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Abstract:

This study analyzes the differences between men and women in terms of access to formal and informal financial services in Burkina Faso. More precisely, using Global Findex (2021) data collected from 1,000 households by the World Bank group, it first attempts, using logistic regressions, to analyze the impact of gender, first on the probability of access to formal financial services, then on the probability of access to formal financial services, of access to informal financial services, and finally on access to both forms of services. Then, using the multivariate decomposition method, it analyzes the gender gaps in access to these two forms of financial services. The results of logistic regressions indicate that compared to men, women are more likely to access not only informal financial services, but also both forms of financial services at the same time. Multivariate decompositions reveal the existence of gaps in access to the two forms of financial services, to the disadvantage of women. These gaps are explained, on the one hand, by differences in characteristics between the two groups, also known as the explained component, particularly standard of living and age, with regard to access to formal financial services, and, on the other hand, by differences in coefficients, also known as the unexplained component, with regard to access to informal financial services.

Keywords: *Gender differences, Access, financial services, Burkina Faso.*

I. Introduction

Finance is most of the time presented as an effective instrument of economic development, thus making financial inclusion a priority for many countries and particularly developing countries (Munemo, 2018). Understood as access to and use of formal financial services by the entire population (particularly vulnerable groups), at reasonable costs and corresponding to their needs (Sarma and Pais, 2011), financial inclusion represents one of the greatest economic and social challenges because it promotes not only economic development but also the social well-being of populations, by fighting against poverty and gender inequalities (Nwosu and Orji, 2017). It is considered as one of the key elements for most of the Sustainable Development Goals (SDGs), particularly SDG 5 (gender equality and women's economic empowerment). However, despite the many acknowledge the benefits of financial inclusion, as well as the implementation of financial systems as development strategies observed in many countries, the level of financial inclusion remains low both globally and in developing countries (Demirgüç-Kunt *et al.* 2018). While Demirguc-Kunt *et al.* (2021) note a somewhat significant improvement in financial inclusion in recent years (with account ownership rates reaching 76% globally and 71% in developing countries), Global Findex data (2021) shows that gender gaps in financial inclusion have not been significantly reduced. Nearly a billion of women living in the poorest 40% of households are still excluded from the formal financial system in developing countries (Global Findex, 2021).

However, if overall the main indicators of financial inclusion have improved somewhat in recent years, we can nevertheless see that gender gaps still persist throughout the world and mainly in developing countries where several studies agree on gender gaps both in terms of account ownership, access to formal credit and access to formal savings (Kaur and Kapuria, 2020; Berguiga and Adair, 2021; Loaba, 2022; Douanla *et al.* 2023). Data from the World Bank's Global Findex survey (2017) shows that 1.2 billion more people than in 2011 had a bank account worldwide. However, this increase still hides a 9% gender gap (unchanged since 2011) in account ownership. Despite the numerous mechanisms (multiplication of bank branches, ATMs, adoption of financial innovations, etc.) which have contributed to a clear improvement in financial inclusion indicators in the world (Gentilini *et al.* 2020): i.e. 76% of adults in the world are financially included (including 71% in developing countries), reflecting an increase of almost 50% between 2011 and 2021; it is clear that the gaps between men and women persist. Global Findex (2021) data reveals a 6% gender gap in account ownership. This represents a reduction of only 2% compared to previous years. This trend is confirmed in sub-Saharan Africa where 48% of men have a bank account compared to 37% of women, reflecting a gap of 11% which has continued to widen in recent years.

According to the Global Findex (2017), the financial sector's recent advancements in Burkina Faso, such as the expansion of bank branches and ATMs, the rise of microfinance, and the adoption of financial innovations like mobile money, have also contributed to a minor improvement in the country's financial inclusion rate, which increased by 29% between 2014 and 2017 (to 43% in 2017 from 14% in 2014). According to the International Monetary Fund (IMF, 2019) report, less than 25% of Burkina Faso's population has a financial institution

account, and less than 10% of this population has taken out a loan from a financial institution (with women finding it especially difficult to access financial services). A more detailed analysis of financial inclusion indicators by gender further reveals the persistence of gender gaps, both in terms of account ownership, access to savings and access to formal credit. The Global Findex (2017) shows that 51% of people with an account at a financial institution were men compared to 34% women, reflecting a gap of 17% between the two groups, higher than the 3% recorded in 2014. According to the same data, 57% of men declared having saved in a tontine, compared to 43% of women (lower than the 61% of women recorded in 2014), thus corresponding to a difference of 14% between the two groups.

Even if the 2021 report on financial inclusion in Burkina Faso shows a relative improvement¹ in financial inclusion indicators in recent years, the banking rate in Burkina Faso still remains low (35.75%) and gender inequalities in financial inclusion persist. These gender inequalities in financial inclusion are observed in a context already marked by large disparities between men and women, despite the various national and international commitments² made by the country in favor of gender equality. Indeed, in Burkina Faso, inequalities between men and women are still deeply rooted in societal norms and remain an important constraint for women empowerment. The country (ranked 38th in Africa in terms of gender inequality) still has a gender inequality index of 0.384 (compared to 0.433 for Benin and 0.504 for Senegal) and a low score (i.e. 0.105, compared to 0.144 for Benin and 0.222 for Senegal) on the dimension of women's empowerment and representation (AfDB, 2020). Thus, there are still gender inequalities in access to productive and economic resources. Although women contribute 77.1% to the national economy, they mainly occupy vulnerable jobs, are more exposed to unemployment compared to men (Only 9.8% of the female labor force is in salaried employment and their monthly income is significantly lower (USD 9.7) than that of men) and have a lower level of education than men (illiteracy rate of 74% among adult women and 56% among men). Also, despite the revision of Agrarian and Land Reform which abolishes all discrimination in this field, access to land remains a real challenge for women (due primarily to socio-cultural factors). Although they constitute 55% of the country's agricultural labor force,

¹ Increase in the number of bank branches from 318 in 2019 to 332 in 2021; regular increase between 2019 and 2021 in the number of ATMs, going from 492 to 508; and a continuous evolution in the number of accounts opened going from 2,120,346 in 2019 to 2,202,333 in 2020 to reach 2,498,791 in 2021, an increase of 3.87% and 13.46% respectively due to the policies of promotion of banking such as free certain financial services, compulsory domiciliation of remuneration of workers in the public and parapublic sector or even scholarships and aid for students etc.

² Burkina Faso has ratified most international legal instruments enshrining gender equality and prohibiting all discrimination against women and girls (adhesion to the Convention on the Elimination of all forms of Discrimination Respect for Women on October 14, 1987; the constitution revised in November 2015 guarantees gender equality and prohibits discrimination based on sex; in 2018, the country adopted a new penal code which addresses gender-based violence in a more comprehensive manner).

In 2009, the country adopted a National Gender Policy which aims to eliminate inequalities between men and women in all areas. In 2017, it developed the Operational Action Plan for the said policy with priority actions on the development of legal texts in favor of equal representation between the sexes in decision-making bodies.

On an institutional level, the Ministry of Women, National Solidarity, Family and Humanitarian Action is the institution responsible for promoting gender equality and the empowerment of women. It includes the National Commission for Monitoring the Implementation of Burkina's Commitments to Women and the General Directorate for the Promotion of Women's Entrepreneurship.

they represent only 31.96% of landowners, work mainly on family land and have little or no power over income from agricultural activity (AGI, 2019).

In addition to these constraints, there are economic constraints marked mainly by the precarious security situation which is weakening the country (attacks by terrorist groups in the country since 2015, political tensions linked to successive military coups such as the last one in September 2022), causes significant internal displacement of populations with more consequences on women (women and children already represented 84% of internally displaced people in April 2020) and contributes to worsening gender gaps. This context legitimizes concerns about the situation of women in Burkina Faso and particularly the search for solutions aimed at remedying gender gaps. Financial inclusion therefore appears to be a potential to be exploited by women to improve their living conditions in such a context.

Considering the dominant theory that tends to explain gender gaps in financial inclusion mainly by supply-side constraints such as collateral (the lack of collateral and high interest rates explain the fact that compared to men, women have less access to interest credit (Morsy and Youssef, 2017)), this study is in line with works analyzing the decision-making behaviors of individuals by emphasizing the importance of factors linked to demand to explain the gaps between sexes (Allen *et al.* 2016; Morsy *et al.* 2019; Douanla *et al.* 2020; Berguiga and Adair, 2021).

According to this second category of work, demand constraints such as lack of confidence in financial institutions; lack of financial literacy; risk aversion; the lack or absence of income also fuel these gaps in access to financial services and strongly condition the financial behavior of men and women, forcing them most of the time to adopt one form of access rather than another (at namely: exclusion, exclusive access to informal services, exclusive access to formal services or access to both forms of services at the same time). We can therefore observe, first of all, a preference of women for informal financial products and services which they consider more accessible (due to the absence of collateral constraints or the low rate of credit), to the detriment of more restrictive formal products and services for the latter. And then, a strong tendency among men to access formal products and services that they consider more accessible (because they have guarantees or stable jobs) to the detriment of informal financial products and services that they may consider riskier (Morsy and Youssef, 2017; Morsy *et al.* 2019; Abbes, 2022). It therefore becomes interesting to pay particular attention to the financial behavior of these two groups of individuals. In other words, what are the factors that explain the differences in behavior between men and women in terms of access to financial services in Burkina Faso? This study sets two objectives: First, analyze the influence of gender on access to formal and informal financial services in Burkina Faso; and then, assess gender gaps in access to formal and informal financial services in Burkina Faso.

To achieve the objectives of our study, it becomes relevant to examine the theoretical and empirical explanations of differences in access to financial services between the sexes (section 2), before proceeding to an empirical analysis of the explanatory factors of these differences in access in both sectors of the financial ecosystem in Burkina Faso, particularly the formal and informal sector (section 3), present and discuss the results obtained (section 4) and finally conclude and make policy recommendations arising from the results (section 5).

II. Review of the literature

1. Theoretical foundations

A review of the literature reveals that two main theories are most often used to explain differences in access to financial services between men and women. These are the economic theories of discrimination based on taste or preference (Becker, 1957), statistical discrimination (Arrow, 1973; Phelps, 1972), implicit discrimination (Bertrand *et al.* 2005), and of the theory of self-selection.

In the literature, self-selection is the argument most often used to justify women's limited access to financial services. The initial idea is that the self-selection of women into the formal financial sector or more particularly into the formal credit market results from anticipation of the decisions of credit institutions. In other words, women would anticipate the decision of formal credit establishments (refusing to give them credit given certain characteristics) and would therefore decide not to apply for credit or not to access the services of these establishments (Berguiga and Adair, 2021). They would therefore give up requesting or accessing formal financial services, given certain characteristics that are specific to them and which limit their access to formal financial services. Consequently, the specific characteristics to women would therefore be the source of their self-selection in the formal financial sector and more particularly in the credit market (Morsy and Youssef, 2017). This existence of characteristics specific to women, although subject to debate, will serve as an argument for numerous studies seeking to explain women's limited access to formal financial services or their choice for less restrictive or more accessible financial services. For most research, the characteristics attributed to women such as: lack of income, lack of financial literacy, low level of education, risk aversion, fear of failure, low solvency etc. would be at the origin of their self-selection into the formal financial sector and their decision to access informal services that they consider more suitable.

