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Finance and Demand for Skill: Evidence from Uganda

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ABSTRACT *We explore the empirical interaction between firm growth, financing constraints, and job creation. Using a novel small-business survey from Uganda, we find that the extent to which small businesses expand skilled employment as their sales and profits increase is significantly related to access to external funding, while the hiring of casual and family workers is not. The results are robust to the inclusion of various firm level controls, region and sector fixed effects. We support our findings by providing empirical evidence on the relationship between planned hiring and firms' access to finance.*

1. Introduction

Creating stable employment opportunities is a primary concern for policy-makers in many developing economies. Most developing countries in Africa have grown rapidly over the past decade, even as the Global Recession has gripped many European countries and the United States. Since most of its countries have become independent around 1960, sub-Saharan Africa has experienced the best period of growth between 2000–2012, where GDP grew more than 4.5 per cent annually on average. However, this growth has not translated into high growth rates in job creation, as in many African countries, growth has primarily relied upon oil, gas, and mineral extraction. Even though the number of industrial sector jobs is projected to increase by 55 per cent over the next 10 years, the growth comes from a small base and will not come close to absorbing the millions of new workers entering the labour force each year (Brooks et al., 2014). What is even more challenging is that many educated workers also fail to be absorbed into the labour market. The lack of employment opportunities for highly skilled and trained workers raises the question of whether there is a shortage of firm-level demand for skill in African economies or there are other constraints holding back their inclusion in the labour market.

The vast literature on finance and growth has shown the importance of access to external funding for firm-level investment decisions, economic development, and growth (see Levine, 2005, for an overview). Access to credit remains difficult for firms in sub-Saharan Africa and continues to top the policy agendas concerning African economic development. In this context, while several papers have documented the relationship between financing constraints and capital investment and growth, there are relatively few papers gauging the importance of financing constraints for hiring decisions, especially of skilled workers with experience and training associated with a particular occupation.

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The aim of this paper is to close this gap and investigate the role of financial constraints in firms' skilled labour demand in developing countries. Specifically, using a unique small-business survey from Uganda, we test whether the likelihood of skilled job creation at profitable businesses rises with access to external finance.

Economic theory predicts a critical role of financing constraints in hiring decisions, similar to the role that they have for capital investment (Benmelech, Bergman, & Seru, 2011). First, timing differences between when wages are paid and when revenues are received requires working capital, and the lack of it can constrain labour demand. This results in a stronger financing constraint in the case of hiring skilled workers, because skilled employees often get paid a skill-premium and hence receive higher wages. In addition, the expected contribution of skilled workers for future revenues might be relatively more intangible than that of unskilled labour – raising firm-level uncertainty and preventing the efficient allocation of external finance to productive users. Second, if hiring of permanent staff implies fixed costs (including training or firing costs), this might require additional funding, especially for smaller firms, again an effect which is expected to be stronger for trained and experienced workers (Oi, 1962). Third, job creation might be restricted by financing constraints if capital and labour are complementary factors in the production process: access to finance can yield access to 'new machinery' and stimulate the demand for 'skill' to operate such newly installed machinery. Finally, the decision whether to hire permanent or fixed-term employees (Caggese & Cuñat, 2008) is likely to be more pronounced for hiring of trained and experienced workers, for whom the outside options are larger. We expect all of these channels to be stronger at profitable firms on growth paths, where demand for skilled and experienced workers should be higher. We evaluate the empirical implications of financial access for skill-growth among small businesses, where development of in-house human capital is limited and access to skilled-employees is likely to be possible only through the labour market.

We empirically explore the interactions between financing constraints, firm growth – measured in sales (as well as in profits) – and job creation. Using comprehensive small-business survey data collected in 2013 from a nationwide representative sample of 1,839 Ugandan companies, we test the extent to which access to external bank funding conditions the relationship between firm growth and employment creation. In our empirical analysis, first, following Popov and Udell (2012), Brown, Ongena, Popov, and Yeşin (2011), Cox and Jappelli (1993), and Duca and Rosenthal (1993), we isolate demand from supply-side financial constraints by distinguishing between firms that (i) applied for and received a loan, (ii) were rejected or discouraged from applying for a loan, and (iii) state that they did not need a loan. Second, our survey also allows us to distinguish between different types of employee categories at a given establishment such as trained and experienced, as well as permanent, casual, and family/friends. While theory predicts a constraining effect of lack of access to finance on the hiring of skilled and trained workers, it does not do so for casual workers or family workers. As a result, we can exploit this difference in our hypothesis testing. Third, we differentiate between growing and non-growing firms, which will determine the demand for labour. Finally, as a key robustness test we relate today's financing constraints to future hiring plans.

While we use data for one specific sub-Saharan African country, Uganda resembles in its economic and demographic structure many other developing economies. Uganda is a landlocked low-income country in Africa, which has experienced high GDP growth over recent years, reaching 3.2 per cent in 2013 (during our sample period) and projected rates of 5.5 per cent for 2017. However, the vast majority of Uganda's labour force remains employed in relatively low productivity sectors, such as agriculture (World Bank, 2013, 2016). Ugandans with higher education are more likely to be unemployed and to under-utilise their skill sets; many educated workers are employed in a job ill-suited to their skills or emigrate to find appropriate employment (EDPRD Uganda, 2014). Uganda has the world's youngest population with over 78 per cent of its population below the age of 30; as the population continues to grow at a rate of 3.2 per cent annually, the country has one of the highest youth unemployment rates in sub-Saharan Africa (The State of Uganda Population Report, 2013). Many of the new entrants are highly educated as a result of past policies to encourage school enrolment and

completing further education. The challenge for Ugandan policy makers is therefore to oversee the labour force's effective transition from a predominantly low productivity and agriculture based economy to a high-human capital intensive – manufacturing and service sector based – economy.

