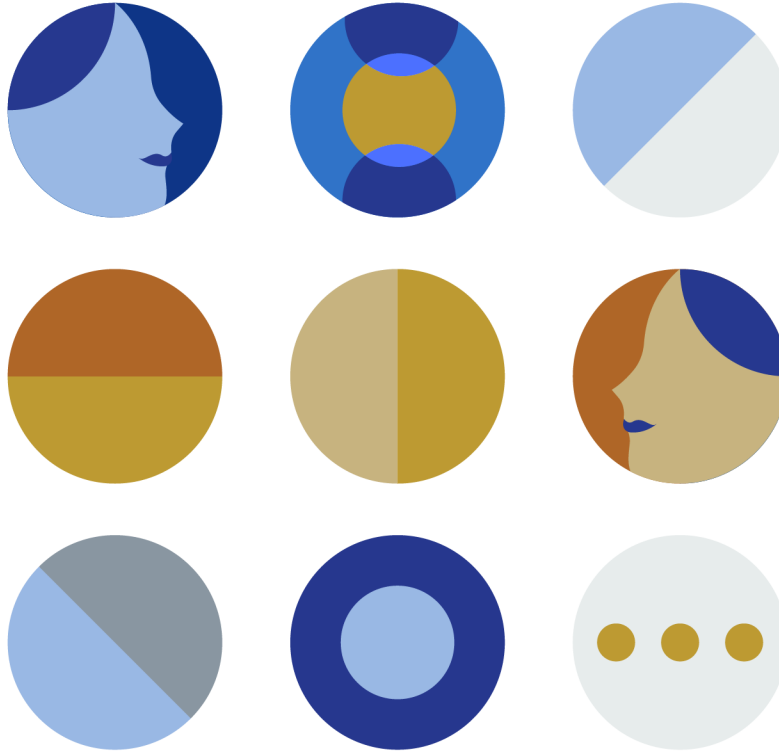




Women's World Banking



Determinants of Women's Financial Inclusion and Economic Empowerment:

A Data-Driven Thought Experiment

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Executive Summary

Women's financial inclusion and economic empowerment are critical building blocks in development. Between now and 2030, the target date for the United Nations Sustainable Development Goals, the inclusion of women in the financial sector and their economic engagement and empowerment will unlock major milestones on the road to a more inclusive future. Recognizing this, Women's World Banking set out to understand the relative weight of policy interventions, infrastructure, and social norms on women's financial inclusion and on women's economic empowerment. We also sought to define the relationship between women's financial inclusion and women's economic empowerment.

This paper asserts that there are specific variables which, on a statistical level, appear to drive women's financial inclusion and women's economic empowerment. The factors identified here—from legal prohibitions on discrimination to social norms to financial sector and digital infrastructure—indicate that policymakers and financial sector providers alike can effect change in both women's financial inclusion and in women's economic empowerment. Furthermore, the findings highlight how interlinked financial inclusion and women's economic empowerment are with other development goals.

To undertake this study, Women's World Banking matched a set of 17 policy and infrastructure enablers with available data from 14 publicly available datasets. The Women's World Banking team went through several rounds of feature selection and narrowed down the initial pool of 1200 indicators down to 58. Using these variables, our team deployed statistical modeling techniques to explore relationships between policy, infrastructure, social norms, women's financial inclusion, and women's economic empowerment. We also conducted a thought experiment to project the impact of women's economic empowerment and financial inclusion on Women's World Banking's priority markets—Bangladesh, Egypt, India, Indonesia, Mexico, and Nigeria—between now and the end of the decade (Appendix C).

We found that three enablers are strongly correlated with women's financial inclusion and women's economic empowerment: policy, infrastructure, and social norms. Specifically, the analysis showed that social norms and enabling policy—including equal inheritance rights, equal rights on immovable property, freedom of movement, and equal rights in employment—are the most influential factors affecting women's economic empowerment.

Research Findings Snapshot

Policy, infrastructure, and social norms all have a role in driving women's financial inclusion and women's economic empowerment.

Contributors like equal rights between men and women in their inheritance, immovable property ownership, freedom of movement and employment appear to be the biggest drivers of women's economic empowerment.

These contributors to women's financial inclusion play a key role alongside financial sector enablers such as credit registry coverage and norms related to technology use.

Women's financial inclusion and women's economic empowerment are related and self-reinforcing. While the two vary across countries together, women's economic empowerment plays a stronger role in facilitating the environment for financial inclusion than vice versa.





Additional models showed that factors such as the prohibition of gender discrimination in the workplace, credit registry coverage, smaller gap between men and women in using mobile/internet for online banking, legal prohibition on dismissal of pregnant workers, and women's economic empowerment have the most impact on women's financial inclusion.

Regarding the relationship between women's financial inclusion and their economic empowerment over time, we found that these two are self-reinforcing. They vary together across country contexts. In statistical terms, we found a positive but not strong relationship between the two, with women's economic empowerment contributing more to women's financial inclusion than women's financial inclusion contributes to women's economic empowerment. The correlation, while weak-to-medium, does get stronger over time.

What We Want to Know:

Which policy, infrastructure, and social norms enable women's financial inclusion and women's economic empowerment?

What is the relationship between women's economic empowerment and women's financial inclusion?

Acknowledgments

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Introduction

Background

Women's financial inclusion and economic empowerment are critical building blocks in development. Between now and 2030, the target date for achieving the sustainable development goals, the inclusion of women in the financial sector and their economic engagement and empowerment will unlock many goals in development, including eradicating poverty, ending hunger, improving health outcomes, achieving gender equality, promoting economic growth and jobs, supporting infrastructure, and reducing inequality. Recognizing the larger development potential of women's financial inclusion and economic empowerment, Women's World Banking is leaning into its role as an advocacy-led organization, taking its engagement and insights from work with financial services providers (FSPs) and translating the data and learnings into policy priorities aimed at increasing women's financial inclusion and their economic empowerment.

We define women's financial inclusion and women's economic empowerment using conventional and agreed-upon definitions from the development community. Women's financial inclusion encompasses women's access to and use of a range of financial services. In our paper, we define women's financial inclusion as relative to men's, recognizing that women are likely to have different rates of inclusion than their male counterparts if there are intentional steps taken to foster this growth—either directly or indirectly. Women's economic empowerment is traditionally defined as power and resources. In other words, do women have the authority to enact their preferences, and do they have the resources (financial or otherwise) to do so? Below, we discuss the proxy indicators we create to try to measure these two concepts.

Against that backdrop, this project set out to review and examine the existing available data, using a comparative panel data analysis of women's financial inclusion, women's economic empowerment, policy, infrastructure, and social norms. Based on Women's World Banking hypothesis on women's economic empowerment and women's financial inclusion, the goal was to answer this research question: Is there a set of enabling policy/infrastructure/social norms indicators that create the ideal conditions for women's economic empowerment and women's financial inclusion over time? Along the way, we also sought to answer the following question: Is there a positive relationship between women's financial inclusion and women's economic empowerment over time.

This report proceeds as follows: First, we briefly review relevant literature on the determinants of women's financial inclusion, the determinants of women's economic empowerment, and the relationship between women's financial inclusion and women's economic empowerment. Next, we share our methodology for this inquiry. We then show our analysis and discuss the findings that emerge from this analysis in the order of our hypotheses. The paper finishes with a discussion of policy implications and future research needed on this topic.

Box 1: Hypotheses on relationships between women's economic empowerment, women's financial inclusion, policy, infrastructure, and social norms

Hypothesis A:

- H0: There is a **set** of enabling policy/infrastructure/social norms indicators that enable women's economic empowerment over time.
- H1: There is **not a set** of enabling policy/infrastructure/social norms indicators that enable women's economic empowerment over time.

