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Branch Management and Firm Credit: Evidence from Ethiopia*

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Abstract

In order to understand the functioning of banks and firm credit in low-income countries, we collect novel datasets on the management practices and credit conditions from the universe of bank branches in Ethiopia. Our preliminary findings indicate that branches with strong practices operate over longer geographic distances and supply more local credit. We also observe that loan characteristics correlate with good branch management through longer maturities, lower collateral requirements and reduced default rates.

JEL: O16, G21, F36, L2

Keywords: Corporate Finance, Banks, Credit, Management

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1 Introduction

There is ample evidence that the availability of credit is essential for firms: to jump-start new enterprises (Black and Strahan (2002)); stimulate firm-investment (Becker and Ivashina (2014)) and boost firm-level employment (Cingano et al. (2016)). However, there is limited knowledge on the mechanisms through which banking systems can promote firm credit. This is particularly relevant in low-income countries because these are disproportionately reliant on banks (Levine (2005)) and the local financing constraints are significantly tighter (Banerjee and Duflo (2014)).

In this paper we provide preliminary empirical evidence on a novel channel through which banks participate to local credit markets: the management practices of their banks. In fact, while traditional measures of financial development rely on the "the extensive margin", like branch expansion and mobile phone access to measure the outreach to new geographic areas (Burgess and Pande (2005), Jack and Suri (2014)), in this paper we note that banks can invest in their local branches to reach out the most innovative entrepreneurs and productive projects. We define this as the "intensive margin" of financial development and measure it by combining a management survey with an extensive set of economic and financial datasets at the bank branch level. Our approach focuses on bank branches as the units that engage with the local economy, given the importance of bank-borrower relations in reducing information asymmetries (Petersen and Rajan (1994), Fisman et al. (2017)).

Such dimension of financial development may be particularly important when the extensive margin is constrained by infrastructure constraints, poor labour market conditions and other institutional features. As a result, banks and other financial institutions may be able to increase their local presence by investing in nearby branches: sending better managers, providing higher performance-based rewards and, in general, strengthening the local organization of branches.

In order to provide evidence on this, we extend the World Management Survey (Bloom and Van Reenen (2007), Bloom, Genakos, Sadun and Van Reenen (2012) and Bloom, Sadun and Van Reenen (2015)) to the study of the financial sector and administer this questionnaire to the universe of bank branches in Ethiopia. As a result, we are able to measure the management practice of local branches and combine these variables with other branch level characteristics (i.e. number of loans, amount of firm credit, price and non-price loan characteristics maturities, default rates). This analysis permits to shade light on a new channel, which may have

potentially important policy implications for our understanding of firm credit and banking in low-income countries.

Among the possible settings to implement this research design, we believe Ethiopia represents an ideal environment to test this specific hypothesis. In fact, Ethiopian banks invest significantly in their branches and management practices, which offers promising statistical power to our test. In fact, alternatives to this margin are either expensive or unavailable. For example, because of underdeveloped electrification (Moneke (2019)), reinforcing the existing branches through strong management may be a viable alternative to reaching unattainable locations by opening novel branches. At the same time, banks may find profitable to invest in retaining and organizing productively their labour force, which would boost their management practices, rather than relying on a high-turnover of employees which may be impractical due to high search costs (Abebe et al. (2018)) and weak transport infrastructure (Franklin (2018)).

To empirically investigate the "intensive margin" of financial development, we build comprehensive data sources through three steps. First, we construct a version of the World Management Survey including specific references to the management of bank branches and tailor the questions to the specific issues faced in this industry. Second, we introduce additional surveys to track information on branch managers (i.e. education, tenure, job experience), the credit volumes and loan conditions offered by each individual branch. This information is important in order to study management practices by controlling for manager characteristics and to measure how credit and lending conditions change with management. Third, we received the endorsement by the local central bank, international institutions and banks' headquarters to run this survey. These were key to secure a high response rate, which lead to 1,911 branches answering our survey, which corresponds to 59% of the 3,232 branches constituting the universe in 2017. This information spans across the 16 banks operating in 2017 and 361 cities across the 11 regions of Ethiopia. As a result, in addition to a cross-sectional study of branch management and credit, we also study within-bank and within-city variation, which are key to net out bank-specific and city-specific unobservables. This is key to refine the correlation between the management practices adopted by a branch and the corresponding credit conditions.

Our empirical analysis offers a preliminary view on an important topic at the intersection of banking and development economics. In analyzing our data, we study whether management

practices allow bank branches to improve their credit allocation. Because it is ex ante unclear which loan characteristics may respond to enhanced management, we combine the study of branch-level credit conditions and loan characteristics. A starting point of our study notes that branches adopting good management practices operate on longer distances from their location and this is important for two reasons. First, it is in line with banks substituting the "extensive margin" of financial development with this "intensive margin". Second, bank branches can search more intensely for promising projects by extending their geographic outreach. In line with this intuition, we note a positive correlation between good practices and the total credit supplied by a branch, but no relation with the overall number of loans. This implies a positive correlation between good practices and larger average loans per customer. This can be rationalized with branches being constrained on their overall credit allocation and hence screening more intensely on the firms receiving credit, hence giving larger loans conditional on being selected. Consistently with this interpretation, we observe that branches with strong management are associated with loans offering longer maturities and lower requirements on the collateral to as a share of loan amount. At the same time, we do not observe a correlation with lending rates, which is consistent with the view that higher lending rates lead the best entrepreneurs to select out of bank credit and hence create adverse selection (Stiglitz and Weiss (1981)). In line with a "positive selection" of entrepreneurs, we verify the existence of a negative correlation between default rates and good management practices, offering grounds to the interpretation of good management enhancing the screening and monitoring of entrepreneurs and leading to improved branch results.

After exploring the relation between management practices and credit, we investigate which characteristics in the local economy are associated with good management. The literature suggests that competition has a positive and strong effect on adopting good management practices (Van Reenen (2011), Bloom, Propper, Seiler and Van Reenen (2015)), as a result we study the effect of both the total number of branches in a given city and the number of competing branches as reported by managers. While these two variables are highly correlated, we find that only the number of competing branches reported by a manager correlate with management practices, while the total number of branches does not correlate with management per se. Furthermore, we verify another pattern documented in the literature: the ownership structure

of organizations is found to be a key determinant of management practices, as documented by Bloom, Sadun and Van Reenen (2015). Given the existence of a large state-owned bank in Ethiopia, the Commercial Bank of Ethiopia, that accounts for 45% of the credit market and 27% of the branches in our sample, we can explore the difference in management practices by comparing state-owned and privately-owned branches. We observe a negative correlation between management and state-ownership, both in the cross-section and once we focus on within-city variation. Lastly, we analyze the relation between variables proxing the extensive and intensive margin of banking outreach (respectively the number of bank branches and average management practices per city) and the level of local economic activity through the satellite images of night lights, as pioneered by Henderson et al. (2011). We find that while the number of branches in a city correlates positively and strongly with local economic activity, this is not the case for management practices. This may be due to the fact that a strong local economy affects positively both the marginal revenue of adopting stronger practices (by increasing the expected return on this asset), but can also push the marginal cost of stronger practices (by increasing the cost of retaining talented employees, having to provide stronger incentives).

