowers = B_0 + B_1 broadband_{it} + B_2 GDP_{it} + B_3 edu_{it} + B_4 banks_{it} + \varepsilon_{it}$$

Table 5. Terms and Definitions	
Term	**Definition**
Dependent Variable	
Borrowers from commercial banks per 1000 adults	"Borrowers from commercial banks are the reported number of resident customers that are nonfinancial corporations (public and private) and households who obtained loans from commercial banks and other banks functioning as commercial banks.
Explanatory Variables	
Mobile Broadband / 100	"Active mobile-broadband subscriptions refers to the sum of standard mobile-broadband and dedicated mobile-broadband subscriptions to the public Internet. It covers actual subscribers; not potential subscribers."
Controlled Variables	
GDP per Capita (USD)	"GDP per capita is the gross domestic product divided by the midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. "
Education	"Average number of years of education received by people ages 25 and older, converted from education attainment levels using official durations of each level."
Bank Access	"Number of commercial bank branches per 100 000 adults"

Source: International Monetary Fund, Financial Access Survey., 2019; Statistics, 2019; The World Bank Group, 2019; Human Development Reports, 2019; International Monetary Fund, Financial Access Survey., 2019

3.4 Specification Tests

Data sets often require alteration and corrections and to ensure that the data being used is presented in an unbiased and consistent manner. For this model, the relevant test and specifications include fixed or random effects, heteroscedasticity, autocorrelation, and multicollinearity.

3.4.1 Fixed vs. Random Effects

In order to determine which effect is most relevant to this data set, a Hauseman test was performed. The Hausman test is used to determine whether fixed or random effects are most appropriate. The null hypothesis (H_0) = the individual-specific effects are random, and this is tested to a significance value of 0.1 ($\alpha = 0.1$). The Hausmen test resulted in a p-value of 0.0720. Following the consensus, "if the P is low, the null must go, if P is high, the null will

fly," the null hypothesis is rejected, which means that fixed effects are more appropriate for this equation.

3.4.2 Heteroscedasticity

This model also needs to be tested for heteroscedasticity to determine whether the variance of the error terms is inconsistent, which results in an Ordinary Least Squares (OLS) that is unbiased, consistent, inefficient, and underestimated standard errors. Testing for heteroscedasticity resulted in a p-value of $0 < 0.1$, meaning the null hypothesis is rejected and that the errors are heteroscedastic. Heteroskedasticity is adjusted by implementing robust standard errors.

3.4.3 Autocorrelation

When dealing with panel data, it is also essential to check that the error terms are not autocorrelated, which is when the error terms from one time period are correlated with another. In this case there is some autocorrelation which was adjusted using robust standard errors.

3.4.4 Multicollinearity

Multicollinearity occurs when at least one explanatory variable is an exact linear combination of the others, meaning there is a strong correlation, which can be defined as$> |0.8|$. A model with perfect multicollinearity cannot produce OLS estimators and may result in high $\beta - parameter$ variances. While some multicollinearity degree is normal and expected and does not directly mean there is misspecification, a high level of multicollinearity results in less efficient and imprecise OLS estimates. The correlation between the mobile phone per 100 and mobile broadband illustrated a correlation of 0.64, which is quiet. Due to their high correlation, mobile phone penetration was be removed from the equation to eliminate any risk of misleading data.

4. Results

This section presents the processed and analyzed data that was described and explained in section three. As previously mentioned, there has shown to be a positive relationship between mobile phones, mobile broadband, and financial inclusion. As this area of development has expanded, it has been found that mobile phones may not have as significant an impact as first assumed. Instead, further research has suggested that mobile phones act as crucial entry points to financial services, but a mobile phone does little to encourage the use of DFS, instead increasing educational attainment is suggested to be more impactful. Instead, other factors such as broadband and education seem to have the most impact.

4.1 Econometric Regression results

$$Borrowers = B_0 + B_1 broadband_{it} + B_2 GDP_{it} + B_3 edu_{it} + B_4 banks_{it} + \varepsilon_{it}$$

Table 6. Econometric Regression Results			
R-Sqaured: 0.526		Number of observations: 787	
Variable	**Coefficient**	**Standard Error**	**Probability**
Constant	-90.54	13.24	0.00
Broadband	1.33	0.22	0.00
GDP	0.005	0.00	0.00
Education	23.01	2.60	0.00
Banks	1.39	0.47	0.00