Hypothesis B:

- H0: There is a **set** of enabling policy/infrastructure/social norms indicators that enable women's financial inclusion over time.
- H1: There is **not a set** of enabling policy/infrastructure/social norms indicators that enable women's financial inclusion over time.

Hypothesis C:

- H0: There is a **strong, positive relationship** between women's financial inclusion and women's economic empowerment over time.
- H1: There is **not a strong, positive relationship** between women's financial inclusion and women's economic empowerment over time.





Literature Review

Women's World Banking is not the first organization to conduct a comparative longitudinal analysis of this kind using publicly available data. However, in our review of the literature, we did not find an exercise of this sort which considered enablers of both women's financial inclusion and women's economic empowerment for the purpose of projecting the future of these indicators in emerging market contexts. In this section, we focus on three different literatures: first, the literature on the determinants of women's economic empowerment; next, the literature on the determinants of financial inclusion, with a focus on women; and finally, the relationship between empowerment and inclusion.

Determinants of women's economic empowerment

Women's economic empowerment is multi-dimensional, and as such has many influencers. Among these influencers are policy interventions, infrastructure, and social norms. In the policy category, interventions related to land rights, childcare, and demand-driven job centers have a proven relationship with women's economic empowerment.¹ Cash transfer programs show both proven and promising relationships with women's economic empowerment.² Within infrastructure, poor and very poor rural women have seen empowerment through rural electrification.³ One study of 19 countries in four African regions which leveraged demographic and health surveys across 26 different dimensions found access to healthcare to be a high predictor of women's economic empowerment.⁴ Regarding social norms, this same study also found attitudes towards violence and labor force participation to be statistically significant predictors of women's economic empowerment, associations that the authors show to be well-founded in the literature.⁵ Given this broad diversity of predictors of women's economic empowerment, we were interested in testing how they might line up against one another in a large-scale time-series analysis.

Determinants of women's financial inclusion

Financial inclusion has a shorter history of recorded data, but nevertheless there are a number of studies that assess the determinants of financial inclusion. These can be grouped into demographic or socioeconomic factors, infrastructure, and policy. Within the category of demographic or socioeconomic factors, the top predictors of financial inclusion are income, education, and age.⁶ As for infrastructure, a few years ago distance to a physical bank branch was seen as a high predictor of financial inclusion,⁷ although we must acknowledge that the rise of digital may offer new channels for remote and hard-to reach customers, as more recent evidence has shown.⁸ In the policy category, a few quantitative studies have shown positive impacts of enabling or inclusive banking sector policies, such as national targets, lower account opening requirements, and national ID programs.⁹

¹ O'Sullivan et al. 2014; Goldstein et al. 2015; Mendola and Simtowe 2015; Bandiera et al. 2020; Chakravarty et al. 2016; Honorati 2015; Maitra and Mani 2014; Baird, McIntosh, and Özler 2011; Baird, McIntosh, and Özler 2016; Blattman, Fiala, and Martinez 2011; Blattman, Fiala, and Martinez 2014.

² Wang 2015; Martinez, Naudeau, and Pereira 2013; Asai et al. 2015; Lee 2016; Contreras and Sepúlveda 2016; Martinez and Perticarà 2017; and Prada, Rucci, and Urzúa 2015.

³ Grogan and Sadanand 2013; Dasso Arana, Fernandez, and Ñopo 2015; Salmon and Tanguy 2016.

⁴ Asaolu et al. 2018; also seen in Ahmed, Creanga, Gillespie, and Tsui 2010.

⁵ Ibid.

⁶ Zins and Weill 2016; Tuesta, Sorensen, Haring, and Camara 2015; Abel, Mutandwa, and Le Roux 2018; Lotto 2018; Soumare 2016; Asuming 2019; Kaur and Kapuria 2020; Dar and Ahmed 2021.

⁷ Tuesta et al. 2015; Akudugo 2013.

⁸ Abel et al. 2018; David, Oluseyi, and Emmanuel 2018.

⁹ Tuesta et al. 2015; Abel et al. 2018; Akudugo 2013.





Relationship between empowerment and inclusion

Through the range of products they offer, financial services providers have a number of pathways by which to influence women's economic empowerment—and women's economic empowerment similarly can create the pre-conditions for women's financial inclusion. In regards to the impact of women's financial inclusion, the Center for Global Development conducted a meta-analysis and found that savings, bundled services, and conditional cash transfers all had a proven effect on women's economic empowerment.¹⁰ Other studies and papers have explored the pathways or mechanisms through which women's financial inclusion might drive women's economic empowerment.¹¹ On the other hand, the influence of women's economic empowerment on financial inclusion is not as well-represented in the literature as such. As we discussed in the last section, however, a range of demographic and socioeconomic characteristics have a strong impact on financial inclusion. Some of these demographic and socioeconomic characteristics are commonly defined under women's economic empowerment. If we consider this broader literature, we can assert that many measures of women's economic empowerment may be strong determinants of individual-level women's financial inclusion, and might add up to a rise in financial inclusion at a national level.

We see in these three literatures that women's economic empowerment and women's financial inclusion are complex, multi-causal phenomena, and as we pursue these goals we are continuing to learn about what works and what does not. Furthermore, while we have focused on impact evaluation literature and meta-analyses, there are qualitative studies that draw out the causal pathways between these concepts while also showing us that even among the outliers, surprising factors can increase women's economic empowerment and financial inclusion. In this paper, we limit our focus to publicly available data but draw on this literature as we articulate hypotheses and explain our results.

¹⁰ Buvinic and O'Donnell 2016.

¹¹ Hendriks 2019; Mulili 2020.

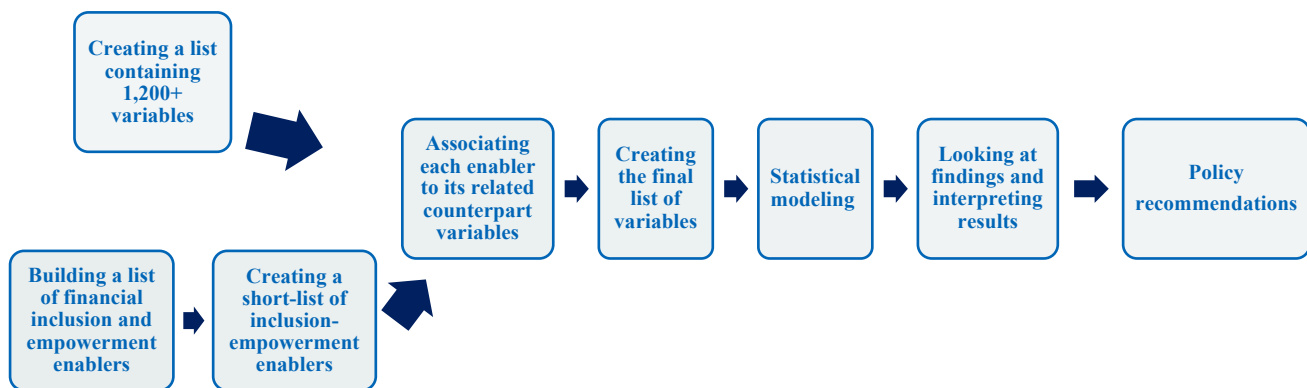




Methodology

In this section, we discuss the methodology we deployed in this research. From a high-level perspective, we took both an inductive and a deductive approach. We first compiled all available relevant datasets and assembled a comprehensive database. Simultaneously, we built a list of women's financial inclusion and women's economic empowerment enablers that would be ideal to study. Figure 1 gives a high-level overview of the research methodology. This process starts with database creation and continues until its last phase: offering policy recommendations. Most of the initial steps in this methodology were conducted on Cloudera Machine Learning Platform (CML). The technical activities reflected in Figure 1 can be divided into the three categories of database creation, database data challenges, and data modeling.

