Local Financial Development and Firm Performance: Evidence from Morocco

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Abstract

Combining data from the Moroccan census of manufacturing enterprises with information from a commune survey, we test whether firm expansion is affected by local financial development. Our findings are consistent with this hypothesis: local bank availability is robustly associated with faster growth for small and medium-size firms in sectors with growth opportunities, with a lower likelihood of firm exit and a higher likelihood of investment. Regarding the channel, the evidence suggests that, over the study period, access to credit was used by pre-existing Moroccan firms to mobilize investment funds, with some evidence that they were partly used towards reducing labor costs.

Keywords: manufacturing, credit constraint, firm size

JEL codes: O16, L25

1 Introduction

There is now a large empirical literature, going back to King and Levine (1993), showing that a country's financial development matters for firm performance and aggregate growth. What has received less attention is within-country heterogeneity with respect to the availability of financing. Asymmetric information and transaction costs considerations suggest that physical distance between lender and borrower is likely to affect access to finance (e.g. Petersen and Rajan, 2002). Indeed borrowers' actions are harder to observe when lender and borrower are far apart, leading to adverse selection (of potential borrowers) and moral hazard (for current borrowers). These issues are of particular importance in less developed economies, increasing the probability that local financial development matters for firm performance.

This paper tests whether local financial development matters for firm growth in Morocco. To this end we combine data on bank availability at the local level with manufacturing census data over the period 1998 to 2003 to study the effect of bank availability on firm growth, entry, and exit. We find that value added grows faster in fast growing sectors for small and medium-size firms located near a bank, providing evidence for the importance of local financial development for small firm development.

There are only few papers that study the importance of within-country variation in financial development. Jayaratne and Strahan (1996) use cross-state variation in bank regulation within the US to study the link between financial development and growth, mainly over the 1970s and 1980s. Dehejia and Lleras-Muney (2007) exploit state-level variation in banking regulation in the US to study regulation, financial development, and growth over the period 1900-1940. Guiso et al. (2004) investigate the role of financial development in Italy, exploiting variation across regions.

These papers generally confirm the role of financial development at levels below the national level. But they only allow for heterogeneity at a relatively aggregate level – 19 regions in Italy and 50 states in the US – and only cover developed economies.[1] For policy purposes, we need to know whether financial development matters at lower levels of disaggregation as well. This question is particularly relevant for developing countries like Morocco where manufacturing is geographically concentrated and localities differ widely in terms of financial infrastructure. One novel aspect of this paper is that we study financial development at a highly disaggregated level, i.e., that of the *commune* which, in the studied country, corresponds roughly to a city or county elsewhere. Operating at a lower level of spatial aggregation offers the advantage of more variation in bank availability. Input-output linkages are also less likely to matter at such disaggregated level.[2]

Being a middle income country with a well established manufacturing sector, Morocco is a good place to study the effect of credit constraints on firm growth. Much of the literature to date has focused on developed economies where bank branches are widespread and it is virtually impossible to find a place without a bank. Consequently, the literature has had to rely on bank density as a proxy for access to formal credit. Yet even in low bank density areas, there always is at least one bank in which a small entrepreneur can secure a loan. Bank density is thus more an indicator of ease of access rather than access per se. Morocco is different in the sense that there are many communes without bank. This is because much of the population, being poor, does not rely on bank services. Hence fewer bank branches are needed to collect deposits and there are many places without a bank. Yet small entrepreneurs, like much of the population, are not particularly wealthy and need external funds to grow beyond what retained earnings allow. Morocco is therefore much

[1] In the context of developing countries, a paper by Burgess and Pande (2005) studies household behavior and shows that branch expansion into previously unbanked rural areas of India led to a significant decrease in poverty.

[2] From Moroccan input-ouput tables we know that the share of own industry inputs is low and therefore intra-industry linkages at the local level are likely to be small. Therefore, we are not very concerned that local-level intra-industry linkages are a major source of bias in our analysis, but we cannot rule out a possible bias because of this channel.

more suitable to test whether lack of access to formal credit is an impediment on firm growth, than the countries that have been studied to date: going from no bank at all to having at least one bank branch should make a big difference for a small firm to access formal credit, and this precisely what we find.

There is considerable difficulty in providing rigorous evidence of a causal link between access to finance and firm performance. Any firm-level correlation between firm performance and access to finance is subject to omitted variables bias or reverse causation since banks are expected to lend to firms with high performance and prospects. As a first step in dealing with this problem, we use local bank availability measured in an earlier *commune* survey as proxy for the individual firm's access to finance. However, banks may locate in places that are expected to grow faster – and hence where firms should perform better. Consequently it is also difficult to ascribe causal interpretation to a correlation between firm performance and local bank availability. Our approach to deal with these endogeneity concerns is based on Rajan and Zingales (1998), the key advantage of this approach is that - in our case - it allows us to control for location-specific growth trends, the expectation of which may have influenced bank placement.

The approach in Rajan and Zingales (1998) is based on the assumption that, because of structural/technological reasons, there is variation across sectors in how much firms in a sector have to rely on external funds. Subsequent work by Fisman and Love (2007) provides a reinterpretation of the original findings by Rajan and Zingales (1998). Fisman and Love (2007) argue that the test by Rajan and Zingales (1998) is implicitly a test about whether financial development facilitates firms' investment in the presence of growth opportunities. Keeping production unchanged only requires replacement investment, which can typically be financed out of retained earnings. In contrast, if there are opportunities for growth, firms need capital for expansion purposes. If funds cannot be found rapidly, opportunities will be seized by others. It follows that access to external finance is

most critical for firms that face growth opportunities.

In this paper, we identify the effect of local bank branch availability by exploiting within-country variation to follow an approach similar to that suggested by Fisman and Love (2007) for cross-country data. Our approach also differs in that we use firm-level data, while previous work has used sector-level data. Using firm-level data we estimate growth opportunities in a sector. The key assumption is that large firms are less likely to be financially constrained, and therefore are more able to take advantage of growth opportunities in their sector. Under this assumption, the observed growth of large firms is a reasonable proxy for growth opportunities in a sector. See Guiso et al. (2004) for a similar assumption, which is based on findings by Berger et al. (2005) and Petersen and Rajan (2003).

Focusing on small and medium-size firms, we find that value added grows faster in fast growing sectors for firms located in a *commune* with one or more bank branches. This result is robust to different choices of the cut-off point for large firms. Similar findings obtain if we use the growth of foreign-owned firms instead of large firms to proxy for growth opportunities. In our data, 1998 to 2003 is a period of slow growth for the main manufacturing sectors of Morocco, which are textile, garments, and leather goods. We find that pre-existing small and medium firms located in a commune with banks invest more in physical capital. They also increase output per worker and reduce labor costs per unit of output. The latter findings suggest that, during the study period, outside funds were used by existing firms to finance labor-saving investment

When we aggregate data at the sectoral level in each commune, we find that communes with a bank witness more growth in expanding sectors, with more firm entry and less exit. There is more growth not only in value added, but also in aggregate output and employment. These findings are robust to changes in the method used to measure sectoral growth potential. Taken together, these results confirm the importance of access to finance for firm growth, but also demonstrate that only

looking at panels of pre-existing firms misses an important part of the effect of credit access on aggregate growth, namely the effect on firm entry and exit.

The paper is organized as follows. We begin in Section 2 by describing the testing strategy used in the empirical analysis. The available data is presented in Section 3 where we also present descriptive statistics that set the stage for the subsequent econometric analysis. Empirical results for pre-existing firms are presented in Section 4 while in Section 5 we present econometric results at the district level not only for firm growth but also for entry and exit.

2 Testing strategy

The key stumbling block when studying the effect of local financial development on firm growth is the possible endogenous placement of banks. To deal with this endogeneity issue, we follow an estimation strategy which is similar in spirit to the ones used by Rajan and Zingales (1998) and Fisman and Love (2007).

The idea behind the testing strategy is the following. Suppose we can identify firms that are a priori less financially constrained and are therefore more likely to be able to react to growth opportunites that arise. In our preferred setup, these will be large firms, known to have easier access to credit (evidence for this in the context of Morocco is provided in Fafchamps and El Hamine 2005). Among the possible theoretical reasons for larger firms' better access to external financing are, for example, information issues: It is less costly for banks to obtain reliable and/or independent information about larger firms' income statements or balance sheets, because "information about small businesses is thought to be 'soft,' and has to be collected by lenders over time through relationships with firms" (Petersen and Rajan 2003, page 241). Larger firms are more likely to have some prior relationship with banks (see, for example, the model in Berger et al. 2005). In addition, even abstracting from the information issues, bank transactions costs of lending to larger firms will

likely be smaller as a percentage of amounts borrowed, simply because of economies of scale. Large firms are also more likely to draw financing from a broad geographical area. Consequently, for them the local availability of bank agencies is expected to be less important.

