

SOURCES OF FINANCE FOR MICROFINANCE INSTITUTIONS IN AFRICA

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ABSTRACT

We examine four sources of finance, and their associated financial structure for microfinance institutions (MFIs) in Africa: debt-equity ratio (leverage) and capital to assets ratio (equity), deposits to assets ratio (deposits), and donations to assets ratio (donations). Our analysis shows that at the firm level, size, age, legal status, and profitability drive financing alternatives in line with theory. For example, asset structure varies inversely with leverage. At the country-level, institutional quality (KKM) varies inversely with deposits and donations. Interestingly, coefficients of financial development and education variables are not significant across all financial structure proxies, going against stylised facts on the macro-level drivers of firms' financing structure. We find that firm-level factors are more relevant in determining the financing structure of MFIs.

Background

Bayai and Ikhide (2016) cite institutional theory in explaining the way microfinance institutions (MFIs) in Africa fund their operations. They note that at the early stages, most MFIs tend to operate as Non-Governmental Organisations (NGOs). These NGOs derive a substantial amount of their funding from donations and concessionary funds, given that commercial funders deem the MFIs too risky (Ledgerwood, 1998; Ledgerwood & White, 2006). Later, in the consolidation stage, the NGOs supplement their funds using government subsidies and equity funding. As they mature, they resort to deposits and debt, whilst often using foreign donors as guarantees. It is at this stage that MFIs are likely to mutate from NGOs that focus on social aspect of availing financial services to the financially excluded to the commercial model where financial sustainability matters as much as social performance.

The transformation of MFIs from NGOs to the commercial model has raised concern over mission drift, wherein MFIs focus more on profitability and less on the social aspect of reaching the unbanked (Mia & Lee, 2017; Ramus & Vaccaro, 2017). Also, some researchers argue that the hybrid business model of most MFIs makes it challenging to integrate them into the formal financial system as financiers deem them too risky for the level of return they offer (Campion & White, 1999). Conversely, the core argument for the institutional transformation of MFIs from the NGO, not-for-profit model, to the commercial model is access to capital markets. Advocates of the financial sustainability model of MFIs posit that capital market funding allows for improved corporate governance and reduces dependence on volatile donor funding (Garmaise & Natividad, 2013; D'Espallier, Hudon, & Szafarz, 2017). Financial sustainability also allows MFIs to reach more unbanked people in the long run (Tchakoute-Tchuigoua, 2010).

Indeed, across the globe and in Africa, many MFIs are transitioning from the NGO not-for-profit model to the financial sustainability approach where they strive to generate profit over and above meeting their social goal (Hudon, 2010; Wagenaar, 2012; Kodongo & Kendi, 2013). Having grown on a donations dependent model, the shift to the commercial model has implied a change in the business model, and most importantly a search for a steady source of capital beyond donations and subsidies (D'Espallier, Hudon, & Szafarz, 2013).

Table 1: Summary Statistics for Categorical Independent Variables

Variable	Legal_form	N	Mean	SD	Min	Q1	Median	Q3	Max
debt_to_equity_NGO	NGO	4782	4.0503	37.0287	-354.2800	0.5100	1.4400	3.1200	558.6200
debt_to_equity_Bank	Bank	4782	4.1094	4.3076	-15.4900	2.1300	3.5900	5.6250	74.8100
debt_to_equity_NBFI	NBFI	4782	3.4804	30.3364	-440.8700	0.7200	1.9750	4.2900	531.2600
debt_to_equity_Coop	Coop	4782	1.4474	97.0693	-3567.2800	1.2500	3.0900	5.4050	585.2400
debt_to_equity_RuralBank	Rural Bank	4782	6.7171	3.2047	-8.5300	5.2550	6.2000	7.6175	20.4300
capital_asset_NGO	NGO	4782	0.4175	0.7521	-18.3526	0.2206	0.3807	0.6372	12.1495
capital_asset_Bank	Bank	4782	0.3037	0.2292	-0.5689	0.1545	0.2390	0.3825	1.6989
capital_asset_NBFI	NBFI	4782	0.3866	0.4741	-1.7789	0.1783	0.3236	0.5571	9.0475
capital_asset_Coop	Coop	4782	0.1960	0.6654	-14.8190	0.1090	0.2077	0.3514	11.2688
capital_asset_Rural Bank	Rural Bank	4782	0.1762	0.2430	-0.1328	0.1030	0.1372	0.1615	1.9819
deposits_to_NGO_assets	NGO assets	4782	0.2245	0.2343	0.0000	0.0000	0.1600	0.3439	1.2738
deposits_to_Bank_assets	Bank assets	4782	0.6042	0.4229	0.0000	0.4128	0.6194	0.7421	4.8674
deposits_to_NBFI_assets	NBFI assets	4782	0.3700	0.8515	0.0000	0.1458	0.2885	0.4748	20.9869
deposits_to_Coop_assets	Coop assets	4782	0.6007	0.3559	0.0000	0.4431	0.5822	0.7244	5.7021
deposits_to_RuralBank_assets	Rural Bank assets	4782	0.8442	0.9931	0.2985	0.6841	0.7474	0.7914	8.9600
donations_asse_NGO	NGO	4782	0.0953	0.2268	-0.0033	0.0000	0.0114	0.0818	2.5981
donations_asse_Bank	Bank	4782	0.0141	0.0754	0.0000	0.0000	0.0000	0.0000	1.3040
donations_asse_NBFI	NBFI	4782	0.0369	0.1241	-0.0007	0.0000	0.0001	0.0129	1.7063
donations_asse_Coop	Coop	4782	0.0199	0.0793	0.0000	0.0000	0.0014	0.0114	1.6166
donations_asse_RuralBank	Rural Bank	4782	0.0015	0.0096	0.0000	0.0000	0.0000	0.0000	0.0773

Source:

Authors' construction from the MIX data

Note:

¹ Legal status include NGO, Non-Bank Financial Institutions (NBFI), Credit Unions, and Banks² Age has mature MFIs older than 8 years, young ones (4 - 8 years), and new ones that are 4 years or less

Table 1 shows the sources of financing for MFIs in Africa. As expected, NGOs are least reliant on debt compared to other MFI models. Rural banks, commercial banks, Credit unions and NBFIs, respectively, have the most debt relative to assets. The picture is the exact opposite for capital to assets ratio where NGOs lead while rural banks trail. NGOs have the lowest median deposits to assets ratio, probably arising from the legal restrictions on deposit mobilisation. Lastly, and not surprisingly, NGOs have the highest median donations to assets. While the data shows some regularity in terms of the legal status of MFIs, it is notable that some MFIs are shifting from the NGO model to the commercial model, mainly as commercial banks and NBFIs (Sarma, 2011; Jia, Cull, Guo, & Ma, 2016). For the NGOs converting to the commercial model, the likelihood of alternative, sustainable sources of finance is a vital consideration.

This article examines the factors that determine the source of financing for MFIs in Africa, beyond the institutional life cycle proposition of Bayai and Ikhide (2016). Specifically, we examine the drivers of two primary capital structure indicators; leverage (debt to equity ratio), equity (capital to assets ratio), deposits (deposits to assets ratio) and finally, donations (donations to assets ratio). The existing literature on capital structure choices predominantly focuses on commercial (profit-oriented) firms (Gropp & Heider, 2010; Liu, Liu, Peng, & Yang, 2017; Matias & Serrasqueiro, 2017). The drivers of financing for MFIs may differ from those of purely commercial firms because the social goals of MFIs may be at conflict with those of the commercial providers of funds. Nonetheless, extant literature on the funding structure of MFIs mainly examines the link between capital structure and the performance and sustainability of MFIs (Kyereboah-Coleman, 2007b; Bogan, 2012; Khachatryan, Hartarska, & Grigoryan, 2017). In this respect, three studies by Kyereboah-Coleman (2007a), Tchakoute-Tchuigoua (2014), and Tchakoute-Tchuigoua (2015) closely resonate with our work. However, in these studies, the researchers focus chiefly on the determinants of leverage (debt-to-equity ratio) for MFIs and find leverage to be positively related to asset tangibility, size, past-due loans, and inversely related to creditor rights and risk; confirming the literature on capital structure. Profitability and credit ratings have limited impact on capital structure, while financial development and legal tradition are significant. Tchakoute-Tchuigoua (2014) further finds that donations are negatively related to past-due loans and asset tangibility, implying donors do care about firm riskiness. None of the studies delves into capital assets ratio.

The contribution of our study goes beyond previous research in this area of scholarship in two respects: context and scope. Prior studies dwell exclusively on leverage (debt-equity ratio) while our study examines leverage, capital-assets ratio. The additional financing structure measures are essential for MFIs that are transitioning to the financial sustainability model as they must source funds externally. Besides, this study goes beyond that of Kyereboah-Coleman (2007a) that examined MFIs in Ghana only by focusing on Africa; thus allowing for cross-country comparisons. As (D'Espallier et al. 2017) cautions, research based on geographically dispersed regions could mask important regional characteristics, as is the case with the research by Tchakoute-Tchuigoua (2014, 2015) that draws from a global dataset. By focusing on Africa, this study will allow for deeper insights and comparison using data from a relatively homogeneous region. Such knowledge would, in turn, permit us to evolve more effective funding strategies to support and enable the unique added benefit of MFIs (that is, financial inclusion for the poor) that is particularly significant for emerging and developing economies and in particular, Africa.

The next section highlights the results of the study, followed by a review of supporting theory and empirical literature. We then describe data and data sources, followed by the research method. We discuss the results and then conclude.

Summary of Results

The age of an MFI is the chief driver of leverage (debt-equity ratio). The key drivers of capital to assets ratio for MFIs in Africa are MFI legal status, legal tradition, size, stock markets development, profitability, and donations. Young and mature MFIs have a lower leverage relative to new MFIs. Similarly, young and mature MFIs have a lower capital to assets ratio compared to new MFIs. The results show that older MFIs tend to rely less on debt and more equity. However, the amount of equity that older MFIs raise is still a smaller proportion of their total assets, given that older MFIs tend to be larger. Furthermore, mature firms are also likely to have lower leverage because they attract more donations and state subsidies. Thus, although the capital structure theory that posits that older firms tend to have higher leverage due to their higher capacity

for debt (Gwatidzo & Ojah, 2009), the presence of donations and subsidies for MFIs could dilute the effects of age on financing structure.