Figure 1: Research methodology flow chart



Database creation

Selection criteria

A wide variety of variables and factors can have effects on women's financial inclusion and women's economic empowerment. Therefore, taking a blind search approach in selecting factors affecting women's financial inclusion and women's economic empowerment would be impractical and inefficient. In this study, three criteria guided our choice of datasets:

- a. We used Women's World Banking subject matter expertise and chose surveys and datasets that the international development community considers as reliable sources of information on gender equality, gender development, and women's financial inclusion
- b. We used datasets that incorporate a large number of countries into their survey. Since our goal is to generalize our findings on a global scale, we tried to be as inclusive as possible in our country selection while accepting the limitations that the availability of datasets imposes on us.
- c. We worked with publicly available datasets, allowing us and other interested researchers to update these research findings in the future using newly released datasets.

Data collection

First, we selected 14 publicly available global datasets (the full list of these datasets is shown in Appendix A) and built a database composed of more than 1,200 variables.





As a separate practice, in parallel with the database creation, we put together a list containing all of the enablers and drivers of women’s economic empowerment and women’s financial inclusion. We created this enablers list based on 40+ years of Women’s World Banking experience in women’s financial inclusion and economic empowerment and on the organization’s subject matter expertise. After creating the enablers list, we shortened it. Unlike the first round of selecting enablers to put on the list, a step that relied on subjective choices, the process of shortening the list was data driven and was based on data availability for each enabler. In this step, we looked into the enablers list and matched each enabler to those variables on the list (of 1,200+ variables) with which they have an association. For some enablers, we found matches between the enabler and the associated variables. For some others, sex-disaggregated data for example, we could not find a variable or group of variables associated with this specific enabler. For such cases, we decided to drop the enabler.

Using the enabler as our guideline in data selection, we could shorten the initial dataset of 1,200+ variables into a list containing 50+ variables. These 50+ variables are shown in Appendix B.

Table 1 shows the initial list of enablers based on available data, and Table 2 shows one example of the process of matching an enabler to its associated list of variables.

Table 1: Enablers list

Initial list of enablers

Client	Financial literacy or capability
	Asset ownership
	Geographic distance from access points / digital channels
	Formal ID
Institutional	Ownership of mobile phones/SIM cards or access to internet
	FSPs design for women
	Sex-disaggregated data (do FSPs tend to collect OR use this?)
	Recognized business case to serve women
	Understanding of women customers’ needs
Ecosystem	Understanding of women customers’ needs
	Connectivity and infrastructure
	Universal ID
	Alternative collateral systems
	Tiered KYC
Social	Sex-disaggregated data
	Social constraints codified into law
	Social and cultural norms

List of enablers based on available data

Client	Financial literacy or capability
	Asset ownership
	Geographic distance from access points / digital channels
	Formal ID
	Ownership of mobile phones/SIM cards OR access to internet
Ecosystem	Connectivity and infrastructure
	Universal ID
Social	Social constraints codified into law
	Social and cultural norms



Table 2: An example of associating an enabler to its associated variables

Social Enabler	Can a woman travel outside of her home in the same way as a man?
	Can a woman choose where to live in the same way as a man?
	Can a woman be the head of household in the same way as a man?





Women's financial inclusion and women's economic empowerment proxies

The Findex database, published by the World Bank, is the most reliable and comprehensive source for measuring financial inclusion. The first Findex database was published in 2012 and the last one was published in 2018. From Findex, we chose two variables: the percentage of females aged 15+ in a country who have an account, and the percentage of males aged 15+ in a country who have an account. We calculated the percentage point difference between these two variables and used this difference as the main proxy for women's financial inclusion. If this difference takes a negative value, it refers to a situation in which the gender balance in account ownership is inclined towards men. If the difference is positive, it means that account ownership is inclined towards women, and if the difference becomes zero it denotes gender equality in account ownership.

To measure women's economic empowerment, we used the United Nations Development Program (UNDP) Gender Development Index (GDI) as a proxy variable. GDI measures gender inequalities using the three dimensions of health, education, and economic resources. The UNDP database we used for studying women's economic empowerment has a longer history in comparison to Findex database and is available from 1995 to 2020. Based on UNDP definitions, we can categorize countries into five different categories based on the GDI. These categories are based on the absolute deviation of GDI from gender parity. The formula for calculating this parity is $(100 * |GDI - 1|)$. Countries with absolute deviation from gender parity of 2.5% or less are considered to have high equality; those with absolute deviation from gender parity of 2.5%–5% are considered to have medium-high equality; absolute deviation from gender parity of 5%–7.5% indicates medium equality; absolute deviation from gender parity of 7.5%–10% points to medium-low equality; and finally, countries with absolute deviation from gender parity of more than 10% are considered to have low equality.

Missing data challenges

After creating the database explained above, the team faced the challenge of removing the missing values from the database. Missing values are a common problem in data analytics and specifically in panel data analytics. Multiple books address this topic, and a wide variety of best practices have been developed for removing missing values in different scenarios. Our approach in handling missing values is based on three strategies:

- a. Imputation based on time-series characteristics: In this method, the imputation is based on interpolation and extrapolation from other time points. This approach tries to preserve temporal correlation between consecutive time points, and it may use linear, quadratic, or cubic functions for interpolation and extrapolation. We used the Interpolation-Imputer built-in module within the PYS Python library and fitted a linear function to impute missing values within the longitudinal format.
- b. Mean replacement: For a few other data points, we did not have enough data or time intervals to make a reliable imputation using the time-series approach. Therefore, we replaced the missing values of the variable of interest using the mean value of other records (countries) that were in the same income category and region, and within the same year.
- c. Discarding the variable: For some other variables, we were not able to use the imputation strategies explained in step a or step b, and we had no option other than discarding such variables from our database.

Data modeling concepts

Exploratory data analysis

After handling the missing values challenge and creating a reliable database, we started the data and statistical analysis. As the first step of our data analysis, we used exploratory data visualization to gain a better understanding of how the variables of interest in our dataset interact with each other, and how they have varied in time and across different countries.





Panel data and cross-sectional data modeling

In this section, we answer two questions:

- What is cross-sectional data analysis and what is panel data analysis?
- What types of panel data and what types of cross-sectional analysis are we going to use?

Cross-sectional analysis is a type of observational study that analyzes a population at one specific point in time, while panel data analysis is a statistical method that is two-dimensional (cross-sectional and longitudinal). These datasets are usually collected over time and involve the same individuals. Table 3 and Table 4 show how we structured cross-sectional as well as panel data models, to help the reader better understand our research and analysis.

Table 3: Panel data structure

Panel data						
Country	Year	Y	X1	X2	...	Xn
Country A	Year 1					
Country A	Year 2					
Country A	Year 3					
...	...					
Country A	Year m					
Country Z	Year 1					
Country Z	Year 2					
Country Z	Year 3					
...	...					
Country Z	Year m					

Table 4: Cross-sectional data structure

Cross sectional data						
Country	Year	Y	X1	X2	...	Xn
Country A	Year X					
Country B	Year X					
...
Country z	Year X					

For our analysis, we built two sets of panel data. A long panel contains data from over 120 countries from 1990-2020, and the second short panel contains data on the same number of countries, covering 2011-2020.

We used the long panel to study women’s economic empowerment, and the short panel to study women’s financial inclusion. Unlike women’s economic empowerment, capturing data on financial inclusion (and therefore women’s financial inclusion) is relatively new: The first endeavor was the 2011 World Bank Global Findex dataset, published in 2012.¹² The short and long panel have some variables in common, while some are used exclusively in one of the panels.

Besides using panel data, we also used cross-sectional data to answer the third research question.