The results from the econometric regression show that the four variables have a positive effect on the number of borrowers from banks per 100 people. However, not all variables have the same level of impact. A one-unit increase in broadband coverage leads to a 1.33 unit increase in borrowers at commercial banks. The p-value for broadband is 0, and a p-value less than 5% suggests that the results are not easily explained by chance alone which is inconsistent with the null hypothesis that the results result from chance (Kenton, 2021). All the p-values are less than 5% (0.05), meaning that the results illustrated in figure 2 are not a result of chance. Additionally, the R-squared value of 0.526 indicates that the regression is a decent fit to the model. Bank branches per 100,000 have a similar effect to that of broadband, where a unit increase in banks per 100,000 leads to a 1.39 unit increase in borrowers. GDP per capita has a less substantial

effect on borrowers, where a 1 unit increase in GDP per capita leads to a 0.005 unit increase in borrowers. However, while the results of the variables are less significant than what was first hypothesized, the data suggests that education is the variable with the most significant impact. A one-unit increase in education leads to a 23 unit increase in borrowers, which suggests that strategies aiming to increase financial inclusion should focus on education, i.e., client-side barriers such as improving digital and financial literacy. These results are not specifically tailored to women as there is limited data focused solely on women. However, it can be said that improving education is of benefit to both men and women's financial inclusion and independence.

Table 7. LIC Econometric Regression Results

R-square: 0.85			**Number of Observations: 105**
Variable	**Coefficient**	**Standard Error**	**Probability**
Constant	14.63	19.7	0.46
Broadband	0.32	0.11	0,0088
GDP	-0,001	0,007	0,8969
Education	-0.54	4.33	0.90
Banks	-0.14	2.47	0.95

Table 8. MIC Econometric Regression Results

R-squared: 0.92			**Number of Observations: 492**
Variable	**Coefficient**	**Standard Error**	**Probability**
Constant	176.83	90.4	0.056
Broadband	0.749	0.47	0.11
GDP	-0,001	0.004	0.79
Education	-2.31	12.4	0.85
Banks	-0.544	2.25	0.81

Table 9. HIC Econometric Regression Results			
R-Squared: 0.187		Number of Observations:190	
Variable	**Coefficient**	**Standard Error**	**Probability**
Constant	-186.3	356	0.60
Broadband	0.91	0.67	0.19
GDP	0.003	0.003	0.42
Education	44.3	28.3	0.13
Banks	0.27	2.5	0.88

When looking specifically at each income group the results are slightly conflicting and the p-values are higher suggesting that the results are not strong enough to indicate that there is an effect. However, considering the results from table 6 where the p-values where low an analysis and comparison we still be done keeping in mind the higher p-values in table 7, 8 and 9.The conflicting results across the income groups does however confirm the already common idea within development, that there is no one size fits all. It is impossible to use the same strategy and tools across all communities as all communities have specific needs and face different barriers. The R-squared value is high for both LIC's and MIC's which indicates that the model is a good fit.

While broadband continues to positively impact on borrowers per 1,000 across all income groups, in line with the hypothesis, the control variables instead have an inverse effect in LIC and MICs. Broadband coverage has a positive relationship with the number of borrowers in all three income groups meaning that as broadband coverage increases the number of borrowers per 1000 increases across all income groups, which suggests that investments in reducing ecosystem and client-side barriers is beneficial regardless of a country's income level. HICs and MICs show the highest values of broadband at 0.91 and 0.74, respectively, while LICs broadband has a value of 0.32. The lower value of broadband in LICs may be because they tend to lag in many areas and require a plethora of variables to work in symbiosis for things to develop. For example, ensuring high rates of mobile penetration must be done in tandem with ensuring broadband coverage so DFS can be readily available and accessible to the unbanked and underserved.

While it may seem counter-intuitive that education, i.e., financial and digital literacy has a slight negative impact on borrowers in LICs and MICs this may be because even if a government

successfully increases the average educational attainment if it is not matched with adequate tools such as DFS and broadband coverage, their new knowledge will not be used. Whereas in HIC education is the most critical factor in determining financial access, this may be because HIC tends to have developed and sophisticated infrastructure that is simply waiting to be exploited. Educating populations in HIC enables greater exploitation of existing resources. Whereas in LIC, education i.e., increased financial and digital literacy, would be of little help if there were no way to access DFS – which may explain why broadband has a greater effect compared to other variables in LICs and MIC. In other words, it is easier in HIC to put financial and digital literacy to use compared to LIC.