Our empirical analysis shows that growing and profitable firms only hire experienced and trained employees if they are not rejected or discouraged from applying for external finance. In our regression analysis we do not find such a significant relationship in the case of hiring casual employees or family and friends, suggesting that – in line with theory – financing constraints are more likely to bind in the context of employment contracts associated with experienced and trained employees with high human capital intensity. This empirical evidence is robust to the inclusion of a large set of firm level controls as well as region and sector fixed effects. Our results are in line with prior and well established conclusions emphasised by Kaplan and Zingales (1997), who document that firms on a growth path are more likely to invest in physical capital when provided with access to finance and Almeida, Campello, and Weisbach (2004) who show that constrained firms have a positive cash flow sensitivity of investment. Our findings are also robust to alternative classifications of financial access. Finally, the key empirical results remain when we regress firms' future hiring intentions (that is, planned hiring) on firm performance and financial access – after controlling for recent hiring trends at the firm. All tables associated with the robustness analysis are presented in the Supplementary Materials.

The findings from our research have important policy implications as they underline the importance of well developed financial systems for job creation. As policy-makers grapple with the challenge of creating formal and permanent jobs in a still growing society, financial sector policies can be critical. The inability of constrained firms to hire skilled labour even though they are performing well is an issue for economic development and highlights the misallocation of high quality labour. Our results also show that beyond helping firms grow faster, more efficient financial systems can also have an impact on poverty alleviation by creating urgently needed jobs.

Our paper contributes to this literature by gauging the role of financing constraints in the relationship between firm growth and skilled job creation in a low-income country. In this respect, our paper is related to several strands of literature. First, we add to the broad literature on financing constraints in developing economies. This literature includes a series of papers that investigate the effects of firm financing constraints on firm growth (such as Ayyagari, Demirgüç-Kunt, & Maksimovic, 2008; Beck, Demirgüç-Kunt, & Maksimovic, 2005, 2008) as well as firm sales and performance (Banerjee & Duflo, 2014; De Mel, McKenzie, & Woodruff, 2008; Zia, 2008).

Second, and more specifically, we add to a smaller and more recent literature on the relationship between financing constraints and job creation. In this research frontier, on the aggregate level, Pagano and Pica (2012) show a positive and significant relationship between financial development and job creation in developing countries, while also uncovering that employment grows slower during downturns in industries with high external-finance dependence. Using a general equilibrium model of occupation choice Giné and Townsend (2004) argue that for Thailand financial liberalisation has contributed to migration of subsistence agricultural workers into urban salaried jobs. Another strand of this literature concentrates on the effects of bank finance on employment patterns. For instance, for the case of the United States, Beck, Levine, and Levkov (2010) and Benmelech et al. (2011) show that branch deregulation and consequent financial liberalisation led to decreases in unemployment and increased labour market participation especially among low-skilled workers. Chodorow-Reich (2014) shows that firms with a pre-crisis relationships with less healthy lenders had higher reductions in employment following the Lehman bankruptcy compared to pre-crisis clients of healthier lenders. In a similar study Cingano, Manaresi, and Sette (2016) show that bank exposure to the credit shock predicts firm investment rates, resulting in lower levels of firm employment. Finally, Popov and Rocholl (2017) study the impact of exogenous funding shocks to German savings banks on firms' labour market behaviour and find that firms which have credit relationships with banks exposed to the mortgage crises experienced a significant decline in labour demand during the Global Financial Crisis.

Several papers gauge the differential effect of financing constraints on different categories of employment. Benito and Hernando (2007) show for a sample of Spanish firms from 1985–2000 that

higher cash flow is associated with relatively more temporary employment while higher levels of financial pressure is associated with relatively lower levels of temporary employment. Caggese and Cuñat (2008) show for a sample of Italian firms that financing constraints bias enterprises towards fixed-term rather than permanent contracts. Finally, Popov (2014) investigates the determinants of firm-on-the-job training and finds that credit constrained firms have a 38 per cent lower probability of investing in on-the-job training. Our paper contributes to these different strands of the literature focusing on a low-income country, where access to finance is substantially more scarce than in most advanced and middle-income countries, studied in the literature so far.

While this is one of the first papers gauging the relationship between access to finance and firms' hiring decisions in a low-income country, our analysis is subject to several caveats, including measurement concerns stemming from the survey nature of our data. Most importantly, the cross-sectional data allows us to only imperfectly control for endogeneity concerns. While we offer an array of robustness tests to address concerns of reverse causation, omitted variable bias, and heterogeneity, we like to stress that our data does not allow for causal inference. Given the unique and novel features of our data though, we still think that our analysis and findings are of interest.

The remainder of the paper is structured as follows. Section 2 elaborates on the composition of our data and Section 3 on the benchmark econometric model. Section 4 presents the main empirical findings. Section 5 presents a series of robustness checks and tackles the endogeneity concerns with respect to financial access and firm performance. Lastly, Section 6 concludes.

2. Data

Our data come from a small-business survey conducted in 2013 in Uganda. Together with Financial Sector Deepening Trust Uganda (FSD-U), we designed the survey instrument that allowed us to collect this business-level data. The project was funded by the Department for International Development (DFID) and Financial Sector Deepening Trust Uganda (FSD-U). The survey was administered by an independent consulting company and in total data from 1839 small and medium sized businesses were collected. The majority of the survey respondents were either owners of the firm or higher level managers that had adequate access to firm financial and operational information.¹ The survey data provide information on firm financials, operations, and most importantly, detailed answers on employment characteristics. For the purpose of this study, we exclude all financial firms from our analysis. After this refinement, we are left with 1702 firms. They come from all five regions of Uganda, 79 districts as well as 16 sectors. The businesses are sampled from sectors such as manufacturing, construction, agricultural, forestry, and utilities. Firms were randomly selected to take part in the survey and compliance was optional. Table A1 describes the composition of our dataset with respect to location, region, and sector classifications. In unreported tabulations, we find very little sectoral level differences when it comes to financial constraints and employment categories and we do not observe any pattern for dominant financial constraint status or employment behaviour specific to a particular industry.