NGOs have a higher debt to equity and capital to assets ratio relative to commercial banks, NBFIs, credit unions and rural banks. In line with the institutional theory, the results could hold due to the donor and state support that NGOs receive. These additional sources give NGOs enhanced capability to raise capital than the commercial firms which are at the mercy of market pressures. Furthermore, NGOs are able to get credit guarantees and receive equity injections from bilateral and multilateral lenders as well as fiscal incentives to further the agenda of financial inclusion. The support in the form of donations and subsidies for NGOs is warranted given that the majority are not licensed to garner deposits (D'Espallier, Goedecke, Hudon, & Mersland, 2017). For debt to equity ratio, the legal status of an MFI is not significant.

Legal tradition is not a significant determinant of leverage, although MFIs in common law countries, on average, have higher leverage. For capital to assets ratio, however, legal tradition matters. MFIs in common law countries have higher capital to assets ratio compared to those in civil law and other legal traditions. These results underline the better financial infrastructure in common law countries relative to other legal traditions (La Porta, Lopez-de-Silanes, and Shleifer 2013; Schnyder, Siems, and Aguilera 2018). The size of MFIs, captured using the logarithm of assets, varies positively with debt-to-equity ratio, and negatively with capital to assets ratio. For debt-to-equity ratio, the relationship is not significant. As expected, larger firms with a wide capital base rely more on internal funds than on the equity market for financing in line with the pecking order theory of capital structure. The ratio of stock market to GDP, donations to assets, and profit margin are significant drivers of capital to assets ratio but do not significantly influence debt to equity ratio. Both profit margin and donations vary positively with capital to assets and debt to equity ratio meaning that they raise the capacity of MFIs to attract both debt and equity capital. However, stock market capitalization is inversely related to leverage and capital to assets ratio. The result could mean that MFIs rarely deal with capital markets, opting instead, to raise finance privately. Also, if stock markets are well developed, it implies that debt markets are well developed which lowers the demand for microfinance overall. In these settings, it is hard for MFIs to raise capital.

However, going against stylised theoretical facts (Allen et al., 2014), private credit to GDP is not a significant determinant leverage and capital to assets ratios in Africa. Similarly, institutional quality does not significantly relate to both leverage and capital to assets ratio (Campello & Giambona, 2011). GDP growth rate neither significantly affects leverage nor capital to assets ratio. Overall, the results suggest that for MFIs in Africa, firm-level factors matter more in financing structure than macroeconomic factors. With slight deviations, these results are consistent with the capital structure theory (Barclay & Smith, 2005; Ojah & Pillay, 2009).

Theoretical Framework

Like commercial firms, MFIs draw their capital from equity, debt (including deposits). Unlike commercial firms, MFIs have a substantial source of capital in the form of donations and subsidies (D'Espallier et al., 2013). As noted, despite the notable difference in financing structure, the empirical research on the financing of MFIs mainly relates to debt-equity mix (Kyereboah-Coleman, 2007a; Tchakoute-Tchuigoua, 2014, 2015). This study seeks to examine the drivers of the more comprehensive financing structure of MFIs relating to leverage and capital (equity) to assets ratio. The study draws its theoretical frame from two theories: the capital structure theory and the institutional (life cycle) theory.

The capital structure theories seek to explain the mix of long-term debt and equity in the financing structure of enterprises (Ehrhardt & Brigham, 2016). The dominant literature in this respect revolves around the Modigliani & Miller capital structure theories, of which the trade-off theory against predominant (Sun, Ding, Guo, & Li, 2016). The classic trade-off theory holds that the debt-equity mix is relevant insofar as it generates a debt tax shield which organisations balance with the costs of possible financial distress that comes with high debt levels (Liu et al., 2017). Further, financial distress explains why firms favour easily negotiable debt, which makes firms to approve bank loans in place of sourcing debt funds via capital markets (De Jong, Verbeek, & Verwijmeren, 2011).

The implication is that mature, profitable firms tend to rely on internal sources of capital as do firms with little cash flows and intangible assets. In this case, the trade-off theory corresponds with the pecking order

theory of Donaldson and Fox (1961) and Myers and Majluf (1984), which posits that firms issue capital in a predetermined order, usually starting with the cheapest internal sources of funds while maintaining a reserve borrowing capacity. In the case of MFIs, we presume that donations and subsidies would come first in the pecking order. The reserve borrowing capacity allows firms to arrange debt funds quickly in case of profitable opportunities that arise. Moreover, the trade-off theory has correspondence with the proposition by Bayai and Ikhide (2016) that the capital structure of MFIs evolves with the institutional life-cycle of firms, with younger firms more proportionately reliant on donations and concessionary funds, and with older firms more inclined to commercial funding.

Extending the trade-off theory, Bradley, Jarrell, and Kim (1984) showed that, under certain conditions, the tax disadvantage of debt at the individual level offset the tax disadvantage at the corporate level. The result was the introduction of leverage related costs to the classical trade-off theory. These costs include the bankruptcy costs, agency costs of debt, the loss of non-debt tax shields (such as accelerated depreciation and investment tax credits). The additional leverage related costs mean that firms seek to balance the tax benefits of debt and the leverage-related costs. Miao (2005) show that the choice of financing mix relates to these non-debt tax shields, in addition to financial and trade cycles. Hence the capital structure is firm-specific and mean-reverting. Still, the capital structure theories cannot explain the observed under-leveraged firms. Moreover, while the profit motive drives commercial firms, the capital structure theories may not fully apply to hybrid firms that have a dual mission, like MFIs.

The institutional theory does have some congruence with the capital (financial) structure of MFIs. Expressly, the observed rise in debt financing and the concurrent drop in donations could point to a shift by MFIs towards a financially sustainable MFI model. The pressure to move towards the financial sustainability model could reflect a broader change in the MF industry or result from pressure from donors, signalling fatigue and the intent to withdraw or reduce funding. The pressure would be especially intense for MFIs that are highly dependent on donations (DiMaggio & Powell, 1991), underlining the role of donors such as USAID in the push towards sustainability (Bateman, 2010). Although the institutional theory cannot fully account for the MFIs that have not changed from NGOs to commercial models, the changing capital structures do indicate that financial sustainability is gaining traction. Figure 4 shows that even without a change in legal forms, the proportion of donations to MFIs in Africa is dropping. The next section details the empirical approach adopted in the study.

Method

The study adopts the fixed and random effects models depending on the outcome of the Hausman tests (see appendix 2). Following Roberts and Whited (2013). We consider the model that follows.

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \mu_{it} \quad (1)$$

Further, assume that,

$$\mu_{it} = C_i + \epsilon_{it} \quad (2)$$

Where c_i captures the aggregate effects of the unobserved, time-invariant explanatory variables for Y_{it} . Further, assume that ϵ_{it} has zero mean conditional on X_{it} . In the case where C_i and X_{it} are correlated, then C_t is a fixed effect; otherwise, it is a random effect. Note that the existence of fixed effects implies the presence of endogeneity. For random effects, on the other hand, endogeneity is not a concern. However, the random-effects model affects the computation of standard errors (Roberts & Whited, 2013).

Thus, the fixed effects models seek the causes of changes within an entity. The fixed-effects model does this by controlling for all time-invariant differences between the individuals, so the estimated coefficients of the fixed-effects models cannot be biased because of omitted time-invariant characteristics, such as culture (Torres-Reyna, 2007). To deal with the endogeneity inherent in the fixed effects model, researchers recommend two strategies. The first approach involves the inclusion of firm-specific intercepts by running the least squares dummy variable regression. The approach is not feasible with medium to large datasets. In the

alternative within-estimator approach, researchers apply OLS to the deviations-from-the-within estimator, which eliminates the fixed effect that is prone to endogeneity. The within-estimator regression is as follows.¹

$$Y_{it} = \beta_1 \Delta X_{it} + \Delta \mu_{it} \quad (3)$$

However, the model does not deal with the potential endogeneity between ΔX_{it} and μ_{it} . Besides, differencing reduces the efficiency of the estimates if there is a correlation between the fixed effect (differenced out of the model) and the dependent variable (Clark & Linzer, 2015). Consequently, we run both fixed and random effects, even where the Hausmann test recommends one over the other.

Variables Definitions and Data Sources

We source panel data from the Microfinance Information Exchange (MIX) pooled database, the Worldwide Governance Indicators (WGI), and World Development Indicators (WDI) from the World Bank databases. Table 1 below describes the variables.

Table 2: Description of Variables

Variable	Description
1. Debt-to-Equity Ratio:	The ratio of total liabilities to equity, the amount of leverage supported by each unit of capital contributed by shareholders. The ratio shows the way an MFI finances its portfolio of assets beyond equity capital to cushion or absorb losses when total assets fall short of all liabilities. Much of the extant research examines the debt-equity mix and its relationship with the performance of MFIs
2. Deposits to Total Assets:	The ratio of deposits to assets that aids in determining the extent to which MFIs use deposits to finance assets. NGOs transitioning to the commercial model can mobilise deposits to fund their operations over and above donations and equity
3. Capital to Assets Ratio:	The ratio of total equity to total assets and a slightly modified reciprocal of the debt to equity ratio. Hence, it captures the ability to meet obligations and to absorb unexpected losses using capital contributions by the owner (Kimmel, Weygandt, & Kieso, 2018)
4. Current Legal Status:	The legal forms of registration of an MFI are as follows; Commercial Bank, Non-Bank Financial Institution (NBFI), Non-Governmental Organization (NGO), Credit Union/ Cooperative, or Rural Bank. The legal status may dictate the profit orientation and sources of capital for the MFIs. The legal status of an MFI may impact the financing structure in several ways. First, legal status or form typically restrict NGOs from taking deposits which lowers both the debt-equity ratio and deposit to assets, hence raising the capital asset ratio. Also, NGOs may not venture into capital markets for funds given their mostly not-for-profit orientation. The opposite is the case for MFIs of commercial banks legal form whose legal status allows for deposits.
5. Age:	MIX classifies MFIs into three categories depending on the time that has elapsed since the MFI started operations- new (0-4 years), young (4-8 years) and mature (over eight years). The variable is hence a dummy. Older firms are likely better established, have a solid reputation and hence likely to attract more debt and deposits. The correspondence between age and debt is captured in the institutional life cycle view of Bayai and Ikhide (2016).
6. Legal Tradition (Legal):	The indicator is a dummy variable with common law countries coded 0, civil law countries 1, and 2 otherwise as per the classification by Oto-Peralías and Romero-Ávila (2014). Typically, common law countries have relatively better financial infrastructure that allows firms to easily access financial markets. Hence, MFIs in common law countries may exhibit higher debt and equity ratios in their capital structures than those in common law and other legal traditions. (Schnyder, Gerhard, Mathias Siems, & Ruth V. Aguilera, 2018)

¹For more detailed, but simplified discussion on the derivation and application of the within-estimator, refer to Roberts and Whited (2013), pp. 558.