GDP per capita has a miniscule impact across all income groups; however, it has a negative relationship with borrowers in LICs and MICs, whereas it is positive in HICs. In LIC and MICs as GDP per capita increases the number of borrowers per 1000 decreases. This inverse relationship is unexpected as the need for financial services usually increases when incomes rise. However, in LIC, many turn to informal financial services due to a lack of trust in formal financial institutions, lack of access or knowledge in using DFS, and social and cultural norms (client-side barriers). Because of limited exposure to formal financial services and education, many individuals in LIC are less likely to be aware of the various uses, benefits, and value of DFS, resulting in low rates of account ownership and/or high levels of account ownership account dormancy. Lastly, banks per 100,000 seem to have the most significant impact in HIC, where the coefficient is 0.27 compared to the inverse effect in MICs and LICs. The high coefficient in HIC may simply be because more people use financial services, and more bank branches are easily accessible by most of the population.

5. Case Studies

As data concerning women's financial inclusion lacks due to its relatively short lifespan, case studies will be used to demonstrate how the variables have been used in real life to improve women's access to finance. This section will explore three case studies conducted by three different organizations, ADB, HERproject, and WWB. All three organizations have addressed the problem of women's financial access from different angles. ADB's project focuses on mobile phones, broadband, and improving technology to enhance the quantity and quality of DFS available. HERprojects project focused on digitizing wages for female garment workers in Bangladesh while in tandem providing educational tools to enhance women's access to financial services and improve their confidence in their ability to be financially independent. Lastly, the WWB project focused solely on education by creating educational infographics about credit, loans, and other financial services with the aim to change negative misconceptions and encourage women to use DFS.

5.1 ADB Cloud- Banking

The econometric regression and previous literature show that mobile phones and mobile broadband are tools, entry points into financial inclusion; however, simply increasing those factors does not increase the unbanked and underserved ability and/or need for financial services. Financial inclusion needs to be addressed from both supply and demand side in order to tackle all three barriers (client, institutional and ecosystem barriers) as the unbanked and underserved need to see the purpose and benefits of DFS. A mobile phone does not encourage the use of mobile banking. However, this does not mean investing in mobile phones and broadband is irrelevant. In June 2017, the ADB and Cantilan Bank Inc (CBI) began a pilot project testing cloud-based core banking technology. CBI is a regional bank in the Philippines, and this pilot project was conducted in Mindanao, an island in the southern Philippine archipelago. The pilot project aimed to increase financial inclusion in a region where 41% of the population remained unbanked, where the average family poverty incidence was 30.8% (14.3% higher than the national average of 16,5%) and where an estimated 7 out of 10 adults keep savings in their homes (Cloud-Based Banking, 2018). The main barriers to financial inclusion in Mindanao include lack of efficient technology infrastructure in rural and remote areas and higher costs of reaching remote and high-risk clients (Cloud-Based Banking, 2018). The World Bank currently classifies the Philippines as a lower-middle-income country. Across

all income groups, broadband showed a positive effect on increasing the number of borrowers from financial institutions. This, in tandem with the ADB case study, suggests that investing in broadband is beneficial for financial inclusion.

ADB collaborated with the Philippine Central Bank to create regulatory conditions which would allow the CBI to adopt a cloud-based banking system. A cloud-based banking system enables banks to store all their data in external data centers, which can be accessed via the internet, enabling the implementation of mobile banking services, making it easier for customers to access their money. It also enables the bank to offer more services such as electronic fund transfer, remittances, and people to manage their finances better. Cloud-based banking eliminates geographical barriers, which many faces when living in remote and rural areas, making financial services more accessible for those who typically are unbanked and underserved. This shift creates a more flexible, accurate, and secure banking system by increasing its efficiency, reducing costs, increasing customer convenience, and boosting financial inclusion.

While this project was not specifically targeted at women, ADBs impact study showed that of the clients surveyed, 70% were women, and 80% of clients conducting loan-related transitions were women. Women saw a great benefit from enhanced mobile banking services. Margilyn Casominano, a client of CBI and a farmer and fish stall owner, concluded during an interview with ADB staff that because of the new mobile banking services, she could more easily access her money, save and invest in her business and that this enabled her to set up her own business and send her children to school (Cantilan Bank, 2019).

Cloud-based banking improved customer service and access and made the bank more efficient and allowed bank staff to focus more on customer services. Sheryl Asio, a fund manager at CBI, stated that she could mitigate the liquidity risks of the bank and make immediate decisions in real-time, something she could not do before (Cantilan Bank, 2019). While the econometric regression showed that the impact of broadband is low compared to the impact of education, the ADB pilot project demonstrates that it is a vital instrument improving the access, quantity and quality of services provided. However, as previously mentioned, DFS are *tools,* and users need to know that they exist, know how to use them, and be confident enough to use them; this is especially important for women. Client-side barriers have remained unchanged, meaning gender-related discrimination, low levels of education/ awareness and lack of compelling use inhibits women's financial inclusion are still major barriers, which is why demand side polities are important as they aim to eliminate these barriers.