While this study is specific to Ethiopia and its banking sector, we believe these implications shade light on an additional effect of good management on the economy. In fact, by promoting a more efficient screening and monitoring of borrowers, good management can lead to a more productive banking sector and efficient credit supply. In terms of policy implications, this work offers a novel dimension to the positive effects of bank competition and the limits of state-ownership through a novel channel, the quality of branch management.

This paper participates to three literatures. First, this paper contributes to the literature on financial development and inclusion showing that banks can use branch management in conjunction to branch expansion to promote their outreach and include new customers. From a theoretical perspective, Townsend and Zhorin (2014) present an innovative framework to evaluate the trade-offs that banks face in branch installation in emerging market countries, with a special focus on geography and industrial organization. A series of applied papers have highlighted the political and economic reasons for branch expansion (Assuncao and Townsend (2012)) and its effects on poverty, firm growth, and competition (Beck and Demirgüç-Kunt (2008), Beck and Maksimovic (2004), Burgess and Pande (2005), Burgess et al. (2005)). Second,

we provide novel insights to the literature on management practices as pioneered by Bloom and Van Reenen (2007), who introduced the World Management Survey. This literature provides robust evidence the importance of management for firm performance (Bloom et al. (2013)) and the long-lasting effects of adopting stronger practices (Bloom, Mahajan, McKenzie and Roberts (2018)). These results were also extended to schools and educational outcomes (Bloom, Lemos, Sadun and Van Reenen (2015)), hospitals and health outcomes (Bloom, Propper, Seiler and Van Reenen (2015)), private equity firms (Bloom, Sadun and Van Reenen (2015)) and exporting firms (Bloom, Manova, Van Reenen, Sun and Yu (2018)). In particular, we give evidence on the importance of management in banking. Third, we contribute to the literature on the role of bank branches in local credit markets, in line with Petersen and Rajan (1994), Petersen and Rajan (2002), Fisman et al. (2017) and Granja et al. (2018).

Section 2 introduces the branch survey, the data collection and summary statistics on the variables used in this paper. In section 3, we present the empirical analysis and study the correlations between branch management, credit and loan characteristics. Section 4 illustrates the determinants of branch management and I offer some concluding remarks in section 5.

2 The Management Survey of Ethiopian Bank Branches

2.1 Measuring Management Practices

In order to investigate the determinants of branch performance, we first need to build an accurate measure of good management practices. In particular, we have to create an aggregated indicator tailored to capture the efficiency of banks' operations that satisfies three important requirements. First, our measure must be built on indicators that can be objectively scored. Second, we need a methodology that allows us to collect accurate and unbiased responses from branch managers. Third, we have to make sure that all respondents representing the branches are willing to participate in the survey and provide all the necessary information. To address these issues, we are going to closely follow the methodology presented by Bloom and Van Reenen (2007) and their study of management practices on firms' performance. By drawing from their approach, we describe how we have addressed these specific points and built our indicator.

2.1.1 Scoring Management Performances

The concept of "good management practice" is often relative and contingent to a specific market or sector. However, international best practices in the banking sector have been widely studied, allowing the literature to reach a consensus on what constitutes a "good" practice. We evaluate and score management practices by defining the concept of "good" and "bad" practice and codifying it from 1 (worst practice) to 5 (best practice) across eight key dimensions. These practices are grouped into four areas: lean management, performance management, target management and people management.

The lean management section evaluates the efficiency of day-to-day operations (e.g. organization of the workflow, management of slack time, method of staff assignment to specific tasks, etc.) and assesses whether the branch has adopted recognized best practices. The performance management part measures how performance is tracked and reviewed (e.g. what KPIs are used, who oversees the performance review, how frequently are the performance measures revised, etc.). The target management section reviews the nature and the scope of branch's targets (e.g. the relative importance of financial targets with respect to non-financial ones, how these targets are linked to performance measures, etc.) and assesses whether they are in line with the bank's objectives. Finally, the people management part tests whether good performance is appropriately rewarded and whether bad performance is sanctioned (e.g. the adoption of an articulated appraisal system, the use of reward plan, the presence of sanctions for underperformers, etc.).

An overview of these four sections is presented in Table 1 while the relative part appearing in our survey can be found in Appendix A. After the completion of the survey, we combine these scores in order to obtain a unique index of management practices. Since the scaling may vary across practices in the econometric estimation, we normalize the final scores to z-scores (i.e. we normalize them to mean zero and standard deviation one). To build our final management index, we take the unweighted average across all z-scores as our primary measure of overall management practice.

Table 1: Survey Indicators

(1) Indicator	(2) Objective	(3) Measure
1	Lean Management	
1.1	Introduction of new management techniques	Tests whether operational efficiencies have been introduced and why
1.2	Good use of human resources	Tests whether incoming demand is segmented appropriately and the efficiency at matching supply and demand of skills
2	Performance Management	
2.1	Performance tracking	Tests whether performance is tracked using meaningful metrics and with appropriate regularity
2.2	Review of performance	Tests whether performance is reviewed with appropriate frequency and communicated with staff
3	Target Management	
3.1	Target balance	Test whether targets cover a sufficiently broad set of metrics
3.2	Target interconnections	Tests whether targets are tied to company objectives and how well they cascade down the organization
4	People Management	
4.1	Building a high performance culture	Tests whether good performance is rewarded proportionately
4.2	Making room for talent	Tests whether the branch is able to deal with underperformers

Note: this figure illustrates our survey's section on management performance. To measure good managerial practices, we evaluate them along four main categories, i.e. lean management, performance management, target management and people management. Each category is scored on two dimensions on a scale from 1 (bad practice) to 5 (good practice). Our final management performance index is calculated by standardizing each of the eight resulting scores and by taking their unweighted average.

2.1.2 Responses Collection

The information content and precision of our management performance index crucially depends on the quality of the responses collected through our survey. For this reason, we structured our questions in a way that allows respondents to provide accurate and unbiased answers. As it has been already pointed out by the literature (Bertrand and Mullainathan (2001)), answers are typically biased by the presence of a scoring scale, which may prompt the respondent to provide the interviewer's expected answer. Moreover, interviewers may have preconceptions towards interviewed managers. Apart from these issues, there are many other background factors that

may be correlated with management behavior, which may in turn generate systematic bias in the survey data.