7. Size (Log of Total Assets): We proxy the size of MFI with the natural logarithm of total assets, again using MIX data. Assets are supported by the sum of capital and liabilities or equivalently, the total value of resources owned or controlled by the MFI resulting from past and current activities and from which the MFI derives future benefits. We expect firms with more assets to have a higher debt capacity and hence more debt to equity ratio and lower capital to equity ratio. Large firms draw their strength from holding diversified investments and hence higher capacity to absorb risk. Besides, they have easy access to debt markets(Kurshev & Strebulaev, 2015). Furthermore, these firms are likely to attract more deposits, given the trust they inspire in depositors and their marketing reach (Kimmel et al., 2018). We hypothesise that donations vary positively with the size of MFI, as large, older firms have established a reputation with donors.

7. Governance/ Institutional Quality (KKM): We create the country level KKM index using the first principal component of the WGI available in the World Bank databases. The index captures the institutional quality in corruption control, government effectiveness, political stability, the rule of law, and voice and accountability (Kaufmann, Kraay, & Mastruzzi, 2011). Firms in countries with better governance can quickly raise debt finance due to ease of contract enforcement — the result, a high debt-equity ratio, and a low capital asset ratio. Similarly, the level of deposits mobilisation may be higher in better-governed countries arising from consumer confidence in legislation relating to deposits protection (La Porta, Lopez-de-Silanes, & Shleifer, 2013; Allen et al., 2014). Lastly, MFIs in countries with low KKM may have higher donations as donors opt to circumvent corrupt government channels.

8. Private Credit to GDP: We capture the total amount of credit advanced to the private sector by financial intermediaries as a proxy for capital markets development concerning the banking sector following Ito and Kawai (2018). The data source is the Global Financial Development Database, GFDD, of the World Bank (See note 4). Private credit to GDP represents the financial resources provided to the private sector by domestic money banks as a share of GDP. Domestic money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits. The data is available in WDI. Financial sector development is central to the acquisition of both equity and debt financing. We hypothesise a high debt to equity ratio, and deposits to assets ratios in countries with more robust financial sectors as financial institutions tend to be highly leveraged.

9. Stock market capitalisation to GDP: We capture the extent of stock market development using the ratio of stock market capitalisation to GDP to proxy how firms can raise equity capital. Although Africa's equity markets are thin, some relatively large stock markets like South Africa, Kenya, and Ghana exist. The data are from the GFDD.

10. GDP annual growth rate (GDP): This is the year on year growth in output adjusted for inflation and sourced from the World Development Indicators (WDI) (See note 2).

11. Education: Education is the ratio of gross secondary school enrolment to gross primary school enrolment that captures the extent of graduation from elementary to secondary education and the overall literacy rate. The data is available in the WDI. We hypothesise a positive relationship between education and debt/equity ratio, which implies a lower capital asset ratio. Similarly, education may enhance the capacity of the populace to use financial products like savings, and hence a higher deposit to assets ratio. Also, education may directly or indirectly influence financial sector development, which eases the acquisition of capital in financial markets (Allen et al., 2014).

12. Asset Structure (Tangibility): Asset structure is measured as the ratio of non-current assets to total assets of an MFI (Microfinance Information Exchange (MIX), 2019). The ratio indicates the extent of investment in physical infrastructure, a significant issue in constraining banking for the poor due to the perceived lack of scale economies to warrant the erection, for instance, of brick and mortar branches (Ledgerwood, 1998). MFIs with a more significant physical presence are likely to attract more deposits. Therefore, they also have a higher capacity to borrow and service debt. Further, tangible assets serve as collateral to protect lenders from the moral hazard problem (Jensen & Meckling, 1976), and hence a positive relationship between debt and asset tangibility (Titman & Wessels, 1988; Kyereboah-Coleman, 2007a).

13. Profit Margin: The profit margin is the net operating income divided by financial revenue. The ratio represents the ability of MFIs to generate income from the core mandate of offering financial services like lending, savings, insurance, and so on. Profitability may enhance the capacity of an MFI to secure debt; thus leading to a higher debt to equity ratio and low capital to assets ratio. The opposite is the case when an MFI retains earnings and hence raises the level of equity.

14. Region: We divide Africa into two regions, Sub-Saharan Africa and North Africa. The division is in recognition of the heterogeneity in the data where North Africa has only NGO-type MFIs in the sample dataset, probably reflecting religious attitudes towards interest charging, for-profit MFI models.

Source:

Authors' construction from the literature

Notes

¹ MIX Database on www.themix.org and <https://datacatalog.worldbank.org/dataset/mix-market>

² WDI on <https://databank.worldbank.org/source/world-development-indicators>.

³ WGI/ KKM on <https://databank.worldbank.org/source/worldwide-governance-indicators>.

⁴ GFDD on <https://www.worldbank.org/en/publication/gfdr/data/global-financial-development-database>

Exploratory Data Analysis

Figure 2 shows the correlation matrix and scatter plots for the numeric variables used in the empirical model of this work. Furthermore, debt-to-equity ratio, capital-to-assets ratio, deposits to assets ratio, and donations to assets ratio (the first four entries of the rows and columns) are the dependent variables. The rest are the independent variables, including donations to assets ratio. The main diagonal shows the distribution of the representative variables in place of correlations of a variable with themselves. The main diagonal shows that most variables are highly skewed, except for assets. The lower half of the Table shows the pairwise scatter plots between the variables, with the axis interpreted as we do correlation matrices as described next.

Table 3: Summary Statistics

Variable	Mean	SD	Min	Q1	Median	Q3	Max
Debt_to_equity_3a2011	58.6087	-3.567e+03	0.9000	2.4300	4.8800	585.240	
Capital_asset_ratio3212	0.6023	-1.835e+01	0.1529	0.2730	0.4781	12.149	
Deposits_to_total0.4139ts	0.5773	0.000e+00	0.1712	0.4105	0.6423	20.987	
Donations_assets0.04435	0.1472	-3.300e-03	0.0000	0.0008	0.0189	2.598	
Assets	14.9461	2.2619	6.931e-01	13.5399	14.8577	16.4162	22.979
Kkm	0.0026	2.0064	-5.233e+00	-1.3041	-0.1137	1.6279	7.369
Education	0.3867	0.1438	7.480e-02	0.2728	0.3862	0.4866	1.050
Pcrdbgdp	2.7194	0.6852	2.981e-01	2.3864	2.7584	3.0522	6.881
Stmktcap	1.1410	1.4732	0.000e+00	0.0000	0.0000	2.4280	5.797
Gdp_growth_annual105	3.5905	-4.608e+01	4.0000	5.4205	6.7233	33.629	
Profit_margin	-7.7393	513.2995	-3.550e+04	-0.1814	0.0484	0.1890	6.202

Source:

Authors' construction from MIX data

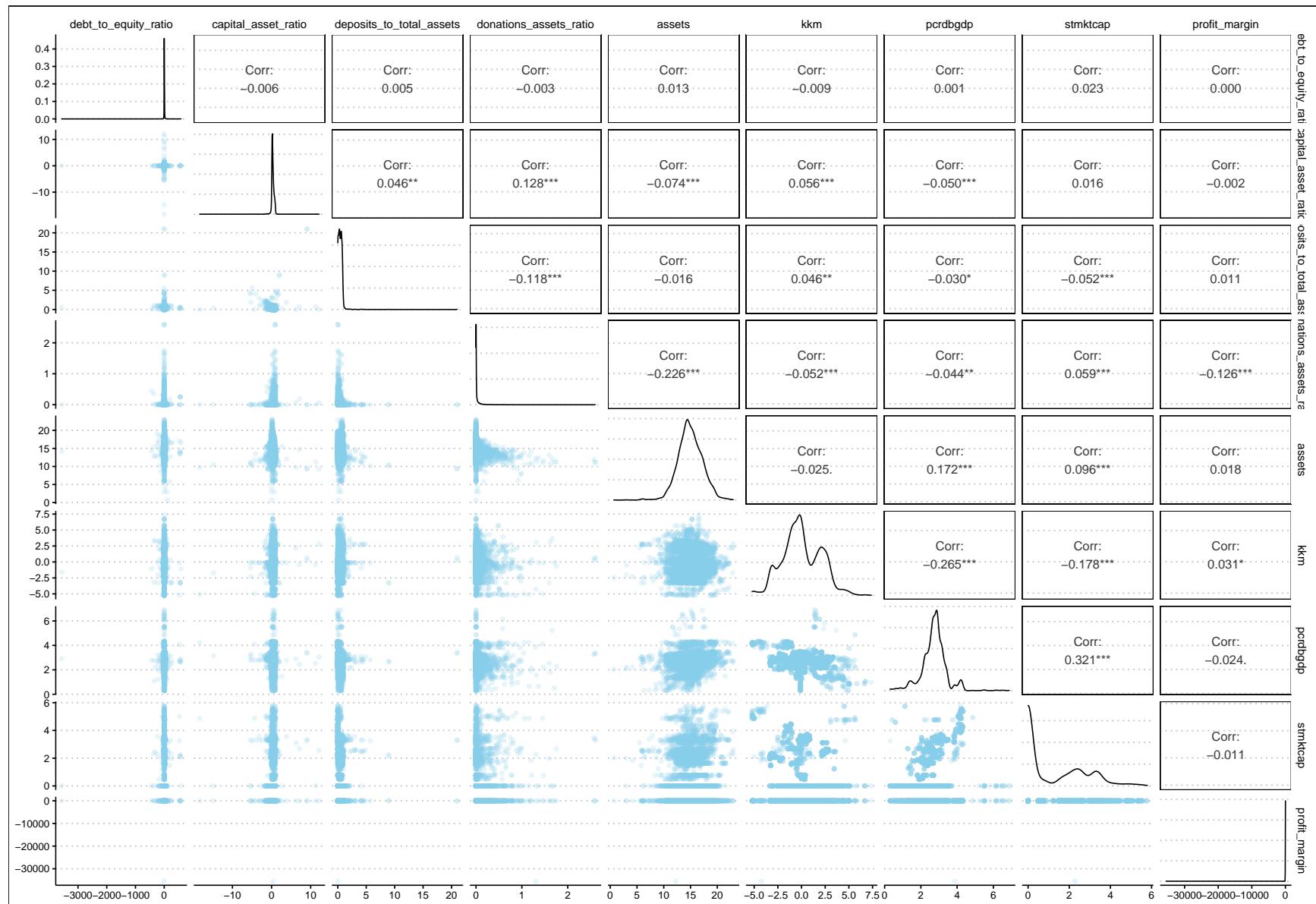


Figure 1: Correlation Matrix for Independent Variables

For dependent variables, there is a substantial negative and significant relationship between capital-asset-ratio (which captures the ratio of equity capital to total assets) and deposits-assets-ratio. The correlations indicate that for MFIs that garner deposits, the injection of equity capital is not a priority as these MFIs, like commercial banks, tend to leverage on deposits and just put in enough equity to meet regulatory requirements. Debt-equity ratio and deposit-asset ratio have a significant positive relationship, although the magnitude is not high. Capital-asset ratio and debt-equity ratio have no meaningful association. For the dependent variables, the highest observed correlation is between education on the one hand and the proxies for capital market development; private credit to GDP and stock market capitalisation to GDP, at 0.461 and 0.538, which is in line with the literature [@]. Consequently, we exclude education from our regressions.