Alternatively, a priori less financially constrained firms can be firms owned by residents of countries with more developed financial institutions, and which for that reason have easier access to external finance. Yet another possibility is that firms that have made the effort of obtaining a corporate legal status may signal higher ability and thus may have easier access to bank credit. This issue is studied in detail by Quinn (2009) who finds that this is indeed the case for Morocco. For this paper, we focus primarily on firm size as indicator of access to credit, but we verify the robustness of our results with alternative proxies of access to credit.

Using data from less constrained firms, we estimate, for each sector, the average growth of value added in those firms over a time interval of interest, say, from t to $t+1$. Let this be denoted as G_s. This serves as proxy for the growth opportunities in that sector.[3]

Armed with G_s, we compare the growth of small firms across locations. Let B_i denote the financial development in location i at time t. We hypothesize that small firms in locations with high B_i are financially less constrained and therefore grow faster. This relationship, however, is only apparent when strong growth opportunities are present. Firms in sectors with low growth

[3]Note that, when we use firm size as indicator of access to credit, we do not have to assume that large firms are fully unconstrained. It just needs to be the case that they are less constrained than smaller firms, an assumption which is supported for Morocco by Fafchamps and El Hamine (2005), and which is also used in Guiso et al. (2004). Growth of larger firms could be even faster if large firms were fully unconstrained. In this sense, the average growth of value added in large firms only provides a lower bound on growth opportunities in their sector.

It is also conceivable that banks refrain from lending to sectors in difficulty. In this case, differences in growth opportunities across sectors will be magnified by banks' lending behavior. This will not, however, affect our testing strategy which only requires that our proxy be correlated with sectoral growth opportunities. We also do not require that growth opportunities of large and small firms be the same within each sector. All we need is that growth opportunities of large and small firms be sufficiently correlated within each sector so that sectoral differences in growth opportunities for large firms proxy for sectoral differences in growth opportunities for small firms.

Growth opportunities of small firms are difficult to observe, if indeed small firms are constrained. To get some insights into this question, we have investigated the correlation of growth of large and small firms in communes with banks present (where small firms are - according to our hypothesis - less constrained). We find that the correlation coefficient between sectoral growth of small firms (i.e. those with less than 100 employees) and the sectoral growth of large firms (the baseline measure used in our paper) is 0.31.

opportunities are less likely to be constrained by poor financial institutions in their location. This is our key identifying assumption. It enables us to devise a testing strategy based on an interaction term $G_s \times B_i$. Formally, let Δy_{fis} be an outcome variable of interest – e.g., growth in y over the given time interval – for firm f in location i in sector s. The baseline version of our estimated equation is of the form:

$$\Delta y_{fis} = \beta B_i G_s + \mu_i + \upsilon_s + e_{fis} \tag{1}$$

where μ_i is a vector of location dummies and υ_s is a vector of sector dummies. These dummies control for different average growth rates across sectors and locations. Firms that were used as reference group to calculate G_s are excluded from regression (1). We interpret a positive coefficient β as evidence for a positive effect of local financial institutions on y_{fis}. Put differently, a positive estimate for β implies that the relative difference between a firm in a high growth sector and a firm in a low growth sector located in a commune with good financial development is larger than the difference between firm in these same sectors but in a less financially developed location. In the empirical analysis, we mainly use the growth of value added, but investigate the robustness of our results to the use of different measures of firm performance, such as growth in sales, output, or employment.[4] We measure B_i at the beginning of the period. Because of the possibility of non-compliance, i.e. changes in the financial development of location i, in years after 1997, the results should be interpreted as intent-to-treat results.

[4] In all regressions standard errors are corrected for clustering at the sector × commune level. We also show robustness to two-way clustering at these two levels.

3 The data

The data used for this study come from two sources: a 1997 Ministry of Planning survey containing information about the presence of financial institutions in 369 localities – called *communes*[5]; and data until 2003 from the census of manufacturing enterprises collected annually by the Ministry of Commerce and Industry. The manufacturing census is collected each year since 1985 by experienced regional teams. Responding to the census questionnaire is a legal obligation for all firms. For this reason, we expect data quality to be good. Census data contain information about output, value added, and employment.[6] All values reported in the census have been deflated using a GDP deflator with 1997 as base year.

Communes are the smallest administrative subdivision in Morocco; they correspond roughly to the concept of city or county. Since we have information on financial institutions only for 1997, we use for our main analysis manufacturing census data of the period from 1998 onwards. This enables us to regard B_i as pre-determined. Any factor affecting the placement of a bank or financial institution in commune i in or prior to 1997, including anticipated future growth in that commune, is captured by the commune fixed effect μ_i.

Starting from 1998, manufacturing census data contain an identifier for the commune in which each enterprises is based.[7] In the data from the demographic census, there are some 1500 communes

[5] The data come from the Base de Donnees Communales (BADOC), which is based on surveys conducted by the Direction de la Statistique, Departement de la Prevision Economique et du Plan, Royaume du Maroc. The precise sampling process of the 1997 commune survey is not known to us but communes with at least some manufacturing are overrepresented in this commune-level data set. Even if we had data on bank branches in under-represented rural communes, this would add little to our sample in the firm-level analysis since these communes do not have manufacturing firms.

[6] The census records permanent workers, that is, those with a permanent labor contract, in man-years. Casual and temporary workers are recorded in man-days. For the analysis presented here we convert man-days into man-year equivalent units and focus on total employment. Many Moroccan firms employ casual workers on a regular basis – especially in the garment and textile sectors.

[7] From 1985 to 1993 manufacturing census data is recorded at the level of the province only. There are around 140 provinces in Morocco, but not all of them have manufacturing enterprises. From 1994 to 1997 census data also contain a city identifier which provides more detailed location information. The commune identifier is available from 1998 onwards. We know that the overwhelming majority of manufacturing firms in Morocco have a single establishment, but for those with multiple establishments we do not know where they are located. Since firms with

in Morocco, but most of them are purely rural and do not host manufacturing firms. The core of our analyses requires that we have data both from the 1997 commune survey and the manufacturing census, which is the case for 195 communes. These communes constitute the focus of our investigation. The online appendix contains a detailed analysis of trends in value added, employment and output over the sample period.

3.1 Growth opportunities

Essential to our testing strategy is the need to compute G_s, a proxy for growth opportunities available to firms in sector s. To ensure the robustness of our results, we follow several complementary strategies. Our preferred approach is to let G_s be the growth of value added in a sector over the period 1998-2003, calculated as $log(sum(vad2003)) - log(sum(vad1998))$. This growth is calculated as the sum of value added over firms that can a priori be considered less constrained by the local availability of financial institutions.[8]

We also experiment with growth in sales as proxy for growth opportunities. On theoretical grounds, value added is a more satisfying proxy for growth opportunities since it measures returns to labor and capital. On the other hand, Fisman and Love (2007) argue that sales have less measurement error: sales are measured directly in the census, while value added is constructed from several variables. The same can be said for employment. Given that, over our study period, employment, sales, and value added moved in different directions, we study all three.

In the analysis that follows, less financially constrained firms are called the reference group. To ensure the robustness of our analysis, we use different reference groups, that is, different ways of dividing out data into firms used to compute G_s and firms used to estimate model (1). Once again,

multiple establishments are large and large firms are only used to obtain G_s at the national level, the issue of multiple establishments and their location can be ignored for our purpose.

[8] To avoid spurious results driven by firms moving across the size threshold between 1998 and 2003, we only use those firms that were above the threshold at the beginning of the period, i.e. in 1998.

firms allocated to the reference group are not used in the firm-level or commune-level regression analysis.

We use three possible ways of identifying less constrained firms: firm size; foreign ownership; and corporate status. As argued before, large firms are more likely to be able to obtain financing and to be able to react to growth opportunities if they arise. In the analysis we investigate robustness by using two cut-off values: firms with more than 100 permanent employees in 1998 (our preferred measure); and firms with more than 50. Foreign firm are less likely to be constrained by local financial markets. We use two different cutoffs to identify foreign firms: firms with a 100% foreign ownership; and firms with more than 50% foreign ownership. Finally, using survey data on manufacturing firms in Morocco between 2000 and 2003, Simon Quinn (2009) has shown that corporations ("Société anonyme / SA") are less financially constrained than other types of firms. Based on this, we use corporate status as our third proxy for credit constraint.

Our preferred reference group is the group of firms with at least 100 employees. For this group we present in Appendix Table (13) the values of G_s calculated for each of the 17 two-digit ISIC sectors covered by the census and which have firms with at least 100 employees in 1998.[9] Figures are presented using value added, sales, and employment. We observe considerable variation across sectors. All sectors, except for three, experience an increase in value added. The evolution is similar in terms output, with a 63% correlation between sectoral growth in value added and of growth of output. In contrast, in all sectors except one large firms reduced their total employment over the study period. The correlation between sectoral of growth of employment and of growth of value added is -0.43, suggesting that value added was increased in part by reducing employment. There is no correlation across sectors between employment growth and output growth.

[9] In addition to these 17 sectors, there is one sector "other light industries", in which no firm had more than 100 employees in 1998. This sector is excluded in the main analyses that use firms with more than 100 employees as reference group.

