

CONNECTEDNESS AND SME FINANCING IN POST-COMMUNIST ECONOMIES:

EVIDENCE FROM UZBEKISTAN<sup>1</sup>

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**Abstract**

This paper investigates effects of interpersonal links with bureaucrats on SME access to formal finance. A survey of 502 SMEs in post-communist Uzbekistan shows fewer SMEs with government connections express a need for external finance, but success rates of applications are higher than for SMEs without connections. Econometric models show government-connected SMEs receive more formal credit than their counterparts. The small share of SME credit available is thus distributed in favour of those capitalising on bureaucratic links, with consequent resource misallocation. Findings imply that greater SME credit flows need supplementing with capacity building that improves bank transparency and efficiency.

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## Introduction

From a position of broad similarity in the late 1980s, financial sector development of transition economies in Eastern Europe and the former Soviet Union (FSU) has become remarkably divergent. Whereas financial development in Eastern Europe has improved significantly, slow-reformer economies of the FSU such as Armenia, Azerbaijan, Belarus, Georgia, the Kyrgyz Republic, Moldova, Tajikistan, Turkmenistan and Uzbekistan remain financially underdeveloped, even by the standards of most other transition economies (Honohan, 2006). Similarly, and unlike in most Eastern European countries (Kornai, 2000), political reform in the Commonwealth of Independent States (CIS) has either been incomplete (e.g. Russia and Kazakhstan) or superficial (e.g. Belarus, Turkmenistan, and Uzbekistan), and mostly benefits the ruling elite.

Dasgupta (2005; 2009) and Rose (2001) argue that when anonymous market relations are not mature and bureaucratic institutions are dysfunctional and lack credibility, rent-seeking behaviour becomes prevalent in society, extending well beyond the level of the political elite as ordinary agents also try to profit from a web of interpersonal relations. In particular, low-ranking government and bank officials will use their impersonal positions for personal gain. Since interpersonal networks are not inclusive, decisions about access to resources can lead to misallocation. Building on this broad argument, our empirical study of Uzbekistan investigates whether interpersonal connections with government officials, among other potential factors, improve SME access to formal finance.

Uzbekistan, in common with other FSU countries, undertook a wide range of trade, price liberalisation and small-scale privatisation reforms after independence in 1991. However, the process stalled in the late 1990s, and has not so far extended to large-scale enterprises or to the banking sector; the latter is still currently dominated by state-owned banks. Political reforms have made even less progress. The ruling elite of the late 1980s has remained unchanged and unchallenged.

As previous empirical studies suggest (La Porta *et al.*, 2002; Faccio, 2006; Faccio *et al.*, 2006), under these circumstances formal sector lending decisions are likely to be influenced by political, rather than economic, factors, and mainly benefit larger enterprises. For SMEs, however, the situation is less clear: for them, particularly, bank credit is one of the most important sources of external finance. Consequently, a survey of SMEs from three regions in Uzbekistan has been conducted to assess the influence of various factors on their access to formal credit.

The study is organised as follows. The next section briefly reviews and discusses relevant literature. The following section provides some contextual information about reforms in Uzbekistan's banking and enterprise sectors, and also highlights country-specific problems in the financial sector, particularly those affecting payment systems. Section 4 describes the data used in this study and presents summary statistics and other stylised facts that emerge from the survey. Section 5 presents the estimation results and main findings, and a discussion and conclusions are provided in Section 6.

## **Institutions, Interpersonal Connections, Organisational Failure, and**

### **Access to Formal Finance**

The role and importance of institutions in promoting economic growth is widely recognised (North, 1990, p.3): by creating incentive mechanisms in human exchange, they shape economic outcomes. Recent empirical studies show that long-run per-capita income differences across developed and developing countries can be explained in terms of the type, and quality, of economic institutions: better protection of private property rights encourages investment in human and physical capital (Hall and Jones, 1999; Acemoglu *et al.*, 2005). While it is difficult to precisely define and successfully design appropriate and effective pro-growth institutions (as recent, and still ongoing, economic transformation in post-communist economies shows), it is also widely accepted that, in market economies, financial development is closely correlated with economic growth (Demirguc-Kunt and Maksimovic, 1998; Levine, 2005). The strength of this correlation depends on

underlying institutional differences, such as the effectiveness of contract enforcements and creditor protection laws (La Porta *et al.*, 1998).