2.1. Labour and employment variables

The main focus of this study is to understand the determinants of firms' employment composition and especially the demand for skilled labour. To serve this purpose, our survey categorises five different types of employment. Specifically, the categories that we identify are (i) *Trained*, (ii) *Experienced*, (iii) *Permanent*, (iv) *Casual*, and (v) *Family/Friends*. *Trained* employees are those who have a formal training appropriate for their particular occupation, while *Experienced* employees are those who have work experience for at least two consecutive years in a particular occupation; we refer to these two categories as skilled employees. *Permanent* employees are those who have worked at the interviewed firm on a daily basis for at least three consecutive months, while *Casual* employees are part time workers, and *Family* employees are either family, relatives, or friends. Skilled employees are expected to be more costly for the firm. In order to

draw a clear picture to this end, the survey asks respondents to provide the average monthly salary that they pay to each category of employees. The survey responses show that the average salary for skilled employees is almost double that of other employees; 225,700 Ugandan Shilling for trained and experienced (approximately 88 US Dollars in 2013) compared to 135,400 Ugandan shillings for casual and family employees (53 US Dollars). When comparing within the same firm, we find an even starker difference, with the average wages for trained and experienced workers being 312 per cent higher than for casual and family workers. Therefore, we conjecture that the hiring rates and the demand for skilled workers is adversely affected by firms' limited financial access compared to the overall demand for employees.

The survey also asks the respondents if the labour demand for categories (i)–(v) above increased, decreased, or stayed the same over the last 12 months. This means we have information of whether the firm hired or fired employees the past one year and, if so, how many. This allows us to investigate the dynamics governing the composition of employment both along extensive and intensive margins. We would like to highlight that the employee categories (i)–(v) are not fully distinct from one another and there are clear overlaps among certain variables. For example, there might be certain cases where a particular worker is a permanent employee as well as a family member.

We present summary statistics of the key variables in [Table 1](#). We observe that only a small proportion of our firms hired over the previous 12 months. Specifically, over this period of time we observe that 149 firms hired permanent employees, 65 hired casual employees, 35 hired family employees, 86 hired trained employees, and 87 hired experienced employees.

2.2. Firm performance, financing constraints, and control variables

In our regression analysis, firm performance is proxied by either sales or profits. The survey asks each firm its sales and profits from the previous month, where profits refer to the total income after paying all expenses including wages for employees, taxes, rents, interest expenditures, and so forth, but not including any income paid to the owner. In addition, the survey asks whether sales and profits had increased or decreased when compared to the same month of the last year. We use this information to construct variables $\Delta Sales$ and $\Delta Profits$, which take the value of 1 if the performance variable increased, 0 if there was no change and -1 if there was a decrease in sales or profits compared to the performance of the firm a year ago.²

In order to measure the degree of financing constraints, we utilise information on whether a firm has outstanding loans and whether the firm has applied for a loan over the last year as well as the reasons for not having applied for a loan. This information allows us to identify firms who were rejected or discouraged from applying for loans. It also allows us to distinguish between firms that have not applied for a loan because they were discouraged and firms that have not applied because they have no demand. There are many firms in our sample who never applied for a loan, however, would need a commercial loan for their operations. In line with earlier and established research, we split the sample based on categories of financial access as (i) *Applied and Got a Loan*, (ii) *Cannot Get a Loan*, and (iii) *Do not Need a Loan*. Group (i) consists of firms who applied for a loan and got accepted to receive one.³ Group (ii) includes firms that applied for a loan, but got rejected as well as firms that did not apply for a loan, but state in the survey that they need a loan for their operations. Group (iii) includes all the firms who have not applied for a loan, because they do not need a loan for their business. Including this third group allows us to disentangle between demand and supply-side constraints. The data in [Table 2](#) show that 62.5 per cent of firms were either rejected or discouraged from applying, while 10.5 per cent received a loan.

We include a set of additional control variables in our econometric analysis. As a standard control variable to proxy size, we include the *Total Employees* of the firm. Total employees include the total of both permanent and casual employees. We also include the log of invested capital. *InvestedCapital* measures the investments made by the firm over the past 12 months. These purchases include machinery, equipment (including computers and software), buildings, land, training/human capital

Table 1. Summary statistics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	N	mean	sd	min	max	p25	p50	p75
(a) Employment Variables								
DHire Trained	1,580	0.054	0.227	0	1	0	0	0
DHire Experienced	1,569	0.055	0.229	0	1	0	0	0
DHire Permanent	1,603	0.093	0.290	0	1	0	0	0
DHire Casual	1,575	0.041	0.199	0	1	0	0	0
DHire Family	1,572	0.022	0.148	0	1	0	0	0
Hire Trained	1,580	0.258	1.954	0	54	0	0	0
Hire Experienced	1,569	0.231	1.410	0	25	0	0	0
Hire Permanent	1,603	0.437	2.548	0	54	0	0	0
Hire Casual	1,575	0.168	1.123	0	20	0	0	0
Hire Family	1,572	0.052	0.558	0	16	0	0	0
DPlanned Trained	1,601	0.094	0.292	0	1	0	0	0
DPlanned Experienced	1,592	0.109	0.312	0	1	0	0	0
Planned Train	275	1.284	1.866	0	20	0	1	2
Planned Exper	266	1.470	2.242	0	30	0	1	2
Trained Employees	1,567	2.206	5.137	0	65	0	0	2
Experienced Employees	1,622	3.566	5.985	0	100	1	2	4
Permanent Employees	1,687	4.871	7.197	0	90	2	3	5
Casual Employees	1,606	2.295	7.095	0	150	0	0	2
Family Employees	1,544	0.610	1.844	0	35	0	0	1
Total Employees	1,597	7.064	10.71	0	200	2	4	8
(b) Performance, Financial, and Control Variables								
ΔProfit	1,702	-0.0517	0.794	-1	1	-1	0	1
ΔSales	1,490	-0.0389	0.880	-1	1	-1	0	1
Applied for Loan	1,702	0.417	0.493	0	1	0	0	1
Cannot Get Loan	1,702	0.633	0.482	0	1	0	1	1
Do Not Need a Loan	1,702	0.261	0.440	0	1	0	0	1
Invested Capital	1,487	9.10e6	5.92e7	0	1.01e9	0	0	1.50e6
Business Age	1,677	10.090	7.673	1	70	5	8	12
New Innovative Product	1,702	0.259	0.438	0	1	0	0	1
Low Education	1,702	0.193	0.395	0	1	0	0	0
Medium Education	1,702	0.287	0.453	0	1	0	0	1
High Education	1,702	0.499	0.500	0	1	0	0	1
(c) Two-Sample <i>t</i> -Test for Equal Means								
VARIABLES	(1) N	(2) Mean Applied and got a Loan	(3) Mean Cannot Get Loan	(4) <i>t</i> -test				
ΔProfit	1257	-0.05	-0.16	*				
ΔSales	1121	-0.04	-0.15					
Invested Capital	1118	9.6e6	1.3e7					
Total Employees	1117	7.06	7.69					
Business Age	1236	10.00	10.64					
New Innovative Product	1257	0.25	0.41	***				
Low Education	1257	0.21	0.21					
Medium Education	1257	0.29	0.30					
High Education	1257	0.48	0.48					

Notes: The Hiring variables with the letter 'D' indicate that the variable is a dummy variable. The performance variables ΔProfit and ΔSales take a value of 1 if performance increased, 0 if there was no change and -1 for a decrease. DPlanned variables with a missing value have been converted to 0.