3.2 Financial development

Local financial development is measured using information from the commune survey. The survey reports the total number of bank branches available in the commune in 1997. Descriptive statistics for financial development variables, at the commune level and using all communes available in our commune-level data set, are presented in Table (1). We see that 46% of communes in the commune survey sample have no bank. When we look at the communes for which we have reported manufacturing activity this number is somewhat smaller, namely 34.4% We take bank branch presence as our main measure of local financial availability: presumably, it is easier for a small or medium-size firm to obtain bank finance if a bank is present in their locality. Seeking credit from a bank agency in another commune is not only inconvenient, it is also more likely to fail given that the bank has less location-specific information to judge the validity of the credit application ex ante, or to monitor ex post. Our main measure of local financial development B_i is equal to 1 if there exists at least one bank in a commune, 0 otherwise.

variable	# obs	mean	std. dev.	median
at least one bank branch	366	0.538	0.499	
exactly one bank branch	366	0.134	0.341	
two bank branches	366	0.104	0.305	
three bank branches	366	0.063	0.243	
four bank branches or more	366	0.238	0.426	
# of branches per 1000 people	366	0.069	0.107	0.038
# of branches per hectare	364	0.004	0.010	0.0004

Table 1: Financial development: summary statistics at the commune level

As alternative measures of bank access, we combine information on bank agencies with data on population and land area per commune. This gives two alternative measures of bank availability: banks per capita, and banks per hectare. The first measure seeks to correct for possible congestion in obtaining bank finance: presumably bank staff are busier if there is a large population to serve, and consequently they may be more likely to reject application for funding. This measure, however,

is non-linear: it is 0 for communes with no bank agency, jumps to a high positive value for communes with one bank but a low population, and typically falls for more densely populated communes. The second measure seeks to control for transaction costs in visiting the bank: other things being equal, it is easier for firm staff to visit a bank if the density of bank agencies is higher. As indicated in Table (1), the numbers of banks per inhabitant or hectare show a great deal of variation across communes.

4 Econometric results

4.1 Baseline results for value added

We now turn to the econometric estimation. We begin by presenting estimates of our core model (1), using value added growth as dependent variable and the bank dummy as measure of local financial development B_i. The dependent variable ΔV_{fis} is constructed as $\log(value\,added)_{fis,2003} - \log(value\,added)_{fis,1998}$. It can therefore be interpreted as 1+ growth rate.

Results are presented in Table (2). The first column uses firms with more than 100 employees to calculate G_s. These firms are excluded from the estimation and only observations on manufacturing firms with at most 100 employees in 1998 are used to estimate the regression. Fixed effects are included for each sector υ_s and each commune μ_i. Throughout standard errors are corrected for two-way clustering at the sector and the commune level, following Cameron et al. (2011). The coefficient of interest β is the coefficient of the $B_i G_s$ interaction term. If this coefficient is positive, it implies that firms in fast growing sectors grow more relative to firms in sectors with less growth if they are located in communes with at least one bank agency. The effect is strongly significant and large in magnitude. In the first specification, the coefficient of $B_i G_s$ is about 3. To get a sense of the magnitude, consider a firms in the sector at the 50th percentile of the G_s distribution, which

is electronics (G_s= 0.12) and a firm in the sector at the 25th percentile of the G_s distribution, which is textiles; with G_s= 0.01. The coefficient of 3 suggests the following differential growth of a small firm (< 100 employees) in the electronics sector relative to a small firm in the textiles sector: the value added growth difference is predicted to be about 7 percentage points higher annually (33 percentage points over the 5 year period) if this firm is located in a commune with at least one bank, relative to this growth difference in a commune with no bank.

Dependent variable: growth of value added				
Reference group[a]	≥ 100	≥ 50	≥ 100	≥ 100
Sample[a]	< 100	< 50	< 50	< 30
	1998-2003 period			
	(1)	(2)	(3)	(4)
$B_i G_s$	3.040***	3.654***	3.911***	2.756***
	(0.900)	(1.332)	(1.169)	(0.777)
Sector fixed effects	yes	yes	yes	yes
Commune fixed effects	yes	yes	yes	yes
Number of observations	2,822	2,432	2,421	2,008
R^2	0.11	0.12	0.12	0.13
	1995-2003 period			
	(5)	(6)	(7)	(8)
$B_i G_s$	1.673**	1.798	2.030	0.629
	(0.747)	(1.505)	(1.469)	(2.544)
Sector fixed effects	yes	yes	yes	yes
Commune fixed effects	yes	yes	yes	yes
Number of observations	2,180	1,841	1,841	1,530
R^2	0.10	0.12	0.12	0.13

Standard errors in parentheses, with two-way clustering by sector and commune; * significant at 10%; ** significant at 5%; *** significant at 1%
a based on 1998 employees in (1)-(4) and 1995 employees in (5)-(8)

Table 2: Baseline results

One may be concerned about outliers driving the results, given the relatively small number of sectors for which we have data. Therefore we reestimated the first specification, each time omitting a different sector. The results are basically unchanged, with a parameter estimate for β of around 3, which is always highly statistically significant. So it is not the case that one sector is driving the results. Omitting the three sectors with negative value added growth G_s also does not affect the main result: in that case the parameter estimate for β is 2.920 with a standard error of 0.760 (and a p-value of <0.01).

In column 2 of Table (2) we repeat the analysis using firms with more than 50 employees to compute G_s. This means that only firms with 50 employees or less are used in the regression. We obtain similar results. In columns 3 and 4 we revert to the G_s measure used in column 1, but we restrict observations to firms with at most 50 employees (column 3) and at most 30 employees (column 4). Results are qualitatively similar. From this, we conclude that our results do not hinge seriously on the cut-off threshold used to separate the data in large and small firms.

Results reported in Table (2) are based on $\Delta V_{fis} = \log V_{fis,2003} - \log V_{fis,1998}$. This formulation offers the advantage of normalizing the dependent variable across firms of different size. But it has the drawback of losing observations with a negative value added in one of the two years. To investigate whether our results are sensitive to this loss, we reestimate all four regressions using $\Delta V_{fis} = V_{fis,2003} - V_{fis,1998}$ as dependent variable. Robust standard errors are used as before. Results, not shown here to save space, are basically identical: β is large and significant in all four regressions.

The 1998-2003 period was marked by a contraction in employment for those firms that were in existence in 1998. In contrast the 1995-98 was a period of rapid growth. We are concerned that our results may be specific to periods of economic contraction for pre-existing firms. To check whether this may be the case, we reestimate our baseline model using firm data covering the 1995

to 2003 period. The results are presented in the second panel of Table (2). They are qualitatively similar to those for the shorter 1998-2003 period, albeit estimated coefficients tend to be smaller in magnitude and less statistically significant, possibly because data is of slightly lower quality in the 1995-98 period (see the data section).

Next, we use foreign owned firms to identify less constrained firms when computing G_s. Results, not shown here to save space, are generally less significant. We note, however, that many firms listed as foreign owned are quite small[10], and thereby unlikely to access funding outside Morocco. Furthermore, there are few foreign owned firms in some sectors. Consequently growth opportunity estimates in those sectors are imprecise. These factors probably combine to yield results with lower levels of statistical significance.

Results obtained using corporate firms to calculate G_s are stronger (results not shown). They are large in magnitude and significant at the 1% level when using either all non-corporate firms as observations, and also when using similar cutoffs as before, i.e. only those non-corporate firms with fewer than 50 employees, or only those with less than 100 employees.

We conduct a number of other robustness checks. We run our baseline regression without sectors that have few observations and hence imprecisely estimated G_s. Results, not shown here to save space, are, if anything, stronger. Next we drop all large sectors, in case banks respond to growth opportunities in large, visible sectors. Results are basically unchanged: $\beta = 3.6$ and is significant with a p-value of 0.06. This means that earlier results are not simply driven by what happens in a few large sectors.

We also reestimate Table (2) using the growth of sales among large firms as indicator of growth opportunities G_s. Once again, results are very similar to the results that we obtain when value

[10] At the median, fully foreign owned firms have 60 employees in 1998, and a quarter of fully foreign owned firms have less than 20 employees. Among firms that have at least 50% foreign ownership, the median number of employees is 70 in 1998.

added is used to measure growth opportunities, albeit slightly weaker.

Finally, note that our baseline specification from Table (2) started from the simplest possible specification to avoid concerns about endogenous regressors and differs from Rajan and Zingales (1998) and, e.g., Fisman and Love (2007), in that it does not contain an industry's share of total manufacturing value added in a commune, i.e. the analogue to the industry's share of a country's manufacturing in total manufacturing, which is used in the above cited literature. In Table 3 (column 1) below we add this variable and find that results do not change. This variable is included in all following specifications to show robustness of results to its inclusion.