To help the more technical reader understand this study better, the following is a high-level explanation of the similarities and differences between the statistical models used in this research:

In this study, we used fixed effects, random effects and between estimator panel models. Both fixed effects and random effects panel models assume an unobserved heterogeneity across individuals over time. An unobserved specification that affects women’s financial inclusion within a specific country can be an example of such an individual specific effect. We use α_i notation to show this unobserved heterogeneity within the i^{th} individual. One distinguishing point between the fixed and random effects model is whether the individual-specific effects are

¹² Demirguc-Kunt and Klapper (2012).





correlated with the regressors. If they are correlated, our model is fixed effects; otherwise it is a random effects model. To understand whether we have such correlations, and to make a choice between the fixed and random effects models, we can use the Hausman test. This test compares the two estimators under the null hypothesis of no significant difference between both models. If we cannot reject the null hypothesis, a random effects estimator is preferred over fixed effects. But if we reject the null hypothesis, the alternative hypothesis—fixed effects—is preferred as it creates more consistent estimators.

We used the Hausman test in both two different modeling scenarios in this study. In both cases, we could reject the null hypothesis and choose the fixed effects model. The fixed effects model allows the individual-specific effects to be correlated with the regressors x and allows each individual to have a different intercept while sharing the same slope parameters. Fixed effects uses the within estimator to capture within variation over time, and the way in which its mathematical formulation is constructed lets the individual-specific effects α_i cancel each other out. This makes fixed effects such a powerful tool for studying the effect of regressors on the outcome variable over time. However, a limitation of the within estimator (fixed effects) is that time-invariant variables are dropped from this model and their coefficients are not identified.

Going into greater detail about these models is beyond the scope of this research, but for those who are interested in the topic we refer them to Wooldridge (2010), Baltagi (2008) or James, G., Witten, D., Hastie, T., and Tibshirani, R. (2013).



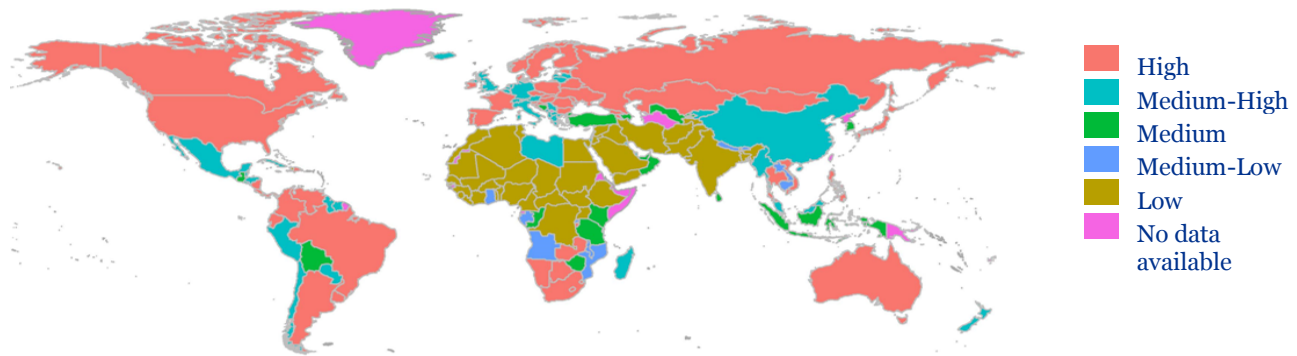


Analysis

Exploratory data analysis

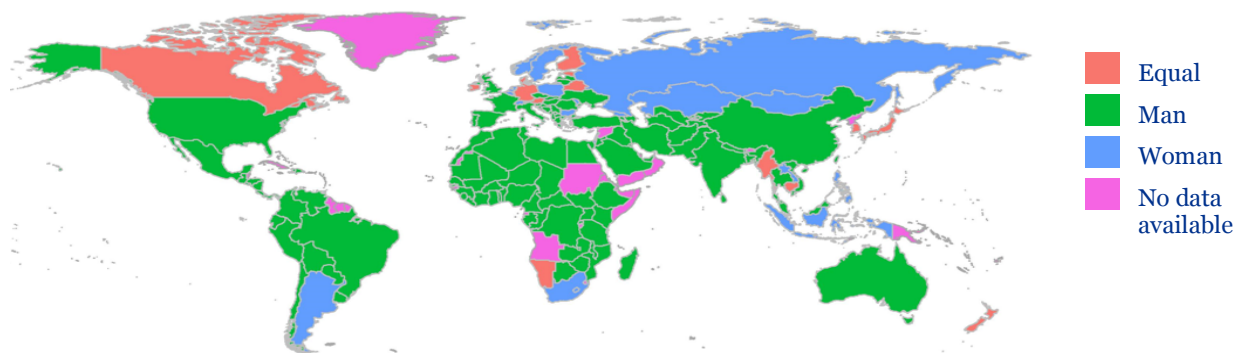
We employed data visualization techniques to study women’s financial inclusion and women’s economic empowerment side by side, using the absolute difference between women’s and men’s financial inclusion and GDI as proxies. Based on these visualizations, it appears that there may not necessarily be a strong correlation between women’s economic empowerment and financial inclusion. Using 2017 data, we used data visualization software Tableau and created Figure 2 and Figure 3 to compare women’s financial inclusion and women’s economic empowerment side by side. Putting these two figures alongside Figure 4 indicates that women’s economic empowerment and women’s financial inclusion may be correlated, but they do not seem to reliably covary in every case.

Figure 2. Women’s Economic Empowerment in 2017



Source: Authors’ depiction of GDI (2017). Countries with absolute deviation from gender parity of 2.5% or less are considered to have high equality; absolute deviation from gender parity of 2.5% –5% indicates medium-high equality; absolute deviation from gender parity of 5%–7.5% indicates medium equality; absolute deviation from gender parity of 7.5%–10% points to medium-low equality; and absolute deviation from gender parity of more than 10% is considered to low equality