To counter these potential negative effects, we adopt a combination of strategies that have already been tested by the existing literature. First, we ensure the collection of accurate responses through the following blind technique. We conduct telephone surveys without informing the managers that their answers will be evaluated against a scoring grid, which allows us to gather information about actual management practices. Second, we ask a series of open-ended questions (e.g. What types of targets are set for the bank in general? What are the goals for your branch?) and record the answer until an accurate assessment of management practices is possible. Third, in order to correct any inconsistent interpretation of responses, we make sure that our interviewers have conducted a minimum amount of training interviews during a pilot survey phase. Furthermore, given that almost all our interviewers conducted more than 40 interviews (with an average of 200 interviews per interviewer), we are also able to control for interviewer fixed effects in a robustness section. Fourth, we adopt a double-scoring technique, i.e. we ask another interviewer to silently listen and score the responses provided during the interview. Finally, we collect information on a large set of manager's characteristics in order to control for them (e.g. age, education, ethnicity, etc.).

2.1.3 Manager Participation

The average duration of an interview was approximately 27 minutes. Interviews have been conducted between January 2015 and February 2018 by locally recruited RAs. The initial survey phase consisted in a pilot that involved 265 branches, which allowed us to polish the survey and to train our interviewers. After this stage, we proceeded with the complete survey of the universe of Ethiopian bank branches, which were 3232 in total. Overall, we obtained a relatively high response rate (59%, 1911 branches), which was possible thanks to a set of specific survey strategies. First, in order to make the interview appear non-controversial, the survey was introduced as "a piece of work" without discussion of the bank's financial position or the accounts of the individual branch. Interviewers in fact were not required to discuss financial figures during the interviews. This strategy allowed us both to maximize the participation rate of branches and to ensure that our interviewers were truly blind to the firm's financial situation.

Second, the questions we asked inquired on evident practices within the branch, which made any branch managers able to provide an answer. This second strategy also contributed to the relatively high response rate. Finally, the stated endorsement and support by the World Bank and the National Bank of Ethiopia (local central bank) helped to convince the managers that this was an important initiative with official support, which also contributed to the response rate.

2.1.4 Data and Summary Statistics

As well as the management practices survey, our interviewers collected a wide range of information on the respondent and the branch's characteristics. The introductory part of our survey is in fact targeted to collect baseline information on the branch (e.g. name, geographic location, number of employees, opening date, etc.) and on the interviewed manager (e.g. age, gender, education, previous employment in other banks, etc.).

A second set of questions addresses the organizational nature of the branch (e.g. management structure, autonomy from the headquarters, etc.) and its operations (e.g. average size and collateral of issued loans, share of defaulted loans, distance of branch operation etc.). Given that this information was collected simultaneously with the management survey, we cross check this information with third-party data on a subset of branches provided by bank headquarters and observe a very high correlation, in the robustness section we discuss this more extensively.

All the entries of our survey can be found in Appendix A while summary statistics for the variables we have just presented is presented in Table 2. All these pieces of information are critical to assess the impact of management practices on objective measures of performance and branch organizational features, which we are going to analyze in the next paragraphs.

In addition to these data sources, we analyse data on cities' nightlight intensity from NOAA's National Geophysical Data Center. Original sources on night light intensity has been collected by the US Air Force Weather Agency and later processed by NOAA. This dataset offers statistics on average yearly brightness level on any location on the globe and it allows us to track Ethiopian cities' brightness at night until 2012. Given that our survey begun its implementation a few years after this, we verify the relation between this pre-determined characteristic and management practices. Night light intensity is measured on a scale from 0 (minimum bright-

ness) to 63 (maximum brightness) and it is computed as the yearly average of daily nightlight intensity in a given location. Moreover, this measure of nightlight intensity is adjusted by controlling for exceptional events (e.g. wildfires) and atmospheric factors (e.g. cloud cover). We are able to extract the level of nightlight intensity by recording the brightness level of the locations corresponding to Ethiopian cities' geographic coordinates.

Panel A of Table 2 gives describes the summary statistics for the eight sub-indicators which result in the management practice index, as presented in Table 1. Panel B presents the statistics for the nine variables that are used in the text. On average a branch deals with customers located within a radius of around 7.2 kilometers (or 1.972 log points), faces 37 branches per city (or 3.609 log points), presents 7 competing branches (described by 1.935 log points), gives 68 million Ethiopian Birr (ETB) in lending (11.13 log points, which correspond to 2.412 USD) and 14 loans (or 2.611 log points). These loans present the following average characteristics: a lending rate of 14.3%; a maturity of 16 months (or 2.77 log points); a collateral worth 99.9% of the value of the loan and default 5% of the times.

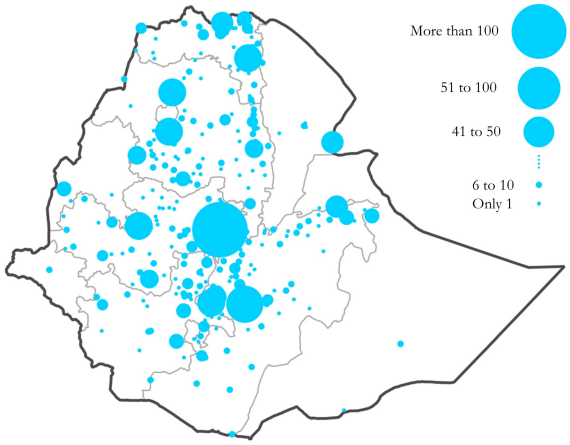
Beyond the summary statistics, it is also interesting to have a look at the spatial dimension of our variables. As we can observe in Figure 1, there is a lot of geographic variation both in terms of location and with respect to the number of branches in each city. For instance, we can clearly observe a huge concentration of branches in the capital region, i.e. Addis Ababa (largest circle in the picture), and in other major cities while, as we would have expected, we see less branches in less populated areas. When we look at the average scores of management practice in Figure 2, we also observe an uneven distribution of scores across the country. While the branches of Eastern Ethiopia have homogeneously adopted satisfactory management practices, the western part scores relatively lower but exhibits some areas where branches have adopted very good practices. As we are going to point out in the course of our discussion, geographic variation plays an important role when studying the impact of managerial practices on branches' activities and characteristics.