These theoretical explanations could also be applied in the context of our study, with regard to the characteristics of women in Burkina Faso. Indeed, Burkinabe women's access to formal financial services and particularly credit still represents a major challenge. They are still mostly excluded from the traditional financial sector (Traore, 2023), because they only represent 40% of account holders in a formal financial institution compared to 60% of men (Global Findex, 2021). If factors linked to supply are often put forward to explain this low participation in the financial sector, the socio-economic conditions of the latter further limit their chances of accessing financial services and provide explanations for the high propensity to self-selection among the latter. Indeed, in Burkina Faso, women are still housed in the most disadvantaged population category, they represent 74.3% of the poor population (NISD³, 2018). They are very often assigned to domestic work, caring for children or even the elderly, which severely limit their participation in lucrative activities and strongly compromise their chances of accessing financial services (Asaduzzaman *et al.* 2017).

Their risk profile (more pronounced risk aversion among women) in economic activities and in financial decisions does not militate in their favor either (Reichert *et al.* 2021). With a literacy rate of 21 percentage points, they represent less than a third of the literate population (NISD, 2018), further compromising their financial education or knowledge. In addition, given the social status granted to them by tradition, very few of them have movable and immovable property that can serve as guarantee with formal financial institutions (Ouedraogo, 2013). These

³ National Institute of Statistics and Demography

different characteristics of women would therefore be at the origin of their self-selection into a formal financial sector in Burkina Faso, which still presents numerous constraints (high costs of services, restrictive documentary requirements, services unsuitable for the needs of women, requirement for guarantees, etc.) and would therefore explain the latter's limited access to formal financial services and their preference for informal financial services deemed more accessible.

Economic theories of discrimination (taste-based discrimination, statistical discrimination, and implicit discrimination) are generally used in the literature to explain differences in how markets treat discriminated groups. They serve as the theoretical basis for several studies addressing the issue of gaps between men and women in terms of financial inclusion and more particularly in terms of access to formal credit (Pablo *et al.* 2021; Berguiga and Adair, 2021; Loaba, 2022 ; Douanla *et al.* 2023). They could therefore provide theoretical explanations for the gender gaps in access to financial services in Burkina Faso.

Becker (1957) proposes a theory of discrimination based on preferences which, on the credit market, is based on the idea that credit institutions have a taste for discrimination against women. In other words, these establishments would be ready to sacrifice part of their profit in order to avoid granting credit to women out of prejudice or bias. It is therefore the preferences and cultural beliefs concerning women that would influence the decisions of credit institutions. This would result in women being offered less credit, experiencing higher rejection rates, or facing higher interest rates in otherwise similar circumstances to men. Applied to our study, the gender gaps in access to financial services in Burkina Faso could find explanations in the prejudices that credit institutions have towards women. These could be prejudices about the low solvency of the latter (Burkinabe women could have difficulty repaying the credit taken out given their low income or the precarious jobs they hold), about their low capacity to use financial services (they might have difficulty using financial services due to their low level of financial education) or even prejudices about the financial habits of women (They might prefer informal financial services that are more accessible and more adapted to their economic activities). Credit institutions would therefore rely on these different prejudices to discriminate against women, hence the existing gap between men and women in terms of access to credit.

This practice of discrimination based on preferences, however, seems unrealistic. Because, if we stick to the latter, credit establishments would only grant credit to men. Becker (1957) predicts that this discriminatory practice tends to disappear with competition between credit institutions, to the extent that those who prefer not to extend credit to women are no longer able to bear the higher costs. To overcome this limit, Arrow (1973) will put forward the most realistic hypothesis of differences in taste for discrimination. In other words, the taste for discrimination against women would differ from one credit institution to another. The latter will have to compare the advantages of granting credit to women, with the psychological costs that result from it. When the real gain of granting credit to a woman rather than a man is greater than its psychological cost, the establishment will grant credit exclusively to women and exclusively to men otherwise. However, Arrow (1973) shows that in such a market, only the least discriminating credit institutions will survive in the long term because they are the ones who make the biggest profits. However, if the theory of discrimination based on preferences or tastes is widely used in the literature as a theoretical basis in analyzes of gender gaps in financial inclusion, it presents a main limitation, namely, the failure to provide a satisfactory explanation for the long-term evolution of gender gaps.

The theory of statistical discrimination provides another explanation for the discrimination of credit institutions (Arrow, 1973; Phelps, 1972). The idea here is that credit institutions have limited information on the ability of credit applicants to repay the credit. This would lead them to use easily observable characteristics (e.g., gender) to assess this repayment capacity. It is therefore in the statistical judgments by which these establishments project certain group characteristics onto individuals that the origin of discrimination on the credit market would lie. In other words, not having perfect information on credit applicants, these establishments would be based on beliefs which could be linked to observations or prejudices against women. Thus, assuming that in Burkina Faso, the chances of loan repayment are lower among women than among men (considering the socioeconomic situation of women and the prejudices against them), credit establishments will prefer to extend more credit to men who present a lower risk. However, criticisms of taste discrimination also apply to this statistical approach.

At the base of theoretical explanations based on discrimination by preferences and statistics, lies the awareness of discriminating which arises either from personal motivations or from the fact that belonging to a group provides relevant information. However, there could be a different, less intentional motivation that involves greater misunderstanding and leads to discrimination. This is implicit or unconscious discrimination (Bertrand *et al.* 2005). This form of discrimination emanates from a recent body of psychological evidence that distinguishes between explicit and implicit attitudes and how they influence individuals' behavior. Thus, several experiments, using the Implicit Association Test (IAT), show how implicit attitudes can significantly influence behavior, particularly in contexts of inattention, time pressure and ambiguity. In the latter case, social psychologists argue that behavior may be more prone to implicit attitudes and that implicit discrimination would be more likely to occur in contexts where multiple non-racist explanations for behavior may exist (Bertrand *et al.* 2005). In our study context, there may be an implicit attitude favoring the granting of credit to men, even if the opposite has been explicitly expressed. Thus, women would be less likely to obtain credit, not because of rational evaluations, but because of unintentional rules and credit scoring evaluations that would involve raising the bar when evaluating credit women compared to men, and which are not based on economic reasons and escape the awareness of credit institutions.

1.1. Research hypotheses

Based on theoretical explanations of women's self-selection, we can pose the verifiable the first hypothesis that in Burkina Faso, women have less chance of access to formal financial services and more chance of access to informal financial services.

Based on these explanations of gender gaps, based on theories of discrimination, we can therefore pose the second hypothesis of this study: There is a gender gap, to the disadvantage of women in access to formal and informal financial services in Burkina Faso.

2. Empirical review

The analysis of gender differences in financial inclusion has been the subject of several studies in recent years. While some studies simply seek to identify whether or not there are differences between these two groups (Abdu *et al.* 2015; Ndoya and Tsala, 2021; Antonijević *et al.* 2022), others seek to find explanations for these discrepancies based on both supply and demand factors for financial services or institutional and regulatory factors (Morsy, 2020; Adegbite and Machethe; 2020). This literature review presents some of these works.

Abdou *et al.* (2015) use a Probit model and the Fairlie decomposition technique to analyze the drivers of financial inclusion in Nigeria as well as gender gaps. Using data from Global Findex (2011), the authors show that young people and people with a high level of education are more likely to be financially included. The results of the decomposition confirm the existence of a gender gap in financial inclusion to the disadvantage of women, explained by a low level of education of the latter as well as a low standard of living. Using data from the Finscope survey (2017), the work of Ndoya and Tsala (2021) analyzes the gaps between men and women in terms of financial inclusion in Cameroon. Using the Fairlie decomposition method, the study concludes that there is a gender gap (in favor of men) in both access to and use of financial services. If the authors put forward the differences in income between men and women to explain the gap in access to financial services, the gap in use is explained by the level of education. Aiming at a similar goal, Antonijević *et al.* (2022) examine differences between men and women in 7 segments of financial inclusion (having an account with a financial institution; saving with a financial institution; borrowing from a financial institution; having a card credit; use a mobile phone or the Internet to access an account; use the Internet to pay bills or buy something online; make or receive digital payments), from a sample of 144 countries worldwide, drawn data from Global Findex (2017). The authors find statistically significant differences between men and women in all segments related to financial inclusion.

Traore (2023) analyzes the gender difference in access to microcredit in rural areas in Burkina Faso based on a sample of 6646 individuals, taken from the National Land Management Program data collected in 2017. By using a probit model combined with the Fairlie decomposition, the author finds that there is indeed discrimination against women in access to microcredit in rural areas in Burkina Faso. The decomposition reveals that wealth has the largest relative contribution estimated at 22.27%, followed by income (21.03%). Using the representative sample of 6392 individuals from seven WAEMU countries (Burkina Faso, Benin, Ivory Coast, Mali, Niger, Senegal and Togo), from Global Findex (2017) data of the World Bank, Loaba (2022) identifies from a Probit mode and an Oaxaca-Blinder decomposition model, the socio-economic factors that explain the difference in access to formal financial products between men and women. The author finds that in West Africa, the gap in access to formal accounts between men and women is largely explained by differences in characteristics. Education level, income level or employment status are the main observable characteristics that explain these access gaps.

These gender gaps in financial inclusion are also observable in digital finance sectors. Several studies also find low adoption and use of mobile financial services among women. The work of Douanla *et al.* (2022) analyze the adoption and use of mobile financial services in Cameroon, based on data from Global Findex (2017). Using a multivariate Probit, the authors find that compared to men, women adopt and use mobile financial services less in Cameroon. Using nationally representative household surveys from Kenya, Constantin and Mußhoff (2022) analyze gender gaps in access to formal digital credit. They find that contrary to expectations, formal digital credit has led to an increase in the gender gap in financial inclusion in Kenya. For the authors, this gender gap (to the detriment of women) is largely attributable to socioeconomic characteristics.

Other empirical studies also highlight the contribution of institutional factors and legal barriers to gender differences in financial inclusion. This is the case with the work of Morsy (2020) who analyzes the gaps between men and women in 141 countries based on Global Findex data

(2017). The results of this study suggest that women are more likely to be excluded from the financial sector in countries where: foreign banks are less present; public banks have a larger share in the banking system; credit information is less available in public and private credit registries, and gender gaps in educational attainment are wide. Work carried out in Nigeria by Adegbite and Machethe (2020) using a set of secondary data (Global Findex 2011, 2014, 2017, Nigeria-Household Survey 2016) shows that the institutional, regulatory, socio-cultural and legal factors that impact demand and supply of formal financial services, are at the root of gender differences in financial inclusion.

3. Literature Gap and New Perspectives

This non-exhaustive review of the literature highlights certain limitations that this study attempts to fill. Indeed, despite the important place given to the analysis of gender inequalities in financial inclusion in the literature, very little work seems to be interested in this question in the Burkina Faso context. It is first of all to try to fill this gap that this study analyzes gender differences in access to financial services in Burkina Faso.

Then, while being part of the work analyzing the explanatory factors of access to financial services, this study has the merit of standing out from others on several points: First, it offers an analysis of the explanatory factors of access not only to formal and informal financial services (like the majority of previous works), but also to these two forms of services at the same time, thus offering a more realistic analysis of the financial situation of individuals in an African context characterized by financial dualism. Such an analysis provides explanations for a more realistic financial behavior which would require certain individuals to choose both forms of financial services (having a bank account which allows them to use banking services and at the same time being a member of a neighborhood, village or colleague tontine, etc.).