Figure 3. Financial Inclusion in 2017

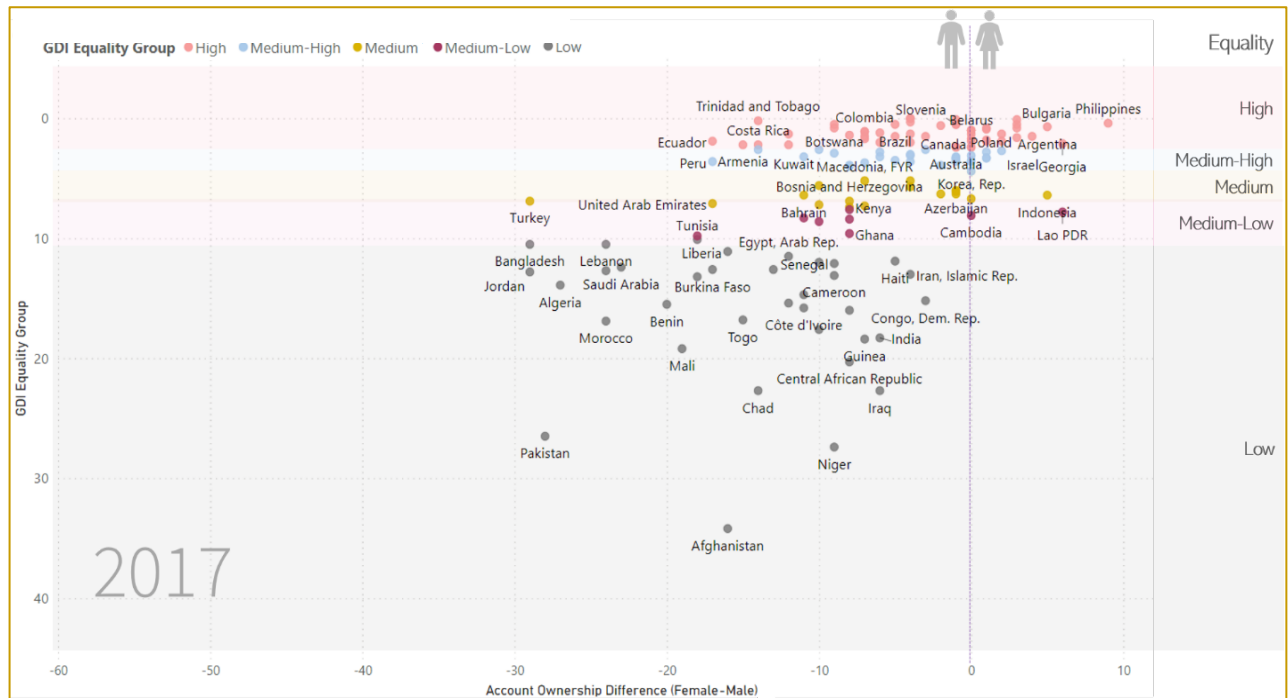
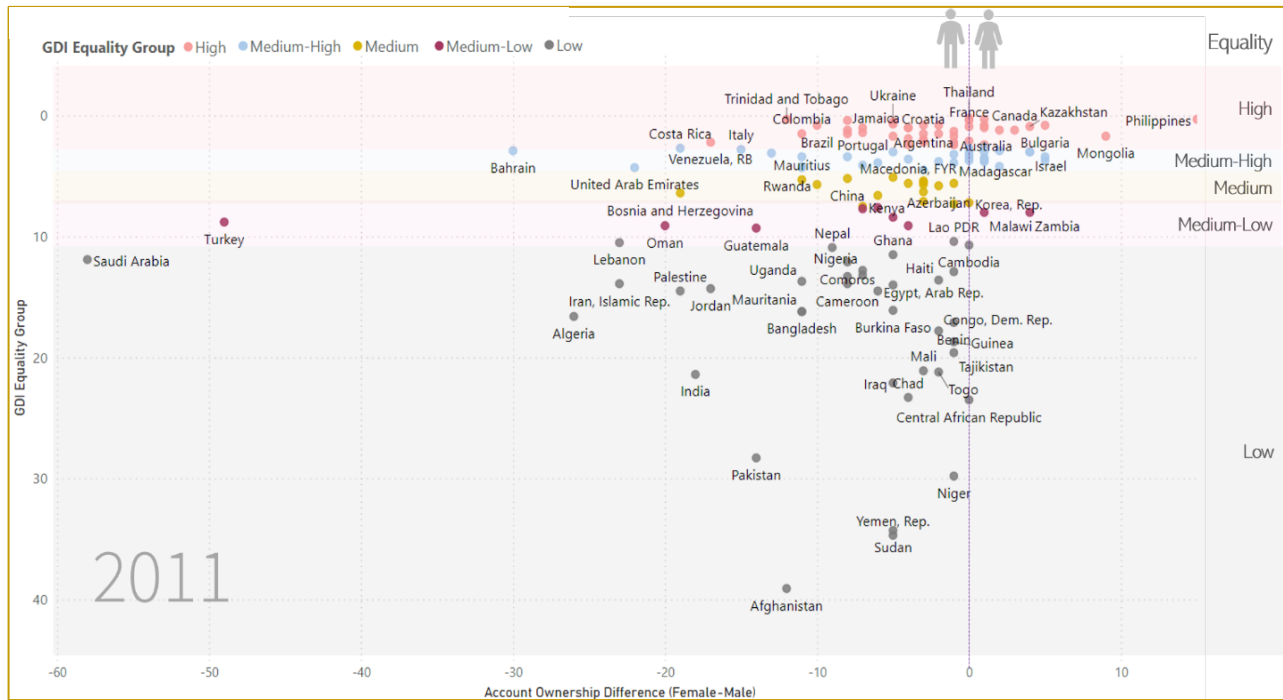


Source: Authors’ depiction of data from World Bank Global Findex (2017). ‘Men’ refers to countries in which a woman is less likely to have an account than a man. ‘Equal’ refers to countries in which a woman and a man have equal chance of having an account. ‘Women’ refers to countries in which a woman is more likely to have an account than a man.





Figure 4. Comparing 2011 and 2017 women’s financial inclusion and women’s economic empowerment in different countries



Source: Author’s elaboration of account ownership difference between men and women from World Bank Global Findex (2017) and GDI from UNDP (2017), with data from both 2011 and 2017. Country-level GDI are grouped into the same categories listed in Figure 2.





Statistical Modeling

For the first two questions, we used panel regressions. On the last question, we built three cross-sectional linear regressions using 2011, 2014, and 2017 data. Table 5 shows how we set our modeling approach.

Table 5. Statistical modeling approach

Research question	Dataset	Modeling Approach
Research question 1	1990-2020 data	Panel data modeling using fixed effects, random effects and between estimator model
Research question 2	2011-2020 data	Panel data modeling using fixed effects, random effects and between estimator model
Research question 3	2011, 2014, and 2017 data	Multiple linear regression

As explained earlier, we used the Gender Development Index (GDI) as the main proxy variable for women’s economic empowerment. GDI changes on decimal points, and relative to financial inclusion, the difference between countries with high and low GDI is relatively small. For example, countries with high GDI might have GDI = 0.96 or 0.97, while countries with low GDI might have GDI = 0.76 or 0.77. Therefore, it would be challenging to interpret the women’s economic empowerment regression results and compare them with financial inclusion, which varies on a larger spectrum (on a range between -30 to 10).

To make our interpretations more tangible, we rescaled both variables into a range between 0-100. In this way, we can more easily interpret the regression coefficients and compare the effects of similar predictors on financial inclusion and women’s economic empowerment. We also tried to interpret the model outputs in a language that would be more accessible to people with no background in statistics.

Research Question 1: Is there a set of enabling policy/infrastructure/social norms indicators that create the ideal conditions for women’s economic empowerment over time? Yes. Looking into Table 6 and Table 7, we can see that there are 10 significant variables in this model. After assessing these 10 variables, we can see that women’s economic empowerment is significantly higher in countries in which sons and daughters have equal legal rights around inheritance; men and women have equal legal rights to travel outside of their home; there is no gender discrimination in employment; women have legal rights to work during the same night-time hours as men; and mobile coverage is high. By and large, we can see that the effects of regulation on inheritance, labour rights, and an individual’s freedom to work outside the home are strongly correlated with gender equality, gender empowerment, and gender development.





Table 6. Fixed effects regression on women’s economic empowerment

Gender Equality	Within Variation-Fixed Effects	
Model Outputs	Regression on Women’s Economic Empowerment	
Variable	Estimate	Pr (> t)
Gini coefficient	-0.05	0.000 ***
Men – women have equal rights on immovable property	2.73	0.000 ***
Son and daughter have equal inheritance rights	6.26	0.000 ***
Equal rights on assets during marriage	0.14	0.854
No legal prohibition on gender discrimination in credit access	-0.27	0.125
Law mandates equal remuneration for work	-0.24	0.236
Women can travel outside home in the same way as men	6.64	0.000 ***
Law prohibits gender discrimination in employment	1.72	0.000 ***
Women and men can work during the same night hours	0.57	0.013 *
Women can work in the same industry as men	0.44	0.048 *
Dismissal of pregnant worker is prohibited	0.26	0.245
Number of commercial bank branches per 1000 km2	0.031	0.000 ***
Mobile penetration (subscription per 100 people)	0.025	0.000 ***
Credit registry coverage	0.019	0.00 ***
R-Squared: 0.40, Adjusted R-Squared: 0.38; Signif. Codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1		