Table 2. Extensive margin effects: hiring skilled employees

VARIABLES	(1)	(2)	(3)	(4)
	DHire Trained	DHire Trained	DHire Experienced	DHire Experienced
Profit Increased* Applied and got a Loan	0.139** (0.063)		0.163** (0.066)	
Profit Increased* Cannot Get Loan	0.053** (0.022)		0.077*** (0.023)	
Sales Increased* Applied and got a Loan		0.112* (0.058)		0.136** (0.062)
Sales Increased* Cannot Get Loan		0.050** (0.022)		0.072*** (0.023)
Δ Profit	0.001 (0.008)		-0.009 (0.010)	
Δ Sales		0.003 (0.009)		-0.009 (0.010)
Applied and got a Loan	-0.005 (0.018)	-0.004 (0.021)	-0.000 (0.023)	-0.002 (0.027)
Cannot Get Loan	0.018 (0.011)	0.017 (0.011)	0.000 (0.012)	-0.004 (0.014)
Total Employees	0.002** (0.001)	0.002* (0.001)	0.003** (0.001)	0.003** (0.001)
ln(1+ Invested Capital)	0.002** (0.001)	0.002** (0.001)	0.003*** (0.001)	0.003*** (0.001)
Business Age	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
New Innovative Product	0.056*** (0.017)	0.059*** (0.019)	0.042** (0.018)	0.044** (0.019)
High Education	0.030** (0.014)	0.042*** (0.015)	0.029* (0.017)	0.041** (0.017)
Medium Education	0.016 (0.013)	0.021 (0.014)	-0.000 (0.015)	0.004 (0.017)
Observations	1,307	1,181	1,302	1,176
R-squared	0.103	0.110	0.098	0.100
Sector FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Wald Test	4.795	3.853	7.840	6.487
Prob > F-val	0.00842	0.0215	0.000413	0.00158

Notes: This table shows our baseline estimation results for the relationship between hiring skilled labour, firm performance, and financial constraints. The detailed variable definitions are provided in Section 2 and the Supplementary Materials. The dependent variable is a dummy variable for whether the firm hired trained or experienced employees in the past 12 months. Variables Δ Sales and Δ Profit take a value of 1 if the performance variable increased, 0 if there was no change and -1 if there was a decrease in sales or profits compared to the performance of the firm a year ago. The Dummy *CannotGetLoan*, includes firms who applied for a loan but do not have a loan and also firms who did not apply for a loan but state in the survey that they need a loan for their operations. We estimate columns 1 to 4 using an OLS regression. To control for unobserved regional and sector level fixed effects, we include sector and region dummies in all our estimations. The results for the Wald Tests are reported in the bottom of the table. The null hypothesis assumes that the interaction terms between performance and financial access are equal to one another. Robust standard errors are reported in parentheses. ***p<0.01, **p<0.05, *p<0.1.

for the employees, and other investment.⁴ We include *BusinessAge* to measure firm experience. As firms with higher R&D expenses require more formal and high skilled employees, we add a dummy variable to our benchmark regression equation, which will be equal to one if the firm introduced any innovative product, service, or process over the past two years.⁵ Lastly, we include the education of the owner as a control variable. It might be that owners who have a higher education

better understand the benefits derived from skilled employment. This might therefore have an influence on the employment composition of the firm. Therefore, we include three dummy variables. The owner is regarded as having a *LowEducation* if he has at most primary school education. We classify *MediumEducation* if the owner has a secondary degree education and *HighEducation* if they have a tertiary, university (undergraduate), or postgraduate (Masters, Doctors, or PhD) degree education. We maintain the education groups *Other* as the base category in our analysis.⁶ The Supplementary Materials provide more information on the additional control variables included in our analysis.

Panel C in Table 1 presents two-sample t-tests for equal means. The population of firms is split between firms who *Applied and Got a Loan* and firms who *Cannot Get a Loan*. The results show that the firms are qualitatively similar when it comes to performance, invested capital, age, and education. However, firms who are not financially constrained were significantly more likely to introduce a new innovative product, service, or process. Results remain similar when we compare firms who *Applied and Got a Loan* against all others. In addition, since we observe low amounts of overall hiring in our sample, one might be concerned that our findings hinge on a very small subset of firms that would therefore drive our results. Two sample t-tests among firms who hire skilled employees remain the same. Unconstrained firms who hire skilled employees and constrained firms who hire skilled employees are qualitatively similar when it comes to performance, invested capital, age, and education. We do not report these results for brevity.

Table A2 presents the correlations between key variables to be included in the regression analysis. The measures of firm-performance, ‘changes in profits’, and ‘changes in sales’ relative to the year before ($\Delta Profit$ and $\Delta Sales$), are positively correlated with hiring trained, experienced, and permanent employees, but not with hiring casual and family employees. As expected, higher firm size and financial access is correlated with all five categories of employee types.

3. Model and methodology

To explore the interactions between performance, financial access, and dynamics of employment composition, we will estimate the following empirical specification:

$$\begin{aligned} ChangeinEmployee_{ik} = & \alpha_0 + \beta_0 PerformanceGroup_i + \beta_1 PerformanceGroup_i * AppliedandGotLoan_i \\ & + \beta_2 PerformanceGroup_i * CannotGetaLoan_i + \beta_3 PerformanceGroup_i \\ & + \beta_4 AppliedandGotLoan_i + \beta_5 CannotGetaLoan_i + \lambda X_i + \varepsilon_i \end{aligned} \quad (1)$$

The dependent variable, *ChangeinEmployee*, is based on the five different categories of employment that we consider; namely, trained, experienced, permanent, casual, and family. The firm is indexed by i and the type of employment is denoted via the subscript k . We vary these variables by examining the hiring decisions at employee type k . We use both extensive and intensive margins of hiring decisions. First, we use a dummy variable equalling 1 if the firm had hired (variable *DHire*) at least one employee from a particular category of k in the past 12 months, thus the *extensive* margin demand for employment. In a second step, we use the actual number of employees hired, which measures the *intensive* hiring margin.