Finally, except for debt to equity ratio, the other three independent variables have significant correlations with the dependent variables. Specifically, the debt to equity ratio has very low correlation with the other dependent and independent variables. The capital asset ratio has no statistically significant correlation with profit margin and stock market capitalisation to GDP. Likewise, donations have no significant correlation with GDP growth and education, while deposits exhibit a significant correlation with donations, institutional quality/ governance, and stock market capitalization to GDP. While correlation does not imply causation, these results point to the need for further investigation that we do in the section on regression models where we shall revisit this result to allow for an in-depth interrogation of the pertinent issues arising. Table 3 shows the summary statistics for the variables and, importantly, the results of stationarity tests.

Figure 2 shows the breakdown of the dependent variables across MFI legal status as reported in Table 1. Note that rural banks and commercial banks have the highest median debt to equity and deposits to assets ratios, followed by credit unions, NBFI, and NGOs. The former could indicate ease in accessing capital markets. At the same time, deposits reflect the capacity of banks to mobilise deposits, and for rural banks their focus on niche rural markets with the unbanked populace that makes it easier to garner deposits. The visualization rightly show that rural banks, commercial banks and cooperatives have the highest deposits to assets ratio. Consequently, commercial banks, cooperatives, and rural banks have the least capital assets ratio. The results show that commercial banks and rural banks do emphasise offering a broader range of financial services, specifically savings products in place of credit alone. For NGOs, Garnering deposits is a challenge due to legal hurdles. Coupled with the emphasis on the social aspect of reaching the poor, NGOs would have a more significant difficulty accessing commercial funding compared to other legal types of MFIs. Reinforcing the welfare approach to microfinance, NGOs have the highest median donations to assets ratios, followed by NBFI, while commercial banks and rural banks come last. These results arise out of the mission of MFIs, where donors fund MFIs that explicitly put a focus on social aspects of reaching the unbanked-meaning that donors still do value the welfare approach to microfinance.

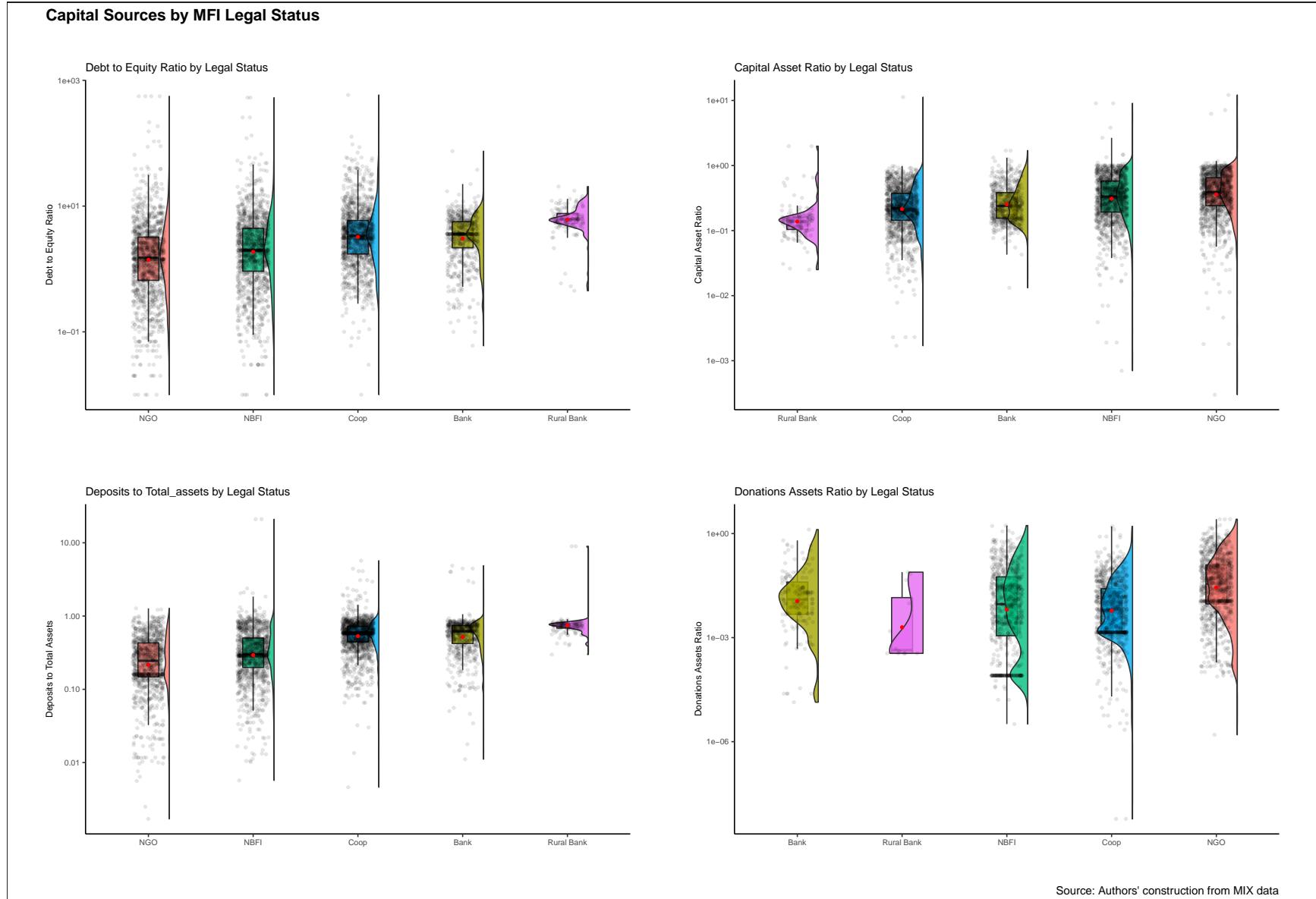


Figure 2: Capital Sources by MFI Legal Status

Figure 3 shows the dependent variables further disaggregated by age. It shows that older firms have marginally higher debt to equity ratios, while older firms receive relatively more deposits than the younger MFIs. The observation could be due to the correspondence between age and the size of MFIs which has a bearing on the ease of accessing capital markets. The access to capital markets is easier for older firms as they typically have more assets to pledge as collateral and hence better credit rating. Thus, older firms tend to have a lower capital to assets ratio as they use relatively more debt contracts to finance their operations. Finally, older firms have more donations to assets ratios which could be due to two reasons. First, older firms older, more established MFIs started when the welfare approach to microfinance was at its peak, and hence have a stronger relationship with donors. In contrast, younger MFIs have started when the paradigm shift to MFI sustainability has taken root, with fewer donors availing financial resources to support MFI start ups.

Finally, Figure 4 shows the trends in the dependent variables over time, with debt to equity ratio trending gradually upwards while capital to assets ratio trends downwards. It shows that over this period, MFIs have steadily been increasing their debt capital as they grow and get to access capital markets. Likewise, deposits have been trending upwards as more MFIs reach a higher number of consumers or as they mature and get the legal mandate to garner deposits. The trend for the donations to assets ratio is like literature in microfinance suggests; donors have gradually been lessening their contribution to MFIs. The implication here is that both donors and MFIs have gradually been embracing the financial sustainability approach to microfinance, and thus requiring MFIs to be financially sustainable while fulfilling their social mandate. Next, we discuss the results of the regressions.