Table 7. Between variation estimator regression on women’s economic empowerment

Gender Equality	Between Variation Estimator	
Model Outputs	Regression on Women’s Economic Empowerment	
Variable	Estimate	Pr (> t)
Gini coefficient	0.009	0.892
Men – women have equal rights on immovable property	-10.07	0.505
Son and daughter have equal inheritance rights	9.39	0.117
Surviving spouses have equal rights to inherit assets	-4.11	0.481
Equal rights on assets during marriage	12.61	0.399
No legal prohibition on gender discrimination in credit access	2.09	0.375
Law mandates equal remuneration for work	-2.31	0.164
Women can travel outside home in the same way as men	-0.59	0.854
Law prohibits gender discrimination in employment	0.82	0.703
Women and men can work during the same night hours	.72	0.678
Women can work in the same industry as men	1.89	0.177
Dismissal of pregnant worker is prohibited	4.14	0.061
Number of commercial bank branches per 100k adults	0.03	0.364
Mobile penetration (subscription per 100 people)	0.18	0.000 ***
Credit registry coverage	0.052	0.25
R-Squared: 0.6, Adjusted R-Squared: 0.55		





Research Question 2: Is there a set of enabling policy/infrastructure/social norms indicators that create the ideal conditions for women’s financial inclusion over time? Yes, there is a group of variables that create the ideal conditions for women’s financial inclusion. As we did with Question 1, we initially fitted a fixed and random effects model on the collected panel dataset for women’s financial inclusion. This dataset contains data points from 2011-2020. As explained in the data preparation phase, we initially had 2011, 2014, and 2017 Findex data. We used these datasets, merged them with other datasets that we explained earlier in the data preparation section, conducted data imputations where necessary, and expanded the initial dataset up to 2020. Taking this enriched dataset and using it in a fixed and random effects model, we found that these two models are not informative for this research question, given the available dataset. The main reason is that we received a negative adjusted R-squared for the fixed effects model. A negative adjusted R-squared implies that the model is not informative. The financial inclusion dataset is only available for a relatively short period of time, and many variables used in this dataset are related to social norms, regulations, and foundational infrastructures. Therefore, we do not expect to see significant changes within these variables in a short period of time, and this can explain why the fixed effects model is not informative for understanding women’s financial inclusion. Knowing that there is little within variation in our dataset, we chose the between estimator modeling approach. Looking at Table 8, we see that the main enablers of women’s financial inclusion include: stronger women’s economic empowerment; legal prohibitions on gender discrimination in credit access; opportunities for women to work during the same night hours as men; a prohibition on the dismissal of pregnant workers; credit registry coverage in the country; and a relatively small gap between men and women in using mobile phones and internet for online banking.

Table 8. Panel regression using between variation estimator

Gender Equality Model Outputs	Between Variation Estimator Regression on Women’s Economic Empowerment	
Variable	Estimate	Pr (> t)
Women’s economic empowerment	0.18	0.000 ***
Men – women have equal rights on immovable property	5.98	0.076 *
Son and daughter have equal inheritance rights	5.73	0.675
Surviving spouses have equal rights to inherit assets	-3.69	0.783
No legal prohibition on gender discrimination in credit access	3.88	0.048 *
Law mandates equal remuneration for work	-0.50	0.769
Women can travel outside home in the same way as men	2.41	0.551
Law prohibits gender discrimination in employment	-2.81	0.334
Women and men can work during the same night hours	4.36	0.094 *
Women can work in the same industry as men	-2.11	0.240
Dismissal of pregnant worker is prohibited	8.21	0.009 **
Women can register their business in the same way as men	0.50	0.963
Number of commercial bank branches per 100k adults	0.08	0.116
Credit registry coverage	0.09	0.006 **
Gender gap in using mobile/internet for online banking	0.35	0.016 *
R-Squared: 0.51, Adjusted R-Squared: 0.44		





Research Question 3: Is there a positive relationship between women’s financial inclusion and women’s economic empowerment over time?

In Question 2, we learned that women’s economic empowerment is a significant explanatory variable in predicting women’s financial inclusion. We gained this result when we entered women’s economic empowerment as an explanatory variable alongside many other explanatory variables. In such cases, due to the confounding effect of some variables, we might not be able to fully detect the effect of one variable on the other variable. Therefore, for the third question we specifically set out to answer, we are going to build three cross-sectional regressions based on 2011, 2014, and 2017 data that has only one outcome and one explanatory variable.

Table 9. Assessing the relationship between women’s financial inclusion and women’s economic empowerment

Year	Predicting Women’s Economic Empowerment Using Financial Inclusion			Predicting Financial Inclusion Using Women’s Economic Empowerment		
	Variable	Estimate	Pr (> t)	Variable	Estimate	Pr (> t)
2017	Financial inclusion	0.43	0.000 ***	Women’s economic empowerment	0.59	0.000 ***
2014		0.26	0.000 ***		0.62	0.000 ***
2011		0.15	0.008 **		0.33	0.008 **

Comparing the results of these two regressions, we learn that in moving from 2011 to 2017, we can find a stronger tie between financial inclusion and women’s economic empowerment over time. Women’s economic empowerment slightly has a stronger predictive power to predict financial inclusion, compared with using financial inclusion to predict women’s economic empowerment.





Findings

Based on the results and model interpretations in the previous chapter, the following findings are indicators which were both statistically and substantively significant contributors to women's economic empowerment and women's financial inclusion.



The main contributors to women's economic empowerment:

- Equal inheritance rights between sons and daughters
- Equal rights on immovable property
- Legal prohibition on freedom of movement limitations
- Legal prohibition on gender discrimination in employment



The main contributors to women's financial inclusion:

- Women's economic empowerment
- Equal rights on immovable properties
- Legal prohibition on gender discrimination in accessing credit
- Legal prohibition on dismissal of pregnant workers
- Women and men can work during the same night hours
- Credit registry coverage for women
- No gender gap in using mobile/internet for online banking





The relationship between women's financial inclusion and women's economic empowerment:

- There is a relatively weak-to-medium correlation between women's financial inclusion and women's economic empowerment.
- Women's economic empowerment better predicts women's financial inclusion than women's financial inclusion predicts women's economic empowerment.





Policy Recommendations

The primary purpose of this paper was to articulate the drivers of women's financial inclusion and women's economic empowerment with an eye to policy implications and "easy wins" for emerging markets. Along the way, we identified other factors, including infrastructure and social norms, which also play a role in enabling women's financial inclusion and economic empowerment. The most important finding in the paper is that most of the variables that are statistically and substantively significant are ones government stakeholders can exercise agency to change. Such changes may drive women's financial inclusion and women's economic empowerment. In this section, we focus primarily on actions that policymakers and regulators (in the financial sector and beyond) can impact.

Specifically for policymakers and regulators, there are some key changes in the financial sector infrastructure, legal environment, or other policy areas that can make a difference in both women's financial inclusion and their economic empowerment. First, where equal property rights exist, women have new sources of collateral for women borrowers, with impacts on both women's financial inclusion and women's economic empowerment. The importance of property also underscores the possible impact of alternative collateral systems, which we were unable to consider in this research because of a lack of data. Second, lowering the financial sector barriers that block access to credit—for instance through broad coverage of the credit registry and the prohibition of discrimination in credit access—can make a difference in women's financial inclusion. Other policy enablers of women's financial inclusion and economic empowerment include enabling labor laws and a legal articulation of women's freedom of movement. Finally, our models point out the infrastructure challenges that women face and that are important to understanding barriers to women's financial inclusion and economic empowerment. Specifically, mobile or internet connectivity for women emerged as a significant variable in the model, underscoring the reality that technology has the power to either create new pathways for inclusion or exacerbate existing inequalities. Government stakeholders and the private sector alike are poised to address these challenges with public-private partnerships so that digitization does not become a new source of exclusion.