5.2 HERfinance Digital Wages Program

HERproject works with nongovernment organizations (NGOs), factories, farms, and international companies with an ambition to empower women through financial inclusion and to increase their dignity in their work to create more ethical and productive businesses. Their model works by tackling client, institutional and ecosystem barriers by bringing together global brands, their suppliers, and local partners (Impact Numbers |HERproject, n.d.).

In 2015 HERproject created a collaborative initiative with the Bill and Melinda Gates Foundation with the aim to empower low-income women working in global supply chains by launching their *HERfinance Digital wages program*. *HERfinance* identified transitioning from cash to digital payrolls as a critical step in financial inclusion as it creates an enabling financial environment that encourages the use of DFS. It was intended to demonstrate how a responsible transition to digital payroll with specific attention placed on women's financial needs could increase women's access to formal financial services and enhance their control and usage of DFS by providing educational tools. The project further demonstrated how digital wages could be a critical benefit to business by increasing transparency, efficiency, and savings. Salaries were directly deposited into accounts; formerly unbanked workers now have access to safe and secure banking and other essential financial services such as savings accounts, credit, and insurance which can help them create a secure future for themselves and their families, invest and reduce their risk. Mobile money accounts can be used on both feature-and smartphones making them available to a wide range of clients, making a large-scale transition to digital payroll very possible.

Having interviewed women at the factories, HERproject identified some of the women's critical financial needs that need to be addressed for them to feel confident and secure in using mobile banking. For example, women have lower levels of financial and digital literacy compared to men, they have limited access to mobile phones, less time to visit cash postings, they don't feel safe visiting ATMs alone, and many lack experience. HERfinance focused on these main issues facing women in order to maximize women's financial empowerment. The results of the HERfinance digital wage project can be distilled into three categories: 1) financial inclusion, 2) empowering female workers, and 3) business efficiency (HERproject, 2020).

Increased Financial Inclusion

Bangladesh is lagging in financial inclusion, a mere 41% of adults in Bangladesh have a financial account. With their strong cash culture, they have an extremely low borrowing rate of just 9.0% and a saving rate of 9.9% at a financial institution. When it comes to the gender gap in access to financial accounts, men are 29% ahead of women (Svarer and Moffat, 2020). Through the HERfinance program, 1 in 2 women opened and owned their own mobile money account, and there was a 21% increase in the savings rate amongst both men and women (Svarer and Moffat, 2020). HERfinance, through an Intermedia survey, found that women's increased access to finance caused a *ripple effect.* In communities surrounding the HERfinance digitized factories, even females who were not employed at the factories became active mobile money account users in comparison to other areas surrounding non-digitized factories. To be precise, there was an 11% difference between the active mobile money accounts in the two areas. Furthermore, neighbors and friends were twice as likely to become mobile money users when peers in the neighborhood used digital money (Svarer and Moffat, 2020). This ripple effect is an essential indicator of the overall spillover effects that women's financial inclusion can bring, and that investment in digitization should be continued. Moshrefa Banu, a 25-year-old quality inspector at a sewing section in a Dhaka factory, recently opened her first digital account, where she now receives her wages. Moshrefa stated that she feels safer receiving and using mobile money, and it's convenient for her in the sense that it saves time. She used *"to be worried about walking with cash, especially on payday, and when sending money. [She] felt uncomfortable going to the agent and waiting in line because there were men there. [She] would get 'Eve teased.' Sometimes [she] received disturbing calls at night because people in the line would overhear [her] number when [she] told the agent. [She] had to pay an extra 20 taka to send the money; now it is free*." Before HERfinance training Moshrefa didn't know how to use mobile money, but through HERfinance, *"[she was] able to learn how to use [her] account—cash out, top-up airtime—and about savings.*" She can save and spend more responsibly, and in the future, she hopes to buy her own house (HERproject, 2020).

Increased Women's Empowerment

The workforce of Bangladesh's garment factory consists of 4 million female workers, 60% of garment factory workers are women. These women face restrictive gender norms that limit their access and ability to engage in financial matters and limit their educational opportunities. As mentioned in the previous section, digitizing payroll increased women with active mobile

money accounts by 50%, this gives these women control over their wages and finances and enables them to participate in financial decision-making (Svarer and Moffat, 2020). Many women involved in this project reported greater confidence in their finances and decision-making abilities. More specifically, 1 in 8 women increased their confidence in meeting expected and unexpected expenses; 1 in 10 women stopped giving their salary to others; and 1 in 5 women now make joint decisions about how their salary is spent. Sufiya Akhter, a 23-year garment factory worker in Chittagong, started receiving her wage digitally in 2018 when her factory joined HERfinance digital wages program. Sufiya has changed the way she handled her money stating that *"When I was paid in cash, I didn't use to plan. If I wanted something and I had money, I would spend it, especially on clothes and cosmetics. But since I had a mobile money account, I stopped buying random things. I have a list, and if I can't buy something this month, then I will wait until next month. This helps me to save around 4,000 taka a month"* (HERproject, 2020). Through the HERfinance program, Sufiya has gained the confidence to manage her own money and take control of her future; for example, her aim is now to save enough to buy land and build a house for her family. She no longer gives her husband, friends, and family free access to her money. Instead, she alone has access to her accounts (HERproject, 2020).