On the right hand side of our regressions, we proxy the performance of the firm based on either of two measures: *Changes in Sales* and *Changes in Profits*. *PerformanceGroup* variables are categorical variables that indicate whether sales or profits increased or decreased, as already discussed above. Specifically, variables $\Delta Sales$ and $\Delta Profits$ take the value of 1 if the performance variable increased, 0 if there was no change and -1 if there was a decrease in sales or profits relative to the performance of the firm a year ago. We include a vector of firm-specific control variables – captured by X_i in the regression specification – as additional right-hand-side variables.

The baseline regressions are estimated via standard OLS (Ordinary Least Squares) for the extensive margin and via Tobit model for the intensive margin. We use OLS instead of probit or logit models for the extensive margin regressions, as we would otherwise lose sectoral and locational cells where either all firms hire or (more likely) no firm hires employees of a specific type. We use Tobit estimations for the regressions with actual hiring as the dependent variable, given their left-censored nature, as we need to account for both the probability of being above the limit (in this case zero), as well as the continuous values of hiring being above zero.

The main interest of all our regressions is to evaluate the significance of the interaction terms between financial access and performance. To test formally whether access to finance interacts with measures of performance in determining the changes in employment composition, we will conduct Wald tests as follows.

$$H_0 = \beta_1 PerformanceGroup_i * AppliedandGotLoan_i = \beta_2 PerformanceGroup_i * CannotGetaLoan_i = 0$$

4. Empirical results

The results in Table 2 show that only growing firms with access to external funding experience a rise in hiring of skilled employees. In our regressions, the main coefficients of interest are the interaction terms, which we present at the top rows of each table. Firms who experience increases in performance (via profit or sales) and at the same time also have a bank loan, hire more trained and experienced employees when compared to their well-performing but constrained counterparts, who do not have access to external finance. The Wald tests of the differences of the coefficients show that this difference is significant. Also, both constrained and unconstrained firms are more likely to hire skilled employees than firms who do not demand external funding. The economic effects of our regressions are also significant and sizable. The first column in Table 2 shows that among firms with rising profits, firms with access to loans are 6.5 percentage points more likely to hire trained and 7 percentage points more likely to hire experienced employees than financially constrained firms. Given that the average likelihood of hiring trained or experienced workers is 5 per cent, this is a large economic effect. We find similar large skilled hiring effects among firms with rising sales, who have access to finance.

Turning to the control variables in our regressions, we find that larger firms, measured by invested capital and total employees, are more likely to hire trained and experienced employees. In addition and as expected, firms that have introduced a new innovative product are more likely to hire skilled labour, because new equipment and sale of new products could require a new set of skills. Our results do not find any evidence for the effects of firm age or education of the business owner on the propensity to hire more skilled employees. Furthermore, there is a potential concern that our performance variables $\Delta Sales$ and $\Delta Profits$ impose linearity as they take a value of 1 if the performance variable increased, 0 if there was no change and -1 if there was a decrease in sales or profits relative to the performance of the firm a year ago. Therefore, we provide a robustness test in Supplementary Materials Table A3 where we replace these variables with dummies *PerformanceIncreased* and *PerformanceDecreased* and we find that our main results remain unchanged.

The results in Table 3 show that financing constraints matter not only for the extensive margin but also for the intensive margin. Specifically, in Table 3 we run the same regression structure as in Table 2, except that we use realised hiring numbers and estimate the model via the Tobit censored regression model. The results in Table 3 are consistent with our previous findings on the extensive margin. For experienced employees, our variables of interest remain significant and the null hypothesis (interactions are equal to one another) is rejected under both specifications. The results for trained employees are less significant, however, the signs and magnitudes of the coefficients are in line with our earlier results. In terms of economic effects, firms with a high performance and access to external funding employ between 0.3–3.5 more skilled employees than firms with high performance and financing constraints.

In unreported regressions, we find that our results are neither driven by sectoral level differences nor by outliers. To this end, we run the extensive margin regressions, while dropping one sector at a time from

Table 3. Intensive margin effects: hiring skilled employees

VARIABLES	(1)	(2)	(3)	(4)
	Hire Trained	Hire Trained	Hire Experienced	Hire Experienced
Profit Increased* Applied and got a Loan	7.100** (3.591)		8.463** (3.434)	
Profit Increased* Cannot Get Loan	4.967** (2.522)		7.497*** (2.723)	
Sales Increased* Applied and got a Loan		5.947 (3.675)		8.240** (3.566)
Sales Increased* Cannot Get Loan		4.892* (2.592)		7.899*** (2.816)
Δ Profit	-0.118 (1.169)		-1.259 (1.287)	
Δ Sales		0.066 (1.199)		-1.686 (1.254)
Applied and got a Loan	0.433 (2.655)	0.327 (2.712)	-0.255 (2.291)	-0.794 (2.402)
Cannot Get Loan	2.311 (1.833)	1.613 (1.828)	-0.572 (1.619)	-1.503 (1.686)
Total Employees	0.129** (0.051)	0.116** (0.049)	0.171*** (0.050)	0.156*** (0.049)
$\ln(1 + \text{Invested Capital})$	0.241*** (0.085)	0.248*** (0.088)	0.212** (0.086)	0.210** (0.089)
Business Age	-0.103 (0.075)	-0.097 (0.078)	-0.101 (0.071)	-0.100 (0.074)
New Innovative Product	5.086*** (1.439)	5.180*** (1.483)	3.564*** (1.340)	3.744*** (1.371)
High Education	3.469* (1.963)	5.466*** (2.045)	1.877 (1.654)	3.042* (1.634)
Medium Education	1.874 (1.938)	3.462* (2.046)	-1.001 (1.684)	-0.168 (1.705)
Observations	1,307	1,181	1,302	1,176
Sector FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Wald Test	2.522	2.002	4.317	4.222
Prob > F-val	0.0807	0.135	0.0135	0.0149