Earlier studies in this area have focused mostly on aggregate size or 'depth' of the financial system rather than on its breadth (Beck and Demirguc-Kunt, 2008), with the resulting tendency to treat the aggregate measures of financial depth as equivalent to the quality of financial development. In fact, breadth and outreach, as well as depth, determine the quality of the financial system. While more developed financial systems generally offer better access to financial services, this is not always the case (Claessens, 2006); commonly used quantitative aggregate measures of financial deepening (such as broad money, private sector credits, or banking sector assets) provide insufficient information about breadth and quality, and, for example, neglect the proportion of economically active entities responsible for utilisation of available financial services. Only more recently has research attention shifted towards questions of financial access and financial inclusion, in terms of how easily firms and households can take advantage of available formal financial services (Beck and Demirguc-Kunt, 2008, p. 383). While studies of this additional dimension have proliferated in a short period of time (Ayyagari *et al.*, 2008; Beck *et al.*, 2008 among others), there are few country-level case-studies or cross-country comparisons.

Financial services access is lower in developing countries. In developed countries, more than 90% of households have access at least to some financial services, but this falls to less than 20% in most of the Commonwealth of Independent States (CIS), exceptions being resource-rich Russia and Kazakhstan (Honohan, 2006). Similarly, enterprise complaints about poor financial access are higher in developing countries; almost one-third cite lack of external finance as either the main or a severe obstacle to their operation (Claessens, 2006).

Unequal access to finance affects growth, because some profitable entrepreneurial initiatives may never come to fruition, while others which fail to raise external finance will operate at sub-optimal levels, despite having high capital productivity (Claessens and Perotti, 2007, p.573). Lack of

access to external finance may also potentially inhibit human and physical capital accumulation (Beck and Demirguc-Kunt, 2008, p.384). Although informal credit institutions expand and contract ‘contracyclically to repression and liberalization of formal finance’ (Chandavarkar, 1992, p.135), they tend to offer only short-term, high-cost loans and thus are far from perfect substitutes for formal institutions and, in the context of transition economies, usually concentrate on particular sectors of the economy with rapid turnover, such as trade and services industries in urban areas (Ruziev and Midmore, 2014). Moreover, evidence shows that financing from formal, rather than informal, financial institutions is associated with faster firm growth (Ayyagari *et al.*, 2008). Studies also show that financial development helps enterprises to overcome liquidity constraints and improve their growth potential (Levine, 2005; Love, 2003; Demirguc-Kunt and Maksimovic, 1998). There is further evidence that smaller enterprises benefit more from the improved availability of formal finance (Beck *et al.*, 2008).

Poor access to financial services in developing countries may be due to high fixed costs associated with the provision of financial services and tight entry regulations (Claessens and Perotti, 2007). Also, countries with low incomes will lack a sufficiently large pool of domestic savings to be efficiently mobilised to meet the enterprises’ demands for external finance. However, the persistence of the problem over a longer run can also be explained by political factors: reforms changing the status quo could also challenge the ability of the incumbent elite to extract rents, and as a result no fundamental reforms will be undertaken (Acemoglu *et al.*, 2005).

Because economic institutions, alongside political factors, matter in the economic process, business environments will differ across countries. This difference is not simply due to levels of development, however, but also to the variety of institutions and associated country-specific constraints and incentive mechanisms which result from differences in the form, pace, and depth of reforms implemented, themselves possible outcomes of decisions by ruling elites. Considerable evidence suggests that political connections play an important role in gaining access to formal

finance, and that larger enterprises gain more benefit from such connections (La Porta *et al.*, 2002; Faccio, 2006; and Faccio *et al.*, 2006). Nevertheless, capturing most country-specific issues in large cross-country studies remains 'challenging in terms of attribution of causes and effects', and consequently 'evidence from case studies highlighting the impact of entrenched elites over institutional environment' (Claessens and Perotti, 2007, p.761) is desirable.