Increased Business Efficiency

Transitioning from cash to digital payroll, if done responsibly, is a transformative change for a business and society by promoting both business efficiency and transparency, all while advancing financial inclusion and the economic empowerment of low-income women. HERfinance found that transporting cash along congested roads between banks and factories can take up to six hours and require multiple managers, neither cost nor time-efficient. Furthermore, it was found that at factories where workers were paid in cash, the average employee spent 7.7 minutes away from each payday from the production in line in order to receive their wage in cash. The factories that implemented a digital payroll, on average, experienced a drop to just 1.7 minutes when pay was received digitally (HERproject, 2020). The time administrators spent on payroll was cut in half while managers' time spent on payroll fell by 59%. Geetha Powani, a worker at Alpha Clothing in Dhaka, where 1,128 (83%) of wages have been digitized, stated that when they received their wage in cash, the factory had to hire security to carry the cash to the factory as there was a substantial risk involved in transporting cash. She also stated that *"it took one full day for two people from the factory head office and*

10 people from the factory to count, pack, and distribute the wages in cash to 1,800 workers. This was a big waste of time for the HR (human resource) and Administration teams." Digitizing wages is an improvement for women's empowerment and financial inclusion and a strategic business move that improves the prosperity of both workers and managers (HERproject, 2020).

HERessentials

In addition to their digital wages program, HERproject has an app, *HERessentials,* developed for workers with low tech and literacy levels. The app includes a worker and a manager toolkit. The worker toolkit focuses on key topics such as hygiene and general health, family health, managing money, DFS, stress management, and more. The manager toolkit includes critical topics such as communication skills and stress management. The information is conveyed through animations teaching core concepts, games to solidify understanding, and pre- and post-quizzes to gauge learnings (HERessentials, n.d.). The app is available offline, catering to workplaces with lower connectivity. This app tackles client-side barriers as it increases women's confidence, financial literacy, and capability and provides information on other important topics such as health that can help improve their livelihoods outside of work. For example, 91% of men and women across 11 factories in India reported saving a greater portion of their salaries, 11% of women increased their use of family planning across 21 factories in five countries. There were 49% of women across ten factories in Bangladesh using sanitary pads during menstruation (HERessentials, n.d.). HERproject is about more than just financial inclusion; it is about improving women's quality of life by enhancing their awareness. In three farms in Kenya, there was a 44% increase in the number of women feeling confident and a 42% increase in the number of women who feel respected by colleagues, family, and community members. Not only has HERproject created more inclusive workspaces, but it has also helped improve workplace performance by increasing productivity and profitability. Five Bangladeshi factories experienced a 93% decrease in payroll costs following wage digitization, as well as a 4.5% decrease in turnover across 37 factories in six countries (HERessentials, n.d.).

5.3 Women's World Banking and DigiAsia

Increasing women's access to financial services requires several different strategies that in symbiosis create an environment where women have access to digital tools such as network coverage and cellphones and the know-how and trust to be able to use DFS. Like Home*Essentials* app, Women's World Banking (WWB), in partnership with DigiAsia, an Indonesian fintech business, focused on expanding women's digital financial capability, which is defined as *"the knowledge, attitudes, and skills that enable a person to actively use digital financial services"* (Dimova, et al., u.d.). Together, WWB and DigiAsia, designed a series of training messages that directly respond to customers' key concerns and questions with simple messages about how to use supplier credit within the context of their lives and businesses (Dimova, et al., u.d.). These messages aim to address their specific barriers and enable them to better understand, trust and use credit.

The smartphone penetration rate in Indonesia was 70% in 2020 and is expected to reach 76% in 2021 (Statista, 2021), and their network coverage averages to 52% nationwide but is in some regions as high as 93.5% (Statista, 2021). What is lacking in most cases is the know-how to use these tools to expand access to financial services. In Indonesia, there is a reverse gender gap: where 51.4% of the female adults are banked compared to 46.2% of the men; however, there are 18 million women with dormant accounts. Only 51% of women participate in the labor force, 80% of whom work in the informal sector, compared to 80% of men who participate in the formal labor market (Women's World Banking, u.d.). Women in Indonesia have an immense potential to increase their financial independence by increasing the usage of the tools available, which is what WEB and DigiAsias collaboration aims to address by maximizing women's capabilities through increased knowledge.