Second, unlike previous works, this study uses interacting variables to analyze the explanatory factors of access to financial services between men and women. The idea put forward here is that being a man or a woman does not determine eligibility or not for access to financial services. However, being a man or woman with a certain qualification or certain characteristics can influence access to financial services. The advantage of such an analysis is that it can provide information on individuals of different sexes but with similar characteristics. Such a result initially indicates the existence of potential discrimination against a category of individuals. As an illustration, it would be interesting to focus on a result showing that at the same level of education or income, women have less access to formal financial services than men. And finally, while following the line of work dealing with differences between men and women in terms of access to financial services, this study stands out from previous studies by offering a more detailed analysis of these gaps. In other words, it focuses its gap analysis on a set of financial services, notably savings and credit. Such an analysis has the advantage of providing specific explanations for differences in access according to services, and of providing more targeted policy recommendations, aimed at reducing or eliminating differences in access to specific services.

III. Data and methodology

1. Data

In this study, we use data from the fourth Global Findex survey, carried out in 2021 by the World Bank. Compiled using nationally representative surveys of 125,000 adults aged 15 and over, in nearly 123 economies, this survey provides information not only on up-to-date indicators of access and use of financial services (formal and informal) but also provides information on the use of financial technology (or fintech), as well as the use of mobile phones and the Internet to carry out financial transactions. These data provide a current overview of the financial inclusion situation around the world. Bringing together representative samples at the national level for each economy, of around 1,000 randomly selected individuals within households, these data make it possible to carry out an analysis of financial inclusion by country. It is in this perspective that within the framework of this study we have chosen to limit ourselves to data concerning Burkina Faso.

Specifically, the data collected in Burkina Faso concerned 1,000 households and provide, based on open-ended questions, information on the socio-demographic characteristics of the respondents (age, income, gender, activity status, level of education); access and use of basic formal financial services (possession of an account in a formal financial institution, savings and formal borrowing, possession of a mobile money account); reasons for saving/borrowing (saving for old age, saving/borrowing for agricultural/business purposes, borrowing for medical purposes/to buy a house, apartment or land); possession and use of payment instruments (possession and use of a debit/credit card, possession of a mobile phone, use of the mobile phone or the internet to access an account or check the balance); informal saving/borrowing (saving/borrowing from an informal savings club, borrowing from family or friends); transfers (sending/receiving funds domestically, sending/receiving funds domestically through a formal financial institution/mobile phone/cash/transfer service); payments (paying utility bills; paying utility bills using an account at a formal financial institution/mobile phone/cash payment)... This information reveals opportunities for strengthening access to financial services for the unbanked, and opportunities for promoting wider use of digital financial services. Also, this database is presented as the cornerstone of global initiatives aimed at promoting financial inclusion. Highly cited by development practitioners and researchers, Global Findex survey data is used to track progress towards the United Nations Sustainable Development Goal as well as the World Bank's universal access to financial services goals.

2. Analysis of the influence of gender on access to financial services

2.1. Taking into account the influence of the gender variable

To achieve this first objective, the method consists of estimating Logit models. This method considers the dichotomous character of the dependent variables. Indeed, the latter can only take two values (0, 1). Similarly, the probability and the proportion of these variables are between 0 and 1, as well as the error term, which follows a discrete distribution. A simple linear regression cannot be appropriate under these conditions because, according to Pampel (2000), it does not consider the maximum or the minimum as well as the normality of the error term. Thus, Logit and Probit regressions are generally used in this case (Djoumessi 2021), the two models making it possible to obtain similar results (Greene, 1995). We therefore choose to use a Logit model

because it not only allows us to take consider the interactions that may exist between the explanatory variables, and which may have an influence on the probability of access to formal and informal financial services, but also to determine the direction of the influence of the explanatory variables (increase or decrease) on the probability of access. The probability associated with access to financial services can therefore be written:

$$\Pr(y_i = 1) \text{ with } y_i = \begin{cases} 1 \\ 0 \end{cases} \quad (1)$$

Individuals can choose between accessing financial services (formal/informal) or not accessing them. Thus, the Logit model specification can be applied as follows:

$$y_i = \beta_0 + \sum_{j=1}^k X_j \beta_j + \varepsilon_i \quad (2)$$

y_i is the dependent variable; X_i the matrix of explanatory variables; β_i the matrix of coefficients associated with the explanatory variables and ε_i the error term of the regression which follows a logistic distribution with 0 mean and variance 1. We can therefore specify the models for the two forms of access to financial services as follows:

$$FA_i = \beta_0 + \sum_{j=1}^k X_j \beta_j + \varepsilon_i \quad (3)$$

$$IA_i = \beta_0 + \sum_{j=1}^k X_j \lambda_j + \mu_i \quad (4)$$

Finally, it is very likely that an individual has access to both forms of financial services. In this case, the model specification can be as follows:

$$FIA_i = \beta_0 + \sum_{j=1}^k X_j \delta_j + \theta_i \quad (5)$$

Equations (3), (4) and (5) respectively represent the equations for access to formal services, access to informal services and access to both forms of financial services at the same time. With FA_i , IA_i and FIA_i , the dependent variables representing access to formal financial services, access to informal financial services and access to both forms of financial services at the same time, respectively. X_i represent the matrix of explanatory variables (consisting of socio-economic and demographic factors and control variables which influence both access to formal and informal financial services). β_i , λ_i and δ_i represent the vector of coefficients associated with the explanatory variables, respectively for equations (3), (4) and (5). Finally ε_i , μ_i and θ_i represent the error terms of the regressions (respectively for equations (3), (4) and (5)), which follow a logistic distribution with mean 0 and variance 1. The confirmation or refutation of our first study hypothesis will be done through the verification during the estimation for each form of access, of the sign and significance of the coefficient associated with the gender variable (notably Women) which designates the sex of the individual. Thus, a positive (or negative) coefficient will designate an increase (or a decrease) in the chances for women to access a form

of financial services. However, the interpretation of the results of the models presented above will be done mainly through the interpretation of marginal effects. A post-estimate LROC test or test of good prediction of the models is carried out to check the quality of prediction of the models. This test makes it possible to obtain the ROC curve (Receiver Operating Characteristic) whose area makes it possible to decide on the quality of prediction of the study models. Thus, an area greater than or equal to 0.70 indicates a good prediction of the model.

2.2. Taking into account the interactions between relevant variables explaining access to financial services

Then, going beyond previous analyzes is proposed and carrying out an analysis of access to different forms of financial services, this time considering the interactions between certain key variables which explain access to financial services between men and women. The idea of this second analysis is that being a man, or a woman does not necessarily determine eligibility for access to a form of financial services. However, being a man or woman with certain qualifications or characteristics could influence access to a form of financial services. It is therefore a question here of analyzing the probabilities of access to different financial services among men and women with similar characteristics and qualifications. Such a more realistic analysis has the advantage of introducing a discussion on the probable existence of gender discrimination in access to financial services in Burkina Faso. Because in fact, with equal qualification levels or characteristics, we would expect individuals of both sexes to have the same chances of access to financial services.

Based on the vast literature on the determinants of access to financial services, we choose to limit ourselves exclusively to two main explanatory variables of access to financial services, which we interact in turn with the variable designating the sex of the individual. These are the variables higher education which makes it possible to better capture the level of qualification of an individual, essential for access to financial services (several studies show that people with a higher level of education have a high chance of accessing financial services (Rastogi and Ragabiruntha, 2018; Douanla *et al*, 2023)) and active worker which makes it possible to capture the possibility for an individual to have an income allowing them to access financial services (people active, therefore having a job, have a good chance of accessing financial services because they have income from their activity allowing them to access financial services (Loaba, 2022; Traore, 2023)).

Thus, by assuming that men and women have the same level of education or are all active people, the analysis models can then be specified respectively for the interaction between the gender and higher variable (6) and for the gender and active variable (7) as follows:

$$Access_i = (gender_i * higher_i)\beta_1 + \sum_{j=2}^J X_{ij} \beta_j + \varepsilon_i \quad (6)$$

$$Access_i = (gender_i * active_i)\lambda_1 + \sum_{j=2}^J X_{ij} \lambda_j + \mu_i \quad (7)$$

where $Access_i$ is the dependent variable representing access to different forms of financial services (formal, informal and both); $(gender_i * higher_i)$ the variable capturing the interaction between the variable $gender$ and the variable $higher$; $(gender_i * active)$ the variable capturing the interaction between the variable $gender$ and the variable $active$; β_1 and λ_1 are the parameters associated with these two interaction variables respectively; X_{ij} is the matrix of the other explanatory variables of the models. These two equations are estimated both for access to formal and informal services and for access to these two forms of services at the same time.

3. Analysis of gender gaps in access to financial services

To analyze gender gaps in access to financial services (the second objective of our study), we adopt an analytical approach based on a multivariate decomposition model (Yun, 2000; Powers *et al.* 2011) inspired by the work of Zinyemba *et al.* (2019). It is an extension of the decomposition method of Oaxaca (1973) and Blinder (1973), widely used in the empirical literature. The robustness of the results obtained by the Oaxaca-Blinder decomposition makes it a method widely used in the analysis of gaps in various fields (financial inclusion, education, health, labor market, etc.). However, the Oaxaca-Blinder decomposition has a main limitation: that of not decomposing dichotomous dependent variables. To circumvent this main limitation, the decomposition method of Fairlie (2005) is very often used which, in addition to being a simple decomposition method to perform, is based on the estimates of the coefficients of a logistic model and can be used directly in the decomposition specification (Jann, 2008). However, Fairlie's decomposition approach also has a limitation in this sense that it only provides the contribution of the individual variables in terms of the explained component (endowment component) and does not take consider the contribution of the individual variables in terms of the unexplained component (return of the endowment).

Thus, to overcome this limitation and provide a more complete analysis of the differences between the two groups, one can use the method of multivariate decomposition. This method of decomposition provides the opportunity to analyze not only how differences in endowments contribute to the gender gap, but also how returns to these endowments vary across genders, thus capturing the unexplained component. Consider the standard problem of decomposing a difference in first moments in which the dependent variable is a function of a linear combination of predictors and regression coefficients:

$$A = F(X\beta) \quad (8)$$

With A representing the vector of the $N \times 1$ dependent variable (in this case access to financial a financial service), X is a $N \times K$ matrix of independent variables, and β is a $K \times 1$ vector of coefficients. $F(.)$ is any one-time differentiable function mapping a linear combination of $X(X\beta)$ to A . The mean difference in A between groups $M(Male)$ and $F(Female)$ can be broken down as follows:

$$\begin{aligned} \bar{A}_M - \bar{A}_F &= \overline{F(X_M \beta_M)} - \overline{F(X_F \beta_F)} \\ &= \underbrace{\overline{F(X_M \beta_M)} - \overline{F(X_F \beta_M)}}_E + \underbrace{\overline{F(X_F \beta_M)} - \overline{F(X_F \beta_F)}}_C \end{aligned} \quad (9)$$

The component E represents the part of the differential attributable to differences in endowments or characteristics, generally called the explained component or characteristics effects. While the C component refers to the part of the differential attributable to the differences in coefficients or effects, generally referred to as the unexplained component or coefficient effects. In other words, if the endowment effect makes it possible to reveal the explained variation in access to financial services due to endowments between the sexes, the coefficient effects for their part make it possible to reveal the unexplained variation which could be due to discrimination, a bias or other unknown reasons. Thus, the positive or negative sign of these coefficients reflects a reduction or an increase in the gaps between men and women and would therefore allow us to decide on our second study hypothesis. In equation (9), we chose group M as the comparison group and group F as the reference group. Thus, E reflects a counterfactual comparison of the difference in outcomes from the perspective of group M (i.e., the expected difference if group M received the distribution of covariates from group F). C reflects a counterfactual comparison of outcomes from the perspective of group F (i.e., the expected difference if group F experienced the behavioral responses of group M to X). Equation (9) is estimated for both access to formal financial services and access to informal financial services.