Political factors can affect economic outcomes formally, through rules and regulations, and informally, through individual political connections and interpersonal relations. For example, entrenched elites may influence institutional environments by adopting formal rules and regulations to protect their rent-seeking interests; at the same time, this may create unfavourable constraints and obstacles for the operation of smaller businesses. As a corollary, increasing bureaucracy will reinforce a culture of favouritism and bribery, suppressing efficient market-based impersonal exchange and resource allocation, and hindering aggregate economic performance (Fedderke *et al.*, 1999, p.734).

In such less than effective market conditions, a thick network of exclusive interpersonal relations will emerge to resolve allocative and redistributive questions, including access to formal finance. Social capital, in the form of a collection of networks and an aggregation of reputations, will grow in importance in production and exchange relations (Stiglitz, 2001, p.64).<sup>1</sup> The complex and dynamic notion of social capital changes with the level of economic development (Stiglitz, 2001): in thin and underdeveloped markets and where the state lacks in credibility, it is mostly represented through community-based and community-ruled horizontal webs of interpersonal networks. As the market-based exchange system develops and deepens, informal communitarian institutions decline in importance and are replaced by formal contracts embedded in impersonal legal systems. However, rather than the stock of social capital shrinking, this transformation indicates a restructuring and a deepening, albeit in broader sense (Stiglitz, 2001, p.65).

Interpersonal networks can be considered as an asset, and as such, can be put to creative or destructive use, or even be left unused. Some interpersonal networks always exist but may remain

inactive. However, agents will resort to their use more frequently, and also form new interpersonal networks, when impersonal markets are suppressed or weak, rent seeking behaviour is prevalent, and rules and laws are dysfunctional (Dasgupta, 2005).

All modern societies use a mix of impersonal markets, bureaucratic organisations, and communitarian institutions which depend upon interpersonal networks (Dasgupta, 2005). Indeed, market-based economic systems are characterised by anonymous markets and impersonal public and private bureaucratic organisations which operate under the rule of law (Weber, 1968). But, after more than twenty years of transition, most post-communist economies of the FSU, including Uzbekistan, have yet to achieve this stage of development. Rose (2001) characterises these economies as suffering from an organisational failure: whilst over the years, market-based exchanges have intensified and formal bureaucratic organisations have gained importance, the latter still fail to operate impartially or predictably, or according to legal prescription. Public officials and civil servants in otherwise impersonal bureaucratic organisations personalise their positions by using the rigidity of rules and regulations as an excuse for rent-seeking. As a result, individuals lose incentives to use prices, rules and regulations as signals; to realize their projects, they resort to variety of interpersonal networks to personalise relationships with impersonal bureaucrats, leading to misallocation of resources (Rose, 2001).

Some individuals are fortunate, and inherit or establish economically beneficial networks of personal connections, while others have connections which, albeit of emotional value, are economically insignificant. Because interpersonal networks are exclusive, a small number of strategically well-connected individuals can often seize a disproportionately large share of common resources and opportunities (McKean, 1992). Large anonymous market-based exchange systems are more efficient than the interpersonal networks because “the best” buyer or seller may not be a part of exclusive networks (Serageldin and Grootaert, 2001, p.53). In this particular example of access to formal credit, the implication is that society will fail to allocate one of its scarce resources to its most productive use, as a result experiencing allocative inefficiency.

Our main, but simple, proxy variable for measuring the importance of such interpersonal network of connections in SMEs' access to formal finance is government connections, which is defined as SMEs having government connections if their senior managers, and/or their friends and/or relatives have held, or still hold, a senior position with a government institution at any of the local, regional, and central government offices. Further details of this and other relevant variables will be discussed in detail in Sections 4 and 5.