WWB and DigiAsia have a systematic approach to ensure that the messages are appropriately targeted, with relevant information, at an appropriate time and place and through an effective medium. DigiAsia had identified female warung shop owners women running small local shops selling everyday essentials – as high-potential customers. But these women face structural and education barriers to understanding and using supplier credit as they often do not meet traditional collateral requirements, lack prior experience with formal lending, and have a limited and negative understanding of credit. To address this lack of knowledge, five training messages on how women can use micro-supplier credit were created addressing their major barriers, misconceptions, and concerns. These messages focused on how these women could keep their

stores well stocked and how to apply for supplier credit (Dimova, et al., u.d.). The information was presented through entertaining, relatable, and easy-to-understand comic strips that are popular in Indonesia. The comic strips use local characters to convey key messages in a relatable fashion.

To maximize their impact, the training messages were shared on slower days (Tuesdays and Thursdays) between 10 am and 2 pm, and before weekly shop orders were made as this was identified as the time the women were most interested in supplier credit and had the most time to actively engage with the information presented. To ensure the messages were accessible and easily shared, they were sent out via WhatsApp, a commonly used platform for warung shop-owners in Indonesia (Dimova, et al., u.d.). This approach promotes women in social commerce, which has the potential to help women overcome client-side barriers they face to start and expand their businesses.

6. Discussion

The econometric equation and the case studies demonstrate that women's financial inclusion requires multiple factors to work together to create an inclusive, trustworthy and efficient financial environment that encourages and enables women to access and use financial services. As highlighted by HERproject, products need to be tailored to women's needs, making them relevant and accessible for their everyday lives as well as boosting their confidence and independence. A sustainable and realistic approach to women's financial inclusion requires both demand and supply-side strategies, which tackles the three main barriers to women's financial inclusion (client, institutional, and ecosystem barriers). As it has become apparent that increasing accessibility is important, it is equally important that women are made aware of the purpose of DFS and see a need to use it. The 2017 global findex report stated that one of the most effective ways to increase account usage is by transferring routine cash payments and utility bills to accounts. Training programs such as the one conducted by WWB is a crucial step in enhancing individuals' confidence with technology enabling them to utilize the tools that are being made readily available (Demirguc-Kunt, et al., 2017).

Education aids in tackling the demand side of financial inclusion, which, as demonstrated by the econometric regression, leads to a substantial increase of access to finance. This is further substantiated by both the HERfinance and WWB case studies. Both organizations aimed to increase women's digital and financial literacy awareness and capabilities by tackling client and institutional barriers through education campaigns. Providing women with the tools to themselves manage their finances and actively take part in household financial decision making.

What has become apparent through the case studies is that a significant barrier to women's financial inclusion is restrictive social and gender norms that reinforce a chain of other inhibiting factors that are particularly prevalent in LIC, where patriarchal structures dominate. Women, for example, tend to have lower levels of education compared to their male counterparts, which means that they also have lower levels of digital and financial literacy, which are essential skills in accessing and using financial services. Due to the lower levels of education, they tend to have lower-income jobs in the informal sectors that are vulnerable to market shocks. Women tend to take on greater responsibilities at home which further inhibit them from completing their education and entering the workforce. All these factors increase the likelihood of women not having access, the need or know-how of using DFS.

These two case studies have demonstrated that women's financial inclusion relies heavily on women's ability and confidence in financial and digital literacy. DFS *must* be paired with comprehensive education and information that provide women with the confidence and know-how to use the DFS available to them. A Microsave consulting study showed that even women with access to financial services, who had a consistent volume/frequency of cash inflow, had dormant accounts because they lacked influence and/or motivation to use DFS (Micro Save Consulting, 2019). Encouraging women is an essential part in increasing their participation in the financial sector. If women's specific needs are not met i.e., taking into consideration their responsibilities at home, their low levels of safety when visiting banks and low levels of financial literacy and capability— disparities will widen, account dormancy rates will increase, and women will continue to be excluded from the financial sector.