Adding additional controls for the level of development Next, we investigate whether bank availability in a commune proxies for other commune characteristics that we may be picking up with our bank variable, such as some general level of (formal) development that prevails in a commune. To this end we use additional information related to the level of development in commune i. Results are reported in Table (3). As a direct measure of the level of development, we use the poverty headcount, i.e. the proportion of the population living below the poverty line ($Poverty$), which we obtain from a spatially disaggregated estimation of poverty that is described and published in Royaume de Maroc (2004), see column 2. Other more indirect measures of development are the population density ($PopDensity$), the distance to the province center ($DistanceCenter$) as well as the distance to the commercial center of Morocco ($DistanceAinSebaa$)[11], see column 3. These variables are drawn from a World Bank database used to generate the 2004 poverty report. Recall that the level of development is captured through the commune fixed effects, therefore we only include the interaction terms of those variables with the growth opportunity measure G_s.

In column 4, we also add a control that proxies for the level of locally available human capital.

[11] We define the commercial center as the commune with the most manufacturing enterprises in our census data. It turns out that this is Aïn Sebaâ in the province of Casablanca.

We base this proxy on data from the Moroccan Demographic and Health Survey of 2003, which is the earliest that allows us to identify the geographic location of sample households.[12] As human capital proxy we use the average of years of education of all individuals that are 15 years and older (*Education*); in unreported alternative specifications we have also confirmed robustness to using the share of all individuals 15 years and older that have at least a primary education. In column 5 we also include interactions of bank presence with the proxies for the importance of manufacturing in commune i: We include (a) a control for the relevance of manufacturing as an employer at the commune-level (sum of employees from our manufacturing census divided by total population - *ManufPopShare*), (b) the commune level manufacturing wage rate (*Wage*).[13]

In columns 6 and 7 we include all of the above commune-level controls and also add firm-level controls that capture initial conditions. In column 6 we add firm value added in 1998, i.e. at the beginning of the sample period, as well as value added in 1998 interacted with bank presence. In column 6 we use a firm's share of total commune-level value added *ShareCommManuf* (as well as the interaction with bank branch presence). This latter measure is chosen as another analogue to the variable that is usually included in papers in the spirit of Rajan and Zingales (1998), namely the industry's share of total manufacturing in a country (which we added in column 1).

To summarize, the data show a strong and very robust positive effect of $B_i G_s$ on the growth of firms. The central message of Table (3) is that the results regarding our key interaction are very robust to including additional controls and interaction terms. It is therefore improbable that $B_i G_s$ simply captures a formal development effect.[14]

[12] The Demographic and Health Survey (DHS) interviews households in clusters and for each household it contains GIS information for the cluster in which the household is located (about 20 to 30 HH per cluster). Based on this information, we can calculate which DHS cluster falls into a 15km radius around the centroid of the commune (which we have from the manufacturing data). Based on that information, we can then calculate various education indicators for the commune based on the DHS data (i.e. based on all households that fall into the 15km radius).

[13] In unreported results we also include commune-level growth trends before our sample period, i.e. before 1998. The results are robust. Because this data is not available for all communes, we do not include this variable here

[14] In results not shown, we have also investigated robustness to the inclusion of other sector-level measures, such as capital growth or capital intensity. The results are robust to including those measures. We have also investigate the

Dependent variable: growth of value added								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$B_i G_s$	3.025***	3.041***	3.265***	3.023***	2.794***	2.307***	3.784***	2.415***
	(0.908)	(0.884)	(1.004)	(0.892)	(0.828)	(0.600)	(0.791)	(0.571)
industry's share	-0.307	-0.307	-0.319	-0.277	-0.279	-0.010	-0.008	-0.107
of commune vad_{is}	(0.196)	(0.200)	(0.197)	(0.220)	(0.218)	(0.217)	(0.229)	(0.229)
$Poverty_i G_s$		0.353				-0.578	-1.339	-0.822
		(1.961)				(2.656)	(2.854)	(2.733)
$PopDensity_i G_s$			0.002			0.001	0.002	0.001
			(0.001)			(0.001)	(0.001)	(0.001)
$DistanceAinSebaa_i G_s$			0.002			0.002	0.003	0.002
			(0.001)			(0.002)	(0.002)	0.002)
$DistanceCenter_i G_s$			0.019			0.022	0.036*	0.024
			(0.025)			(0.018)	(0.022)	(0.018)
$Education_i G_s$				0.188***		0.217**	0.202*	0.213**
				(0.073)		(0.111)	(0.107)	(0.109)
$ManufPopShare_i G_s$					-0.418	2.111*	2.192**	2.116**
					(0.623)	(1.094)	(1.006)	(1.077)
$Wage_i G_s$					-0.001	0.006	0.010	0.006
					(0.011)	(0.016)	(0.016)	(0.016)
$\log(vad_{fis,1998})$						-0.515***		-0.489
						(0.160)		(0.171)***
$B_i \log(vad_{fis,1998})$						0.289*		0.274
						(0.166)		(0.177)
$ShareCommManuf_{fis}$							-3.211**	-1.211
							(1.272)	(1.533)
$ShareCommManuf_{fis} G_s$							-0.332	-0.292
							(1.682)	(1.794)
sector FE	yes	yes	yes	yes	yes	yes	yes	yes
commune FE	yes	yes	yes	yes	yes	yes	yes	yes
Observations	2822	2822	2816	2567	2691	2561	2561	2561

Standard errors in parentheses, with two-way clustering by sector and commune;
* significant at 10%; ** significant at 5%; *** significant at 1%
Reference group: ≥ 100 employees in1998, sample < 100 employees in1998

Table 3: Robustness: other controls for level of economic development

robustness of our results to the inclusion of more commune-level controls and firm-level controls. Results, available on request, are robust to the inclusion of these additional controls.

In robustness checks, we examine whether results change if, for B_i, we replace the bank dummy with more detailed information about the number of banks. The results indicate that what matters is the switch from no bank branch to one or more bank branches. The precise number of banks does not seem to matter, either by itself or divided by population or area. Estimation results are available in the appendix, table (14).

4.2 Measurement error in the estimates of growth opportunity

In recent papers Ciccone and Papaioannou (2007, 2010) have emphasized a possible source of non-classical measurement error in the cross-country literature that uses one country as reference, typically the US. The concern is that growth in the US may not proxy well for growth opportunities in other parts of the world, and this measurement error may be correlated with the variable of interest, such as financial development.

In our setting, we do not use a single location as reference: our measure of growth opportunities G_s is based on large firms in all communes, whether or not they have bank branches. So the concern does not apply directly. Moreover, Moroccan communes share many similarities, such as a common legal environment and identical country-specific shocks, such as exchange rate fluctuations and competition from other countries. Sector-specific growth opportunities are more likely to be similar across communes than across different countries, each of which has a different business environment. For these reasons, the measurement error bias emphasized by Ciccone and Papaioannou is a priori less serious with our methodology.

However, it is true in our data that large firms – on which our measure of growth opportunities G_s is based – are more often found in communes with banks than in communes without banks.

Therefore, there remains a concern that G_s proxies growth opportunities better in communes with banks than in those without banks. Hence attenuation bias due to larger measurement error in communes without banks could in principle account for our results.

Ciccone and Papaioannou (2007, 2010) propose a method to correct for this possible bias. Since this method assumes that a specific location is used as reference, it is not applicable to our case. We can, however, investigate directly whether the growth of large firms differs systematically between communes with and without bank branches. To this effect, we construct two sets of G_s estimates: one using large firms in communes with one or more bank branches, which we denote G_s^{bank}, and another using large firms in communes without bank, which we denote G_s^{nobank}. Because of the relatively small number of large firms in communes without banks, we use a broader definition of large firms, i.e. $\geq$50 employees instead of $\geq$100 employees as we have done so far.

The correlation between G_s^{bank} and the baseline measure G_s based on all communes is 0.79.[15] Removing one outlier sector based on two firm-level observations increases the correlation to 0.95.[16] Estimating G_s^{nobank} is more delicate because there are few large firms in unbanked communes. To avoid having results driven by a single firm, we restrict the analysis to sectors in which there is a minimum of two large firms. We find a correlation of 0.73 between G_s^{bank} and G_s^{nobank} (0.61 if we consider firms $\geq$100 employees). Growth opportunities in different sectors are thus highly correlated across communes with and without bank branches. In addition, differences in levels caused by factors that affect growth in all sectors in communes without banks are picked up by commune fixed effects.

Despite the three arguments made above, we cannot completely rule out the above mentioned measurement error bias. But in our view the arguments that we make and the empirical evidence

[15] 0.84 if we look at firms $\geq$100 employees

[16] The correlation is 0.98 if we look at firms $\geq$100 employees. Note that we have confirmed in robustness checks, in which we exclude one sector at a time, that no individual sector drives our baseline results.

that we provide suggest that, although measurement error has been shown to be a significant issue in cross-country studies, this does not seem to be a first-order concern in our specific case.[17]

4.3 The channel from finance to value added growth

We have seen that, over the study period, access to banks is associated with faster growth for small and medium-size firms in growth sectors. The question then is: How do firms achieve higher value added growth?