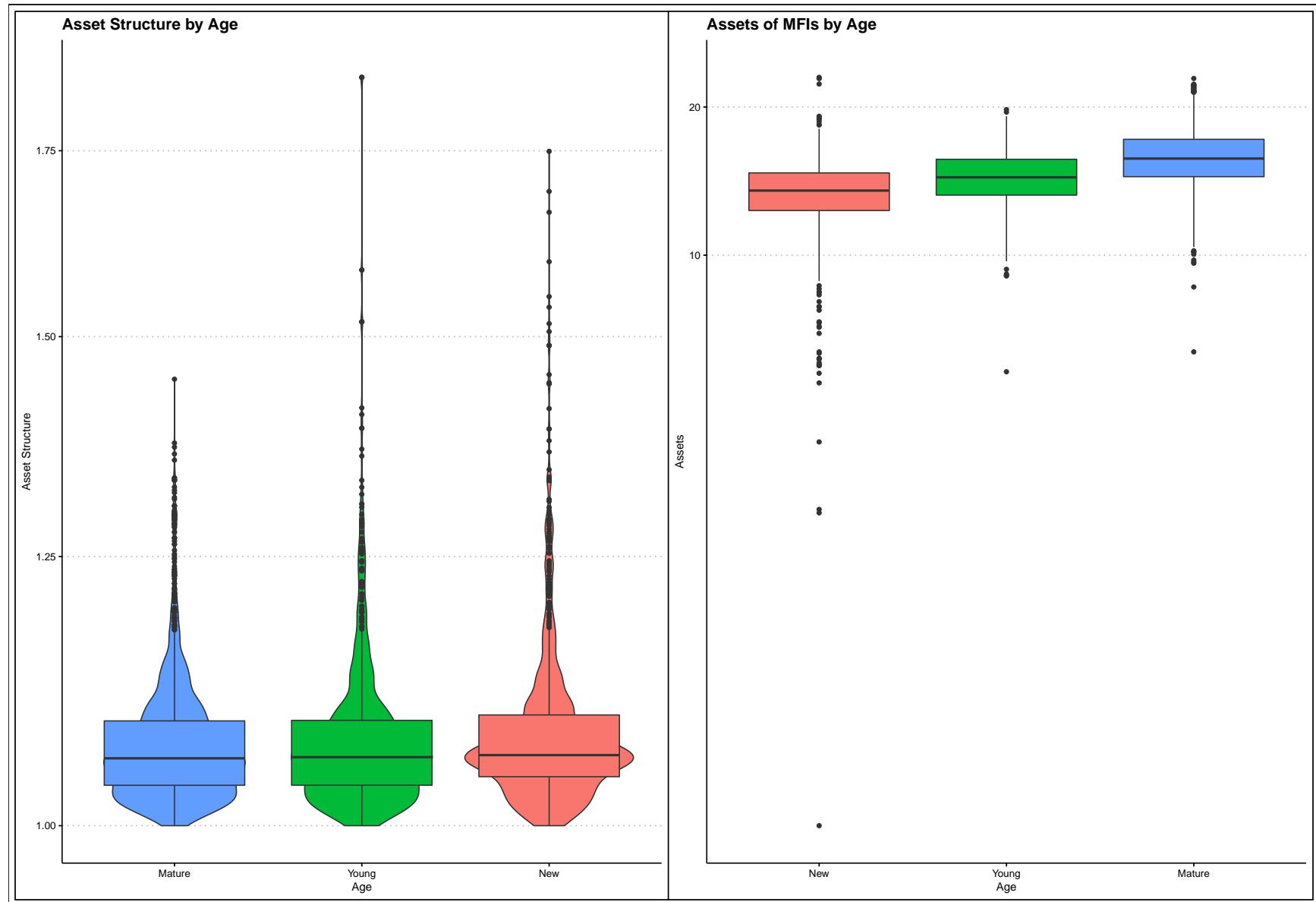


Figure 3: Assets, Asset Structure, and Profit margin of MFIs in Africa

Trends in Capital, Debt, Deposits and Donations for MFIs in Africa

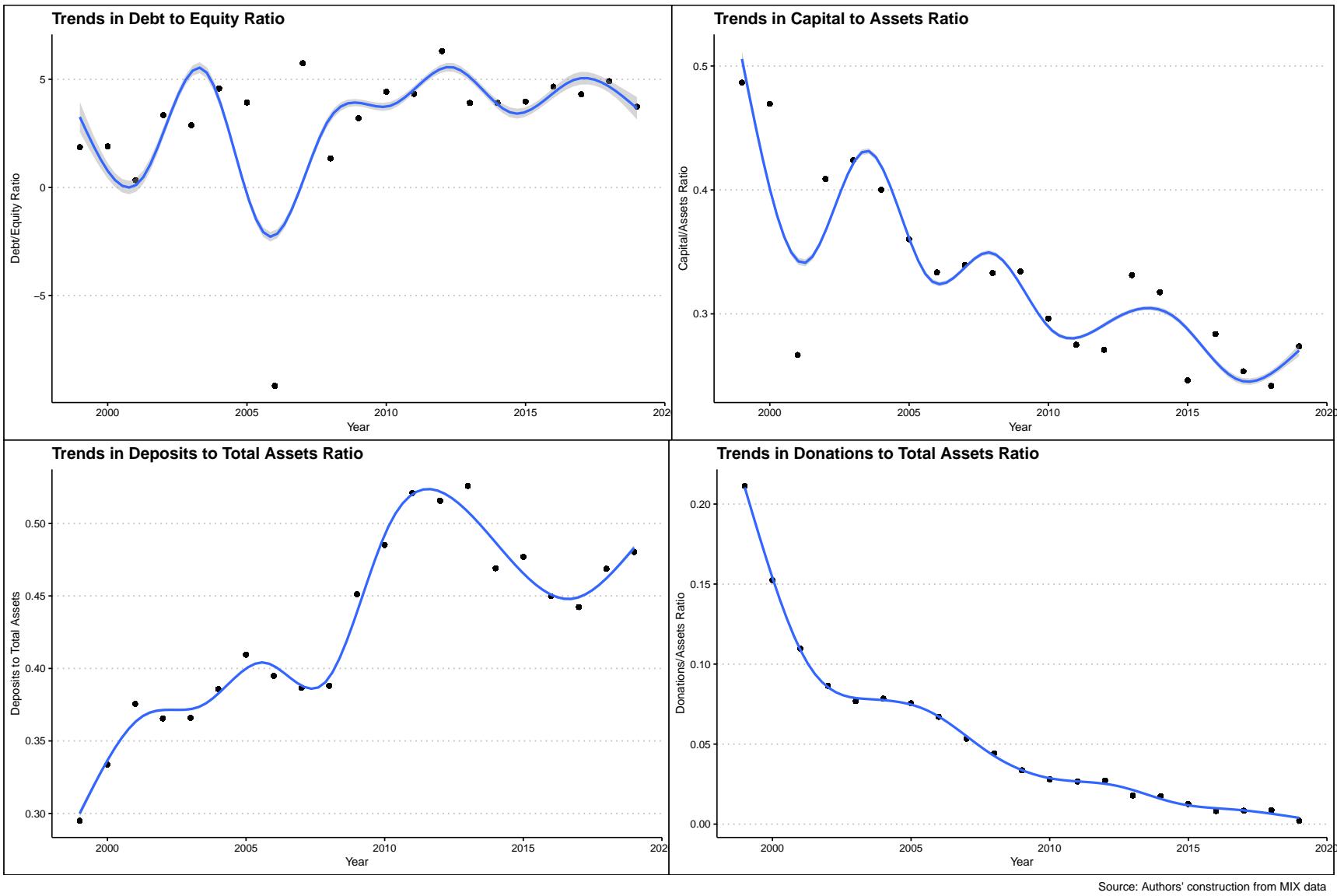


Figure 4: Trends in Capital, Debt, Deposits, and Donations

Table 4: Summary Statistics for Categorical Independent Variables

Variable	N	Mean	SD	Min	Q1	Median	Q3	Max
asset_structure	4782	0.0759	0.0694	0.000e+00	0.0351	0.0599	0.092	0.8598
assets	4782	14.9461	2.2619	6.931e-01	13.5399	14.8577	16.416	22.9786
pcrdbgdp	4782	2.7194	0.6852	2.981e-01	2.3864	2.7584	3.052	6.8806
stmktcap	4782	1.1410	1.4732	0.000e+00	0.0000	0.0000	2.428	5.7972
profit_margin	4782	-7.7393	513.2995	-3.550e+04	-0.1814	0.0484	0.189	6.2019

Source:

Authors' construction from the MIX data

Note:

¹ Legal status include NGO, Non-Bank Financial Institutions (NBFIs), Credit Unions, and Banks

² Age has mature MFIs older than 8 years, young ones (4 - 8 years), and new ones that are 4 years or less

Regression Results

This section provides a discussion on the output from the regression models, starting with the debt to equity ratio (random-effects model), the capital to assets ratio, the deposits to total assets ratio, and finally, donations to assets ratio. Appendix 1 shows the results of the Hausmann Test and the choice over fixed and random effects models. For robustness, however, we run both fixed and random effects. The data at hand is an unbalanced panel. For this reason, we ran a random-effects model on the full dataset. We then subset the data for instances with three or more years of data and then five or more years of data. These figures (three and five) correspond to the mean and median number of years of data per MFI in the dataset. Finally, we run a pooled OLS and a fixed-effects model using the full dataset.

Drivers of Leverage (Debt to Equity Ratio)

Table 3 shows the output of the relevant regression models with debt to equity ratio as the dependent variable. The regressions indicate that at the firm level, the age of an MFI matter the most in determining the debt to equity ratio. At the macro-level, institutional quality is a significant driver of leverage.

Age The regression output for leverage is in Table 5 below. For age, new MFIs (0-4 years) in Africa have significantly higher debt to equity ratio than young MFIs (4-8 years), on average. However, there is no significant difference between the leverage of new MFIs and mature MFIs (8 years and above). This result means that the oldest firms and the newest MFIs tend to finance their operations with more equity relative to debt. Given that equity is riskier than debt, it follows that investors have more confidence in older MFIs and youngest MFIs. The capital structure theory does not mention the age of a firm as a significant driver of capital structure. However, if age has a direct correspondence with size, then we expect that older, larger MFIs are more profitable (a source of internal equity) and can attract long term equity funding due to their track record. The relatively high debt to equity ratio of new MFIs could reflect the emphasis on financial sustainability of MFIs which makes start ups to resort to relatively more debt to finance their operations due to reduced availability of donations and government subsidies. Without the initial support from donors, equity funders deem start up MFIs too risky. Without the initial seed capital in the form of donations and concessionary funds, the institutional lifecycle theory of Bayai and Ikhide (2016) may not hold.

Institutional Quality (KKM) Institutional quality or governance (KKM) has an inverse relationship with the debt to equity ratio of MFIs in Africa. Higher KKM corresponds to lower debt to equity ratio, and vice versa, implying that MFIs in high KKM countries rely more on equity relative to debt. Research on capital structure theory shows that indeed governance matters in determining the ease of contract enforcement and safeguarding property rights [@]. Governance also reflects in effective regulation of capital markets, and hence

better capital markets development [Matias and Serrasqueiro, 2017; Ojah and Ombati, 2016]. In the case of MFIs, better KKM may encourage long term equity investment relative to debt investment and hence the observed relationship.

Other Insignificant variables Larger MFIs with more assets tend to have a higher debt to equity ratio, holding other variables in the models constant. However, this effect is not significant in both the fixed and random effects models. In this case, a unit rise in assets corresponds to upto 0.3 units rise in leverage going by the fixed and random-effects model. The result is consistent with the capital structure theory (Barclay and Smith, 2005; Barclay et al., 2006). Large firms can use the assets as collateral for debt and usually tend to be well established with a solid credit history and hence can quickly source funds in the capital markets (Campello & Giambona, 2011; Ojah & Ombati, 2016). Moreover, firms size corresponds to lower information asymmetry as the firm is well established with a traceable track record and well developed and reliable accounting information systems. With this hindsight, larger MFIs have a better chance of surviving the conversion to the commercial model, given that they have better access to the financial markets for funds. It also implies that, given the easy access to both internal and external funding, established MFIs are likely to better balance between financial goals and the social mandate of reaching out to the financially excluded. In this case, it is possible for larger MFIs to use their resources to lend to the relatively wealthy at market rates while subsidizing, or offering zero margins services to the financially excluded (Mia and Lee 2017). This way, larger MFIs are less prone to mission drift and could even experience mission expansion after conversion (Mersland and Strøm 2010).

Legal tradition is also an insignificant driver of debt to equity ratio, with the commercial MFIs having lower debt to equity ratio than NGOs. Asset structure and profit margin have a negative but insignificant relationship with debt to equity ratio. Retained profits form part of internal equity and hence reduce leverage. However, theory shows that higher asset structure, that is, more fixed assets relative to total assets corresponds to more leverage [(Campello and Giambona , 2011; Ojah and Ombati , 2016)]. However, total assets shows a positive relationship with leverage in line with theory. Both stock market and debt market capitalization show mixed results in their relationship with leverage.