For financial sector policymakers and regulators, this list of enablers should underscore that financial sector regulation may not be enough to most effectively pursue financial inclusion. Financial sector policy is closely connected to other policy enablers and development indicators. Considering these, financial sector policymakers and regulators must coordinate with other ministries and advocate for policy interventions that enable women's economic empowerment.

As a caveat, we add that we are making these recommendations without sufficient available data, which leads to our final recommendation: to continue to provide relevant and sex-disaggregated data. Our best model described in this research only explained about 60 percent of variation in women's economic empowerment, underscoring that the lack of data keeps us from more comprehensive policy recommendations. Evidence-based policy requires more data on women than the world can currently access.

Future Research

This research underscores the complex relationship between policy, infrastructure, social norms, women's financial inclusion, and women's economic empowerment. Entire communities have emerged in silos to study each of these, but recognizing the connections among these factors is critical to accelerating our progress. Future research might leverage more localized studies to understand the determinants of women's financial inclusion at the individual (rather than the national) level; or might better articulate the conditions under which women's financial inclusion leads to their economic empowerment (and vice versa); or might examine other inputs outside the scope of our inquiry, including health, well-being, and gender-based violence. As we continue to explore these complex and interlocking concepts, we look forward to seeing a more financially inclusive and empowered population become a reality around the world.





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Appendix A

Datasets used in building the initial database:

	Dataset	Publisher	Years of available data	Dataset focus
1	Brookings Financial and Digital Inclusion	Brookings Institution	2010-2017	Evaluates access to and usage of affordable financial services by underserved people across 26 countries
2	Corruption Perception Index (CPI)	Transparency International	2012-2019	Measures the level of corruption in the public sector
3	Doing Business	The World Bank	2004-2020	Ranks economies by sorting them based on ease of doing business
4	EIU Global Microscope	The Economist	2007-2020	Ranks financial sector policy and infrastructure indicators by country
5	Financial Access Survey	International Monetary Fund	2004-2019	A supply-side dataset on access and use of financial services; aimed at supporting policymakers in measuring and monitoring financial inclusion and benchmark progress against peers
6	Financial Inclusion Index	Kantar	2014-2020	Produces original data and practical knowledge on trends in mobile money and other digital financial services
7	Gender Development Index (GDI)	United Nations Development Programme	1995-2020	Measures gender gaps in Human Development Index (HDI)
8	Gender Inequality Index (GII)	United Nations Development Programme	1990-2020	Measures gender inequalities in HDI
9	Gini Index	The World Bank	1980-2018	Measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution
10	Global Findex	The World Bank	2011, 2014, and 2017	The most comprehensive dataset on how adults save, borrow, make payments, and manage risk
11	Identification for Development (ID4D)	Identification for Development	1986-2018	Global estimate for the number of individuals without proof of legal identity
12	Social Institution and Gender Index (SIGI)	Organization for Economic Cooperation and Development	2014 and 2019	Measures discrimination against women in social institutions across 180 countries by taking into account laws, social norms, and practices
13	Time-Use Statistics	United Nations Statistics Division	1984-2015	Quantitative summaries of how individuals “spend” or allocate their time over a specified period – typically over the 24 hours of a day or the 7 days of a week
14	Women, Business and the Law (WBL)	The World Bank	1971-2020	Identifies barriers to women’s economic participation and encourages the reform of discriminatory laws





Appendix B

List of variables explored in statistical modeling

- Account, male, age 15+ (Findex)
- Account, female, age 15+ (Findex)
- Used the internet to pay bills in the past year, male, age 15+ (Findex)
- Used the internet to pay bills in the past year, female, age 15+ (Findex)
- Used the internet to buy something online in the past year, male, age 15+ (Findex)
- Used the internet to buy something online in the past year, female, age 15+ (Findex)
- Used mobile/internet for checking an account, male, age 15+ (Findex)
- Used mobile/internet for checking an account, female, age 15+ (Findex)
- Made or received digital payments in the past year, male, age 15+ (Findex)
- Made or received digital payments in the past year, female, age 15+ (Findex)
- Mobile money account, male, age 15+ (Findex)
- Mobile money account, female, age 15+ (Findex)
- No account because financial institutions are too far away (Findex)
- No account because of religious reasons (Global Findex)
- No account because of lack of necessary documentation (Findex)
- Credit card ownership, male, age 15+ (Findex)
- Credit card ownership, female, age 15+ (Findex)
- Outstanding loan for a funeral or wedding, male, age 15+ (Findex)
- Outstanding loan for a funeral or wedding, female, age 15+ (Findex)
- Coming up with emergency funds, male, age 15+ (Findex)
- Coming up with emergency funds, female, age 15+ (Findex)
- Received domestic remittances in the past year, male, age 15+ (Findex)
- Received domestic remittances in the past year, female, age 15+ (Findex)
- Gender development index (GDI)
- Ratio of estimated female to male income (GDI)
- Gender inequality index (GII)
- Corruption Perceptions Index score (CPI)
- Digitized ID (ID4D)
- Telecomm & Infrastructure Index (ID4D)
- Credit registry coverage (Doing Business)
- Credit bureau coverage (Doing Business)
- Reliability of infrastructure index (Doing Business)
- Ease of doing business rank (Doing Business)
- (Female - Male) labour force participation rates (GII)
- Gini coefficient (Gini Index)
- Do men and women have equal ownership rights to immovable property? (WBL)
- Do sons and daughters have equal rights to inherit assets from their parents? (WBL)
- Does the law grant spouses equal administrative authority over assets during marriage? (WBL)
- Do female and male surviving spouses have equal rights to inherit assets?(WBL)
- Equal access to property rights index (Doing Business)
- Does the law mandate equal remuneration for work of equal value? (WBL)
- Can a woman travel outside her home in the same way as a man? (WBL)
- Mobile penetration, subscription per 100 people (Financial Access Survey)
- Does the law prohibit discrimination in access to credit based on gender? (WBL)
- Can women work the same night hours as men? (WBL)
- Are women able to work in the same industries as men? (WBL)
- Is dismissal of pregnant workers prohibited? (WBL)
- Can a woman register a business in the same way as a man? (WBL)
- Can a woman open a bank account in the same way as a man? (WBL)
- Does the law prohibit discrimination in access to credit based on gender? (WBL)
- Restricted civil liberties (SIGI)
- Restricted access to productive and financial resources (SIGI)
- Restricted physical integrity (SIGI)
- Discrimination in the family (SIGI)
- Number of commercial bank branches per 1000 km2 (Financial Access Survey)
- Number of registered mobile money agent outlets per 100,000 adults (Financial Access Survey)





Appendix C

The goals of this research were to use quantitative methods to provide insights into the factors influencing women's economic empowerment and women's financial inclusion, and to look at how each of these indicators contributes to the other. Our hope is that policymakers and development practitioners who are involved in financial inclusion and women's economic empowerment find these learnings useful. In addition to conducting this research and making policy recommendations, we decided to undertake a thought experiment that would predict the state of women's economic empowerment and financial inclusion in 2030, the target year for reaching the 17 Sustainable Development Goals adopted by all United Nations member states, assuming various intervention scenarios.

As we mentioned in the analysis and methodology sections, we took the insights from the panel analysis to predict women's economic empowerment and financial inclusion in 2030. We built our predictions based on two sets of scenarios. One scenario forecasts the value of each predictor in 2030, assuming that variables related to social norms and regulations remain constant. The second scenario takes an optimistic approach. Beyond forecasting the values of numerical predictors in 2030, it assumes that social norms and regulations have changed in a direction that supports financial inclusion and women's economic empowerment. We are aware that our prediction exercise has three main shortcomings:

Since our initial goal in statistical modeling is focused on inference rather than prediction, our models are not best fit for prediction purposes.

Financial inclusion data is still lacking, and currently incorporates only the years 2011, 2014, and 2017. Predicting patterns by taking just a few data points and projecting them into 2030 has inherent limitations.