Notes: This table shows the estimation results for the relationship between hiring skilled labour, firm performance, and financial constraints. The detailed variable definitions are provided in Section 2 and the Supplementary Materials. The dependent variable is realised hiring variable measuring the amount of trained or experienced employees the firm hired in the past 12 months. Variables Δ Sales and Δ Profit take a value of 1 if the performance variable increased, 0 if there was no change and -1 if there was a decrease in sales or profits compared to the performance of the firm a year ago. The Dummy *CannotGetLoan*, includes firms who applied for a loan but do not have a loan and also firms who did not apply for a loan but state in the survey that they need a loan for their operations. We estimate columns 1 to 4 using a Tobit regression where we account for left censoring at zero. To control for unobserved regional and sector level fixed effects, we include sector and region dummies in all our estimations. The results for the Wald Tests are reported in the bottom of the table. The null hypothesis assumes that the interaction terms between performance and financial access are equal to one another. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

our sample. Under each reduced sample specification, our main results remain consistent. In addition, we winsorize our dependent variables at the 99 per cent level for our intensive margin regressions in case our results were driven by outliers. This refinement does not have an affect on the main results either.

The results in Table 4 show that access to external funding is not relevant for hiring decisions of less skilled workers, including casual and family workers. Here, we test whether financing constraints could also be important for hiring decisions of permanent or casual employees or family members. While theory does not make a clear prediction on the hiring of permanent employees, as they could

Table 4. Extensive margin effects: hiring other employees

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	DHire Permanent	DHire Permanent	DHire Casual	DHire Casual	DHire Family	DHire Family	DEmployee Training	DEmployee Training
Profit Increased* Applied and got a Loan	0.134** (0.066)		0.019 (0.046)		0.008 (0.042)		0.139* (0.072)	
Profit Increased* Cannot Get Loan	0.104*** (0.030)		0.042* (0.022)		0.016 (0.014)		0.108*** (0.026)	
Sales Increased* Applied and got a Loan		0.103 (0.063)		0.004 (0.046)		-0.001 (0.041)		0.150** (0.073)
Sales Increased* Cannot Get Loan		0.117*** (0.030)		0.030 (0.022)		0.014 (0.014)		0.085*** (0.027)
ΔProfit	-0.001 (0.013)		-0.006 (0.010)		0.000 (0.006)		-0.049*** (0.013)	
ΔSales		-0.002 (0.013)		-0.005 (0.011)		-0.003 (0.006)		-0.041*** (0.014)
Applied and got a Loan	-0.009 (0.027)	-0.003 (0.031)	0.001 (0.022)	0.003 (0.026)	0.023 (0.018)	0.027 (0.022)	0.017 (0.038)	0.018 (0.042)
Cannot Get Loan	0.007 (0.017)	0.001 (0.017)	-0.004 (0.012)	-0.005 (0.013)	0.005 (0.005)	0.006 (0.008)	-0.056*** (0.018)	-0.052** (0.020)
Total Employees	0.004*** (0.001)	0.004*** (0.001)	0.002** (0.001)	0.002** (0.001)	0.001 (0.000)	0.001 (0.000)	0.001 (0.001)	0.000 (0.001)
ln(1+ Invested Capital)	0.003*** (0.001)	0.004*** (0.001)	0.002** (0.001)	0.002** (0.001)	0.001** (0.001)	0.001** (0.001)	0.005*** (0.001)	0.005*** (0.001)
Business Age	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)	0.002 (0.001)	0.002 (0.001)
New Innovative Product	0.066*** (0.021)	0.064*** (0.022)	0.018 (0.016)	0.019 (0.017)	0.021* (0.011)	0.022* (0.012)	0.077*** (0.022)	0.080*** (0.024)
High Education	0.033 (0.020)	0.042** (0.020)	0.020 (0.014)	0.028** (0.014)	0.018** (0.009)	0.021** (0.010)	0.024 (0.020)	0.027 (0.022)
Medium Education	0.010 (0.019)	0.016 (0.020)	0.021 (0.014)	0.028* (0.015)	0.013 (0.010)	0.015 (0.011)	-0.030* (0.018)	-0.035* (0.020)
Observations	1,325	1,198	1,308	1,181	1,304	1,177	1,392	1,244
R-squared	0.122	0.136	0.046	0.047	0.043	0.045	0.130	0.136

(continued)

Table 4. (Continued)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	DHire Permanent	DHire Permanent	DHire Casual	DHire Casual	DHire Family	DHire Family	DEmployee Training	DEmployee Training
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald Test	6.819	8.019	1.794	1.057	0.652	0.509	9.373	6.033
Prob > F-val	0.00113	0.000347	0.167	0.348	0.521	0.601	9.06e-05	0.00247

Notes: This table shows our baseline estimation results for the relationship between hiring other labour (permanent, casual, and family), employee training, firm performance, and financial constraints. The detailed variable definitions are provided in Section 2 and the Supplementary Materials. The dependent variable is a dummy variable for whether the firm hired permanent, casual or family employees in the past 12 months. Variables $\Delta Sales$ and $\Delta Profit$ take a value of 1 if the performance variable increased, 0 if there was no change and -1 if there was a decrease in sales or profits compared to the performance of the firm a year ago. The Dummy *CannotGetLoan*, includes firms who applied for a loan but do not have a loan and also firms who did not apply for a loan but state in the survey that they need a loan for their operations. We estimate columns 1 to 8 using an OLS regression. To control for unobserved regional and sector level fixed effects, we include sector and region dummies in all our estimations. The results for the Wald Tests are reported in the bottom of the table. The null hypothesis assumes that the interaction terms between performance and financial access are equal to one another. Robust standard errors are reported in parentheses. ***p<0.01, **p<0.05, *p<0.1.

be either skilled or not-skilled, theory predicts a non-positive impact of access to external funding for the hiring decisions of casual workers or family members – as these employment categories are potential substitutes for access to credit as evidenced by Bos, De Haas, and Millone (2016). Nearly all our coefficients of interest in Table 4 are insignificant, suggesting that growing firms with financial access do not employ more casual employees or family members. These results remain the same for various econometric specifications. We note that in some cases financially constrained firms are more likely to hire *other* forms of labour. This might imply a substitution effect on employment. These results are intuitive, but we cannot establish this relationship for all our econometric specifications. Furthermore, in our current specification, we see that unconstrained firms with higher profits employ more permanent employees. This too is an intuitive result, however, we are unable to establish this relationship for all our econometric specifications.