Table 5: Regression Output for Debt to Equity Ratio

	Dependent variable: depvar					
	(1)	(2)	(3)	(4)	(5)	(6)
currentlegalstatusBank				-0.957 (3.558)	-1.837 (5.208)	-0.045 (2.389)
currentlegalstatusNBF				-0.439 (2.777)	-1.578 (3.857)	-0.796 (1.796)
currentlegalstatusCoop	6.452 (46.350)	6.987 (48.550)	5.845 (22.100)	-2.289 (2.781)	-4.758 (4.023)	0.453 (1.944)
currentlegalstatusRural Bank				2.284 (5.982)	1.188 (9.034)	-0.868 (5.894)
ageYoung	-7.131** (3.526)	-9.221** (3.860)	-1.628 (1.927)	-4.476* (2.553)	-6.681** (3.338)	-2.085 (1.754)
ageMature	-3.220 (4.726)	-4.572 (5.085)	0.235 (2.440)	-0.547 (2.270)	-1.494 (3.305)	-1.235 (1.751)
legal_traditionCivil				-0.605 (3.397)	-1.323 (4.735)	-0.803 (2.186)
legal_traditionOther				0.926 (3.281)	1.563 (4.777)	-0.495 (2.267)
kkm	-4.084** (1.940)	-4.737** (2.069)	-1.135 (0.979)	-0.299 (0.528)	-0.472 (0.766)	-0.821** (0.372)
asset_structure	-10.050 (27.480)	-13.200 (30.250)	-8.258 (15.280)	-10.320 (13.320)	-13.850 (18.700)	-17.940* (9.814)
pcrdbgdp	-0.724 (5.330)	-0.939 (5.913)	0.848 (2.827)	-1.542 (1.741)	-2.134 (2.404)	-0.701 (1.126)
stmktcap	0.229 (3.413)	0.239 (3.635)	-0.552 (1.755)	0.831 (1.001)	0.627 (1.413)	0.090 (0.669)
profit_margin	0.00001 (0.002)	-0.00002 (0.002)	0.265 (0.278)	0.00001 (0.002)	-0.00001 (0.002)	0.173 (0.263)
Model	Within Full	Within >= 3Years	Within >= 5Years	Random Full	Random >= 3Years	Random >= 5Years
Data						
Observations	4,782	3,840	3,165	4,782	3,840	3,165
R ²	0.006	0.009	0.005	0.005	0.007	0.007
Adjusted R ²	-0.230	-0.131	-0.106	-0.002	-0.002	-0.003
F Statistic	0.878 (df = 28; 3862)	1.040 (df = 28; 3366)	0.557 (df = 28; 2845)	24.610	26.490	23.480

Note:

*p<0.1; **p<0.05; ***p<0.01

Drivers of Capital to Assets Ratio in Microfinance Institutions

Regression results for the drivers of the capital-assets ratio among MFIs in Africa appear in Table 4. Capital assets ratio is the ratio of total equity to total assets. Going by the definition, we expect the opposite of the results obtained in section 7.1. Again, legal status, age, size and stock market development are related to the equity to total assets ratio. We examine these significant variables in turns.

Current Legal Status: NGOs consistently have higher capital to assets ratio than other legal traditions: banks, cooperatives, NBFIs, and rural banks. By the definition of debt to equity ratio, it means that NGOs finance their operations using more equity relative to debt. The results are in line with the institutional life cycle theory which posits that MFIs often start financing operations using donations and concessionary funds, then switch to equity as they mature [1]. Debt is often for well established MFIs, at which point they are likely financially sustainable and likely to switch to the commercial model [1]. NBFIs have the second highest mean and median levels of capital to assets ratio, followed by banks while cooperative and rural banks come last in that order. These results are in line with the literature confirming high leverage of banks [1], with the bulk of the capital in the form of deposits.

The results also reflect the market conditions where donations and subsidies are getting less available as donors begin to stress sustainability. Mature firms have a long-running relationship with donors to the extent they have a profitable business model and developed a business profile that allows them to make profits and issue equity. Characteristically, commercial banks and other deposit taking institutions tend to be more leveraged compared to other financial intermediaries because they have the license and scale to garner deposits and other debt instruments, which could explain the pattern of results.

Age: Young (4-8 years) and mature (8 years and over) MFIs have lower capital to assets ratios, on average, than new MFIs (0-4 years). The mean and median capital to assets ratio These results are also in line with the literature on capital structure. Older firms are likely larger with more assets to pledge as collateral and hence can easily raise funds in the debt markets [1]. Also, as MFIs mature, they are likely to graduate from the loans only model to start accepting deposits which further raises their leverage. Overall, this makes the equity component smaller relative to the debt component. In the capital structure literature, age is not a significant driver of capital structure except through its link to the size of an MFI as we discuss next.

Size: The size of an MFI is negatively related to capital assets ratio in line with the capital structure theory. Larger MFIs have more absolute amounts of assets to pledge as collateral, meaning that they have lower equity relative to debt, and hence, a lower capital to asset ratio (or alternatively, a higher debt to equity ratio). Older MFIs are likely to be larger which links to the previous result on the relationship between age and capital to assets ratio. Hence, these results are in line with the literature on capital structure theory which shows that larger firms tend to be more leveraged.

Legal Tradition: MFIs located in common law countries have, on average, higher capital to assets ratio than equivalent MFIs in civil law or other legal tradition countries. The results follow from the law and finance literature which shows that common law legal tradition corresponds to a higher level of capital market development, especially stock market development [1]. Civil law countries have the lowest mean and median capital to assets ratio confirming the law and finance literature in Africa's context [1]. If capital markets and especially equity markets are more developed in common law countries, it means that MFIs in these countries can easily issue equity financial instruments. Also, venture capitalists are more willing to inject private equity in MFIs in common law countries because the public equity markets offer an opportunity to exit the investment once it takes root [1].

Stock Market Development There is a weak negative but statistically significant relationship between stock market development and capital to assets ratio. It means that MFIs in countries with weak stock markets have more equity relative to assets and vice versa. These results may reflect the bank-based versus capital market based model of financing. Most economies in Africa follow the bank based model [1] where firms mostly raise funds from commercial banks in the form of loans as opposed to equity and debt markets.

Effectively, there is a very weak link between microfinance and equity and debt market which reflects in the small coefficients [1]. MFIs appear to have little linkage with the equity markets, and even where they do, prefer retained earnings and private equity to listing publicly. Available evidence shows very few cases of MFIs that are publicly listed [1].

Other Insignificant Variables Governance or institutional quality (KKM), asset structure, private credit to GDP, and profit margin are statistically insignificant drivers of capital to assets ratio. However, KKM and private credit to GDP both have a positive relationship with capital to assets ratio which reflects the importance of institutions both in the development of debt and equity markets. The relationship between profit margin and capital to assets ratio shows mixed results which may highlight the low profitability of MFIs in Africa (see appendix 7).

Table 6: Regression Output for Capital to Assets Ratio

	Dependent variable: depvar					
	depvar					
	(1)	(2)	(3)	(4)	(5)	(6)
currentlegalstatusBank				-0.201*** (0.070)	-0.157*** (0.049)	-0.162*** (0.047)
currentlegalstatusNBFI				-0.047 (0.056)	-0.055 (0.036)	-0.085** (0.035)
currentlegalstatusCoop	-0.029 (0.298)	-0.030 (0.229)	-0.018 (0.232)	-0.230*** (0.054)	-0.180*** (0.037)	-0.141*** (0.037)
currentlegalstatusRural Bank				-0.277*** (0.101)	-0.304*** (0.076)	-0.319*** (0.107)
ageYoung	-0.056** (0.023)	-0.058*** (0.018)	-0.052** (0.020)	-0.062*** (0.022)	-0.063*** (0.017)	-0.054*** (0.020)
ageMature	-0.072** (0.030)	-0.073*** (0.024)	-0.062** (0.026)	-0.068*** (0.026)	-0.077*** (0.020)	-0.069*** (0.022)
legal_traditionCivil				-0.262*** (0.062)	-0.176*** (0.041)	-0.149*** (0.040)
legal_traditionOther				-0.170*** (0.060)	-0.117*** (0.042)	-0.001 (0.042)
kkm	0.007 (0.012)	0.006 (0.010)	0.005 (0.010)	0.022*** (0.008)	0.005 (0.006)	-0.001 (0.006)
asset_structure	-0.198 (0.177)	-0.099 (0.143)	0.301* (0.161)	-0.171 (0.156)	-0.250** (0.119)	0.197 (0.134)
pcrdbgdp	0.026 (0.034)	0.027 (0.028)	0.024 (0.030)	0.009 (0.025)	0.018 (0.018)	0.019 (0.018)
stmktcap	-0.028 (0.022)	-0.029* (0.017)	-0.030 (0.018)	-0.048*** (0.015)	-0.044*** (0.011)	-0.020* (0.011)
profit_margin	-0.00000 (0.00001)	-0.00001 (0.00001)	0.001 (0.003)	-0.00000 (0.00001)	-0.00001 (0.00001)	0.002 (0.003)
Model	Within Full	Within >= 3 Years	Within >= 5 Years	Random Full	Random >= 3 Years	Random >= 5 Years
Data						
Observations	4,782	3,840	3,165	4,782	3,840	3,165
R ²	0.027	0.048	0.052	0.034	0.061	0.066
Adjusted R ²	-0.205	-0.086	-0.054	0.028	0.053	0.056
F Statistic	3.792*** (df = 28; 3862)	6.005*** (df = 28; 3366)	5.558*** (df = 28; 2845)	159.000***	236.300***	208.700***

Note:

*p<0.1; **p<0.05; ***p<0.01

Drivers of Deposits to Total Assets

The deposits to assets ratio has a positive relationship with MFI legal form, age, asset structure, size (logarithm of assets), and profit margin. At the macro-level, the significant drivers of deposits to assets ratio are legal tradition and institutional quality (KKM). Proxies for capital markets development, private credit to GDP and stock markets development to GDP, do not have no significant relationship with deposits to assets ratio. We discuss each of these relationships next.

Current Legal Status NGO-type MFIs have lower deposits to assets ratio than commercial banks, credit unions/ cooperatives, NBFIs, and rural banks. These results arise out of the differing business models. NGOs have taken root dependent on donations and subsidies with little emphasis on deposit mobilisation [1]. For instance, Credit Unions, on the other hand, thrive on taking deposits from members who raise their capacity for deposits mobilisation compared to NGOs. Also, legal restrictions on mobilising deposits by entities not under the oversight of central banks also contribute to the low levels of deposits [2]. As expected rural banks, commercial banks and cooperatives have the highest mean and median deposits to assets ratios which reflects their high deposits-driven leverage levels [3].

Age Older MFIs have higher deposits to assets ratio than younger MFIs. This result reflects the regional presence of older, larger MFIs in many locations. Also, older MFIs have invested in information technology that allows them to reach people in remote locations.