The Covid-19 global pandemic has had high-impact consequences on the global economy. At the time we are writing this report, June 2021, there are published studies that show how the pandemic has changed people's financial behavior, negatively affected traditional banking, and increased the use of digital finance. When countries are finally able to control the pandemic, what will turn out to be its long-term consequences on people and on the global economy? This is one of the questions for which we do not know the answers at this moment. But we do know that the pandemic will have a significant effect on women's economic empowerment and financial inclusion. Since we used the pre-pandemic databases in this study, our model does not capture the potential systemic changes imposed by the pandemic.

Taking these three points into account, Women's World Banking embarked on this thought experiment by focusing the predictions on our six priority countries - the ones in which most of our projects are based.

In the following tables, we can see the predictions about women's economic empowerment and women's financial inclusion in 2030. Cells labelled "no possible change" refer to those specific policies or regulations that positively affect women's economic empowerment or financial inclusion and are already enacted within a specific country. We only chose statistically significant variables in this prediction exercise, regardless of the volume of their contribution.

The right column shows the predicted value of women's economic empowerment (GDI) or the gender account ownership gap under each aforementioned circumstance that the column label refers to. For example, the value for any column that is related to an inheritance or a labour law shows the predicted value for GDI or financial inclusion within that country, if those laws were to be enacted. For the other columns, we forecasted the value of each specific variable within each country in 2030, and, using the coefficients derived from our statistical models, we predicted 2030 GDI and financial inclusion.





Bangladesh:

In 2019, GDI in Bangladesh was 0.904.

In 2017, women in Bangladesh were 28.75 percentage points less likely to have an account than men.

If ...	Then GDI in 2030 is...
Daughters and sons have equal inheritance rights	0.967
Women and men can work in the same industries	0.948
The law prohibits gender employment discrimination	0.921
Mobile phone subscriptions per 100 people increases by 51%	0.917
Number of commercial bank branches per 1000 km ² increases by 38%	0.916
Gini coefficient decreases by 1%	0.909
Women and men can work the same nigh hours	No possible change
Women can travel outside the home in the same way as men	No possible change
Women and men have equal rights on immovable property	No possible change
If ...	Then the gender gap in accounts in 2030 is... *
Pregnant workers cannot be dismissed from work	-20.54*
The gender gap in using mobile/internet online banking narrows by 20%	-21.75
There is no legal prohibition on gender discrimination in credit access	-24.85
Women's economic empowerment increases by 10%	-27.00

*Negative/positive gender gap in accounts means that women are less/more likely to have an account than men

Indonesia:

In 2019, GDI in Indonesia was 0.940.

In 2017, women in Indonesia were 5.11 percentage points more likely to have an account than men

If ...	Then GDI in 2030 is ...
Daughters and sons have equal inheritance rights	1.003
Number of commercial bank branches per 1000 km ² increases by 124%	0.971
Mobile phone subscriptions per 100 people increases by 32.5%	0.948
Gini coefficient decreases by 1%	0.942
The law prohibits gender employment discrimination	No possible change
Women and men can work in the same industries	No possible change
Women and men can work the same nigh hours	No possible change
Women can travel outside the home in the same way as men	No possible change
Women and men have equal rights on immovable property	No possible change
If ...	Then the gender gap in accounts in 2030 is... *
The gender gap in using mobile/internet online banking narrows by 20%	12.11
There is no legal prohibition on gender discrimination in credit access	8.99
Women's economic empowerment increases by 2.5%	6.01
Pregnant workers cannot be dismissed from work	No possible change

*Negative/positive gender gap in accounts means that women are less/more likely to have an account than men





Egypt:

In 2019, GDI in Egypt was 0.882.

In 2017, women in Egypt were 11.66 percentage points less likely to have an account than men.

If ...	Then GDI in 2030 is ...
Daughters and sons have equal inheritance rights	0.945
Women and men can work in the same industries	0.926
Number of commercial bank branches per 1000 km ² increases by 72%	0.904
Women and men can work the same nigh hours	0.888
Gini coefficient decreases by 1%	0.887
Mobile phone subscriptions per 100 people increases by 10%	0.884
The law prohibits gender employment discrimination	No possible change
Women can travel outside the home in the same way as men	No possible change
Women and men have equal rights on immovable property	No possible change
If ...	Then the gender gap in accounts in 2030 is... *
The gender gap in using mobile/internet online banking narrows by 20%	-4.66
There is no legal prohibition on gender discrimination in credit access	-8.12
Women's economic empowerment increases by 4.7%	-11.02
Pregnant workers cannot be dismissed from work	No possible change

*Negative/positive gender gap in accounts means that women are less/more likely to have an account than men

India:

In 2019, GDI in India was 0.820.

In 2017, women in India were 6.37 percentage points less likely to have an account than men.

If ...	Then GDI in 2030 is ...
Women and men can work in the same industries	0.864
Number of commercial bank branches per 1000 km ² increases by 120%	0.851
Mobile phone subscriptions per 100 people increases by 26%	0.825
Women and men can work the same nigh hours	0.819
Gini coefficient decreases by 10%	No possible change
The law prohibits gender employment discrimination	No possible change
Daughters and sons have equal inheritance rights	No possible change
Women can travel outside the home in the same way as men	No possible change
Women and men have equal rights on immovable property	No possible change
If ...	Then the gender gap in accounts in 2030 is... *
The gender gap in using mobile/internet online banking narrows by 20%	0.63
Women's economic empowerment increases by 5.5%	-5.00
There is no legal prohibition on gender discrimination in credit access	-2.49
Pregnant workers cannot be dismissed from work	No possible change

*Negative/positive gender gap in accounts means that women are less/more likely to have an account than men





Mexico:

In 2019, GDI in Mexico was 0.960.

In 2017, women in Mexico were 7.81 percentage points less likely to have an account than men.

If ...	Then GDI in 2030 is ...
Gini coefficient decreases by 1%	0.965
Number of commercial bank branches per 1000 km ² increases by 14%	0.964
Mobile phone subscriptions per 100 people increases by 13%	0.963
Daughters and sons have equal inheritance rights	No possible change
Women and men can work in the same industries	No possible change
The law prohibits gender employment discrimination	No possible change
Women and men can work the same nigh hours	No possible change
Women can travel outside the home in the same way as men	No possible change
Women and men have equal rights on immovable property	No possible change
If ...	Then the gender gap in accounts in 2030 is... *
The gender gap in using mobile/internet online banking narrows by 20%	-0.77
Women's economic empowerment increases by 2%	-7.45
There is no legal prohibition on gender discrimination in credit access	No possible change
Pregnant workers cannot be dismissed from work	No possible change

*Negative/positive gender gap in accounts means that women are less/more likely to have an account than men

Nigeria:

In 2019, GDI in Nigeria was 0.881.

In 2017, women in Nigeria were 24.13 percentage points less likely to have an account than men.

If ...	Then GDI in 2030 is ...
Number of commercial bank branches per 1000 km ² increases by 19%	0.966
Women and men can work in the same industries	0.925
The law prohibits gender employment discrimination	0.898
Mobile phone subscriptions per 100 people increases by 33%	0.889
Gini coefficient decreases by 1%	0.886
Daughters and sons have equal inheritance rights	No possible change
Women and men can work the same nigh hours	No possible change
Women can travel outside the home in the same way as men	No possible change
Women and men have equal rights on immovable property	No possible change
If ...	Then the gender gap in accounts in 2030 is... *
Pregnant workers cannot be dismissed from work	-15.93
The gender gap in using mobile/internet online banking narrows by 20%	-17.13
There is no legal prohibition on gender discrimination in credit access	-20.25
Women's economic empowerment increases by 4%	-23.02

*Negative/positive gender gap in accounts means that women are less/more likely to have an account than men




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