3.1. Robustness

Then, to test the robustness of the results obtained with the multivariate decomposition, we use the decomposition method of Fairlie (2005) which, in addition to being a simple decomposition method to perform, has the advantage of decomposing a binary dependent variable. (Like the dependent variables in this study) and is based on coefficient estimates from a logistic model and can be used directly in the decomposition specification (Jann, 2008). According to Fairlie and Meyer (1999), the decomposition of a nonlinear equation:

$$B = F(X\hat{\beta}) \quad (10)$$

can be written as follows:

$$\bar{B}_M - \bar{B}_F = \underbrace{\left[\sum_{i=1}^{N_M} \frac{F(X_{iM}\hat{\beta}_F)}{N_M} - \sum_{i=1}^{N_F} \frac{F(X_{iF}\hat{\beta}_F)}{N_F} \right]}_E + \underbrace{\left[\sum_{i=1}^{N_M} \frac{F(X_{iM}\hat{\beta}_M)}{N_M} - \sum_{i=1}^{N_F} \frac{F(X_{iM}\hat{\beta}_F)}{N_F} \right]}_C \quad (11)$$

where B is the variable capturing access to financial services (formal or informal); N_j is the sample size for group j (with M and F representing males and females respectively). If the first term of this equation (E) represents the share of gender gaps due to differences in the distribution of X , the second term (C) represents the share of gender gaps due to unobservable characteristics between these two groups.

However, it is also interesting to carry out a more detailed analysis of the gender gaps in access to financial services, this time distinguishing between different financial services. In other words, an analysis making it possible to identify for each financial service (savings, credit) the existence or not of gaps between the sexes is interesting to the extent that it presents a double advantage. Indeed, if such an analysis first makes it possible to see whether the gender gaps vary according to the different financial services studied, it secondly makes it possible to

produce more targeted policy recommendations aimed at reducing these gaps. To carry out this analysis, we draw inspiration from equation (9) for the decomposition of access to financial services, to obtain respectively the equations for the decomposition of access to savings and access to credit between the two groups. If S represents the vector of $n \times 1$ dependent variables (here representing access to savings) and C the vector of $m \times 1$ dependent variables (here representing access to credit), the average difference in S and C between the groups of Male and Female can therefore be specified similarly to equation (9). Where the first term of equation (9) ($\bar{A}_M - \bar{A}_F$) is replaced by $\bar{S}_M - \bar{S}_F$ in the case of the breakdown of access to savings, and replaced by $\bar{C}_M - \bar{C}_F$ in the case of the breakdown of access to credit. The explanatory variables in these two cases of decomposition remaining the same as those in equation (9). This composition analysis is carried out both for access to formal and informal savings, as well as for access to formal and informal credit.

4. Description of variables

4.1. Dependent variables

Based on data from the Global Findex survey (2021), and particularly the responses concerning the use of formal and informal financial services, we construct the two dependent variables relating to formal access (FA) and informal access (IA). They represent the different forms of access individuals have to financial services. These variables are binary. They are coded 1 if the respondent has saved or obtained a loan in the last 12 months in a formal financial institution and 0 if not (FA) and coded 1 if the respondent has saved or obtained a loan during the 12 last months in a tontine and 0 if not (IA). Variable A represents access to a financial service. For each of the multivariate decompositions, it will represent in turn: access to formal/informal savings (coded 1 if the respondent has saved in the last 12 months in a formal financial institution/tontine and 0 if not) ; access to formal/informal credit (coded 1 if the respondent obtained a loan during the last 12 months in a formal financial institution/tontine and 0 if not); access to a formal/informal account (coded 1 if the respondent has an account in a formal financial institution/is a member of a tontine and 0 if not).

4.2. Independent variables

The explanatory variables retained in this study are the variables *gender*, *age*, *primary*, *secondary* and *higher* (representing the level of education of the respondent), *very poor*, *poor*, *middle income*, *rich*, and *very rich* (representing the standard of living of the respondent), *active* (representing the activity status of the respondent), *urban* (representing the area of residence), *mobile money* (possession of a mobile money account) and *mobile phone* (possession of a mobile phone).

The *gender* variable is binary, it takes the value 0 if the individual questioned is a woman and 1 if he is a man. This variable considers the fact that certain categories of people have more access to financial services than others. Abbas (2022) shows that compared to men, women are less likely to access financial services. The *age* variable is continuous. It represents in completed years, the age of the individual surveyed. This variable makes it possible to take into account the possibility of a correlation between the age of individuals and their decision to access financial services or not. According to the hypothesis of the life cycle theory, we expect

a nonlinear effect of this variable on the probability of access to financial services. The *primary* variables (which takes the value 1 if respondent has completed primary school and 0 if not); *secondary* (takes the value of 1 if the respondent has completed secondary school and 0 if not) and *higher* (takes the value of 1 if the respondent has completed higher education and 0 if not) make it possible to take into account the influence of cognitive aspects on the probability of access to financial services. The work of Kumar *et al.* (2017); Rastogi and Ragabiruntha (2018) show that people with a high level of education are more likely to access financial services.

The variables *very poor*, *poor*, *intermediaries (or middle income)*, *rich* and *very rich* represent the standard of living of individuals. These variables correspond to the household income quintile to which the respondent belongs within the economy. Thus the *very poor* variable takes the value 1 if the respondent belongs to the 20% poorest households and 0 otherwise; the *poor* variable takes the value 1 if the respondent belongs to the 20% of poor households and 0 otherwise; the *intermediaries* variable which takes the value 1 if the respondent belongs to the 20% of households with an middle income and 0 otherwise; the *rich* variable takes the value 1 if the respondent belongs to the 20% of rich households and 0 otherwise and finally the *very rich* variable takes the value 1 if the respondent belongs to the 20% richest households and 0 otherwise. They make it possible to take into account the level of poverty/wealth of the respondent. The work of Soumaré *et al.* (2016) show that access to financial services increases with the level of income or wealth of the individual. Allen *et al.* (2016) find that rich people are more likely to access formal financial services. In the same way, the *active* variable which indicates whether the respondent belongs to the active population, in other words, if the latter has a job (it takes the value 1 if the respondent belongs to the active population and 0 otherwise), makes it possible to assess whether the respondent has a source of income or simply a job that can provide income that could facilitate access to financial services. The work of Johnson and Nino-Zarazua (2009) shows that people without income are less likely to access financial services.

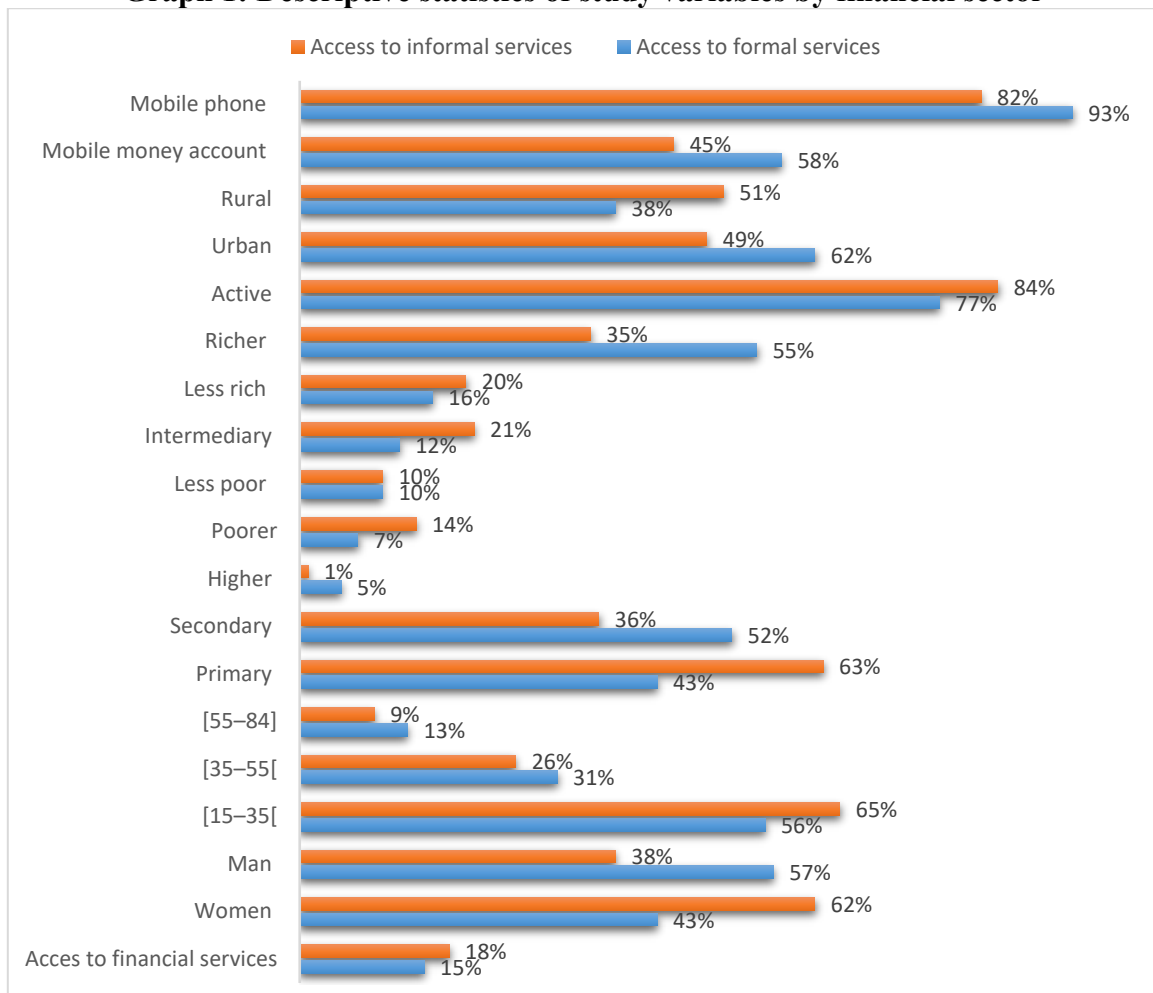
The *urban* variable that designates the respondent's area of residence is binary. It takes the value 1 if the respondent lives in an urban area and 0 if not. It makes it possible to take into consideration the fact that the concentration of financial institutions in urban areas can constitute an obstacle to access to financial services for people residing in underserved rural areas. Douanla and Fomba (2019) find that people residing in urban areas are more likely to access financial services compared to those residing in rural areas. The *mobile money* variable is also binary. It takes the value 1 if the respondent has a mobile money account and 0 if not. Tontines very often use mobile money to collect or receive membership fees, it is possible to establish a link between the possession of such a money mobile account and access to informal financial services. Similarly, the *mobile phone* variable is a binary variable (it takes the value 1 if the respondent has a mobile phone and 0 if not). The mobile phone being the medium of mobile money, it would be very likely that there is a link between its possession and the holding of a mobile money account and consequently access to informal services. However, it is likely that there is collinearity between the *mobile money* and *mobile phone* variables. Indeed, the possession of a mobile account by an individual may imply that the latter also has a mobile phone, even if it is possible to own a mobile phone and not have a mobile money account.