Table 2: Summary Statistics

	(1) Observations	(2) Mean	(3) SD	(4) Min	(5) Max
Panel A - Management Practices					
Lean Management 1.1	1,911	3.33	1.02	1	5
Lean Management 1.2	1,911	3.28	1.02	1	5
Perfomance Management 2.1	1,911	3.25	1.03	1	5
Perfomance Management 2.2	1,911	3.35	1.04	1	5
Target Management 3.1	1,911	3.14	1.02	1	5
Target Management 3.2	1,911	2.97	0.94	1	5
People Management 4.1	1,911	3.07	1.14	1	5
People Management 4.2	1,911	2.76	1.26	1	5
Management Practice Index	1,911	0.000	0.768	-2.047	1.756
Panel B - Branch Characteristics					
Operational Distance	1,911	1.972	0.300	1.098	3.401
Total Branches	1,911	3.608	2.084	0.693	6.376
Competing Branches	1,911	1.935	0.808	0	4.394
State-Owned	1,911	0.274	0.446	0	1
Lending Volume	1,911	1.113	0.529	9.605	13.232
Number of Loans	1,911	2.611	0.192	2.397	3.761
Lending Rate	1,911	0.143	0.030	0	0.2
Loan Maturity	1,911	2.770	0.859	0	4.189
Collateral Share	1,911	0.999	0.257	0	2.1
Default Rate	1,911	0.049	0.091	0	1
Panel C - Satellite Images					
Night Light Pixels	331	1.302	1.212	0	4.15

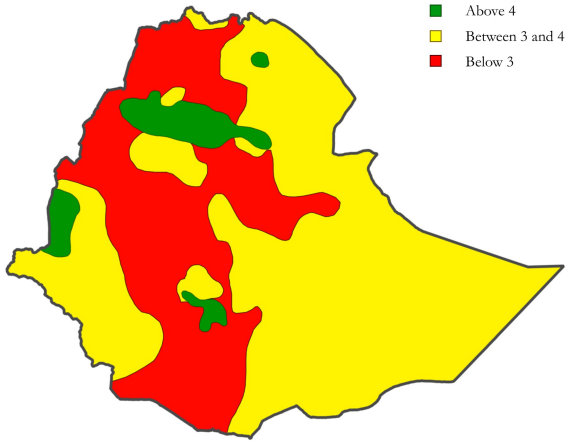
Note: this table reports summary statistics on branches' management practice scores in Panel A and other characteristics in Panel B. The first column reports number of observations, the second shows the mean for all listed variables, the third column shows their standard deviation and the fourth and fifth columns indicate their minimum and maximum values respectively. The unit of observation is the individual bank's branch. The variables reported in Panel A are described in the text and in Table 1. The variables reported in Panel B are the natural logarithm of the number of kilometers in which the bank operates, Operational Distance; the natural logarithm of the total number of branches operating in a city, as calculated by summing up branches in a city, indicated by Total Branches; natural logarithm of the number of competing branches, as reported by the branch manager and indicated by Competing Branches; a dummy for whether a branch is state-owned , State-Owned; the natural logarithm of the volume of lending, Lending Volume; the natural logarithm of the number of loans, Number of Loans; the average lending rate administered by the branch, Lending Rate; the natural logarithm of the average loan maturity in the number of months, Loan Maturity; the value of the loan requested as a collateral by the bank, Collateral Share; the share of loans that default in one year, Default Rate. Panel C describes the summary statistics on the natural logarithm of the night light pixels, image and data processing by NOAA's National Geophysical Data Center, collected by US Air Force Weather Agency.

Figure 1: Number of Branches by City



Notes: this figure reports the number of bank branches in Ethiopian cities. The circle position indicates the city location while its size represents the number of branches in each city. The circle size is scaled proportionally depending on the number of branches located within a city. We re-scale down the number of branches for the capital city, Addis Ababa (the largest circle on the map), in order to keep the map visible.

Figure 2: Management Practice Scores by City



Notes: this figure reports the mean of management practice index by city and across Ethiopian cities, in particular it depicts the prevalence of bad (scoring below 3), average (scoring between 3 and 4) and good (scoring above 4) management practices. Cities that present a majority of branches scoring below 3 on our management performance index are shaded in red, those that have a majority of branches scoring between 3 and 4 are marked in yellow while provinces that exibit a majority of branches scoring above 4 are shaded in green.

3 Empirical Analysis

In next two sections we explore the branch management practice index introduced in the previous section and focus on two aspects. First, we investigate the correlation between the management practice index and firm credit, in particular the amount of credit, the price and non-price characteristics of lending, the default rate and the operational distance. Second, we study the determinants of management practices and focus on branch competition, the type of bank ownership (i.e. state-owned vs. privately-owned branches) and local economic conditions.

3.1 Management Practices and Firm Credit

3.1.1 Lending and Number of Loans

In this section we investigate whether firm credit, as supplied by branches, is associated with the presence of good management practices. In order to study this relationship, we focus on two elements that are available throughout the survey.

First, the total number of loans that are supplied by a branch in a given year. Second, the volume of overall lending supplied by an individual branch, which is calculated by multiplying the reported average size of a loan and the number of loans. Combining the study of these two variables is precious, because highlights whether well-managed branches are able to find more customers, deliver more to existing customers or both.

As a result, we combine this yearly information on credit with the measures of management practices. While from a theoretical standpoint we would expect a positive relation between credit and management practices, it is not clear which of these margins should be affected and how. For this reason, we study the following model:

$$Credit_{ibc} = \beta MPI_{ibc} + \iota_c + \iota_b + \varepsilon_{ibc}$$

$Credit_{ibc}$ reports the two variables previously described, hence in Table 3 is the natural logarithm of the overall number of loans, while in Table 4 is the natural logarithm of yearly credit volume issued by branch i. These variables are regressed over MPI_{ibc}, which is the management performance index of branch i affiliated to bank b and located in city c, and. As we did in our first model, we add city and bank fixed effects (ι_c and ι_b respectively) in order to

Table 3: Number of Loans and Management

	(1)	(2)	(3)	(4)
Variables	Number of Loans			
Management Practice	-0.008	0.011	-0.007	0.004
$Index_i$	(0.006)	(0.007)	(0.006)	(0.006)
Bank FE		Yes		Yes
City FE			Yes	Yes
Obs.	1911	1911	1911	1911
Adj. R sq.	0.005	0.194	0.017	0.188
Mean Dep. Var.	2.612	2.612	2.612	2.612
S.D. Dep. Var.	0.193	0.193	0.193	0.193

Note: This table presents ordinary least squares (OLS) estimates, where the unit of observation is branch i affiliated to bank b and located in city c. The dependent variable in all columns is the natural logarithm of the number loans given by the branch in the previous year, *Number of Loans*, which is regressed over the management practice index. In column (2) we include bank fixed effects alone, in column (3) we add city fixed effects alone while in column (4) we include both of them. The row Adj. R sq. shows the adjusted R^2 of these regressions while the following two rows show the mean and standard deviation (S.D.) of the dependent variable respectively. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

take into account unobservable city and bank fixed characteristics. We cluster standard errors at the city level.

