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Investment decisions and exposure to crime and corruption.

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Abstract

Using firm-level data from Afghanistan, we find that undertaking investment raises the likelihood of experiencing episodes of crime and corruption. Our analysis suggests that firms more prone to criminal attacks are aware of the risks and accordingly make costly security arrangements to mitigate the impact. The likelihood of security spending is higher for formal firms and those having access to finance. The two policy instruments increase the availability of resources, some of which is spent to fight crime.

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1. Introduction

Previous literature has shown that both conflict and corruption can have a detrimental impact on economic growth. A mechanism that delivers this negative association operates via the investment channel. Conflict and corruption reduce expected returns thereby hampering investment activity.[1] Nonetheless, the bulk of this research has investigated the impact at the aggregate – either at the national or at some sub-national level. A principal objective of the aggregate inquiry is to ascertain whether regions plagued with conflict and corruption have low rates of investment. The micro-level analysis of individual firms is rather scarce given data constraints.[2]

The few studies that consider the firm-specific impact pool data from across countries as observations at country-level are low. However, often the results are not robust across sub-samples.[3] While this research has been helpful, analysis at a country level helps control for economic, social, and political factors as they are likely to vary less within the country. In this note, we seek to add to this small literature by focusing on Afghanistan where investment activity remains depressed. In our sample, one in three firms reports making an investment-related expenditure. We use data on more than 1,400 firms to examine how exposure to crime[4] and corruption is related to investment decisions.

We find that investment activity is significantly correlated with a firm's exposure to crime and corruption. We further explore the crime-investment relationship by considering firm decisions regarding security expenditures. Firms that make costly security arrangements are more likely to experience crime. This suggests the presence of a self-selection mechanism. Firms more prone to attacks are aware of the risks. Accordingly, they take preventive security arrangements. Finally, we also find that the likelihood of security spending is higher for firms that participate in financial markets (FM) or are formal. The two policy instruments arguably give firms access to additional resources, some of which is spent to fight crime.

2. Data

The World Bank's Enterprise Surveys (ES) covering the formal sector and Informal Enterprise Surveys (IES) serve as the data sources for the study. The data pertain to two survey

[1] See, for example, Knack and Keefer (1995) and Mauro (1995) who study the link between investment and corruption, and Knight, Loayza and Villanueva (1996) and Collier (1999) who examine the role of conflict.

[2] Brück, Naudé, and Verwimp (2013) comment on the gap in micro-analysis of investment decisions (and entrepreneurial activity) and conflict. Zakharov (2019) points out the limited research on the investment impact of corruption at the sub-national level. There are a few notable exceptions. Pshisva and Suarez (2010) analyzes the effect of kidnappings on corporate investment in Columbia. Singh (2013) investigates the impact of conflict on agricultural investment in Punjab (India). Compared to them, our analysis includes smaller non-corporatized non-agricultural firms that fall into both manufacturing and services. Relatedly, Bai *et al.* (2019) provide evidence that growth can causally reduce corruption.

[3] For example, see Asiedu and Freeman (2009) for the corruption-investment link.

[4] The variable we use for crime includes theft, robbery, vandalism, and arson. We cannot differentiate whether these are carried out by conflict groups relative to others. Given the conflict situation in Afghanistan, it is likely that conflict dominates. Nonetheless, we use the term crime instead of conflict in adherence with the survey question.

years – 2008 and 2014. The latter cross-section comprises formal firms only. The surveys contain information on a broad range of business-related topics. Critical to our analysis, firms report information on investment activity, access to finance, and exposure to crime and corruption. In our benchmark specification, we pool the data from ES (2008,2014) and IES (2008) featuring more than 1,400 firms.[5]

We employ the following specification to document the systematic variability of firms' exposure to crime and corruption with firms' decisions and characteristics.

$$Y_{it} = \alpha_{it} + \beta_1 INV_{it} + \beta_2 FIN_{it} + \beta_3 FOR_{it} + \theta X_{it} + \Psi_t D_t + \epsilon_{it} \quad (1)$$

Y_{it} captures the exposure to crime and corruption where i and t are indexes for firm and year respectively. The event of experiencing a loss due to theft, robbery, vandalism, or arson on premises assists us in tracking a firm's exposure to crime. We consider two outcomes related to corruption – whether a firm underwent tax inspection and whether the authorities requested a payment of informal gift during the process. The principal variable of interest is the dummy INV_{it} that indicates whether a firm undertook investment in the previous year or not.

We discuss the role of two additional firm choices. First, FIN_{it} denotes the FM participation status of a firm. Specifically, we use access to a bank account and application for a loan as the two measures of FM participation. An extensive literature highlights the role finance plays in economic growth by facilitating investment (Levine, 2005). However, institutional quality, which is associated with corruption, is also related to financial development. For instance, external financing is more common in countries where legal systems rank high on efficiency (Demirguc-Kunt and Maksimovic, 1998). In general, the nexus between crime, corruption, and finance is intricate. While they bear a direct influence on firm growth, they also interact with each other affecting growth indirectly (Ayyagari *et al.*, 2008). As such, controlling for a firm's access to finance seems vital.