The underlying assumption in the finance and growth literature is that access to finance facilitates investment and that this, in turn, generates growth in value added by increasing capital and raising productivity. Our data allow us to test these hypotheses directly. We first test whether firms with better access to bank finance invest more. We then investigate whether investment is used simply to increase the physical capital stock, or whether it also increases output per worker, as would occur if investment helps raise labor productivity. In case of investment in labor saving equipment, it is also conceivable that value added rises but output remains unchanged.

We begin by reestimating model (1) using investment in lieu of value added as dependent variable. More precisely, let Δy_{fis} be average annual investment over the period 1998-2003 divided by 1998 output (summary statistics appear in the appendix, table 12). Regression results are presented in Table (4). In column 1, 2 and 3 we show the baseline results that only include an industry's share of commune manufacturing as a control. In columns 1 and 2 G_s is calculated using all firms with 100 employees or more, in column 3 G_s is calculated using all firms with 50 employees or more.

Results show that access to credit was used for investment. They are marginally significant in

[17] In a previous version of this paper we have also investigated ways to deal with a possible measurement error through the use of instrumental variable techniques. The findings generally confirmed our main results. Results are available on request.

column 1 (p-value is 0.12) and significant in columns 2 and 3. In columns 4 through 7 we add other development controls, as in table 3. The magnitude of the estimated β on $B_i G_s$ is somewhat larger, and statistically significant at least at the 10% level in all other specifications, with the largest statistical significance for smaller firms, and when G_s is calculated using all firms with 50 or more employees (column 7; the p-value is <0.05 in that model). These results suggest that firms' investment benefitted from the presence of bank branches, and that this effect is more significant for firms with less than 50 employees.

Dependent variable: annual investment 1998 -2003 as a share of output in 1998							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Reference group	≥ 100 (in 1998)	≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 50
Sample	< 100 (in 1998)	< 50	< 50	< 100	< 100	< 50	< 50
$B_i G_s$	0.822	1.048*	0.974**	1.040*	1.117*	1.301*	1.191**
	(0.527)	(0.619)	(0.417)	(0.587)	(0.614)	(0.726)	0.507
industry's share	-0.006	-0.002	-0.001	-0.004	0.005	0.024	0.022
of commune vad_{is}	(0.093)	(0.113)	(0.122)	(0.099)	(0.136)	(0.163)	(0.172)
$Poverty_i G_s$				-1.380	-1.651*	-1.471	-0.727
				(0.952)	(0.850)	(1.103)	(1.676)
$PopDensity_i G_s$				-0.000	-0.000	-0.000	-0.000
				(0.000)	(0.001)	(0.001)	(0.000)
$DistanceAinSebaa_i G_s$				0.000	0.000	0.000	0.000
				(0.001)	(0.001)	(0.001)	(0.001)
$DistanceCenter_i G_s$				0.014**	0.017**	0.017**	0.016**
				(0.007)	(0.007)	(0.008)	(0.007)
$Education_i G_s$					0.023	0.012	0.006
					(0.030)	(0.022)	(0.027)
$ManufPopShare_i G_s$					-0.043	0.229	0.299
					(0.774)	(0.474)	(0.529)
$Wage_i G_s$					0.001	0.001	0.001
					(0.003)	(0.003)	(0.003)
sector FE	yes	yes	yes	yes	yes	yes	yes
commune FE	yes	yes	yes	yes	yes	yes	yes
Observations	2822	2421	2432	2816	2561	2182	2193
Standard errors in parentheses, with two-way clustering by sector and commune; * significant at 10%; ** significant at 5%; *** significant at 1%							

Table 4: Dependent Variable: cumulative investment relative to investment per year, relative to output in 1998

The next issue we investigate is what the investment is used for. Recall that the study period corresponds to a time of slow growth in manufacturing output for pre-existing firms. If production is contracting, it is less obvious that firm do need funds to expand production. External finance may nevertheless help firms remain competitive internationally by investing to reduce labor cost and increase output per worker.

To investigate this, we estimate model (1) using output and employment as dependent variables. Results, only shown in the appendix to save space (table 15), indicate that access to credit is associated with a significant increase in both output and employment. The effect, however, is noticeably larger in magnitude and statistically more significant for output than it is for employment. Results are similar independent of whether we use 100 or 50 as cutoff firm size for the calculation of G_s, and $B_i G_s$ remains statistically significant in all but one specification (in which the p-value is 0.16) if we add other commune and firm-specific controls.

Next we estimate equation (1) using growth of output per worker, wage per worker, and wage per output as dependent variables. If investment was used to increase labor productivity, we expect output per worker to increase. If this labor productivity increase served to reduce costs, we expect wage per worker to increase less than output – or remain constant – so that wage per output falls.

Regression results presented in Table (5) provide evidence that is consistent with these hypotheses. The results indicate that output per worker increased more for firms with access to credit (columns 1 and 2). At the same time, results in columns 3 and 4 suggest that wages per worker did not increase significantly, while wage per output fell for firms in growth sectors and communes with access to credit (columns 5 and 6).

Dependent variable:	growth of output per worker, 1998-2003		growth of wage per worker, 1998-2003		growth of wage per output, 1998-2003	
Reference group	≥ 100 (in 1998)	≥ 50	≥ 100	≥ 50	≥ 100	≥ 50
Sample	< 100 (in 1998)	< 50	< 100	< 50	< 100	< 50
	(1)	(2)	(3)	(4)	(5)	(6)
$B_i G_s$	1.493**	2.115***	0.453	0.327	-1.040***	-1.787***
	(0.599)	(0.798)	(0.396)	(0.601)	(0.379)	(0.518)
industry's share	-0.078	-0.194	-0.246	-0.292	-0.167	-0.098
of commune vad_{is}	(0.252)	(0.255)	(0.148)	(0.179)	(0.169)	(0.189)
$Poverty_i G_s$	-2.794	-2.667	2.941**	3.174**	5.736**	5.841**
	(2.000)	(2.969)	(1.317)	(1.565)	(1.320)	(2.436)
$PopDensity_i G_s$	0.000	-0.000	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
$DistanceAinSebaa_i G_s$	0.001	0.001	-0.002**	-0.002	-0.003**	-0.003**
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
$DistanceCenter_i G_s$	0.029*	0.029	-0.013	-0.007	-0.042***	-0.036*
	(0.017)	(0.023)	(0.012)	(0.018)	(0.015)	(0.021)
$Education_i G_s$	0.083	0.064	0.030	0.087	-0.052	0.022
	(0.110)	(0.135)	(0.144)	(0.125)	(0.112)	(0.130)
$ManufPopShare_i G_s$	0.455	-0.140	1.357	1.258	0.901	1.398
	(0.956)	(1.363)	(1.093)	(1.362)	(0.861)	(1.175)
$Wage_i G_s$	0.015	0.018	0.003	0.003	-0.013	-0.015
	(0.012)	(0.014)	(0.009)	(0.010)	(0.009)	(0.011)
sector FE	yes	yes	yes	yes	yes	yes
commune FE	yes	yes	yes	yes	yes	yes
Observations	2561	2193	2561	2193	2561	2193

Standard errors in parentheses, with two-way clustering by sector and commune;
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Growth of output per worker, wage per worker, wage per output

Another way of economizing on labor is to replace permanent workers with casuals who, in Morocco, typically receive fewer benefits. To investigate this possibility, we compute the share of permanent workers in total firm employment.[18] Over the study period, this ratio increased slightly for surviving firms – from 0.93 to 0.96 – as would happen when firms reduce employment by shedding casual workers. But when we regress the change in this ratio on $G_s B_i$, we find a negative effect, suggesting that firms with access to finance reduced less the proportion of casuals in their labor force.[19] This effect is significant only when the 100 employee cutoff is used for G_s, i.e., when firms with 50 to 100 employees are used in the regression. This suggest that it is medium-sized firms that retained casuals thanks to better access to finance. This probably contributed to economizing on the cost of labor.

Taken together, the evidence suggests that, over the study period, access to credit was used by pre-existing Moroccan firms to mobilize investment funds, with some evidence that they were partly used towards reducing labor costs.

4.4 Commune level analysis

The analysis conducted so far has focused on firms that were present in 1998 and survived until 2003. Such an analysis can present a misleading picture of the effect on credit availability on manufacturing because it ignores potential effects on firm entry and exit which, in our data, are quite high: over the 1995-2003 period, the average entry rate was 9.3% per year while the average exit rate was 8.7%.[20]

Because firm-level growth can only be computed for surviving firms, this generates a possible selection bias, the direction of which is a priori unclear. The effect of credit on manufacturing

[18] Recall that total firm employment includes the labor supplied by casuals. Not all firms use casual workers.

[19] Regression results are not shown here to save space.

[20] "Exit" in our data means that a firm permanently does not appear in the data any more. There are instances where data for a firm is missing in an individual year, but reappears later, this is not considered exit. Relocating is also not counted as exit: firms are tracked if they relocated elsewhere.

growth could be underestimated if firms without credit access grow less but are also more likely to exit – and hence to drop out of the sample. Alternatively, firms with access to credit may survive more often because they are protected against liquidity shortages.