### **Recent Developments in Uzbekistan's Banking Sector: A Background**

Uzbekistan's initial market-oriented reforms from independence to the mid-1990s were relatively speedy and comprehensive (Pomfret, 2010). Privatisation of small-scale enterprises was fast and successful, and the privatisation process began to be extended to large enterprises: private sector share in GDP rose from almost zero before transition to 45% by 1997. Nevertheless, progress stalled after the late 1990s and, even after more than 20 years of transition, state control remains over key sectors of the economy.

According to the European Bank for Reconstruction and Development (EBRD, 2011), no change has occurred in Uzbekistan's reform indices<sup>2</sup> for banking, enterprise, and large scale privatisation respectively since the 2000s. In the banking sector, liberalisation policies for credit allocation, soft credits, and interest ceilings are stalled; enforcement of bankruptcy legislation remains weak and administrative methods of corporate governance have not fully been abolished in the enterprise sector (EBRD, 2011). More generally, Uzbekistan's transition economy counterparts have left it behind in transforming banking, as well as enterprise sectors, as shown in Figures 1 and 2.

#### **<Figures 1 and 2>**

The ratio of bank assets to GDP has remained large in relation to the ratio of broad money to GDP (see Figure 3). One possible explanation is that Uzbekistan resorted to external finance for investment projects in the 1990s, especially in the energy sector, and borrowed well over US\$5



billion, equivalent to more than 55% of GDP (World Bank, 2003). Most of these loans were attracted by large state-owned banks under sovereign guarantee. However, international reserves grew from around US\$1 billion in 2000 to over US\$11 billion in 2009, arising from consistent trade surpluses and large remittance inflows. Consequently, as the ratio of external debt to GDP declined, so did the ratio of bank assets to GDP.

**<Figure 3>**

An alternative account identifies the continuation of the old-style directed credit, and highlights attempts to deal with its impact on excessive credit growth and hence inflation (Akimov and Dollery, 2009). While a generous credit policy helped prevent unemployment and output losses, its consequence was an excess supply of bank credit (non-cash money) in the economy, a key systematic problem for the banking sector (EBRD, 2003, p.212). Monetary authorities dealt with this problem through command-economy style restrictions on free convertibility between cash money and non-cash money.<sup>3</sup> Such payments system problems remain an issue for the smooth operation and growth of enterprises, as the next section shows.

To mitigate the impact of the global financial crisis and economic recession on the domestic economy, significant liquidity was injected into the capital base of the largest state-owned banks. This helped increase banking sector capital by around 40% each year in 2008-10, and also supported annual bank credit supply growth to economy at more than 30% during this period (CBU, 2012).

Nevertheless, with relatively small sizes of monetisation and bank intermediation (compared to the size of the economy), state control of the banking sector and most large-scale enterprises, and persistent payments system problems associated with operating business accounts with banks, prospects for access to formal credit by SMEs do not appear encouraging. On their own, however, these general indicators do not provide any insight into important questions such as whether or not

all SMEs have equal access to bank credit, and the major influences affecting their use of formal finance. These issues will be discussed in more depth in the next two sections.

### **Data Used in the Study and Their Preliminary Analysis**

The primary data used in this study is a sample of 502 SMEs which comes from three different regions in Uzbekistan. The detailed discussion of the data source and the method of construction can be found in Appendix 1.

Summary statistics of the main variables used in the study are presented in Table 1; Table 2 shows the same set of variables distinguished by the existence or otherwise of government connections (regarded as an indicator of senior SME managers' interpersonal connections with government officials), and also test whether or not the simple sub-sample means are statistically different under a two-tailed t-test.