Second, the binary variable FOR_{it} serves as an indicator of a firm's status as a formal firm. Svensson (2003) posits that the degree of interaction with public officials depends on a firm's visibility and an increase in the latter raises the incidence of bribes. Formal firms, by the virtue of their registration, are more visible. We extend this argument by hypothesizing that visibility might also expose firms to criminal acts. The control is also analogous to controlling for the survey type (ES vs. IES).

In addition, we control for location fixed-effects as the intensity of both crime and corruption is likely to vary with geography in addition to the year fixed-effects D_t. X_{it} represents all other firm characteristics including size and industry.

3. Results

The indicators of crime and corruption are binary in nature. Hence, we employ probit regressions to document the correlations. Table I reports the marginal effects from regressions.[6]

[5] The survey data is not of panel nature. Hence, we are unable to employ dynamic models in our analysis.

[6] Table I only reports coefficients of interest. The regression results for other variables are listed in appendix Table A.III.

Our main finding is that the likelihood of enduring both crime and corruption increases with investment activity. The point estimates suggest that firms undertaking investment are 7 percentage points (pp) more likely to experience a crime on premises (column (1)). Investment activity raises the likelihood of being inspected for tax purposes by 7 pp (column (2)). Moreover, conditional on being inspected, authorities are 7.4 pp more likely to demand an informal gift from investing firms (column (3)). These findings suggest that undertaking investment acts as a signal of a firm's productivity. Such firms become a lucrative target for rent-seeking via both crime and corruption.

Table I: Correlates of crime/corruption

	Incidence of crime	**Tax inspection**	**Informal gifts**
	(1)	(2)	(3)
Investment	0.072***	0.070***	0.074**
	(0.019)	(0.027)	(0.034)
Bank account	0.014	0.012	0.135***
	(0.019)	(0.027)	(0.036)
Loan application	0.046	0.079	0.094
	(0.037)	(0.050)	(0.062)
Formal	0.012	0.074**	-0.116**
	(0.022)	(0.032)	(0.048)
Firm-specific controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Location FE	Yes	Yes	Yes
Observations	1,432	1,433	753

Figures indicate marginal effects from probit regressions. Standard errors in parentheses. Regressions control for firm-specific characteristics in addition to year and location dummies. See appendix for details on controls.
***Significant at 1 percent, **Significant at 5 percent, *Significant at 10 percent.

Now, let us consider the FM variables. Theoretical and empirical studies have highlighted the importance of credit availability for investment projects. But what if FM participation exposes firms to crime and corruption as well? We do not find FM participation to be a significant determinant of exposure to crime. Participating firms are also no more likely to be inspected for tax purposes. Nonetheless, firms with a bank account are 13.5 pp more likely of being asked for an informal gift when inspected. The point estimate in column (3) for firms with a loan application also suggests a similar effect. However, the coefficient lacks precision.

The coefficients in the last row correspond to the firm's decision to become formal. The trade-offs concerning this decision are well-known. Formal firms benefit by getting access to credit and other instruments. But they also become more visible to the authorities and find it difficult to evade taxation. They arguably become increasingly more prone to corruption as well. Column (2) confirms this hypothesis. The likelihood of tax inspection is 7.4 pp higher for formal firms. Surprisingly, formal firms are 11.6 pp less likely to be asked for a gift conditional on an inspection. The dynamic nature of firm-authority interaction offers a possible explanation. Formal firms meet

authorities periodically and might have formed a system in which bribes flow outside the event of an inspection. In contrast, interaction for informal firms is ad-hoc which makes bribe flow contingent on the event itself.

Moving on, we further explore the investment-crime relationship. Firms can mitigate the impact of crime by making costly arrangements. The data allow us to observe whether a firm paid for security or not. These expenditures relate to payments for security equipment, personnel, or services. Around 33 percent of firms in the pooled cross-section report making such payments. We also look at the intensive margin by considering what share of total sales is spent on security. The incidence of crime should decline with security arrangements. However, these decisions are endogenous. If firms can gauge their exposure, they can decide to arrange for security and the degree of protection. Past experiences can also lead to updating of priors and ensuing spending decisions.

Panel A of Table II shows how security spending is correlated with crime. To make comparisons consistent across columns (1)-(3), we focus on firms for which the security information is available. Column (1) corresponds to results in Table I that do not feature security expenditure. Like before, the likelihood of crime increases with investment activity. The point estimate is around 0.5 pp higher.