The opposite is also possible if the likelihood of survival is higher, not lower, among firms with no credit access. Firms that do not borrow cannot be forced into bankruptcy by creditors. In contrast, firms with access to credit tend to be leveraged and this makes them vulnerable to shocks relative to unleveraged firms. Using data on Kenya manufacturing, Nkurunziza (2004) indeed shows that borrowing firms were less likely to survive the high-interest-rate macro shock of the mid-1990's but, conditional on surviving, they were growing faster. Ignoring exit may thus bias inference one way or the other.

Ignoring entry may also result in a biased picture. This is best illustrated with two stylized examples. *Example 1*: Suppose that manufacturing output follows shifts in inelastic demand. The only issue is who produces – which, if we assume constant returns to scale and identical TFP, is indeterminate. With these assumptions, if existing firms do not grow when demand rises, there is room for new firms to enter. But if existing firms grow because they have access to outside finance, there is less room for new firms. Credit access can thus enable existing firms to grow by displacing new entrants. In this case, focusing the analysis on existing firms gives the erroneous impression that credit is beneficial for manufacturing growth even though, given our assumptions, it does not affect aggregate output.

The opposite bias is also possible. *Example 2*: Suppose that demand is elastic and that production is characterized by fixed costs and rising marginal costs, as in the textbook U-shaped average cost curve case. Fixed costs make entry difficult without access to external finance. With entry restricted by lack of credit, existing firms grow to meet demand, but the price rises because they face an increase in marginal cost. If, however, credit access makes entry easier, existing firms

grow less because they are outcompeted by new entrants with a lower marginal cost. With elastic demand, aggregate output is larger with entry because demand is served at a lower marginal cost, and hence at a lower price and larger quantity sold. In this example, the effect of credit access on manufacturing growth is underestimated if the analysis is limited to pre-existing firms. These two examples therefore illustrate that it is essential to complement firm-level analysis with a commune-level analysis, something that our data allow since we have a census of all manufacturing firms.

The second part of our regression analysis thus uses communes as the unit of analysis. The model we estimate is of the form:

$$\Delta y_{is} = \gamma B_i G_s + \mu_i + \upsilon_s + e_{is}$$

where Δy_{is} is now the number of entry and exit, or the growth of value added, output or employment, depending on the regression. Sector and commune fixed effects are included, as before.[21]

We begin by examining firm entry and exit. Since G_s is calculated using firms with more than the cutoff number of employees, we only consider entry and exit of firms with less than the cutoff. Regression results, with G_s calculated using a 100 employee cutoff, are reported in Table (6) together with robust standard errors. The first two columns refer to exit. Column 1 shows the baseline results for exit. Because exit (as well as entry) is a non-negative count variable, we estimate a Poisson model. In column 2 we use the exit rate instead of the number of exited firms as dependent variable. In both specifications, we observe less firm exit in sectors that are growing faster in communes with easier access to banks: In column 2, $\widehat{\beta}$ is significant at the 5% level, in column 1 the p-value is 0.13.

[21] Note that in the previous analyses firms that only appear after 1998 and/or disappear before 2003 do not enter the firm-level data sets. For the study of entry and exit however, we also include firms that entered and/or exited between 1998 and 2003.

Dependent variable:	number of firms exited post 1998	exit rate: firms exited post 1998/ firms in 1998	number of new firms post 1998	entry rate: firms entered post 1998/ firms in 1998	net change in number of firms '98 - '03
estimator	Poisson	OLS	Poisson	OLS	OLS
	(1)	(2)	(3)	(4)	(5)
B_iG_s	-1.110	-0.519**	4.197*	0.054	2.040*
	(0.726)	(0.245)	(2.366)	(0.110)	(1.161)
industry's share	0597**	-0.175**	1.324***	0.189**	-0.340
of commune vad_{is}	(0.237)	(0.076)	(0.349)	(0.075)	(0.445)
$Poverty_iG_s$	5.560	-0.561	9.874	0.708	-6.836
	(5.917)	(1.311)	(12.642)	(0.880)	(6.281)
$PopulationDensity_iG_s$	-0.000	0.002**	0.004	0.000	0.002
	(0.002)	(0.001)	(0.003)	(0.000)	(0.005)
$DistanceAinSebaa_iG_s$	0.000	0.001	0.005	0.000	0.000
	(0.002)	(0.001)	(0.004)	(0.000)	(0.003)
$DistanceCenter_iG_s$	-0.029	-0.006	0.034	0.002	0.013
	(0.018)	(0.005)	(0.041)	(0.003)	(0.022)
$Education_iG_s$	0.095	0.020	0.275	0.029	-0.107
	(0.146)	(0.065)	(0.307)	(0.030)	(0.245)
$ManufPopShare_iG_s$	-2.016	1.111	1.364	-0.397	7.629
	(4.085)	(1.098)	(5.833)	(0.603)	(10.978)
$Wage_iG_s$	-0.006	0.001	-0.025	0.002	0.001
	(0.011)	(0.004)	(0.042)	(0.002)	(0.017)
sector FE	yes	yes	yes	yes	yes
comm. FE	yes	yes	yes	yes	yes
Obs.	809	809	809	772	809
R-squared					
Robust standard errors in parentheses					
* significant at 10%; ** significant at 5%; *** significant at 1%					

Table 6: Entry and exit - regressions at the commune x sector level

For firm entry (columns 3 and 4), the estimated β coefficient is positive as anticipated, but it is statistically significant only for the Poisson model but not the entry rate (note that the entry rate is not defined for commune-sectors that do not contain firms in 1998). The net effect of entry and exit on the number of firms is shown in column 5. Here we see that bank availability has a positive and statistically significant effect on the change in the net number of firms. Taken together, these results confirm the beneficial effect of access to finance on manufacturing, and they suggest that, for

the period under consideration, some of the effect comes from reduced exit. This suggests that one important role of banks during this period was to protect firms against liquidity shortages induced by increased competition.

Next we repeat the analysis with growth in value added, employment, and output. Communes with no manufacturing in any sector are omitted from the analysis. The results, reported in Table (7), confirm those reported for individual firms: sectors with growth opportunities at the national level grow faster in communes with bank availability. This is true for value added, output, as well as employment.

At the commune-level point estimates on $B_i G_s$ are larger in the employment growth regressions than in the output growth regressions. We found the opposite at the firm-level (see appendix, table 15). From the analysis of individual firms we concluded that, during the study period, access to credit helped firms increase output per worker. At the commune level, access to credit is associated with a larger increase in employement than in output. Given that access to credit was shown to reduce exit but not foster entry, this suggests that, at a time of contraction in manufacturing, access to credit saved jobs by allowing less productivity firms to survive. This feature is obscured if we focus only on surviving firms.

Dependent variable:	value added growth (at comm x sector level)		output growth (at comm x sector level)		employment growth (at comm x sector level)	
	(1)	(2)	(3)	(4)	(5)	(6)
B_iG_s	7.026*	6.425*	2.777*	2.932**	3.602***	3.149**
	(3.766)	(3.639)	(1.488)	(1.471)	(0.889)	(1.313)
industry's share	-0.414	-0.564*	0.271	0.264	0.341	0.425
of commune vad_{is}	(0.330)	(0.336)	(0.369)	(0.376)	(0.250)	(0.289)
$\text{Poverty}_i\text{G}_s$		-4.592		-2.871		0.744
		(5.856)		(3.945)		(2.475)
$\text{PopulationDensity}_i\text{G}_s$		0.002		-0.000		-0.000
		(0.004)		(0.004)		(0.002)
$\text{DistanceAinSebaa}_i\text{G}_s$		0.003		0.002		0.000
		(0.003)		(0.003)		(0.002)
$\text{DistanceCenter}_i\text{G}_s$		0.010		0.071**		-0.007
		(0.051)		(0.034)		(0.023)
$\text{Education}_i\text{G}_s$		0.330		0.280		0.165
		(0.219)		(0.218)		(0.164)
$\text{ManufPopShare}_i\text{G}_s$		2.337		-2.039		-2.660
		(3.439)		(3.041)		(2.266)
Wage_iG_s		0.010		-0.004		-0.022
		(0.028)		(0.022)		(0.016)
sector FE	yes	yes	yes	yes	yes	yes
comm. FE	yes	yes	yes	yes	yes	yes
Obs.	626	536	650	554	652	556
R-squared	0.43	0.44	0.43	0.43	0.47	0.48
Robust standard errors in parentheses						
* significant at 10%; ** significant at 5%; *** significant at 1%						

Table 7: Regressions at the commune x sector level

Sector × commune observations with zero values in 1998 or 2003 naturally drop out of the regressions reported in Table (7) since the dependent variable is expressed as a growth rate. To investigate whether this affects inference, we reestimate the same regressions using the absolute change as the dependent variable instead of the growth rate[22]; similar results obtain.