As can be seen in Table 1, the average age of SME heads in the sample is approximately 43 years with the standard deviation (s.d.) of 11 years, implying SMEs are mostly governed by middle aged individuals. The average value of SME heads' education, reflecting their human capital, is over 17 years with an s.d. of 3 years, which implies that most SME heads in the sample have a higher education degree. SME management is dominated by males, as female SME heads constituted only 17% of the sample.<sup>4</sup> As for the age of SMEs, which can be interpreted as business experience, the sample is dominated by relatively young SMEs: the average age of SMEs is around 8 years.

#### **<Tables 1 and 2>**

Further relevant information about some of the other important variables is presented in Figures 4-6. Enterprises usually face a variety of obstacles outside their control that hinder their smooth operation and growth; accessibility of appropriately-priced external finance is only one of them. Figure 4 ranks respondents' subjective assessment of the severity of obstacles which hamper their operation and growth, focusing only on "very important" and "important" answers as a percentage

of total responses (other possible responses were “slightly important”, “of little importance”, “not important”, and “not a problem”). Key obstacles relevant to financial sector development are highlighted in a darker colour, and thus around 33% and 59% of sampled enterprises indicated that the external finance constraint and the payments system problems respectively were “important” or “very important” obstacles, the latter reinforcing previous discussion of payment system problems as a major country-specific commercial difficulty in Uzbekistan. Respondents’ subjective evaluation of their access to bank credit, in the scale of 1 (very easy) to 5 (very difficult), is reported in Figure 5: those describing access to formal finance “difficult” or “very difficult” constituted more than half of the respondents.

**<Figures 4 and 5>**

Entrepreneurs require external finance, both formal and informal, for variety of purposes including business start-ups, working capital needs, fixed capital formation, and possibly even for debt financing. However, formal credit institutions such as banks mostly provide loans to well-established SMEs for specific working capital and investment purposes. Table 3 provides general information on the proportion of SMEs within the sample which, respectively, invested in business expansion, expressed a need for external finance, applied for formal credit, and obtained formal credit. As can be seen from the second and third columns, 70% of the SMEs in the sample invested in the expansion of their business since their inception (or privatisation if they were former SOEs); 53% of respondents indicated a need for external finance; around 37% applied for formal finance; and less than 21% had actually obtained formal bank credit during the last five years, a comparatively small proportion relative to the average ratio of 34% over 30 countries in the World Bank and EBRD Business Environment and Enterprise Performance Survey in 2005 (Muravyev *et al.*, 2009, p. 275).

**<Table 3>**

SMEs which did not apply for formal finance were asked to identify reasons for their self-exclusion from the formal credit market; the main responses were sufficient internal finance (33%), loan costs (23%), loan agreement terms and collateral requirements (21% combined), and complexity of the application process (15%). Additionally, SMEs which applied unsuccessfully for formal finance were asked for their opinion of why their applications failed. Figure 6 indicates that the most important reason for rejection (over 35% of responses) was unsuitability of their collateral for formal credit institutions, which is a classical problem (Chandavarkar, 1992).

**<Figure 6>**

Nevertheless, *use* of formal credit is not the same as *access* to formal credit. Access is a broader term referring to the availability of a reasonable quantity of formal finance at reasonable costs (Claessens, 2006, pp.210-11); it covers both existing users of formal credit as well as those who voluntarily exclude themselves for variety of reasons including assumed rejection, self-sufficiency of internal funds, and possibly even lack of awareness. In this sense, additional information provided in the fourth column of Table 3 can be useful in depicting a clearer picture of SMEs' access to formal finance. Approximately three-quarters of SMEs which had invested in business expansion since their start-up expressed a need for external finance. Of these around 70% applied for formal finance, which in this study just comprises bank credits – the predominant source of external finance for small enterprises (Berger and Udell, 1998). Most importantly, conditional upon applying for bank credit, more than half of the SMEs successfully received formal credit, indicating that access to formal credit is actually greater than suggested by the low ratio of SMEs with credit use in the overall sample.

While this preliminary analysis provides some insight into SME financial constraints, other issues remain unresolved. For example, some SMEs which do not require bank credit may still apply for and even obtain it (due, for example, to the existence of interpersonal relations, asymmetric information and adverse selection problems).