The ADB case study focused on improving the financial ecosystem in Mindanao through implementing cloud-based banking and decreasing geographical restraints on financial services. The ADB case study is more in line with the econometric equation. It supports the idea that there is a positive correlation between mobile broadband and the use of financial services. The implementation of cloud-based banking, enabling a wider range of mobile banking services that were more easily accessible, increased users' number, in which a majority were women. Improving the financial ecosystem is a crucial step towards a more inclusive financial system as it enables a broader range and access to a wider variety of financial services. Cloud-based banking enables improved and increased uniformed ID, KYC, regulations, and connectivity. In the long term this enables increased understanding of customer needs as data collection is simplified which in turn aids in increasing customer awareness and account usage. While the cloud-based banking project focused on streamlining the financial ecosystem, it created opportunities to further expand and improve on other areas of the financial sector, leading to a more inclusive and diverse system with a broader customer reach.

The outbreak of the coronavirus pandemic in 2020 highlighted inefficiencies in cash payments and despite scientific evidence indicating that currency doesn't transmit COVID-19, there continues to be a weariness around the use of cash, impacting millions of low-income workers like textile workers in the garment industry who depend on cash payment for their labor (The Canadian Press, 2020). Without DFS, some governments have also found it challenging to ensure much-needed cash transfers reach the targeted recipients. DFS and mobile banking is not only a tool to empower women; it is a multifaceted tool that has the potential to transform the economic environment into an efficient, transparent, and productive ecosystem. In the long-

term, it has the power to build financial resilience, increase social mobility and bring the unbanked and underserved into the formal financial sector. The key to empowering women in finance is to create tools that cater to their specific needs, boost their confidence and security.

7. Conclusion

What has become apparent is that a mobile phone can only do so much. Mobile phone ownership, particularly smartphone ownership, is an entry point for many unbanked and underserved into the formal finance sector, but mobile phone ownership does not automatically correlate to the increased use of DFS. Instead, strategies aiming to increase women's financial inclusion need to tackle both supply and demand side issues. In other words, all three (client-side, institution, and ecosystem). Tackling client-side barriers increases women's financial capability and confidence in their ability to independently manage their finances. Dismantling institutional barriers increases data and services that specifically cater to their needs, i.e., safety, convenience, and accessibility. Overcoming ecosystem barriers includes improving regulations, connectivity, infrastructure, ID, KYC, and creating a more enabling environment.

The econometric equation was more focused on ecosystem, and client-side barriers as the variable's broadband and banks per 100,000 represented accessibility, and education represented financial and digital literacy. The data, as well as GSMA Mobile Gender Gap Report 2020, concluded that even mobile phone users who are aware of mobile internet capabilities neither have the digital or financial literacy skills needed to use DFS on their phones (Rowntree & Matthew, 2020). While broadband had a positive impact on borrowers per 1,000, education had a much larger impact, and policies aiming to increase women's financial inclusion should place more focus on improving financial and digital literacy as mobile phone penetration is already quite high and is simply waiting to be fully utilized. Furthermore, dismantling oppressive gender norms and reducing the gender gap in, for example, educational attainment is an important hurdle in creating a more inclusive and equal finance sector. HERproject found that 81% of women own a phone, but 31% were not comfortable using it; they found a strong relationship between a user's comfort using a mobile phone and DFS. The slow uptake of DFS is mainly due to the mistrust of new and foreign technologies, which many users perceive as being too complicated. A key takeaway from this is that DFS, such as digital wages, offer little to no benefit without training. In the process of implementing DFS and mobile banking, new users, specifically women, require training and support to aid in their transition to optimize their use of DFS. Decreasing gender gaps in education and labor force participation are crucial in enabling women to see the need and benefits of DFS. The policy implications of the evidence and data presented suggest that policies should focus on creating DFS that are catered to meet

the specific needs of women, to provide the tools to enhance digital and financial literacy and awareness, and in doing so, increase financial access and usage.

Network coverage and digital devices do, to an extent, positively impact women's access to finance. However, network coverage and DFS are supply-side policies that do nothing to improve demand-side conditions. While increasing access to network coverage will to an extent expand financial inclusion, it needs to be paired with demand-side policies aiming to increase individual's capacity in order for the results to be long-term. Increasing women's education and labor force participation and building up their confidence, belief in their ability to independently take charge of their finances and decision making. Women's financial inclusion is about giving women the chance to control their own lives and show them that they can be independent.