IV. Results and discussions

1. Descriptive statistics of study variables

Graphs 1 and 2 present the descriptive statistics (by financial sector and by gender respectively) of the variables retained for our analyses. The first reveals a very low rate of financial inclusion (both formal and informal) in our sample, probably due to the existence of numerous constraints emanating from both supply (high cost of services, very restrictive documentary requirements, concentration of credit institutions etc.) and demand (financial illiteracy, lack of trust in financial institutions, cultural or religious factors etc.) for financial services in Burkina Faso. Indeed, if only 15% of respondents declare having access to formal financial services, 18% declare having access to informal financial services.

Graph 1: Descriptive statistics of study variables by financial sector



Source: Authors using on Global Findex data (2021).

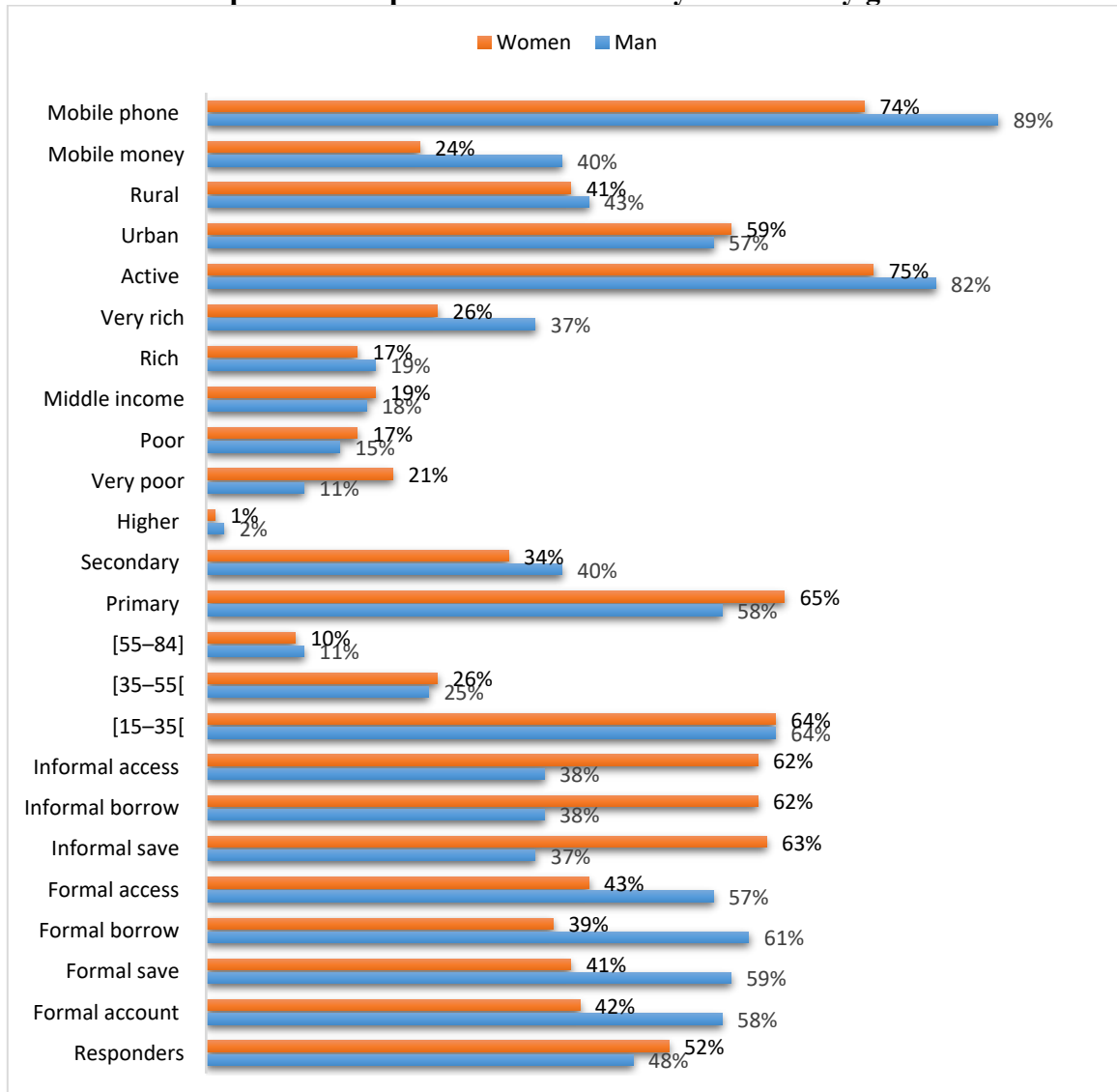
Analysis of access to financial services by gender of respondents indicates a preference of women for informal services. Indeed, while men are the majority in access to formal financial services (57% against 43% for women), women represent 62% (against only 38% for men) of

access to informal services. According to the second graph, men represent 58% of formal account ownership, 59% of formal savings and 61% of formal loans, while women represent 63% of informal savings and 62% of informal loans.

While this preference of women for informal financial services may reflect their self-exclusion from the formal financial sector due to a low perception of their creditworthiness (Morsy and Youssef, 2017) or the lack of financial education that most women suffer from in Burkina, it can also be explained by the more accessible nature of informal financial services, particularly informal credit which represents the main source of financing women's economic activities (Lelart, 2002).

The analysis according to the age of respondents shows that respondents belonging to the [15-35 years] bracket have most of the access to financial services, whether formal (56%) or informal (65%). Next come those in the [15-35 years] bracket (representing 31% formal access and 26% informal access). The analysis by gender (graph 2) also shows that our sample is mainly composed of individuals belonging to the [15-35 years] bracket with an equal proportion of men and women, i.e. 64%, followed by individuals belonging to the segment of [35-55 years] where there are 25% men and 26% women. These two age groups correspond to the age groups of persons belonging to the active population. In other words, people with a job and therefore an income enabling them to access financial services. This last explanation is confirmed with regard to the results of the analysis of access to financial services according to the activity status of the respondents. They show that active people (mainly men as shown in graph 2) have the majority of access to financial services in Burkina Faso (ie 77% for formal access and 84% for informal access).

Graph 2: Descriptive statistics of study variables by gender



Source: Authors using on Global Findex data (2021).

The analysis also reveals high rates of access to financial services in urban areas (i.e. 77% for formal services and 84% for informal services), which could be explained by the high concentration of financial institutions, as well as than the populations of these areas to the detriment of poorly served and sparsely populated rural areas due to the exodus to the big cities. Analysis by gender of respondents shows that there are almost as many men as women in urban areas (57% and 59% respectively) as in rural areas (43% and 41% respectively). We also note that people with a mobile phone mostly access financial services. Indeed, while 93% of respondents with a mobile phone say they have access to formal financial services, 82% of them

access informal financial services. This result can find an explanation in the offer of financial services via the mobile phone. Because indeed the mobile phone operators, in partnership or not with financial institutions, offer the possibility of accessing various financial services from a mobile phone. Compared to women, men mostly own mobile phones (74% versus 89% respectively).

Analysis of access to financial services according to respondents' standard of living reveals higher access rates among the rich (55% formal access and 35% informal access for the rich; 16% formal access and 20% informal access for the less wealthy) and lower among the poor (7% formal access and 14% informal access for the poorest; 10% formal access and 10% informal access for the less poor). This result may explain the cost constraints of access to financial services. Indeed, the costs applied to financial services condition access to financial services and represent a barrier to access for people with low incomes or those with no income. An analysis by gender shows that compared to men (11% of the very poor) women are more represented in the group of very poor people (i.e. 21%), while men (37% of the very rich) in the group of very wealthy people compared to women. This could explain their poor access to often expensive formal financial services.

Table A (in the appendix) complements this descriptive analysis by presenting descriptive statistics for the variables in our study sample. It shows that, on average, 14.6% of respondents have access to formal financial services, 17.6% to informal financial services, and 27.6% to both types of financial services. Regarding access to savings, the sample reveals that 10.9% of respondents have access to formal savings, 17.6% to informal savings, and 27.6% to both types of savings. As for credit, access to formal credit concerns only 6.6% of those surveyed, 4.2% for informal credit, and 10.1% for both types of credit. The distribution of our sample by gender shows that it is made up of 47.6% men. The average age is 32 years. Regarding educational level, the sample is predominantly composed of people with a low level of education. Indeed, while 61.6% of respondents have a primary school education, 37.3% have a secondary school education, and only 0.1% have a higher education. Regarding standard of living, the analysis reveals that 15.9% of respondents belong to the poorest category, 16.3% to the lower-middle income category, 18.6% to the middle-income category, 17.9% to the upper-middle income category, and 31.3% to the wealthiest category. 18.5% of respondents are part of the workforce; 58% live in urban areas; 81.4% own a mobile phone, and 31.5% have a mobile money account.

2. Analysis of the influence of gender on access to financial services

2.1. Taking into account the influence of the gender variable

Table 1 presents the results of logistic regressions of access to formal financial services (column 1), access to informal financial services (column 2) and access to both forms of financial services at the same time (column 3). The tests carried out post-estimation of the two access models (figure A in the appendix) confirm the good predictive quality of the models. Indeed, the area under the curve is equal to 0.74 for access to formal financial services, 0.66 for access to informal financial services and 0.70 for access to both forms of financial services. A multicollinearity test between the independent variables makes it possible to decide on the collinearity that may exist between these two variables. This classic approach is to look at the

variance inflation factor (VIF). Based on the decision rule for this test, variables with a VIF value greater than 10 may warrant further investigation. The multicollinearity test performed (Table B in the appendix) demonstrates the low degree of collinearity between the independent variables of our analysis model. Because no VIF value is greater than 10 and the average VIF is 1.36. A correlation test between the independent variables (Table C in the appendix) completes this analysis. It provides a correlation coefficient of 0.26 between the two variables, reflecting a low correlation between them.

When we look at the variable designating the sex of the individual, we see that, compared to men, women are more likely to access informal financial services. Indeed, the coefficient associated with the woman variable turns out to be positive and significant at 1%. If this result agrees with those of several studies (Johnson et al. 2010; Adebite and Machethe, 2020; Akhter and Cheng, 2020), it therefore supports the idea of women's financial behavior oriented towards the informal financial sector. Loaba (2022) or Douanla *et al.* (2023) note that, given the requirements imposed by formal financial institutions and their aversion to risk, women anticipate the decisions of these establishments and prefer to self-exclude or simply resort to the informal finance they find more flexible and above all more adapted to their activities. In other words, the latter have a strong preference for informal finance which they find less risky (compared to formal finance) and more suited to their activities (small activities very often requiring own funds or small capital easily available in the informal circuits). This choice for informal services would therefore be strongly dictated by the numerous advantages that informal finance provides to women. Indeed, in addition to offering extremely varied services (deposits, loans of small amounts, loans of short duration, etc.), transactions in this sector are based on the trust born from the personal relationships that these women maintain among themselves. Generally, no guarantee is required (the guarantee of a debt being ensured by the past behavior of the borrower in terms of repayment, personal good faith and social pressure to maintain payments) and flexibility in level of interest rates applied allows the lender to cover the opportunity cost of the funds committed and the risk of payment default. Informal financial services would therefore represent an opportunity and an alternative for financing the activities and empowering these women. This result confirms our first hypothesis regarding women's access to informal financial services.

When we look at the probability of access to both forms of financial services (column 3), we see that compared to men, women also have more chances of accessing both forms of financial services at the same time (the coefficient associated with the woman variable is positive and statistically significant at 5%). In other words, the chances of accessing both formal and informal financial services would be higher for women. This situation can find a relationship in the relationship between these two financial sectors and the socio-economic situation of women in Burkina Faso. Indeed, due to the lack of income and the constraints of formal credit establishments, women would be more attracted by informal credit to finance their economic activities. Once this activity is stable and generating significant income, they would be tempted to go to formal establishments either to save their money or to ask for credit. This latter result can also be explained by the greater representation of women in the sub-sample of respondents with access to both forms of financial services. They represent more than half of the people with access to both formal and informal services (i.e. 54%).