The results of tables 3 and 4 indicate that the effect of good management practices on credit do not go through the extensive margin, hence the number of loans given by a branch, rather the amounts of lending. In fact, 3 shows that there is no correlation between the management practice index and the number of loans. Beyond the lack of a statistically significant effect, it is relevant that the point estimates are very low and fluctuate tightly around zero. On the contrary, Table 4 illustrates that the volume of lending responds and significantly to the management practice index. The coefficient highlights that credit volume has a significant and positive impact on the use of good management practices: a increase in the index of 1 point, leads to an approximate increase in lending by 5%. This is the case in spite of the different source of variations used, by controlling for city and time fixed effects, both separately and together.

3.1.2 Price and Non-Price Characteristics of Loans

In this section we study the characteristics of loans and verify whether there is a relation between these and management practices. To perform such analysis, we merge the management practice survey with the information on lending, which includes rates, maturities and the share of collateral.

Table 4: Lending Volume and Management

	(1)	(2)	(3)	(4)
Variables	Lending Volume			
Management Practice $Index_i$	0.0483**	0.0516***	0.0516*	0.0588**
	(0.0234)	(0.0169)	(0.0230)	(0.0254)
Bank FE		Yes		Yes
City FE			Yes	Yes
Obs.	1911	1911	1911	1911
Adj. R sq.	0.004	0.072	0.035	0.070
Mean Dep. Var.	11.13	11.13	11.13	11.13
S.D. Dep. Var.	0.530	0.530	0.530	0.530

Note: This table presents ordinary least squares (OLS) estimates, where the unit of observation is branch i affiliated to bank b and located in city c. The dependent variable in all columns is the natural logarithm of the volume of lending given by the branch in the past year, *Lending Volume*, which is regressed over management practice index. In column (2) we include bank fixed effects alone, in column (3) we add city fixed effects alone while in column (4) we include both of them. The row Adj. R sq. shows the adjusted R^2 of these regressions while the following two rows show the mean and standard deviation (S.D.) of the dependent variable respectively. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

While from a general perspective, we would expect that well-managed branches to give out "better" loans, it is ex ante unclear along which margins such loans could differ. As a result, our setting ideal to verify how this is implemented. To test this, we estimate the following model:

$$Loan\ Characteristics_{ibc} = \beta MPI_{ibc} + \iota_c + \iota_b + \varepsilon_{ibc}$$

Where $Loan\ Characteristics_{ibc}$ is the characteristic of a loan given in branch i affiliated to bank b and located in city c and this is regressed over MPI_{ibc}, which is the corresponding management performance index. Once again, we add city and bank fixed effects (ι_c and ι_b respectively) and add the error term ε_{ic}, which is clustered at the city level.

Table 5, 6 and 7 show that loans given in branches with good management practices do not present lending rates are not higher than other branches, exhibit significantly longer maturities and originated with a lower collateral requirement. This evidence is consistent with a view that branch management, as the intensive margin of financial development, allows banks to find more valuable firms, fund promising projects and with better characteristics.

Table 5 describes the relation between management practices and the average lending rate. As usual, there are four specifications with different sources of variations and all of them report positive effects. This is definitely statistically different from zero in columns (1) and (3), while it is barely insignificant in both columns (2) and (4). In all of these cases the magnitudes are clearly negligible and fluctuate around 0.003 (between 0.001 and 0.005). This implies that branches that are one point above the average in their management practice index give loans

Table 5: Management and Lending Rate

	(1)	(2)	(3)	(4)
Variables	Lending Rate			
Management Practice $Index_i$	0.005***	0.002*	0.004***	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Bank FE		Yes		Yes
City FE			Yes	Yes
Obs.	1911	1911	1911	1911
Adj. R sq.	0.016	0.125	0.005	0.109
Mean Dep. Var.	0.143	0.143	0.143	0.143
S.D. Dep. Var.	0.0303	0.0303	0.0303	0.0303

Note: This table presents ordinary least squares (OLS) estimates, where the unit of observation is branch i affiliated to bank b and located in city c. The dependent variable in all columns is the average lending rate reported by the branch manager, *Lending Rate*, which is regressed over the management practice index. In column (2) we include bank fixed effects alone, in column (3) we add city fixed effects alone while in column (4) we include both of them. The row Adj. R sq. shows the adjusted R^2 of these regressions while the following two rows show the mean and standard deviation (S.D.) of the dependent variable respectively. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

with a rate that is 2% higher than the average lending rate, which is a negligible effect in this case.

Tables 6 and 7 give an interesting perspective on the non-price characteristics of these loans. These are significantly longer in terms of maturity, with a point estimate around 0.15, included between 0.1 and 0.2. Hence an increase in the management practice index of one point is associated with a 15% increase in the maturities of lending. Beyond being significant, this effect is also large: an average loan would pass from a maturity of 16 months to a maturity of 18, receiving almost an extra quarter of credit.

On the contrary, we observe in Table 7 that the collateral requirements are significantly lower with a point estimate around -0.03, between -0.032 and -0.027. This result is statistically different from zero, but not large: a one point increase in the index, implies a decline in the collateral requirement of 3% of the value of the loan.

3.1.3 Management practices and default rates

We also want to study the link between branches' reported loan defalut rates and their management practices. To perform this analysis, we exploit the survey question: "Out of 10 loans given in the last year, how many of these was not repaid or not repaid on time?". The resulting percentage of non-repaid loans is used as an indicator of default rates. From a general point of

Table 6: Management and Maturities

	(1)	(2)	(3)	(4)
Variables	Loan Maturity			
Management Practice	0.226***	0.132***	0.187***	0.103**
$Index_i$	(0.037)	(0.043)	(0.035)	(0.040)
Bank FE		Yes		Yes
City FE			Yes	Yes
Obs.	1911	1911	1911	1911
Adj. R sq.	0.040	0.145	0.047	0.152
Mean Dep. Var.	2.770	2.770	2.770	2.770
S.D. Dep. Var.	0.860	0.860	0.860	0.860

Note: This table presents ordinary least squares (OLS) estimates, where the unit of observation is branch i affiliated to bank b and located in city c. The dependent variable in all columns is the natural logarithm of the average loan maturity in number of months, *Average Maturity*, which is regressed over the management practice index. In column (2) we include bank fixed effects alone, in column (3) we add city fixed effects alone while in column (4) we include both of them. The row Adj. R sq. shows the adjusted R^2 of these regressions while the following two rows show the mean and standard deviation (S.D.) of the dependent variable respectively. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