Legal Tradition

Institutional Quality (KKM)

Asset Structure

Size (Logarithm of Assets)

Profit Margin

Other Insignificant Variables

Table 7: Regression Output for Deposits to Assets Ratio

	Dependent variable: depvar					
	(1)	(2)	(3)	(4)	(5)	(6)
currentlegalstatusBank				0.398*** (0.074)	0.305*** (0.045)	0.290*** (0.046)
currentlegalstatusNBFI				0.186*** (0.060)	0.084** (0.033)	0.078** (0.033)
currentlegalstatusCoop	0.082 (0.104)	0.078 (0.088)	0.071 (0.083)	0.336*** (0.052)	0.300*** (0.032)	0.258*** (0.034)
currentlegalstatusRural Bank				0.674*** (0.106)	0.534*** (0.068)	0.505*** (0.103)
ageYoung	0.011 (0.008)	0.013* (0.007)	0.011 (0.007)	0.007 (0.009)	0.016** (0.007)	0.014* (0.007)
ageMature	0.026** (0.011)	0.029*** (0.009)	0.028*** (0.009)	0.019* (0.011)	0.035*** (0.009)	0.034*** (0.009)
legal_traditionCivil				0.013 (0.058)	0.068** (0.034)	0.077** (0.035)
legal_traditionOther				0.012 (0.060)	0.114*** (0.035)	0.036 (0.037)
kkm	-0.007 (0.004)	-0.007* (0.004)	-0.005 (0.004)	-0.003 (0.004)	-0.003 (0.003)	-0.001 (0.003)
asset_structure	0.100 (0.062)	0.060 (0.055)	-0.160*** (0.057)	0.096 (0.067)	0.130** (0.053)	-0.114** (0.056)
pcrdbgdp	-0.001 (0.012)	-0.002 (0.011)	0.005 (0.011)	0.002 (0.012)	-0.010 (0.010)	-0.010 (0.010)
stmktcap	-0.0004 (0.008)	0.00004 (0.007)	0.003 (0.007)	0.005 (0.008)	0.003 (0.006)	-0.003 (0.006)
profit_margin	0.00001** (0.00000)	0.00001** (0.00000)	-0.0002 (0.001)	0.00001** (0.00000)	0.00001*** (0.00000)	-0.0003 (0.001)
Model	Within Full	Within >= 3 Years	Within >= 5 Years	Random Full	Random >= 3 Years	Random >= 5 Years
Data						
Observations	4,782	3,840	3,165	4,782	3,840	3,165
R ²	0.040	0.061	0.074	0.071	0.119	0.111
Adjusted R ²	-0.188	-0.071	-0.030	0.065	0.111	0.101
F Statistic	5.801*** (df = 28; 3862)	7.807*** (df = 28; 3366)	8.087*** (df = 28; 2845)	207.100***	401.200***	339.500***

Note:

Drivers of Donations to Assets Ratio The results in Table 3 show a weak negative but significant link between institutional capacity (KKM) and donations. The results could be explained by the preference of donors to circumvent corrupt government channels in favour of non-state actors in availing development financing in Africa. As in other financing sources, the legal status of MFIs is an essential driver of donations, with commercial banks receiving the least donor funding which could be due to the perceived lack of commitment to the social course of microfinance. Where it is significant, financial development has a negative relationship with donations, meaning that donations flow to countries where MFIs find it harder to raise finance in the capital markets. These results show some deviation from the other sources of finance- given the place of institutional quality which is absent as a driver of other cases.

Table 8: Regression Output for Donations to Assets Ratio

	Dependent variable: depvar					
	(1)	(2)	(3)	(4)	(5)	(6)
currentlegalstatusBank				-0.116*** (0.015)	-0.071*** (0.014)	-0.069*** (0.013)
currentlegalstatusNBFI				-0.077*** (0.012)	-0.049*** (0.011)	-0.052*** (0.010)
currentlegalstatusCoop	0.038 (0.076)	0.038 (0.079)	0.032 (0.078)	-0.084*** (0.011)	-0.057*** (0.011)	-0.046*** (0.011)
currentlegalstatusRural Bank				-0.123*** (0.022)	-0.090*** (0.023)	-0.078** (0.031)
ageYoung	-0.033*** (0.006)	-0.034*** (0.006)	-0.026*** (0.007)	-0.026*** (0.005)	-0.032*** (0.006)	-0.023*** (0.006)
ageMature	-0.040*** (0.008)	-0.042*** (0.008)	-0.038*** (0.009)	-0.032*** (0.006)	-0.041*** (0.007)	-0.036*** (0.007)
legal_traditionCivil				-0.026* (0.013)	-0.015 (0.012)	-0.027** (0.012)
legal_traditionOther				0.001 (0.013)	0.008 (0.013)	-0.002 (0.012)
kkm	0.007** (0.003)	0.007** (0.003)	0.010*** (0.003)	-0.001 (0.002)	0.001 (0.002)	0.004** (0.002)
asset_structure	0.230*** (0.045)	0.256*** (0.049)	0.243*** (0.054)	0.179*** (0.037)	0.175*** (0.039)	0.198*** (0.043)
pcrdbgdp	-0.022** (0.009)	-0.025*** (0.010)	-0.024** (0.010)	-0.0001 (0.006)	-0.007 (0.006)	-0.004 (0.005)
stmktcap	0.006 (0.006)	0.008 (0.006)	0.002 (0.006)	0.003 (0.003)	0.001 (0.003)	-0.0001 (0.003)
profit_margin	-0.00003*** (0.00000)	-0.00003*** (0.00000)	-0.010*** (0.001)	-0.00003*** (0.00000)	-0.00003*** (0.00000)	-0.011*** (0.001)
Model	Within Full	Within >= 3Years	Within >= 5Years	Random Full	Random >= 3Years	Random >= 5Years
Data						
Observations	4,782	3,840	3,165	4,782	3,840	3,165
R ²	0.128	0.136	0.165	0.125	0.142	0.168
Adjusted R ²	-0.080	0.015	0.071	0.119	0.135	0.159
F Statistic	20.210*** (df = 28; 3862)	18.920*** (df = 28; 3366)	20.040*** (df = 28; 2845)	665.000***	618.900***	625.100***

Note:

The relationship between age and donations is less clear with the coefficients being insignificant in the regressions. Where significant, new firms appear to attract fewer deposits compared to the mature firms, going against the observations in Figure 3. However, in section 7.1, when we winsorise the data to remove outliers, age is no longer an essential driver of donations, which would explain the mixed results in Table 7.

Robustness Checks

In this section, we highlight the robustness checks on the models run in four areas: extreme values (outliers), heteroscedasticity, autocorrelation, and cross-sectional dependence. In each case, we discuss the corrective measures taken.

Extreme values/ Outliers

The likelihood that extreme values could influence the results is highly likely in a panel setting containing different units. To check whether the outliers affect our inference, we winsorise the data by removing the top 10% and the bottom 10% for each variable used in the regression analysis. We then ran regression models on the new dataset with the results displayed in appendix 1. Like in prior regressions, size, and profit margin drive of the choice of financing, holding all other variables constant. Notably, both education and financial development remain less critical as drivers of choice for funding. The legal status of MFIs remains an essential contributor to the selection of financing sources. However, age loses its importance. It means that the observed differences in levels of donations emanate from a few MFIs that receive the most donations rather than a systemic difference based on age. Most donations accrue to newest and most mature MFIs.

Cross-Sectional Dependence, heteroscedasticity, and serial correlation

In panel data settings, cross-sectional dependence (CSD) is an important consideration. CSD arises when there is a correlation between units in the same cross-section, usually due to unobserved common factors that affect all groups, although probably to differing extents. The omission of common elements in the model results in inconsistent estimates for fixed effects, random effects, and even the first difference model (Henningsen & Henningsen, 2019). In our case, we run the Breusch-Pagan LM test of independence with the results shown in appendix 4 and 5. The analyses indicate the presence of cross-sectional dependence in the regressions with Capital to Total Assets Ratio and Deposits to Total Assets Ratio as the dependent variables.

Extant research deals with CSD in three main ways. The traditional method is the use of seemingly unrelated regressions (SUR) of Zellner and Huang (1962) (Arouri & Rault, 2013). SUR allows for the estimation of the individual coefficient β_{it} and hence estimate the effects of the independent variables on the dependent variables for each unit of analysis, in our case MFIs (Sarafidis & Wansbeek, 2012). Again, the cross-sectional data is not sufficient for SUR analysis. The second method developed by Pesaran and Smith (1995) - the panel mean groups- works by averaging individual coefficients across panels. The technique hence requires panel data where each panel has sufficient data for a regression, which is not possible in this study. Therefore, we implement the third approach; the Panel Corrected Standard Errors (PCSE) (Bailey & Katz, 2011; Croissant et al., 2020). PCSE is useful when working with heterogeneous dynamic panel data by correcting for autocorrelation and cross-sectional dependence while providing more robust standard errors (Ikpesu, Vincent, & Dakare, 2019). The results presented have their standard errors corrected for CSD, resulting in heteroscedastic consistent coefficients.

Conclusion

This article examined the drivers of four indicators of the financing structure of MFIs in Africa: Debt to equity ratio, capital to assets ratio, deposits to assets ratio and donations to assets ratio. The results show that size, legal status, and age of MFIs are consistently related to the financing structure. Profit margin is directly related to leverage and inversely with capital to assets ratio as capital structure theory predicts. Institutional quality (KKM) refers only to deposits and donations, with lower KKM corresponding to more deposits and donations. Education and asset structure relate weakly to leverage, while financial development is not a significant factor which contradicts stylized facts on the capital structure of firms. For MFIs, it is the

institutional level factors that drive the financing structure. Microfinance in Africa shows a weak linkage to the macro-economy.