Columns (2) and (3) contain controls for the extensive and intensive margin of security spending. The logarithm of the percentage of annual sales spent on security augmented by unity serves as the measure of intensive margin. We find that the coefficients on investment dummy contract a bit. Thus, controlling for security decisions weakens the crime-investment link. The coefficients on security variables are positive and significant. For instance, firms that do make security payments are 4.7 pp more likely to experience crime. The finding suggests that security decisions are endogenous. The takeaway is that firms employ costly protection measures to mitigate crime-related risks.

Like investment projects, security arrangements require resources. We have shown that FM participation and formality are correlated with increased risks of corruption. However, the two policy instruments also help firms gain access to resources. We find evidence that firms use such resources towards alleviating exposure to crime. Panel B of Table II reports the results of regressing security expenditure on controls. Columns (4) and (5) correspond to the extensive and intensive margins of security spending. Both FM participation variables are strongly correlated with the two margins. Having access to a bank account increases the likelihood of spending by 7 pp. Firms with a loan application are also 11 pp more likely to spend on security. A similar finding extends for formal status. Formal firms are more likely to make security arrangements, though the relationship is not significant at the intensive margin. The findings are consistent with the mechanism proposed in Ranasinghe and Restuccia (2018). Access to more resources as borrowing constraints weaken helps firms to protect themselves against crime. Though, our results add some caution to such an approach. While additional resources benefit firms on a net basis, a part of the gains is lost due to increased exposure to corruption.

Table II: Crime and security expenditures

	Panel A: Incidence of crime			Panel B: Security spending	
				Extensive	Intensive
	(1)	(2)	(3)	(4)	(5)
Investment	0.077***	0.075***	0.073***	0.006	0.107***
	(0.020)	(0.020)	(0.020)	(0.024)	(0.037)
Security spending: Extensive		0.047**			
		(0.022)			
Security spending: Intensive			0.027**		
			(0.012)		
Bank account	0.020	0.014	0.014	0.070***	0.132***
	(0.019)	(0.019)	(0.019)	(0.026)	(0.037)
Loan application	0.044	0.038	0.035	0.111**	0.252***
	(0.038)	(0.037)	(0.037)	(0.047)	(0.070)
Formal	0.019	0.016	0.018	0.069***	0.021
	(0.022)	(0.022)	(0.022)	(0.027)	(0.043)
Firm-specific controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Location FE	Yes	Yes	Yes	Yes	Yes
Observations	1,323	1,323	1,323	1,323	1,323

Figures indicate marginal effects from probit regressions except for security spending at the intensive margin in column (5) for which the OLS estimate is reported. The intensive margin of security spending is defined the share (%) of firm's total annual sales used to pay for security. Standard errors in parentheses. Regressions control for firm-specific characteristics in addition to year and location dummies. See appendix for details on controls.
***Significant at 1 percent, **Significant at 5 percent, *Significant at 10 percent.

4. Discussion

Promoting economic growth in conflict-ridden regions is among the top developmental goals for policymakers. Many believe that fostering capital accumulation can put a country on a high-growth path. The strategy appears promising as investment activity remains sluggish and has ample room to grow in Afghanistan. While numerous steps are being taken to deliver on these goals, the development of financial markets (FM) perhaps receives attention not matched by others.[7] As such, it is prudent to ask whether a high-conflict and an unstable political climate pose indigenous challenges to capital accumulation not encountered elsewhere. In a recent paper, Ranasinghe and Restuccia (2018) show that crime amplifies the contractionary pressures of an underdeveloped FM. Our analysis of Afghan firms show that losses are probably even higher. There exists a crucial difference between how crime and corruption are related to financial constraints. A weakening of borrowing constraints enables firms to reduce exposure to crime through security arrangements. But FM participation makes firms more visible and more prone to corruption with corruption-related losses substituting a part of crime-related losses.

We conclude by raising a policy-relevant concern related to firm-size that is central to the misallocation literature. Numerous studies have shown the distortions firms face are systematically related to their size. Indeed, some recent studies have documented the size-dependent nature of crime as well (Oguzoglu and Ranasinghe, 2017; Ranasinghe and Restuccia, 2018). From the steady-state perspective, it does not matter when a firm experiences a shock – after it has reached maturity, or in the transition period. Nonetheless, from a policy perspective, it is important to separate the two. Do the groups appropriating firm resources use investment activity as a signal or the firm-size, or both? Our analysis hints that it is the former as exposure does not vary monotonically with firm-size when we control for investment activity.[8] The policy response should be to put safeguards at every step of firm growth and not only when they become sufficiently large.

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[7] FM interventions also receive sizable development funding. For example, the World Bank (2020) has earmarked USD 50 million towards efforts to increase access to finance for micro, small, and medium enterprises in the country.
[8] Appendix Table A.III lists the results related to firm size. Size is insignificant when we consider exposure to crime. The likelihood of tax inspection is correlated with firm-size dummies. Still, the effect is non-monotonic.

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