Table 7: Management and Collateral Share

	(1)	(2)	(3)	(4)
Variables	Collateral as a Share of Loan			
Management Practice	-0.032***	-0.027***	-0.031***	-0.031***
$Index_i$	(0.007)	(0.007)	(0.007)	(0.008)
Bank FE		Yes		Yes
City FE			Yes	Yes
Obs.	1911	1911	1911	1911
Adj. R sq.	0.008	0.071	0.003	0.057
Mean Dep. Var.	0.999	0.999	0.999	0.999
S.D. Dep. Var.	0.258	0.258	0.258	0.258

Note: This table presents ordinary least squares (OLS) estimates, where the unit of observation is branch i affiliated to bank b and located in city c. The dependent variable in all columns is the reported average value of the collateral as a share of the loan, *Collateral Share*, which is regressed over the management practice index. In column (2) we include bank fixed effects alone, in column (3) we add city fixed effects alone while in column (4) we include both of them. The row Adj. R sq. shows the adjusted R^2 of these regressions while the following two rows show the mean and standard deviation (S.D.) of the dependent variable respectively. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

Table 8: Management and Default Rate

	(1)	(2)	(3)	(4)
Variables	Default Rate			
Management Practice	-0.009***	-0.008**	-0.009**	-0.008*
$Index_i$	(0.003)	(0.003)	(0.004)	(0.004)
Bank FE		Yes		Yes
City FE			Yes	Yes
Obs.	1911	1911	1911	1911
Adj. R sq.	0.005	0.009	0.015	0.017
Mean Dep. Var.	0.050	0.050	0.050	0.050
S.D. Dep. Var.	0.092	0.092	0.092	0.092

Note: This table presents ordinary least squares (OLS) estimates, where the unit of observation is branch i affiliated to bank b and located in city c. The dependent variable in all columns is the reported average default rate of loans issued in the past year, *Default Rate*, which is regressed over the management practice index. In column (2) we include bank fixed effects alone, in column (3) we add city fixed effects alone while in column (4) we include both of them. The row Adj. R sq. shows the adjusted R^2 of these regressions while the following two rows show the mean and standard deviation (S.D.) of the dependent variable respectively. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

view, we would expect that branches that exhibit high default rates would be those with worse management practices. To test our expectation, we estimate the following model:

$$Default\ Rate_i = \beta MPI_{ibc} + \iota_c + \iota_b + \varepsilon_{ibc}$$

where $Default\ Rate_i$ is the loans' default rate derived from the managers' reported number of non-repaid loans in branch i and is regressed over MPI_{ibc}, as the management performance index. Once again, we add city and bank fixed effects (ι_c and ι_b respectively) and standard errors are clustered at the city level.

Table 4 present the estimated coefficients of model. In line with our underlying hypothesis, we find that well-managed branches achieve lower default rates regardless of the variation under analysis. These results are sizeable despite the small point estimate, which is 0.0085 between 0.008 and 0.009. This implies that a one point increase in the management practice index leads to a decline in default rates by 17%.

3.1.4 Management Practices and Operating Distance

Finally, we provide a key test for our underlying hypothesis: do branches with stronger management practices operate on a more extensive geography? In order to answer this question, we asked the branch managers to report the average distance of the customers with whom they interact. Figure 3 plots two interesting maps that give graphic evidence on the importance of the branch operating distance for financial development. In fact, while the left figure reports

the geography of bank branches across the country, the right picture shows the extent of the country that is covered through the operating distance of Ethiopian bank branches. On the same point, Figure 4 zooms into a particular group of cities in the Oromia region, showing how different branches operate along heterogeneous distances.

To test the hypothesis that well-managed branches operate on longer geographic distances, we estimate the following model:

$$Operating\ Distance_{ibc} = \beta MPI_{ibc} + \iota_c + \iota_b + \varepsilon_{ibc}$$

Where $Operating\ Distance_{ibc}$ is the natural logarithm of the operating distance of the branch i affiliated to bank b and located in city c in kilometers, which is regressed on MPI_{ibc}, the management performance index and city and bank fixed effects (ι_c and ι_b respectively). Standard errors are clustered at the city level.

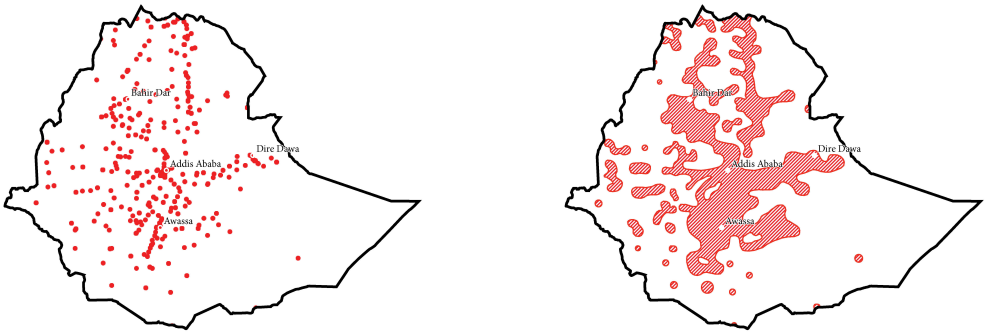
Table 9 presents the estimated coefficients of the previous empirical model. Our results suggest a positive correlation between the operational distance of the branch and the management practices adopted at the branch. This correlation is positive and statistically different from zero across the specifications, with the point estimate being around 0.050, between 0.0482 and 0.0533. As a result, branches with a one point higher management practice index reach out to further destinations by 5%, hence from an average of 7.53 to 7.91 kilometres.

Table 9: Management and Operational Distance

	(1)	(2)	(3)	(4)
Variables	Operational Distance			
Management Practice	0.0533***	0.0535***	0.0482***	0.0511***
Index$_i$	(0.00953)	(0.0101)	(0.0103)	(0.0107)
Bank FE		Yes		Yes
City FE			Yes	Yes
Obs.	1911	1911	1911	1911
Adj. R sq.	0.018	0.029	0.025	0.029
Mean Dep. Var.	1.972	1.972	1.972	1.972
S.D. Dep. Var.	0.300	0.300	0.300	0.300