Table 1: Results of estimation of Logit models of access to formal and informal financial services in Burkina Faso

Variable	(1) Formal financial services	(2) Informal financial services	(3) Formal and Informal financial services
	dy/dx (Std.Err)	dy/dx (Std.Err)	dy/dx (Std.Err)
Women (ref.=men)	-0.0036 (0.0201)	0.0928*** (0.0237)	0.0745** (0.0295)
Men	Ref	Ref	Ref
[15 – 35[	-0.0861** (0.0388)	0.0088 (0.0417)	-0.1011** (0.0522)
[35 – 55 [	-0.0204 (0.0315)	-0.0034 (0.0449)	-0.0414 (0.0495)
[55 – 84]	Ref	Ref	Ref
Primary (ref.= higher)	-0.1928** (0.0968)	0.1629 (0.1234)	-0.1607 (0.1364)
Secondary	-0.1106* (0.0579)	0.1295 (0.1692)	-0.1389 (0.1127)
Higher	Ref	Ref	Ref
Poorer	-0.0706*** (0.0235)	-0.0417 (0.0337)	-0.1171*** (0.0381)
Less poor	-0.0589** (0.0229)	-0.0730** (0.0300)	-0.1456*** (0.0344)
Intermediaries	-0.0680*** (0.0208)	-0.0002 (0.0334)	-0.0668* (0.0368)
Less rich	-0.0527** (0.0207)	-0.0045 (0.0327)	-0.0589 (0.0366)
Richer	Ref	Ref	Ref
Active	0.0084 (0.0234)	0.0624** (0.0254)	0.0671** (0.0328)
Urban	-0.0290 (0.0231)	-0.0537** (0.0273)	-0.0815** (0.0332)
Rural	Ref	Ref	Ref
Mobile phone	0.0428 (0.0286)	-0.0190 (0.0341)	0.0043 (0.0422)
Mobile money	0.1155*** (0.0271)	0.1278*** (0.0306)	0.2111*** (0.0350)
Number of observation:	1,000	1,000	1,000
Marginal effects after Logit:	y = Pr (Formal) (predict) = 0.11371792	y = Pr (Informal) (predict) = 0.15885476	y = Pr (Formal Informal) (predict) = 0.25348213

Source: Authors using Global Findex data (2021). *** Significant at 1%; ** Significant at 5%, * Significant at 10%.

The analysis of the Age variable reveals a negative discriminating effect (and significant at 5%) of the age group of [15-35] years, both on the probability of access to formal financial services (column 1) and on the probability of access to the two forms of financial services (column 3). In other words, compared to older individuals, individuals in this age group are less likely to access both formal financial services and both forms of financial services at the same time. If this result can be explained by the lack of income of people belonging to this age category in Burkina Faso, it also reflects the employment situation of the latter. Indeed, the results of an

INSD survey (2020) indicate higher unemployment rates among young Burkinabé people. According to this survey, the unemployment rate and the number of unemployed people drop sharply when the age of individuals increases: In fact, 50% of the unemployed are aged 15 to 24, and the unemployment rate rises to 15.8% in the population aged 15 to 24. At the same time, 23% of the unemployed are aged 25 to 34, and the unemployment rate in this range stands at 9.2%. Those aged 65 and over have the lowest numbers and unemployment rates. In fact, 3.4% of the unemployed are at least 65 years old, and the unemployment rate in this sub-population is 6.1%. Thus, young people (mostly unemployed) would not have income that would allow them to access financial services. These explanations can be confirmed with regard to the analysis of variables relating to the standard of living of individuals. We find that, unlike wealthier people, poorer, middle-income and less wealthy people are less likely to access formal financial services and both forms of services at the same time. In addition, the probability of accessing both types of financial services is low for the least wealthy individuals.

If these results reflect the need to have income to access financial services, they are similar to those of the work of Loaba (2022) in West Africa and Douanla *et al.* (2023) conducted in Cameroon, which revealed that activity status (having a job), a high standard of living and age increase the chances of accessing financial services. This last result can also be confirmed with regard to the sign and significance of the coefficient of the active variable in the estimation of the equations of access to informal financial services and access to both forms of financial services at the same time. We can see that the active variable exerts a positive and significant influence at 5% (column 2 and 3). In other words, active or employed people are more likely to access informal financial services and both forms of financial services at the same time.

The analyzes also reveal that the primary and secondary variables, relating to the education level of individuals, reduce the probability of access to formal financial services. Indeed, the coefficient associated with this variable is negative and statistically significant at the 5% level (and 10% for the secondary variable). In other words, compared to people with higher levels of education, those with primary and secondary education are less likely to access formal financial services. This result, which reveals the importance of cognitive factors in access to financial services, is similar to that found by the work of Arora (2012). The author finds that individuals with a low level of education generally have low financial education and are therefore less likely to access formal financial services. The results also show that having a mobile money account has the effect of increasing the probability of access to both types of financial services (the coefficients associated with the mobile money variable are positive and significant at 1% as well as at (1) than in (2) than (3)). In other words, people with a mobile account are more likely to access financial services. This result can explain the possibility of providing financial services via mobile money, both in the formal (bank account consultation, savings or deposit of money into a bank account, money transfers, etc.) and informal sectors. (Storage/deposit of money, transfers, receiving money, etc.).

2.2. Taking into account the interactions between relevant variables explaining access to financial services

Concerning the analysis of the interaction between the *gender* variable and the *higher* variable (table 2) on the one hand and between the *gender* variable and the *active* variable (Table 3) on

the other hand, we note that compared to men not having a higher level of education, women not having a higher level of education are more likely to access informal financial services (column 2 of Table 2). Table 3 indicates that, compared to men, working women are more likely to access informal financial services (column 2). These results can be explained by women's preference for informal financial channels, which they find more accessible and less restrictive. In line with this, several studies show that compared to men, women tend to have greater access to informal financial services due to either a low perception of their solvency (Morsy *et al*, 2019), or risk aversion (Reichert *et al*, 2021), or their low level of education (Mukong *et al*, 2020).

Table 2: Results of estimation of Logit models of access to formal and informal financial services: interaction between gender and higher variables

Variable	(1) Formal financial services		(2) Informal financial services		(3) Formal and Informal financial services	
	Coef	(Std.Err)	Coef	(Std.Err)	Coef	(Std.Err)
Women#Higher						
Men#Higher	1.2467	(0.7589)	0	(empty)	0.8221	(0.7545)
Women#Not higher	-0.0540	(0.2010)	0.6889***	(0.1831)	0.3966**	(0.1593)
Women#Higher	1.5293	(1.3093)	0.7695	(1.2869)	1.0744	(1.3318)
Men#Not higher	Ref	Ref	Ref	Ref	Ref	Ref
[15 – 35[	-0.6546**	(0.3130)	-0.0420	(0.3115)	-0.5049*	(0.2551)
[35 – 55 [	-0.1894	(0.3375)	-0.0301	(0.3385)	-0.2237	(0.2775)
[55 – 84]	Ref	Ref	Ref	Ref	Ref	Ref
Poorer	-0.9542**	(0.3697)	-0.2393	(0.2936)	-0.7134***	(0.2639)
Less poor	-0.7691**	(0.3236)	-0.5589*	(0.3054)	-0.9165***	(0.2617)
Intermediaries	-0.8688***	(0.3025)	0.0630	(0.2480)	-0.3811*	(0.2198)
Less rich	-0.6802**	(0.2728)	0.0551	(0.2453)	-0.3373	(0.2141)
Richer	Ref	Ref	Ref	Ref	Ref	Ref
Active	0.0435	(0.2394)	0.5374**	(0.2341)	0.3718*	(0.1947)
Urban	-0.3875*	(0.2128)	-0.2837	(0.1897)	-0.4351	(0.1651)
Rural	Ref	Ref	Ref	Ref	Ref	Ref
Mobile phone	0.5204	(0.3619)	-0.1748	(0.2400)	-0.0187	(0.2208)
Mobile money	1.0331***	(0.2033)	0.7988***	(0.1881)	1.0386***	(0.1638)
Constant	-1.5592***	(0.4842)	-2.2280***	(0.4235)	-0.8715**	(0.3545)
Number of observation :		1,000		992		1,000
LR chi2 (13) :		101.45		47.35		105.64
Prob > chi2 :		0.0000		0.0000		0.0000
Pseudo R2 :		0.1220		0.0511		0.0897

Source: Authors using Global Findex data (2021). *** Significant at 1%; ** Significant at 5%, * Significant at 10%.

Table 3: Results of estimation of Logit models of access to formal and informal financial services: interaction between gender and active variables

Variable	(1) Formal financial services		(2) Informal financial services		(3) Formal and Informal financial services	
	Coef	(Std.Err)	Coef	(Std.Err)	Coef	(Std.Err)

Women#Active						
Men#Active	0.2740	(0.3472)	0.2842	(0.3768)	0.2832	(0.2950)
Women#Not Active	0.2571	(0.4281)	0.3943	(0.4375)	0.2666	(0.3528)
Women#Active	0.1625	(0.3636)	1.0406***	(0.3727)	0.7082**	(0.3002)
Men#Not active	Ref	Ref	Ref	Ref	Ref	Ref
[15 – 35[	-0.7900**	(0.3223)	0.0774	(0.3170)	-0.5129**	(0.2598)
[35 – 55 [	-0.2092	(0.3380)	-0.0225	(0.3396)	-0.2258	(0.2777)
[55 – 84]	Ref	Ref	Ref	Ref	Ref	Ref
Primary	-1.6555**	(0.6820)	1.3815	(1.0906)	-0.7948	(0.6737)
Secondary	-1.2461*	(0.6661)	0.9427	(1.0848)	-0.7521	(0.6660)
Higher	Ref	Ref	Ref	Ref	Ref	Ref
Poorer	-0.8707**	(0.3728)	-0.3434	(0.2977)	-0.7066***	(0.2666)
Less poor	-0.6935**	(0.3266)	-0.6410**	(0.3080)	-0.9120***	(0.2634)
Intermediaries	-0.8052***	(0.3045)	-0.0152	(0.2511)	-0.3812**	(0.2215)
Less rich	-0.6001**	(0.2763)	-0.0403	(0.2491)	-0.3317	(0.2167)
Richer	Ref	Ref	Ref	Ref	Ref	Ref
Urban	-0.2723	(0.2219)	-0.3973**	(0.1966)	-0.4275**	(0.1711)
Rural	Ref	Ref	Ref	Ref	Ref	Ref
Mobile phone	0.4939	(0.3642)	-0.1492	(0.2414)	-0.0286	(0.2218)
Mobile money	1.0045***	(0.2068)	0.8523***	(0.1909)	1.0285***	(0.1656)
Constant	-0.2667	(0.7903)	-3.2336	(1.1411)	-0.0080	(0.7224)
Number of observation :	1,000		1,000		1,000	
LR chi2 (14) :	105.26		53.80		105.86	
Prob > chi2 :	0.0000		0.0000		0.0000	
Pseudo R2 :	0.1266		0.0578		0.0898	

Source: Authors using Global Findex data (2021). *** Significant at 1%; ** Significant at 5%, * Significant at 10%.