As robustness check, we investigate whether the effect of bank availability is stronger in communes with little manufacturing. We started the paper by arguing that bank availability is probably more important for small and medium size firms than for large firms who can obtain finance from a

[22]For the purpose of this analysis a sector with no manufacturing activity recorded in a commune for 1998 or 2003 is coded as 0, if we have data from other sectors for this commune.

variety of sources. Is the same true at the commune level, i.e., is bank availability more important in locations that start small? We suspect it is, because alternatives to bank finance – such as supplier credit or equity finance through partnerships – are probably easier to find in locations with more intense industrial activity. To investigate this possibility, we expand the estimated model to be of the form:

$$\Delta y_{is} = \gamma_0 B_i G_s + \gamma_1 B_i G_s y_{is,t-1} + \gamma_2 B_i y_{is,t-1} + \tau y_{is,t-1} + \mu_i + \upsilon_s + e_{is} \tag{2}$$

where $y_{is,t-1}$ is the value of y in sector s in commune i in 1998. We are interested in the coefficient γ_1 of the interaction term with $B_i G_s$. We include regressors $y_{is,t-1}$ and $B_i y_{is,t-1}$ as controls to avoid spurious results. If bank availability is more important for small sector $\times$ communes, we expect γ_1 to be negative: the beneficial effect of bank availability falls with $y_{is,t-1}$.

Results are reported in Table (8) for growth in value added, output, and employment. In five out of the six reported regressions γ_1 is negative, significantly so for value added and employment in the sparser specifications. Similar results are obtained if we use changes in levels instead of growth rates as dependent variable. Because statistical significance is not robust, findings about heterogeneous effects at the commune level are not as strong as other findings reported in this paper. They nevertheless provide some evidence that bank availability is critical not only for small and medium size firms, but also for less industrialized locations.

Dependent variable:	value added growth (at the commune × sector level)		output growth (at the commune × sector level)		employment growth (at the commune × sector level)	
	(1)	(2)	(3)	(4)	(5)	(6)
B_iG_s	6.168**	5.491*	2.302	2.206	3.452***	2.615**
	(3.102)	(3.009)	(1.440)	(1.526)	(0.800)	(1.261)
industry's share	-0.170	-0.303	0.333	0.335	0.422	0.508*
of commune vad_{is}	(0.344)	(0.356)	(0.373)	(0.382)	(0.258)	(0.297)
$B_iG_s \times vad_{is,t-1}$	-0.029**	-0.018				
	(0.012)	(0.013)				
$B_i \times vad_{is,t-1}$	0.111***	0.111***				
	(0.034)	(0.033)				
$vad_{is,t-1}$	-0.117***	-0.117***				
	(0.034)	(0.033)				
$B_iG_s \times output_{is,t-1}$			-0.003	0.001		
			(0.003)	(0.003)		
$B_i \times output_{is,t-1}$			0.015***	0.016***		
			(0.004)	(0.004)		
$output_{is,t-1}$			-0.017***	-0.018***		
			(0.004)	(0.004)		
$B_iG_s \times employment_{is,t-1}$					-2.251***	-0.410
					(0.848)	(1.027)
$B_i \times employment_{is,t-1}$					2.901*	3.364*
					(1.706)	(1.914)
$employment_{is,t-1}$					-3.194*	-3.831**
					(1.711)	(1.914)
interactions of G_s with other development controls[a]	no	yes	no	yes	no	yes
Sector FE	yes	yes	yes	yes	yes	yes
Commune FE	yes	yes	yes	yes	yes	yes
# of obs	626	536	650	554	652	556
R^2	0.45	0.46	0.44	0.45	0.48	0.49

Robust standard errors in parentheses
*significant at10%; **significant at5%; ***significant at1%
(a) other development controls interacted with G_s included:
population density, distance to Ain Sebaa, distance to province capital,
manufacting share, wage per employee, average years of education of population 15+

Table 8: Regressions at the commune x sector level, including initial levels

5 Conclusion

In this paper we have combined data from the Moroccan census of manufacturing enterprises with information from a commune survey to examine whether firm expansion is affected by local bank availability. The five year period we study is characterized by a mild contraction in manufacturing employment among pre-existing firms, a feature that should be kept in mind when considering the external validity of our findings.

Results show that, in sectors that are growing faster and where growth opportunities are thus expected to be stronger, bank availability is robustly associated with faster firm growth, both at the commune level, using aggregate data of the kind that is usually available in the cross industry/cross-country literature, as well as at the individual level. We also find some evidence of a lower likelihood of firm exit and larger likelihood of firm entry. Additionally, we provide evidence that the effect of bank availability is more significant for medium size firms and in less industrialized communes. Taken together, these findings indicate that bank availability is more critical for certain firms and for locations and sectors at the onset of industrial development.

Our firm-level data also enables us to investigate the channels through which bank availability affects firm performance. We find that firms in a growing sector with a bank nearby are more likely to invest and hire workers. They also increase output per worker and reduce labor costs per unit of output. This suggests that, in our data and over the studied period, access to credit was used by firms to invest in labor saving technology so as to increase value added by reducing labor costs. This effect is partly mitigated at the commune level, where access to credit has reduced firm exit and enabled firms with many workers to survive. These results confirm previous studies and refine earlier findings in various important directions.

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Appendix

6 Descriptive analysis

Using firms for which we have complete data in 1998 and 2003,[23] we report in Table (9) the mean of value added per firm in those two years. We also report the corresponding standard deviation and median. There is enormous variation in levels of value added across firms, and a 10 times difference between the mean and median value added. This serves to remind us that the size distribution of firms in Morocco, as elsewhere, is skewed, with a few large firms and many small ones.

We observe a rise in value added over the 5 year interval, but the rise is relatively modest. It corresponds to a 5.5% increase over 5 years. Next we restrict attention to firms with at least 100 employees. There are 639 firms that meet this criterion among firms present in 1998 and 2003. For these firms, the rise in value added is even more modest. We repeat the exercise for the 1041 firms with at least 50 workers; the growth in value added is less than 3% over five years. We also repeat the analysis at the commune level, this time including all firms, that is, firms that either exit or enter between 1998 and 2003. We again find a small increase in the median total value added as well as in the mean and median growth of value added.

Table (10) reports similar figures for employment. We observe a 2% fall in employment for firms present in both 1998 and 2003. As shown in the Table, this fall is much stronger among firms that had a large labor force in 1998. This implies that the period under study is characterized by a mild contraction in manufacturing employment among those firms in existence in 1998.

This firm-level picture, however, is incomplete. In the second panel of Table (10) we report

[23] For this part of the analysis we drop firms with negative value added for which the growth rate of value added cannot be computed. For later parts, e.g. when studying location-level value added growth, we keep observations with negative value added. We also investigated value added changes, in which we also keep observations with negative value added.

variable	# obs	mean	std. dev.	median
Firm level:				
value added 1998	3473	10,754	124,139	983
value added 2003	3473	11,298	96,675	1,023
change in value added 1998-2003	3473	544	35,587	45
growth of value added 1998-2003	3473	0.055	0.967	0.089
growth of vad, only $\geq$ 100 employees	639	0.050	0.713	0.096
growth of vad, only $\geq$ 50 employees	1041	0.029	0.814	0.079
Commune level: (all communes in data)				
value added 1998	241	197,139	760,526	2,845
value added 2003	241	192,496	665,291	2,923
change in value added 1998-2003	241	-4,642	546,400	407
Commune level: (value added >0 in 1998 and 2003)				
value added 1998	161	291,207	916,552	17,422
value added 2003	161	284,282	798,653	17,177
change in value added 1998-2003	161	-6,924	668,213	867
growth of value added 1998-2003	161	0.14	1.962	0.27
Note: values are in constant 1997 Moroccan Dirham				

Table 9: Summary Statistics Value Added (vad)

employment changes at the commune level, including firms that exit and enter between 1998 and 2003. Mean and median employment falls over the study period, but the median change in employment is small but positive. A similar picture obtains if we limit ourselves to communes with positive manufacturing employment in 1998 (third panel of Table 10). Communes with small levels of initial manufacturing employment seem to have enjoyed some growth while communes with high employment levels in 1998 witnessed a sizeable contraction. This implies a deconcentration of manufacturing employment across space during the study period.

variable	# obs	mean	std. dev.	median
Firm level:				
employment in 1998	3678	82.8	254.6	20.0
employment in 2003	3678	80.5	250.1	20.0
change in employment 1998-2003	3678	-2.3	166.5	0.0
growth of employment 1998-2003	3678	-0.019	0.676	0.0
growth of employment, only $\geq$ 100 employees	654	-0.227	0.738	-0.14
growth of employment, only $\geq$ 50 employees	1078	-0.186	0.722	-0.103
Commune level: (all communes in data)				
employment in 1998	241	1,929.0	5,680.9	101.1
employment in 2003	241	1,705,2	4,727.4	77.0
change in employment 1998-2003	241	-223.8	3,357.3	9.32
Commune level: (employment >0 in 1998 and 2003)				
employment in 1998	167	2,740.5	6,667.3	279.0
employment in 2003	167	2,394.7	5,530.0	247.9
change in employment 1998-2003	167	-345.7	4,001.7	9.3
growth of employment 1998-2003	167	-0.016	1.584	0.153%
Note: values are in constant 1997 Moroccan Dirham				

Table 10: Summary Statistics Employment

If we look at output, we see that firms that already existed in 1998 and remained in existence until 2003 experienced a small increase in output. This is clear from the first panel of Table (11) which shows a 1.8% growth in output on average between 1998 and 2003. If we include entering and exiting firms and aggregate manufacturing output at the commune level (second and third panels of Table 11), we find a healthy increase in output over the study period: over all communes that had some manufacturing output in 1998, the average growth rate in commune output is 23%. This is much higher than the growth rate in aggregate output, which is only 7.4% across all communes – and 6% for communes that had some manufacturing in 1998.[24] These figures confirm that during the study period there was a deconcentration of manufacturing output away from communes with initially high levels of manufacturing towards commune that had little or no manufacturing in 1998.