To further test any potential substitution effects, we exploit a question that asks the respondents whether they had made any ‘training or human capital investments’ for their employees in the past year. With this information, we run the same regressions as before, but replace the dependent variable with a dummy variable *DEmployee Training*. We present the results in columns 7 and 8. Our results are similar to earlier findings. Well-performing firms with access to finance are more likely to train their employees or invest in human capital. These results are in line with findings by Popov (2014) and demonstrate that the firms in our sample do not substitute the lack of skilled employment with employee training or similar forms of human capital investment. The results from all these empirical tests indicate that alleviating financial constraints has a clear effect on relatively high-skill labour as opposed to the lower skilled and casual employment.

In summary, growing firms with demand for external finance hire skilled and trained employees if their financing needs are satisfied, while there appears to be no such constraints for the hiring of casual workers and family members. This result is in line with Kaplan and Zingales’ (1997) analysis on the positive association between cash-flow sensitivity of investment and financial access – providing indicative evidence that in developing countries human capital investment’s cash-flow sensitivity behaves in a way similar to physical capital investment’s cash-flow sensitivity.

5. Robustness tests

In this section, we present a series of robustness checks for our main findings. First, we provide indicative evidence for why the relationship between financial access and hiring of skilled employees might not be explained by reverse causality. In addition, we conduct a robustness test where we alter our financial access sub-groups. Finally, we use alternative econometric specifications to test the sensitivity of our results to the model specification. All tables associated with the robustness analysis are presented in the Supplementary Materials.

5.1. Addressing reverse causality

Reverse causality is a concern for our model, as it is likely that changes in employment quality could have an effect on firms’ probability of financing as well as firm performance. It may be the case that changes in employee composition drive access to finance. The higher the quantity of skilled employees, the larger the firm, the greater legitimacy in the loan application process. Because of this reverse causality concern, our model might be improperly identified. To potentially address this possible bias, we analyse the effects of firm performance and financial access on *Planned Hiring*. For this, we utilise a survey question on how many trained, experienced, permanent, and casual employees firms plan to hire over the upcoming 12 months. We run the same regressions as before, except that our dependent variable is now *PlannedHiring*. Unlike contemporaneous hiring, which might affect access to external funding (by, for example sending positive signals to lender), it is relatively less likely that future hiring plans influence today’s access to external finance.⁷

We run the same models as before with planned hiring of firms as a dependent variable. The *DPlanned Hiring* variable measures the hiring intentions of the firm. The variable takes the value of 1 if the firm intends to hire one or more employees in the future. In the survey approximately 300 firms gave actual values to these questions of which only around 100 admitted to not planning to hire anyone in the future. All other 1500 observations were labelled as missing values. In order to have enough observations to conduct this analysis, we convert all missing values to zero. We understand that this is a strong assumption and, therefore, we also perform alternative conversions to assure that our findings are not biased by this conversion. Specifically, we only consider missing values that were labelled as ‘do not know’ as zero, thus only converting approximately 60 missing observations. This is a more conservative conversion as the answer ‘do not know’ can reasonably be interpreted as a zero value.⁸

Table A4 shows a positive and significant relationship between the interaction of profit/sales growth and access to external funding, on the one hand, and future hiring of trained or experienced employees, on the other hand. Columns (1)–(4) report the result that converts all the missing values to zero and columns (5)–(8) with the more conservative conversion. Overall, the results are very similar to our prior findings. Firms with greater financial access and rising performance *plan* to hire more skilled employees. Our Wald tests are significant across all specifications and the magnitude of all coefficients are very similar to those found in earlier regressions. Most notably, our first interaction *PerformanceIncrease * AppliedandGotaLoan* remains strongly significant across nearly all specifications. In economic terms, growing firms with access to external funding are between eight and 42 percentage points more likely to plan to hire skilled employees than growing firms with financing constraints.

Additionally, we also test whether our results hold with intensive margin values for planned hiring. Firms reported that they were planning to hire on average between zero and 30 employees depending on the employee type. In this setting, we run the same Tobit regressions as before, with actual values for planned hiring and converting only the ‘do not know’ replies to zero. We present the Tobit regression results in Table A5. Under this specification, the majority of our results remain consistent with the previous findings. Well-performing firms with access to finance plan to employ between 1.3–4.5 more skilled employees than firms with a high performance but with no access to credit.

Finally, to control for the fact that firms might exhibit some persistence over time with respect to hiring behaviour, we include actual current hiring in our planned hiring regressions. We conduct separate regressions where we include a dummy variable as well as the real hiring variable on whether the firm had previously hired a particular skilled employee type. We present the results in Table A6. In columns 1–4, we present the regression results for the extensive margin and columns 5–8 for the intensive margin while controlling for realised hiring behaviour. Our results remain consistent with our earlier findings, firms with financial access and high firm performance hire more skilled employees than constrained firms.

5.2. Alternative access to finance classification

In this section, we take a closer look into the division of our financial access sub-samples. Specifically, we distinguish among firms with financing constraints between those that were rejected and those that were discouraged, though we expect the differences between these two groups to be small. The purpose of this exercise is to separate these groups and to test whether there are further differences in employment composition. In addition, we use this to test the consistency and robustness of our results while altering our financial access sub-samples.

The results in Table A7 show a significant association between external funding and hiring decisions of skilled employees and all of our previous findings remain consistent across all specifications. Firms with greater financial access (that is *Applied for a Loan and Got a Loan*) exhibit a rise in skilled employment relatively more than their constrained counterparts as performance increases. The results from the Wald tests are in line with these results. We also conduct Wald tests separately between each pair of interactions for all possible combinations. For example, in the lower rows of Table A7, ‘Test12 Chi’ tests for the equality between the first and the second interaction and ‘Test 23

Chi' between the second and the third interaction, respectively. By doing so, we formally test for significant differences among all financial access sub-samples. The results from these alternative specifications are also in line with the prior findings. Based on the Wald tests, nearly all our interactions are significantly distinct from one another. Coefficients are broadly significant and are in line with prior results showing that greater financial access and positive performance increase the hiring rates of skilled employment. We do not find a consistent ranking in terms of whether rejected or discouraged are more likely to hire trained and experienced workers as their performance goes up.