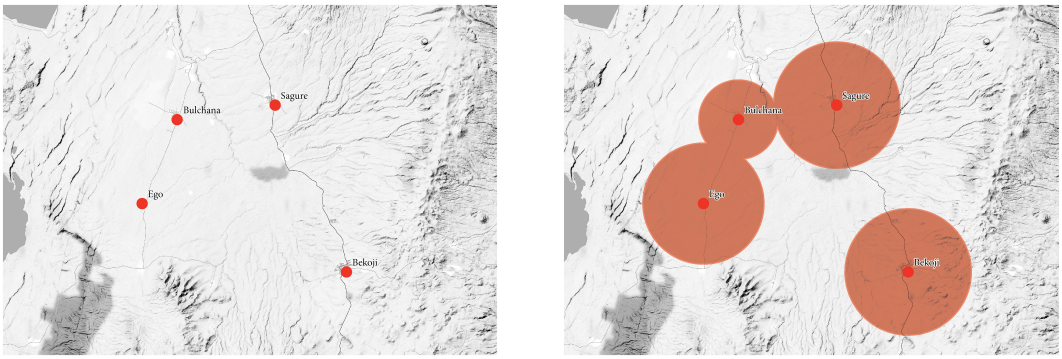
Note: This table presents ordinary least squares (OLS) estimates, where the unit of observation is branch i affiliated to bank b and located in city c. The dependent variable in all columns is the natural logarithm of the average distance over which the branch operates, *Operational Distance*, which is regressed over the management practice index. In column (2) we include bank fixed effects alone, in column (3) we add city fixed effects alone while in column (4) we include both of them. The row Adj. R sq. shows the adjusted R^2 of these regressions while the following two rows show the mean and standard deviation (S.D.) of the dependent variable respectively. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

Figure 3: A Map of Operational Distance, Number of Branches and Branch Outreach



Notes: The figures reports on the left panel the map of Ethiopia and the locations of bank branches, while on the right panel it shows the parts of the country that are covered by bank branches through their operating distances.

Figure 4: An Example of Bank Branches and Operating Distances



Notes: The figures reports on the left panel the map of bank branches around the city of Sagure, in Oromia region. The right panel highlights also the operating distance of the local bank branches.

4 Management Practices and the Local Economy

4.1 Branch Competition

In order to study the effect of competition on the adoption of management practices, we proceed in two ways. First, we count the total number of branches operating in every city and use this as a proxy for competition. Second, in our survey, we ask the branch managers to report the number of competing branches in proximity to their location. While these two variables are significantly correlated, this effect is not very high and definitely lower than one (the correlation is $0.234 * **$). This is useful as we can study the relation between management practices and competition and distinguish this story from an effect of "market size" as proxied by the total number of branches. To investigate this hypothesis, we study the following model:

$$MPI_{ibc} = \beta\, Total\ Branches_c + \eta\, Competing\ Branches_i + \iota_c + \iota_b + \varepsilon_{ibc}$$

Where MPI_{ibc} is the management performance index of branch i affiliated to bank b and located in city c, and $Total\,Branches_c$ is the natural logarithm of the total number of branches operating in citiy c, while $Competing\ Branches_i$ is the natural logarithm of the number of competing branches in the city where branch i is located. In our model we also add city and bank fixed effects (ι_c and ι_b respectively) in order to take into account unobservable city and bank fixed characteristics. We cluster standard errors at the city level.

Table 10 reports the estimated coefficients of our model. These results offer evidence that higher competition at the city level is associated with a positive and significant management practices in a given branch. The significance and the size of this impact is persistent regardless of the variation expressed in columns (1) to (4). This is interesting, because column (1) implies that regardless of city and bank characteristics, a higher degree of competition leads to better practice adoption. This is true also once city and bank fixed effects are netted out. Column (4) adds an important dimension to this finding: even within a city and within a bank, branches that face more competitors are better managed.

4.2 Bank Ownership

Banks in Ethiopia are either privately-owned or state-owned, as there are no publicly-owned banks due to the absence of a stock market. In our dataset, we code the affiliation of all branches

Table 10: Management and Competition

	(1)	(2)	(3)	(4)
Variables	Management Practice Index			
$Total\ Branches_c$	-0.011	-0.003		
	(0.012)	(0.007)		
$Competing\ Branches_{ibc}$	0.111***	0.080***	0.129***	0.124***
	(0.022)	(0.021)	(0.024)	(0.016)
Bank FE		Yes		Yes
City FE			Yes	Yes
Obs.	1911	1911	1911	1911
Adj. R sq.	0.012	0.156	0.088	0.220
Mean Dep. Var.	0.000	0.000	0.000	0.000
S.D. Dep. Var.	0.768	0.768	0.768	0.768

Note: This table presents ordinary least squares (OLS) estimates, where the unit of observation is branch i affiliated to bank b and located in city c. The dependent variable in all columns is the management practice index, which is regressed over the natural logarithm of the total number of branches operating in city c, $Total\,Branches_c$, and the natural logarithm of the total number of competing branches located in the city where branch i is located, $Competing\ Branches_{ibc}$. In column (2) we include bank fixed effects alone, in column (3) we add city fixed effects alone while in column (4) we include them both. The row Adj. R sq. shows the adjusted R^2 of these regressions while the following two rows show the mean and standard deviation (S.D.) of the dependent variable respectively. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

to the 16 banks operating in Ethiopia: among these 15 are privately-owned and one is directly controlled by the government. This is the Commercial Bank of Ethiopia (CBE) which is one of the oldest and largest banks in Africa, it accounts for 27% of the branches in our dataset.

Branch ownership can management in multiple ways. In fact, by focusing on non-economic incentives rather than profit-maximization, this may lead to delay the introduction of new practices, have frictions in human resource management and tracking of performance. In this section, we verify whether the branches of the state-owned bank present different management practices with respect to privately owned banks. To do so, we analyze the following model:

$$MPI_{ic} = \beta State - Owned_b + \iota_c + \varepsilon_{ic}$$

Where MPI_{ic} is the usual management performance index of branch i in city c and $State-Owned_b$ is a dummy that takes the value of one if the branch i is affiliated to a state-owned bank and zero otherwise. In our model, we also include city fixed effect (ι_c).

Table 11 shows the coefficients resulting from the estimation of our second model. Our estimates indicate that state-owned branches are much more likely to exhibit a lower performance index. This effect is large and significant both when we do not include city fixed effects and when we add them. We interpret these estimates by noting that, if a bank hypothetically becomes state-owned, its standardized management practice index decreases by between 0.2