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Appendix A

Countires Included in the regression		
HIC	MIC	LIC
Belgium	Albania	Afghanistan
Belgium	Albania	Afghanistan
Belgium	Albania	Afghanistan
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Belgium	Albania	Afghanistan
Belgium	Albania	Afghanistan
Belgium	Albania	Afghanistan
Brunei	Algeria	Burundi
Brunei	Algeria	Burundi
Brunei	Algeria	Burundi
Brunei	Algeria	Burundi
Brunei	Algeria	Burundi
Brunei	Algeria	Burundi

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Brunei	Algeria	Burundi
Brunei	Algeria	Burundi
Chile	Argentina	Chad
Chile	Argentina	Chad
Chile	Argentina	Chad
Chile	Argentina	Chad
Chile	Argentina	Chad
Chile	Argentina	Chad
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Chile	Argentina	Chad
Chile	Argentina	Chad
Chile	Argentina	Chad
Chile	Argentina	Chad
Chile	Argentina	Chad
Croatia	Azerbaijan	Congo, Dem. Rep.
Croatia	Azerbaijan	Congo, Dem. Rep.
Croatia	Azerbaijan	Congo, Dem. Rep.
Croatia	Azerbaijan	Congo, Dem. Rep.
Croatia	Azerbaijan	Congo, Dem. Rep.
Croatia	Azerbaijan	Congo, Dem. Rep.
Croatia	Azerbaijan	Congo, Dem. Rep.

Croatia	Azerbaijan	Congo, Dem. Rep.
Croatia	Azerbaijan	Congo, Dem. Rep.
Croatia	Azerbaijan	Congo, Dem. Rep.
Croatia	Azerbaijan	Congo, Dem. Rep.
Croatia	Azerbaijan	Congo, Dem. Rep.
Croatia	Azerbaijan	Congo, Dem. Rep.
Estonia	Bangladesh	Ethiopia
Estonia	Bangladesh	Ethiopia
Estonia	Bangladesh	Ethiopia
Estonia	Bangladesh	Ethiopia
Estonia	Bangladesh	Ethiopia
Estonia	Bangladesh	Ethiopia
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Estonia	Bangladesh	Ethiopia
Estonia	Bangladesh	Ethiopia
Estonia	Bangladesh	Ethiopia
Estonia	Bangladesh	Ethiopia
Hungary	Bangladesh	Ethiopia
Hungary	Belize	Guinea
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Hungary	Belize	Guinea
Hungary	Belize	Guinea
Italy	Belize	Guinea
Italy	Bolivia	Haiti
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Italy	Bolivia	Haiti
Italy	Bolivia	Haiti
Italy	Bolivia	Haiti
Kuwait	Bolivia	Haiti
Kuwait	Bosnia and Herzegovina	Madagascar
Kuwait	Bosnia and Herzegovina	Madagascar
Kuwait	Bosnia and Herzegovina	Madagascar
Kuwait	Bosnia and Herzegovina	Madagascar
Kuwait	Bosnia and Herzegovina	Madagascar
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Kuwait	Bosnia and Herzegovina	Madagascar

Kuwait	Bosnia and Herzegovina	Madagascar
Kuwait	Bosnia and Herzegovina	Madagascar
Kuwait	Bosnia and Herzegovina	Madagascar
Latvia	Bosnia and Herzegovina	Madagascar
Latvia	Brazil	Mozambique
Latvia	Brazil	Mozambique
Latvia	Brazil	Mozambique
Latvia	Brazil	Mozambique
Latvia	Brazil	Mozambique
Latvia	Brazil	Mozambique
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Latvia	Brazil	Mozambique
Latvia	Brazil	Mozambique
Latvia	Brazil	Mozambique
Latvia	Brazil	Mozambique
Poland	Brazil	Mozambique
Poland	Cabo Verde	Rwanda
Poland	Cabo Verde	Rwanda
Poland	Cabo Verde	Rwanda
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Poland	Cabo Verde	Rwanda
Poland	Cabo Verde	Rwanda
Poland	Cabo Verde	Rwanda

Portugal	Cabo Verde	Rwanda
Portugal	Cameroon	South Sudan
Portugal	Cameroon	South Sudan
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Portugal	Cameroon	South Sudan
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Portugal	Cameroon	South Sudan
Portugal	Cameroon	South Sudan
Portugal	Cameroon	South Sudan
Quatar	Cameroon	South Sudan
Quatar	Columbia	Uganda
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Quatar	Columbia	Uganda
Quatar	Columbia	Uganda
Romania	Columbia	Uganda
Romania	Comoros	Yemen
Romania	Comoros	Yemen
Romania	Comoros	Yemen
Romania	Comoros	Yemen

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Romania	Comoros	Yemen
Romania	Comoros	Yemen
Romania	Comoros	Yemen
Suadi Arabia	Comoros	Yemen
Suadi Arabia	Costa Rica	
Suadi Arabia	Costa Rica	
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Suadi Arabia	Costa Rica	
Seychelles	Costa Rica	
Seychelles	Dijibouti	
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Seychelles	Dijibouti
Singapore	Dijibouti
Singapore	Dominican Rep.
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