To further test the legitimacy of our discouraged group specification, we change our interpretation for the discouraged firms. In our survey, we asked whether firms 'would like to take out new debt in the next 12 months'. With this question, we create a new variable *Cannot Get a Loan*². This includes firms who (i) applied for a loan, but got rejected and (ii) firms who did not apply for a loan but admit needing loan application and other financial services as well as would like to take out new debt in the next 12 months. Overall, this is a more conservative approach for classifying our constrained firms. The results in Table A8 show that our findings remain unchanged. Financial access and rising performance interaction are positively linked with the hiring of skilled employment.

5.3. Accounting for total number of skilled employees

Our analysis is unable to fully account for the average firm level skilled employment requirements. In order to address this, we include the total amount of skilled employees as a control variable in our regressions. In the survey, firms were asked 'how many of their their total employees were trained or experienced'. By incorporating this information, we further control for firm size and average firm level skilled employee requirements. The results in Table A9 show that our main findings remain unchanged. As one would expect, we see that firms with more skilled employees hire more skilled employees. In addition, and in line with our earlier results, greater financial access and positive performance continue to exhibit its strong positive association with the hiring rates of skilled employees.

5.4. Other robustness tests

Estimating regressions where the dependent variable is a dichotomous variable is more often better implemented by using other limited dependent variable estimators such as Probit and Logit. When using OLS regressions with dichotomous dependent variables, predicted probabilities are not necessarily bounded by values between 0 and 1. OLS also assumes that there is a linear and additive relationship between the dependent and independent variables and this is not always necessarily the case. Due to these inherent difficulties and more, we perform alternative tests by incorporating a Probit model. We present the results from this estimation strategy in Table A10. Results from these tests are in line with our prior results.

Finally, to further address potential concerns regarding omitted variables, we interact all the firm level controls with the financial access variables. The results from these regressions are reported in Table A11. Our main findings remain unchanged and we continue to observe that firms with financial access and high performance have higher probability of employing skilled labour, with significance levels and coefficient sizes similar to our baseline results. These results thus show that the interaction of firm growth with access to external funding does not proxy for the interaction of access to external finance with other firm characteristics.

The paper so far has been incorporating the number of new hires as a dependent variable and one might argue that it would be best to incorporate net employment changes to take into account the fact that employee turnover may differ across firms. Data limitations prevent us from running such a regression, however, as our data set has very few firms that hire skilled employees to begin with and from that subsample alone, we find much fewer firms who fire skilled employees as well. Therefore, to address all these concerns and limitations, Table A12 shows the results from our main empirical analysis, while controlling for whether the firm had fired a skilled employee in the

past year. We find that turnover differences, as expected, matter for hiring skilled employment and that our main results remain unchanged.

Lastly, based on the results of the main empirical analysis, one might argue that financially unconstrained firms (whose profits grow) expand employment significantly more not only than firms that were refused a loan but also than firms not needing a loan. If financially unconstrained firms with good performance expand employment significantly more than firms not needing a loan, this might suggest that firms that get a loan are enjoying an unobserved growth opportunity and therefore, for this reason, they need (and get) a loan. As such, they are more likely to expand profits and employment, while firms not needing a loan do not need it because they do not have a sizable growth opportunity. Even though our regressions control for managerial capacity (by including education variables) we run an additional analysis to address this concern, whereby we include the interaction terms *PerformanceIncreased * AppliedandGotaLoan* and *PerformanceIncreased * DoNotNeedLoan* and run the Wald-tests between these two interaction terms. The results from this analysis – that we report in Table A13 – are unable to reject the null hypothesis indicating that we are unable to find support for the previous concern.

6. Conclusion

We use a novel small-business survey from Uganda and show that the interaction between performance and financial access is positively correlated with high-skill labour demand. We then further investigate this relationship and show that performance and financial access are not related to the hiring rates of other types of employees, which include casual and family labour.

The results from our study underline the potential importance of financial sector development for employment. As firms grow and become profitable, with access to finance, employment opportunities could increase for those who are formally trained, educated, and more experienced – with complementary ‘skills’ to business needs. This is an important issue for many nations and especially for developing countries. In this respect, our paper points out another reason why policy-makers might need to tackle small firms’ financing constraints.

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Notes

1. To be exact, 1,256 of the respondents were owners and over 450 were identified as managers.
2. While the survey also asked respondents to quantify the realised profits and sales, very few of them were able to provide this information. Survey questions in developing countries are typically phrased in such a manner so that it is most conceivable for the respondents. For example, in many cases firms are only able to report their monthly revenues. This is mainly because they do not have any systematic bookkeeping or reliable estimates for annual performance. Therefore, our questions are also phrased in monthly terms.
3. For consistency, we drop 11 observations from the sample where firms admitted to having a loan, but have never applied for a loan.
4. Other investments firms made included purchases of furniture, agriculture related investments such as livestock, rental expenditures, nets, watering pipes, boats, and all other kinds of miscellaneous items. While we have information on the total *CapitalStock* of firms, only a small proportion of the firms in the sample disclosed this information.
5. Respondents were asked to provide yes or no answers to this question. If they answered yes, we asked them to describe in detail the main innovative product, service, or process that the establishment introduced from fiscal year 2010 through 2012. There were a variety of responses. For example, the 'introduction of tomato and chilli sauces' and the 'introduction of self-produced fertilizer'.
6. Forty-two respondents were unable to categorise the education of the owner. *Other* includes a variety of answers, such as 'do not know', 'different education', 'vocational training', 'diploma', and more.
7. We acknowledge that we cannot fully eliminate this concern. It could be argued that because firms were planning to steadily increase employment over the next few years, this is the reason they applied for the loan in the first place. This might happen in order to cover for the gradual increases in costs.
8. For clarity, responses are not driven by the position of the responder in the firm. As we mentioned before, 1,248 out of the total 1,839 respondents were owners of the firm and therefore 'do not know' responses are not driven by the answers given by managers or other employee statuses.

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