3. Analysis of gender gaps in access to formal and informal financial services

The results of the decomposition of the gaps in access to formal (column 1) and informal (column 2) financial services and to these two forms of services (column 3), resulting from the estimation of equation (9) are presented in Table 4. This presents the effects of differences in endowments or characteristics (the explained part (E)), differences in coefficients (the unexplained part (C)), as well as the interaction of the differences (R). The positive or negative sign of the coefficients E_k , C_k reflects a reduction or increase in the gaps between men and women.

Table 4: Results of the multivariate decomposition of gaps in access to formal and informal financial services in Burkina Faso

Decomposition by gender: Men as comparison	(1) Access to formal financial services		(2) Access to informal financial services		(3) Formal and Informal financial services	
	Coef (Std.Err)	Contributi on (%)	Coef (Std.Err)	Contributi on (%)	Coef (Std.Err)	Contributi on (%)
Due to Difference in Characteristics/Endowments (E)	-0.05821*** (0.01083)	107	-0.05062*** (0.01177)	-71	-0.07765*** (0.01177)	-815
Due to Difference in Coefficients/Coefficients effect (C)	0.00407 (0.02590)	-7	0.12187*** (0.03022)	171	0.08718*** (0.03022)	915
Interaction (R) R= E+C	-0.05414** (0.02097)	100	0.07125*** (0.02300)	100	0.00953 (0.02655)	100
Number of observation	1,000		1,000		1,000	

<i>Due to Difference in Characteristics/Endowments (E)</i>						
Variable	Coef	(Std.Err)	Coef	(Std.Err)	Coef	(Std.Err)
[15 – 35[	-0.00025*	(0.00014)	0.00003	(0.00017)	-0.00019	(0.00017)
[35 – 55 [	-0.00098	(0.00139)	0.00037	(0.00177)	-0.00098	(0.00181)
Primary	-0.01819	(0.01241)	0.00188	(0.01615)	-0.01171	(0.01989)
Secondary	0.01163	(0.01013)	0.00056	(0.01348)	0.00806	(0.01657)
Poorer	-0.01718**	(0.00675)	-0.00864	(0.00664)	-0.01868***	(0.00715)
Less poor	-0.00089	(0.00104)	-0.00293**	(0.00133)	-0.00393***	(0.00715)
Intermediaries	-0.00105	(0.00098)	-0.00025	(0.00106)	-0.00125	(0.00116)
Less rich	0.00192	(0.00135)	0.00068	(0.00141)	0.00248	(0.00156)
Active	0.00200	(0.00307)	-0.00635*	(0.00349)	-0.00481	(0.00379)
Urban	0.00042	(0.00086)	0.00035	(0.00094)	0.00002	(0.00102)
Mobile phone	-0.00608	(0.00795)	0.00005	(0.00767)	-0.00187	(0.00843)
Mobile money	-0.02956	(0.00790)	-0.03637***	(0.00818)	-0.04479***	(0.00833)
<i>Due to Difference in Coefficients/Coefficients effect (C)</i>						
[15 – 35[	-0.01064	(0.09649)	-0.00193	(0.08081)	0.02157	(0.06402)
[35 – 55 [	-0.01033	(0.05950)	0.00388	(0.13108)	-0.00367	(0.02619)
Primary	-0.05720	(0.33410)	-1.10306	(103.556)	-0.01531	(0.17537)
Secondary	-0.02940	(0.18050)	-0.73887	(72.9902)	0.01041	(0.12089)
Poorer	-0.01592	(0.08358)	-0.00241	(0.08075)	-0.00572	(0.01149)
Less poor	0.01732	(0.08561)	-0.01048	(0.35012)	-0.00608	(0.01612)
Intermediaries	0.02099	(0.10345)	-0.00314	(0.10545)	0.00565	(0.01531)
Less rich	-0.00176	(0.02089)	-0.00452	(0.15121)	-0.01058	(0.01615)
Active	-0.06357	(0.32993)	0.01674	(0.56087)	0.00263	(0.06260)
Urban	0.06818	(0.34521)	0.08106	(2.70657)	0.09755***	(0.03690)
Mobile phone	-0.09153	(0.44654)	0.05384	(1.79843)	0.04173	(0.08263)
Mobile money	0.04694	(0.25181)	0.04173	(1.39335)	0.03803	(0.02803)
Constant	0.13097	(0.70098)	1.78904	(182.382)	-0.08904	(0.31550)

Source: Authors using Global Findex data (2021). *** Significant at 1%; ** Significant at 5%, * Significant at 10%.

Column 1 of Table 4 shows that there is a gap (statistically significant at 5%) in access to formal financial services between men and women in Burkina Faso. This access gap is mainly attributed to differences in characteristics or endowments between the two groups (i.e. a contribution of 107% to this gap). In other words, unlike men, women have characteristics or endowments that limit their access to formal financial services, thus widening the gap between the two groups. The analysis therefore reveals that age ([15-35]) and standard of living (poorer) are the factors that contribute to increasing the gaps between men and women in access to formal financial services. This result is similar to those obtained by Loaba (2022) who notes that in West Africa, there is a gap in access to formal accounts between men and women, explained mainly by differences in characteristics, namely: income level and employment status. Moving in this direction, the work of Abdu et al. (2015) show that a low standard of living or lack of income is an important factor in explaining the gender gap in financial inclusion. In other words, formal financial services requiring a cost, and women's lack of income due to their unfavorable socio-economic situation, constituted a real obstacle to access. The gap in access to formal financial services explained by the age of women could also find

explanations in the lack of income of women belonging to this age group. Indeed, in addition to the high youth unemployment rate observed in Burkina Faso (50% of the unemployed are aged 15 to 24 (INSD (2020))), unlike young men, young women carry out less income-generating activities and are generally affected household chores.

Column 2 presents the results of the decomposition of differences in access to informal financial services between the two groups studied. The results show that there is also a gap in access (statistically significant at 1%) to informal financial services between the two sexes, and mainly attributed to differences in coefficients, representing a contribution of 171% to this gap, while 71% of most of the gap is attributed to differences in characteristics between the two groups. The analysis reveals that standard of living (poorer), activity status (active) and possession of a mobile money account are the main factors which accentuate the gaps in access to informal financial services between sexes. In other words, attributing these same characteristics to women, particularly in terms of standard of living, activity status and possession of mobile money accounts, would lead to a significant reduction in the gaps in access to informal financial services between the two groups in Burkina Faso. The results contained in columns 1 and 2 allow us to confirm our second study hypothesis. Finally, the analysis of column 3 shows that there is no significant difference between men and women regarding access to both forms of financial services at the same time. Indeed, the interaction term (0.00953) does not turn out to be significant. Such a result could indicate that: the likely gap between men and women in access to both forms of financial services could be due to a change in behavior, rather than a change in composition of the sample. In other words, the gap could be explained by the fact that women are more inclined to use only one form of financial services compared to men.

Table D in the appendix presents the results of the estimation of equation (11), representing the robustness analysis of the decomposition of access to formal and informal financial services between men and women. The results obtained from this analysis present similar trends to those obtained by multivariate decomposition. Indeed, the Fairlie decomposition shows that there is also a gap in access to formal financial services and that this is also mainly explained by the differences in characteristics observed between the two groups. Also, similar to the results in Table 4, this analysis reveals a gender gap in access to informal financial services. This is mainly attributable to unobserved characteristics between the two groups.

Table 5 presents a summary of the results of the decomposition of the gaps in access to savings and formal and informal credit. As for the analysis of savings, column 1 shows that there is a gap (statistically significant at 1%) in access to formal savings between men and women. A gap mainly attributable to differences in characteristics between these two groups (i.e. a contribution of 114% to this gap). In other words, unlike men, women have characteristics or endowments that limit their access to formal savings. As for access to informal savings (column 2), the analysis reveals that there is also a gap (statistically significant at 1%) between the two groups, attributable this time to differences in coefficients (i.e. a contribution of 171% to this gap), while -71% of this gap is attributed to differences in the characteristics of the two groups. Thus, attributing the same characteristics to women would lead to a significant reduction in the gaps in access to savings between these two groups. Finally, this analysis does not reveal any gap between the sexes with regard to access to the two forms of savings (the interaction term being not significant).

Table 5: Results of the multivariate decomposition of the gaps in access to formal and informal savings and credit in Burkina Faso

<i>Decomposition by gender: Men as comparison</i>	(1)		(2)		(3)	
	Access to formal savings		Access to informal savings		Access to formal and informal savings	
	Coef (Std.Err)	Contribution (%)	Coef (Std.Err)	Contribution (%)	Coef (Std.Err)	Contribution (%)
Due to Difference in Characteristics/Endowments (E)	-0.05542*** (0.01065)	114	-0.05062*** (0.01145)	-71	-0.07716*** (0.01178)	-351
Due to Difference in Coefficients/Coefficients effect (C)	0.00685 (0.02373)	-14	0.12187*** (0.02732)	171	0.09911*** (0.02954)	451
Interaction (R) R= E+C	-0.04858*** (0.01818)	100	0.07125*** (0.02300)	100	0.02195 (0.02561)	100
Number of observation	1,000		1,000		1,000	
	Access to formal credit		Access to informal credit		Access to formal and informal credit	
	Coef (Std.Err)	Contribution (%)	Coef (Std.Err)	Contribution (%)	Coef (Std.Err)	Contribution (%)
	Coef (Std.Err)	Contribution (%)	Coef (Std.Err)	Contribution (%)	Coef (Std.Err)	Contribution (%)
Due to Difference in Characteristics/Endowments (E)	-0.01804** (0.00763)	52	-0.00870 (0.00649)	-54	-0.02392*** (0.00905)	151
Due to Difference in Coefficients/Coefficients effect (C)	-0.01638 (0.01882)	48	0.02471* (0.01492)	154	0.00818 (0.02227)	-51
Interaction (R) R= E+C	-0.03441** (0.01548)	100	0.01600 (0.01237)	100	-0.01574 (0.01868)	100
Number of observation	1,000		1,000		1,000	

*Source: Authors using Global Findex data (2021). *** Significant at 1%; ** Significant at 5%, * Significant at 10%.*

Column 1 of Table 5 shows that there is a gap (statistically significant at 5%) in access to formal credit between men and women. A gap mainly attributable to differences in characteristics between these two groups (i.e. a contribution of 52% to this gap). In other words, unlike men, women have characteristics or endowments that limit their access to formal credit. The breakdown of access to informal credit (column 2) and to both forms of credit at the same time (column 3) reveals no gap between men and women (the interaction terms for these last two analyzes being non-significant).

V. Conclusion and recommendations

This study aimed to contribute to the empirical literature on differences between men and women in terms of financial inclusion in Burkina Faso, by analyzing in turn the influence of gender on access to formal and informal financial services and to the analysis of gender differences in access to these two forms of financial services, based on Global Findex (2021) data, collected from 1000 households by the World Bank group.

The results of logistic regressions indicate that, compared to men, women are more likely to access not only informal financial services, but also both forms of financial services at the same time. Among other things, these analyzes reveal that the probability of access to formal financial services depends on age (younger people have less chance of access), a high level of education (people with a lower education level primary and secondary education with fewer chances of access), a high standard of living and possession of a mobile money account. Regarding the probability of accessing informal financial services, the analysis reveals that it depends on the age of the respondent, a high standard of living, their activity status (people belong to the active population having more chances of access) and possession of a mobile money account. Finally, the probability of access to both forms of financial services at the same time is conditioned by the age of the respondent, a high standard of living, activity status and possession of a mobile money account.