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Appendix

Appendix 1: Results of the Hausmann Test

Table 9: Hausmann Tests

Variable	Statistic	Parameter
Debt-Equity Ratio	5.731	10
Capital/Asset Ratio	23.578***	10
Deposits/Assets Ratio	42.394***	10

Source:

Authors’ construction from MIX data

Note:

¹ Alternative Hypothesis: One model is inconsistent

Appendix 2: Regressions using Winsorized Data

Table 10: Regression Output for Winsorized Data

	Dependent variable: depvar		
	(1)	(2)	(3)
currentlegalstatusBank		-0.190*** (0.029)	
currentlegalstatusNBFI		-0.087*** (0.023)	
currentlegalstatusCoop	-0.002 (0.096)	-0.183*** (0.022)	0.077 (0.067)
currentlegalstatusRural Bank		-0.316*** (0.037)	
ageYoung	-0.038*** (0.011)	-0.040*** (0.010)	0.003 (0.007)
ageMature	-0.071*** (0.014)	-0.068*** (0.011)	0.006 (0.009)
legal_traditionCivil		-0.115*** (0.025)	
legal_traditionOther		-0.049* (0.025)	
kkm	0.004 (0.006)	0.006* (0.004)	-0.0002 (0.004)
asset_structure	0.702*** (0.108)	0.499*** (0.094)	-0.355*** (0.075)
pcrdbgdp	0.061*** (0.019)	0.035*** (0.013)	0.024* (0.013)
stmktcap	-0.022*** (0.009)	-0.025*** (0.006)	-0.013*** (0.006)
profit_margin	0.046*** (0.013)	0.053*** (0.012)	-0.010 (0.009)
Model	<i>Within</i>		
Data	<i>Winsorized</i>		
Observations	2,816	2,816	2,816
R ²	0.123	0.183	0.081
Adjusted R ²	-0.121	0.173	-0.175
F Statistic (df = 28; 2202)	11.050*** 30	430.400*** 515.00	6.939*** 30

* p<0.1; ** p<0.05

Note:

Table 11: Variance Inflation Factors

	GVIF	Df	$GVIF^{(1/(2*Df))}$	GVIF	Df	$GVIF^{(1/(2*Df))}$
currentlegalstatus	1.893	4	1.083	1.977	4	1.089
age	1.466	2	1.100	1.171	2	1.040
legal_tradition	2.367	2	1.240	2.818	2	1.296
kkm	1.229	1	1.109	1.293	1	1.137
asset_structure	1.032	1	1.016	1.044	1	1.022
pcrdbgdp	1.681	1	1.296	1.631	1	1.277
stmktcap	1.904	1	1.380	2.408	1	1.552
profit_margin	1.009	1	1.004	1.009	1	1.005
year	2.178	20	1.020	1.488	20	1.010

Source:

Authors' construction from MIX data

Note:

¹ The first three rows show VIF for the model on capital asset ratio followed by debt-equity ratio

Appendix 3: Multicollinearity: Variance Inflation Factors

Table 12: Fixed versus Pooled OLS

Independent_variable	Df1	Df2	Statistic	Alternative
capital Asset Ratio	886	3862	9.212***	significant effects
Debt-Equity Ratio	886	3862	1.191***	significant effects

Source:

Authors' construction from MIX data

Note:

¹ The results show significant panel effects hence the choice of the fixed effects model over the pooled OLS

Appendix 4: Fixed vs pooled OLS- F test for Individual Effects

Appendix 5: Cross sectional dependence

```
## # A tibble: 4 x 5
##   statistic p.value parameter method      alternative
##       <dbl>    <dbl>     <int> <chr>        <chr>
## 1 300338.     0  155954 Breusch-Pagan LM test for cros~ cross-sectional ~
## 2 300999.     0  155954 Breusch-Pagan LM test for cros~ cross-sectional ~
## 3 300999.     0  155954 Breusch-Pagan LM test for cros~ cross-sectional ~
## 4 366514.     0  155954 Breusch-Pagan LM test for cros~ cross-sectional ~
```

Appendix 6: Residuals QQ-Plots

Appendix 7: profitability of MFIs in Africa

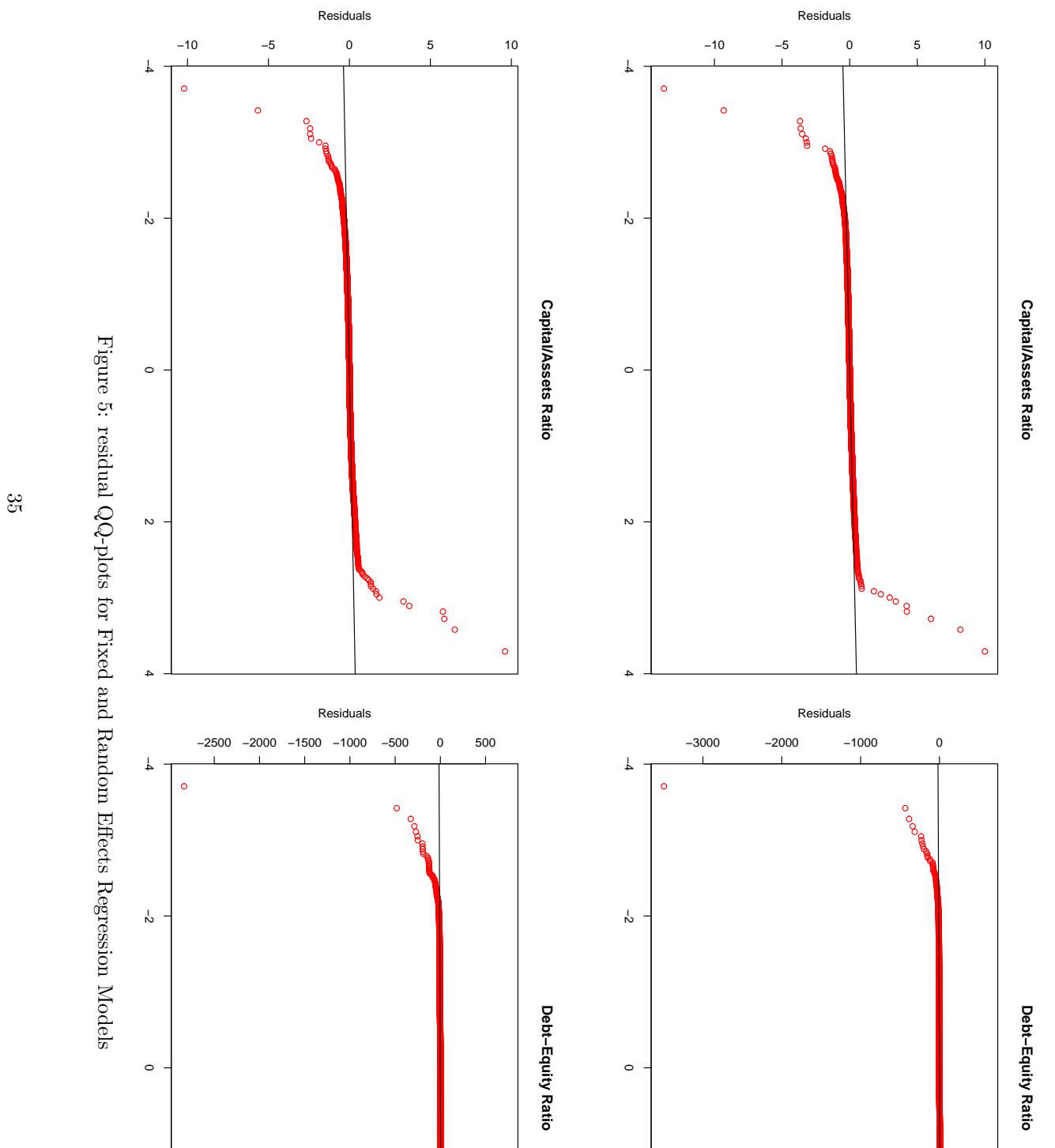


Figure 5: residual QQ-plots for Fixed and Random Effects Regression Models

Distribution of Profit Margins of MFIs in Africa

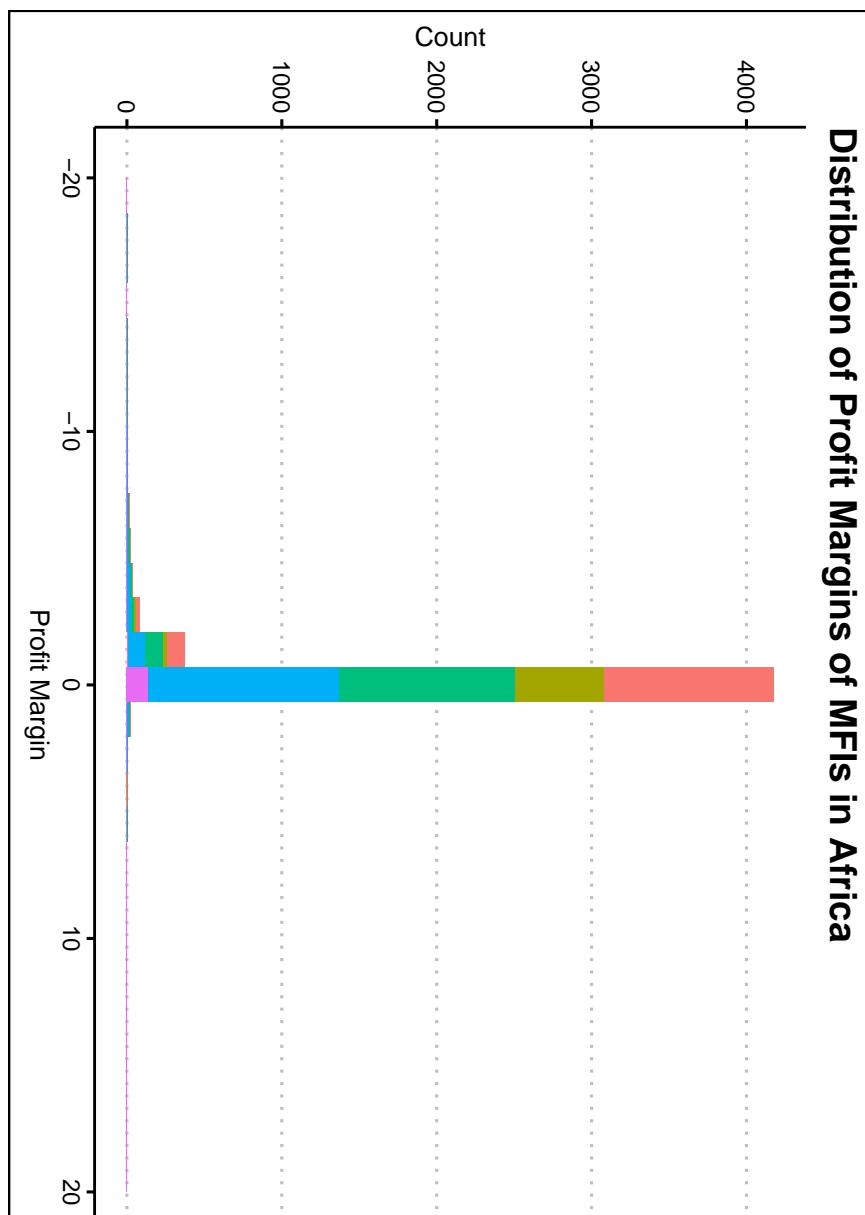


Figure 6: Distribution of Profit Margins of MFIs in Africa