[24] We cannot entirely rule out the possibility that that part of the increase in manufacturing in communes with no initial manufacturing reflects improved coverage over the study period. This is one of the reasons why in the commune-level regressions we control for commune fixed effects to eliminate this possible source of bias.

Variable	# obs	mean	std. dev.	median
Firm level:				
output in 1998	3677	29,304	242,246	2,774
output in 2003	3677	32,050	219,863	2,802
change in output 1998-2003	3677	2,746	60,379	45
growth of output 1998-2003	3677	0.018	1.025	0.038
growth of output, only $\geq$ 100 employees	654	0.017	0.812	0.074
growth of output, only $\geq$ 50 employees	1078	-0.002	0.881	0.041
Commune level: (all communes in data)				
output in 1998	241	575,110	2,074,672	327
output in 2003	241	617,952	2,004,011	1,145
change in output 1998-2003	241	42,842	1,135,833	2,105
Commune level: (employment >0 in 1998 and 2003)				
output in 1998	165	832,640	2,466,775	72,720
output in 2003	165	887,913	2,374,125	70,195
change in output 1998-2003	165	55,272	1,369,848	5,258
growth of output 1998-2003	165	0.231	2.029	0.372
Note: values are in constant 1997 Moroccan Dirham				

Table 11: Summary Statistics Output

The combination of contraction in employment and increase in value added in existing firms means that output per worker, measured at the firm-level, increased by 3.7% between 1998 and 2003. Over the same period wage per worker increased by 23%, possibly because layoffs were concentrated among unskilled workers.

Summary statistics for the investment variable used in section 4.3 are shown in table 12.

Variable	# obs	mean	std. dev.	median
Firm level				
annual investment 1998-2003 as share of output in 1998	3677	0.167	1.891	0.028
.... only $\geq$ 100 employees	654	0.087	0.144	0.047
.... only $\geq$ 50 employees	1078	0.110	0.446	0.042

Table 12: Summary Statistics Investment

7 Growth of the large firms (≥100 employees) by sector

sector	vad growth	emp growth	output growth
food processing (bakeries)	0.077	-0.459	0.102
other food processing	0.153	0.071	0.186
beverages and tobacco	-0.204	-0.095	-0.159
textile	0.016	-0.072	0.059
garment	0.089	-0.024	0.121
leather	0.268	-0.040	0.171
wood and wood products	0.336	-0.006	0.831
paper and printing	0.220	-0.145	0.237
metal transformation	0.170	-0.271	0.220
basic metal industries	-0.109	-0.292	0.039
metal products	0.141	-0.284	0.230
mechanical equipment	0.290	-0.304	0.056
transport equipment	0.010	-0.196	-0.187
electric and electronic	0.124	-0.044	0.037
office equipment	0.637	-1.454	0.344
chemical	0.065	-0.253	0.002
plastics and rubber	-0.325	-0.409	-0.006

Table 13: Growth of the large firms (>=100 employees) by sector

8 Examining non-linearities

In this appendix we examine whether results change if, for B_i, we replace the bank dummy with more detailed information about financial development. To allow for flexibility we use indicator functions for different parts of the distribution of the absolute number of banks, the banks per capita and the banks per hectare distributions. To generate those dummy variables we use cut-offs that are roughly the 25th and 75th percentile of the locations that have at least one bank. $Q1$ is quartile 1 of the distribution, $Q23$ is quartile 2 and 3 of the distribution, $Q4$ is quartile 4 of the distribution, B_Q1 means Quartile 1 of the banks distribution (if at least one bank), Bpc_Q1 means quartile 1 of the banks per capita distribution, $Bpha\_Q1$ means quartile 1 of the log(banks per hectare) distribution. For the absolute number of banks, for example, these numbers are 2 and 7. Results are shown in Table (14). We see that the coefficients of financial development $\times$ growth opportunity remain positive and, in most cases, significant.

Dependent variable: growth of value added								
Reference group	≥ 100	≥ 100	≥ 50	≥ 50	≥ 100	≥ 100	≥ 100	
sample	<100	<100	<50	< 50	<100	< 100	< 100	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
B_Q1$_i$× G$_s$	2.606**	3.744***	3.437**	4.196**				
	(1.256)	(1.231)	(1.723)	(1.846)				
B_Q23$_i$×G$_s$	3.150***	3.607***	3.731**	3.687**				
	(0.915)	(0.787)	(1.495)	(1.531)				
B_Q4$_i$×G$_s$	3.005***	3.795***	3.638***	3.878***				
	(0.920)	(0.705)	(1.310)	(1.280)				
Bpc_Q1$_i$ × G$_s$					3.230***	3.876***		
					(0.850)	(0.628)		
Bpc_Q23$_i$×G$_s$					2.938***	3.513***		
					(0.956)	(0.777)		
Bpc_Q4×G$_s$					2.934***	3.775***		
					(0.960)	(0.857)		
Bpha_Q1$_i$ × G$_s$							3.354***	
							(0.962)	
Bpha_Q23$_i$ × G$_s$							2.900***	
							(0.937)	
Bpha_Q4$_i$ × G$_s$							2.953***	
							(0.940)	
sector FE	yes	yes	yes	yes	yes	yes	yes	
commune FE	yes	yes	yes	yes	yes	yes	yes	
interactions of G_s with other development controls[a]	no	yes	no	yes	no	yes	no	
Observations	2822	2561	2432	2193	2822	2561	2816	

Standard errors in parentheses, with two-way clustering by sector and commune;
* significant at 10%; ** significant at 5%; *** significant at 1%
(a) other development controls interacted with G_s included:
industry's share of commune vad$_{is}$, population density,
distance to Ain Sebaa, distance to province capital, manufacting share,
wage per employee, average years of education of population 15+

Table 14: Robustness: other indicators for local financial development

9 The channel from finance to value added growth: Additional results

Dependent variable:	employment growth 1998-2003				output growth 1998-2003			
Reference group	≥ 100	≥ 100	≥ 50	≥ 50	≥ 100	≥ 100	≥ 50	≥ 50
Sample	< 100	< 100	< 50	< 50	< 100	< 100	< 50	< 50
	(1)	(2)	(3)	(4)	(5)	(6)		
$B_i G_s$	0.751*	0.986**	1.041*	1.063	1.596*	2.502***	2.691***	3.173***
	(0.406)	(0.470)	(0.587)	(0.762)	(0.895)	(0.614)	(0.863)	(0.730)
industry's share	0.197	0.251	0.376**	0.486***	0.109	0.125	0.157	0.222
of commune vad_{is}	(0.145)	(0.153)	(0.153)	(0.147)	(0.207)	(0.255)	(0.263)	(0.302)
$Poverty_i G_s$		0.934		1.513		-1.617		-0.622
		(1.308)		(0.966)		(1.927)		(2.944)
$PopDensity_i G_s$		0.001		0.002		0.002		0.001
		(0.001)		(0.001)		(0.002)		(0.002)
$DistanceAinSebaa_i G_s$		0.002**		0.002**		0.003		0.003*
		(0.001)		(0.001)		(0.002)		(0.001)
$DistanceCenter_i G_s$		0.015		0.006		0.044***		0.033**
		(0.012)		(0.015)		(0.016)		(0.016)
$Education_i G_s$		0.011		-0.081		0.095		-0.014
		(0.091)		(0.077)		(0.121)		(0.131)
$ManufPopShare_i G_s$		0.910		0.623		1.389		0.448
		(1.023)		(1.554)		(1.104)		(1.753)
$Wage_i G_s$		0.000		0.005		0.015		0.023
		(0.005)		(0.008)		(0.015)		(0.019)
sector FE	yes	yes	yes	yes	yes	yes	yes	yes
commune FE	yes	yes	yes	yes	yes	yes	yes	yes
Observations	2822	2561	2432	2193	2822	2561	2432	2193

Standard errors in parentheses, with two-way clustering by sector and commune;
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 15: Dependent variables: employment and output growth