The results of the multivariate decomposition reveal, on the one hand, the existence of gaps in access to the two forms of financial services between men and women. These gaps are explained mainly by differences in characteristics between the two groups (107%), with regard to access to formal financial services and by differences in coefficient (171%) with regard to access to informal financial services. On the other hand, there are gaps in access to both forms of savings between the sexes. These gaps are mainly attributed to differences in characteristics between the two groups (114%), with regard to access to formal savings and attributed to differences in coefficient (171%) with regard to access to informal savings. Concerning access to formal credit, this analysis reveals the existence of a gap between the sexes, 52% explained by the differences in characteristics between the two groups.

These results prove important for the implementation of measures aimed at reducing the gaps between men and women in terms of financial inclusion in Burkina Faso. The results suggest that differences in endowments, notably women's low level of education and their low standard of living, increase the gaps in access to formal financial services between the sexes. These characteristics, which can respectively explain a lack of financial education among women and the low economic empowerment of the latter, call upon public authorities to establish strategies

aimed initially at significantly improve the level of education of Burkinabe women in general, and of young girls in particular. This can involve not only additional investments (both in terms of infrastructure and quality of education) in the education of young girls and women, but also through the establishment for them, incentive measures (the reduction or exemption of school fees, the provision of textbooks, the offer of scholarships, school sponsorship strategies to limit dropouts, etc.) for their schooling. This promotion of women's education also involves raising awareness among community and religious leaders, parents and learners of both sexes, on gender issues and the importance of women's education in Burkinabe society.

A second measure would consist of establishing strategies to promote the economic empowerment of women (a guarantee of a decent income essential to access to financial services). This could involve establishing employment policies in favor of women through training programs, subsidies or incentive measures aimed at encouraging their initiatives in business creation. And to ensure respect and application of non-discriminatory practices towards women in the labor market.

Another result of this study suggests that in Burkina Faso, women are more likely to access informal financial services, the access conditions of which are less restrictive and more flexible for them. The informal financial sector and particularly the tontines would therefore represent the main source of financing for their activities and would therefore actively participate in their empowerment. Such a result calls for the establishment of mechanisms allowing a greater number of women excluded from formal finance to join the tontine, which represents an alternative source of financing their activities. This could therefore involve setting up awareness and information campaigns on tontine services, aimed at groups still reluctant to practice tontine. More specifically, the aim is to inform them about the different products offered by the tontine and the advantages of joining such an organization, particularly in terms of empowerment. It could also involve the use of digital platforms and tools in this sector, with the aim of facilitating the use of tontine services. In other words, thanks to digital tools, it is a matter of giving the members of a tontine the opportunity to pay their contributions, to receive their funds in complete security and on time and to have information on time real information on the progress of the tontine thanks to notification messages without however traveling to a gathering place.

However, this study has a major limitation: the instantaneous cross-sectional structure of this study exposes it to a cohort bias linked to the fact that the results obtained may represent a phenomenon that occurred only during the year of data collection (i.e. in 2021) and whose temporal validity remains questionable.

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Annex

Table A: Descriptive statistics of study variables

Variable	Observation	Mean	Std. Dev.	Min	Max
Formal access	1,000	0.146	0.353	0	1
Informal access	1,000	0.176	0.381	0	1
Formal and informal access	1,000	0.276	0.447	0	1
Formal savings	1,000	0.109	0.311	0	1
Informal savings	1,000	0.176	0.381	0	1
Formal and informal savings	1,000	0.251	0.433	0	1
Formal credit	1,000	0.066	0.248	0	1
Informal credit	1,000	0.042	0.201	0	1
Formal and informal credit	1,000	0.101	0.301	0	1
Men	1,000	0.476	0.499	0	1
Age	1,000	32.782	14.773	15	90
Primary	1,000	0.616	0.486	0	1
Secondary	1,000	0.373	0.483	0	1
Higher	1,000	0.011	0.104	0	1
Poorer	1,000	0.159	0.365	0	1
Less poor	1,000	0.163	0.369	0	1
Intermediaries	1,000	0.186	0.389	0	1
Less rich	1,000	0.179	0.383	0	1

Richer	1,000	0.313	0.463	0	1
Active person	1,000	0.785	0.411	0	1
Urban area	1,000	0.58	0.493	0	1
Mobile phone	1,000	0.814	0.389	0	1
Mobile money	1,000	0.315	0.464	0	1

Source: Authors using Global Findex data (2021).

Table B: Multicollinearity test between independent variables

Variable	VIF	1/VIF
Men	1.09	0.919081
Age	1.09	0.916201
Primary	1.06	0.942201
Higher	1.33	0.751009
Poorer	1.70	0.589476
Less poor	1.65	0.607784
Intermediaries	1.68	0.594861
Richer	1.99	0.501885
Active person	1.05	0.949644
Urban area	1.33	0.749441
Mobile phone	1.16	0.865413
Mobile money	1.17	0.853867
Mean VIF	1.36	

Source: Authors using Global Findex data (2021).

Table C: Correlation between independent variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)Men	1.000													
(2)Age	0.034	1.000												
(3)Primary	-0.070*	0.233*	1.000											
(4)Secondary	0.059	-0.254*	-0.976*	1.000										
(5)Higher	0.053	0.0879*	-0.133*	-0.081*	1.000									
(6)Poorer	-0.140*	0.002	0.185*	-0.177*	-0.045	1.000								
(7)Less poor	-0.024	0.029	0.086*	-0.077*	-0.046	-0.191*	1.000							
(8)Intermediaries	-0.023	-0.041	0.033	-0.023	-0.050	-0.207*	-0.210*	1.000						
(9)Less rich	0.030	0.031	0.057	-0.052	-0.024	-0.203*	-0.206*	-0.223*	1.000					
(10)Richer	0.125*	-0.017	-0.291*	0.264*	0.135*	-0.293*	-0.297*	-0.322*	-0.315*	1.000				
(11)Urban	-0.020	0.019	0.369*	-0.349*	-0.104*	0.253*	0.150*	0.057	-0.051	-0.325*	1.000			
(12)Active	0.845*	-0.043	0.082*	-0.069*	-0.061	0.021	0.020	0.025	-0.003	-0.050	0.136*	1.000		
(13)Mobile phone	0.193*	0.018	-0.181*	0.172*	0.050	-0.136*	-0.018	-0.068*	-0.004	0.184*	-0.162*	0.100*	1.000	
(14)Mobile money	0.177*	-0.048	-0.234*	0.215*	0.093*	-0.112*	-0.106*	-0.036	0.037	0.173*	-0.216*	0.045	0.263*	1.000

Source: Authors using Global Findex data (2021).

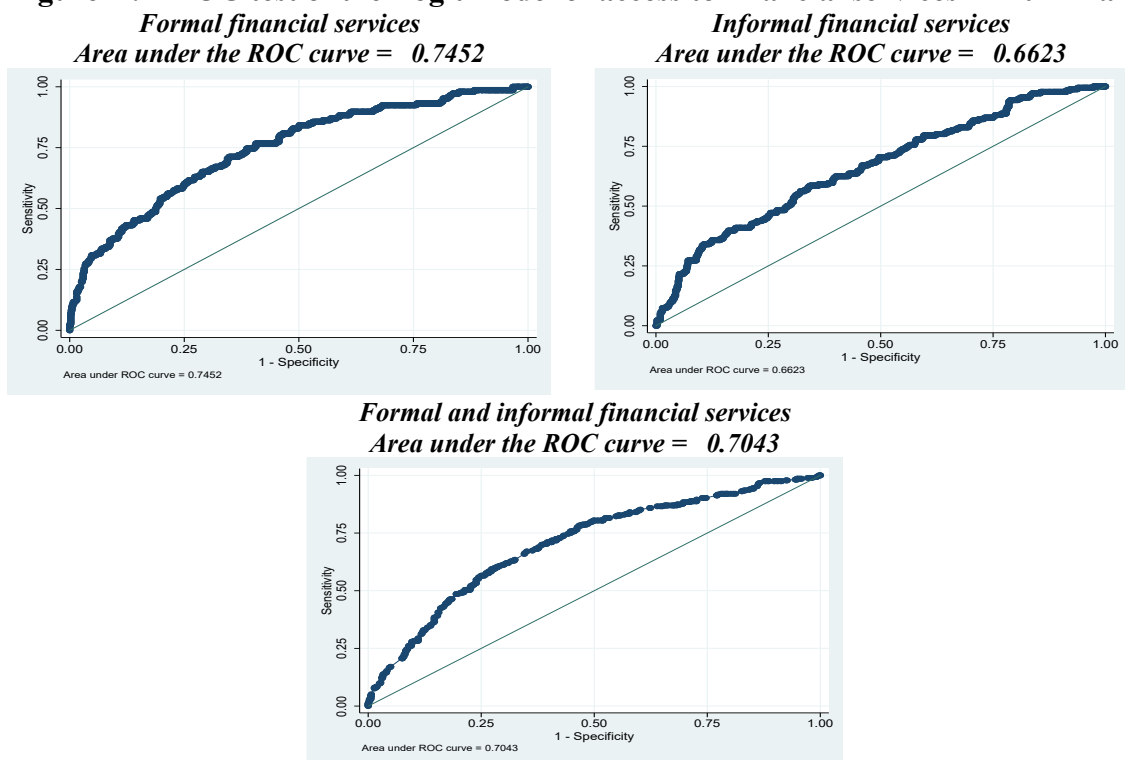
Table D: Results of the decomposition using the Fairlie method of the gaps in access to formal and informal financial services in Burkina Faso

Variable	(1) Access to formal financial services		(2) Access to informal financial services		(3) Formal and Informal financial services	
	Coef	(Std.Err)	Coef	(Std.Err)	Coef	(Std.Err)
[15 – 35]	-0.0100	(0.0086)	-0.00002	(0.0007)	-0.0055	(0.0053)
[35 – 55 [	0.0016	(0.0084)	0.00002	(0.0006)	0.0020	(0.0063)
Primary	0.0054	(0.0111)	-0.1633***	(0.0060)	0.0078**	(0.0036)

Secondary		0.0030	(0.0127)	0.1452***	(0.0083)	-0.0086**	(0.0035)
Poorer		0.0035	(0.0045)	0.0031	(0.0056)	0.0060	(0.0038)
Less poor		0.0008	(0.0016)	0.0015	(0.0022)	0.0030*	(0.0018)
Intermediaries		0.0040	(0.0029)	-0.0004	(0.0026)	0.0044	((0.0033))
Less rich		0.0004	(0.0017)	0.00002	(0.0005)	0.0001	(0.0007)
Active		0.0017	(0.0023)	0.0016	(0.0017)	0.0031	(0.0028)
Urban		0.0045	(0.0032)	0.0097*	(0.0050)	0.0037	(0.0023)
Mobile phone		0.0115*	(0.0069)	-0.0087	(0.0084)	-0.0045	(0.0102)
Mobile money		0.0201**	(0.0083)	0.0095	(0.0078)	0.0313	(0.0095)
Predicted probability man =		0.1743		0.1386		0.2710	
Predicted probability women =		0.1202		0.2099		0.2805	
Difference =		0.0541(100%)		-0.0712(100%)		-0.0095(100%)	
Explained =		0.0468(87%)		-0.0014 (2%)		0.0431(-454%)	
Unexplained =		0.0073 (13%)		-0.0698(98%)		-0.0526(554%)	
Number of observation =		1,000		1,000		1,000	

Source: Authors using Global Findex data (2021). *** Significant at 1%; ** Significant at 5%, * Significant at 10%.

Figure A: LROC test of the Logit model of access to financial services in Burkina Faso



Source: Authors using Global Findex data (2021).



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