Table 11: Management and Bank Ownership

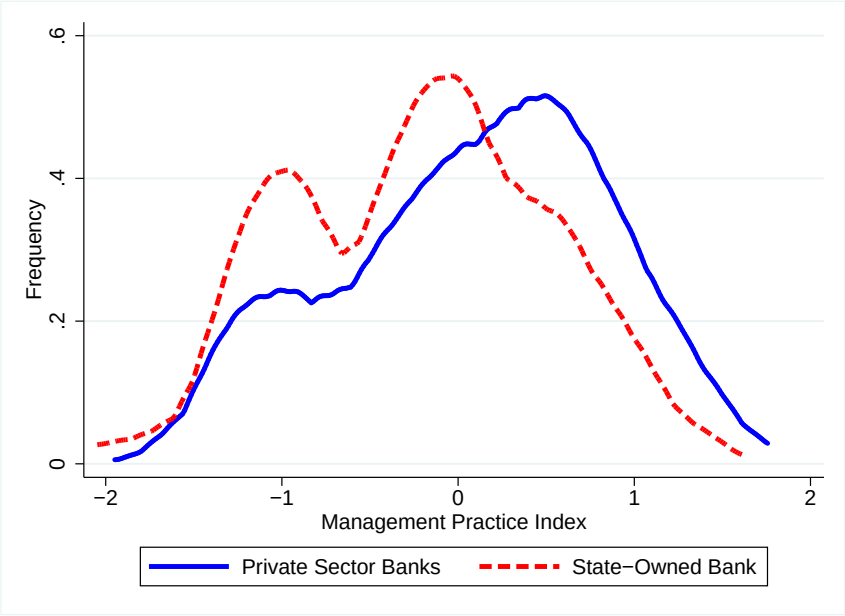
	(1)	(2)
Variables	Management Practice Index	
$State\ Owned_{ibc}$	-0.305***	-0.196***
	(0.0586)	(0.0492)
Bank FE		
City FE		Yes
Obs.	1911	1911
Adj. R sq.	0.030	0.084
Mean Dep. Var.	0.000	0.000
S.D. Dep. Var.	0.768	0.768

Note: This table presents ordinary least squares (OLS) estimates, where the unit of observation is branch i affiliated to bank b and located in city c. The dependent variable in all columns is the management practice index, which is regressed over a dummy variable that takes the value of one if branch i is affiliated to a state-owned bank and zero otherwise, $State\ Owned_{ibc}$. In column (2) we include city fixed effects. The row Adj. R sq. shows the adjusted R^2 of these regressions while the following two rows show the mean and standard deviation (S.D.) of the dependent variable respectively. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

and 0.3 points. This result is in line with the negative effect of state-ownership on the adoption of good practices.

In addition to this, we also offer graphic evidence on the distance between state- and privately-owned banks. In Figure 5 we report distribution of the management practice index for all branches according to their ownership type. In line with Table 11, it is clear that most state-owned branches are located toward the left-side of the distribution, with the mode being located in zero. On the contrary, the mass of privately-owned banks is largely located on the right-side of the distribution, with the mode being around 0.8. This heterogeneity if also notable in the tails of the distribution: state-owned branches are more present from -1 leftward, while privately-owned branches are abundant from 1 rightward.

Figure 5: The Distribution of Management Practices by Ownership



Notes: this figure shows the distribution of management practices for the branches of private sector banks (blu full line) and those of the state-owned bank (red dashed line). The management practice index is the z-score of

4.3 Local Economic Activity and Night Lights

In this section we verify whether and to what extent local management practices respond to the local economic activity. It is ex ante ambiguous to determine the direction of this correlation. On the one hand, a stronger local economic environment may raise the marginal revenue of adopting stronger practices and invest in branch organization, creating a positive correlation. On the other hand, a stronger local economy may also generate larger costs of adopting improved practices (i.e. firing costs may be higher, hiring new employees may be harder et cetera).

In this test we create a new database containing three pieces of information. First, we aggregate the management practices at city level for the 366 cities identified in our survey. Second, we also retain information on the number of branches in every city. Third, we exploit the satellite images of night lights as an indicator of local economic activity, as in Henderson et al. (2011). Figure 6 reports our map for Ethiopia in 2012, the latest available year from the NOAA database. As a result, we can study the cross-sectional relation between the management practices, branches and local lights and we use the following model

$$Branch_c = \beta Lights_c + \iota_{Lat_c} + \iota_{Lon_c} + \epsilon_c$$

In which $Branch_c$ is the average management practice index in city c or the natural logarithm of the number of branches in city c, which are regressed on the natural logarithm of the number of lights in city c as a proxy for the local economic characteristics. In two specifications we also include fixed effects for the latitude and longitude of a city. Standard errors are robust in this case.

Table 12 reports the results of the previous empirical model with columns (1) and (2) offering the results for the number of branches, while (3) and (4) focus on the management practices. The results shown in the first two columns is expected: cities with a stronger local economic activity, as proxied by $Lights_c$, present a larger number of branches. Column (1) reports the simple cross-sectional correlation, while Column (2) also include fixed effects for the latitude and longitude. In both cases we find a positive and significant correlation, with an elasticity of branch number to local economic activity around 0.4. This is a large effect given the mean and standard deviation of the dependent variable: if a city doubles its local economic activity, this generates an increase in the number of branches by 60% of the mean or 40% of a standard deviation.

The result shown in the last two columns reflects to some extent the ambiguity previously discussed. In fact, we find that the effect of local economic conditions on the adoption of good management practices is not statistically different from zero. This is the case both in the specification without fixed effects and in the specification controlling for latitude and longitude unobservables. Beyond statistical significance and precision, the point estimates of the result is also very small, leading toward a well-estimated zero.

Figure 6: A Satellite Image of Night Lights in Ethiopia

Notes: The figures report the satellite image of the night lights in Ethiopia in 2012. The original data are available from NOAA's National Geophysical Data Center (CIT) collected through the US Air Force Weather Agency.

Table 12: Management, Branches and Local Economic Activity

	(1)	(2)	(3)	(4)
Variables	Number of Branches		Management Practice Index	
$Lights_c$	0.384***	0.405***	-0.022	-0.018
	(0.055)	(0.058)	(0.031)	(0.033)
Latitude FE		Yes		Yes
Longitude FE		Yes		Yes
Obs.	361	361	361	361
Adj. R sq.	0.217	0.208	0.002	0.041
Mean Dep. Var.	0.652	0.652	0.0138	0.0138
S.D. Dep. Var.	0.971	0.971	0.699	0.699

Note: This table presents ordinary least squares (OLS) estimates, where the unit of observation is city c. The dependent variable in columns (1) and (2) is the natural logarithm of the number of branches in the city, while in columns (3) and (4) is average management practice index per town. These variables are regressed over the natural logarithm of the night light pixels as an index of economic activity. In column (1) and (3) we do not include any fixed effect, while columns (2) and (4) include fixed effects for the latitude and longitude. The row Adj. R sq. shows the adjusted R^2 of these regressions while the following two rows show the mean and standard deviation (S.D.) of the dependent variable respectively. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

5 Conclusion

This paper offers a preliminary assessment on the intensive margin of financial development through a study of bank branch management in Ethiopia. We observe that both the geographic outreach of existing branches and the local credit supply are increasing in stronger manage-

ment. The management of branches affects also the loan characteristics offered by branches a correlation is found between good branch management and maturities, collateral requirements and default rates. By studying the determinants of branch management, it is noted that weak management is prevalent in the presence of low branch competition and state-ownership, with no relation to the local economic activity.

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