Table 3 also divides information on these variables for SMEs with and without government connections. Simple comparison between results for these two sub-samples shows that, conditional upon undertaking business expansion, the proportion of SMEs requiring external finance is higher for enterprises without government connections than their counterparts. However, and more importantly, of the enterprises requiring external finance, more SMEs with government connections applied for formal credit than those without government connections; furthermore, conditional upon applying for formal credit, the success rate is also rather higher for SMEs with government connections than that for those without. On average, a larger proportion of SMEs with government connections obtained bank credit (29%) than those without government connections (19%), whereas a smaller proportion of the former group (67%) carried out business expansion since their inception, compared to that of the latter group (80%). In both cases, the differences in the means are statistically significant at less than 5% level in a two-sided t-test (see Table 2). An important caveat, however, is that not all government connections are equal and that having connections at the highest level would result in more access to resource opportunities. Nevertheless, our assumption (also consistent with evidence found elsewhere: Faccio, 2006; Faccio *et al.*, 2006) is that the established political elite in Uzbekistan is more likely to be linked with large enterprises, having turnovers in excess of millions of dollars and employing thousands of people. This, combined with the fact that majority of the SMEs in our sample employ less than 25 people, implies that we are dealing with a 'second tier' of connectedness which can be treated as relatively equal.

### **Do Interpersonal Relations Matter in Gaining Access to Formal Finance?**

#### **Estimation Results and Main Findings**

While only a fifth of sampled enterprises obtained formal credit, a relatively high proportion of credit applicants were successful. In the context of weak financial sector development and poor enterprise sector reforms in Uzbekistan, the determinants of access to formal finance thus become a focus of interest. In particular, we wish to understand whether or not interpersonal relations play statistically significant role in improving SME access to formal finance.

The basic econometric equation used to estimate various dichotomous models related to formal credit use in this study can be expressed as follows:

$$Y_i = \alpha + X_i\beta + Z_i\gamma + \varepsilon_i \quad (1)$$

where  $Y$  is a binary dependent variable that takes the value of 1 for success and 0 otherwise.  $X$  and  $Z$  are vectors of predictors that affect the probability of success, the former including both continuous and categorical control variables such as entrepreneurs' age, business experience, education, gender, regions, sectors, and payment system problems, while latter comprises three proxy variables for interpersonal networks, namely *gov\_connect*, *bribe*, and *bzinbrpl*;  $\alpha$ ,  $\beta$ , and  $\gamma$  are parameters to be estimated, and  $\varepsilon$  is the random error term. The logit maximum likelihood approach is used.

Estimation results of equation (1) for the model of credit use are reported in Table 4. The complete list of predictors and their expected signs are presented in the first two columns of the table respectively; brief descriptions of the variables can be found in Table 1. The variables *age* and *bsness\_exper* can be used as proxies for human capital and entrepreneurial ability respectively. While they are expected to have a positive impact on the probability of obtaining formal credit, their impact is expected to diminish as the values of the variables increase. Hence a squared term, with an expected negative sign, is also included for both variables. The underlying rationale is that life and business experience will make entrepreneurs appreciate the importance of using their input resources, including external finance, more efficiently. Moreover, from the lenders' perspective, longer established enterprises may have better reputations, credit histories, and possibly longer-term relationships with formal credit institutions (Cavaluzzo and Cavaluzzo, 1998, p. 779). The coefficient of the variable, *educ*, a proxy for business owners' human capital as well as personal wealth, is also expected to have a positive sign. The variable *lnsales* is a proxy for enterprise size (Cavaluzzo and Cavaluzzo, 1998, p.779): larger enterprises are expected to have higher sales revenues. Intuitively, we would expect the estimated parameter of this variable to have a positive sign on the basis that formal credit organisations prefer lending to larger SMEs due to the higher transaction costs associated with monitoring a large number of small loans. The dummy variable

*expnd\_d* refers to an increase in sales revenues compared to the previous year and its coefficient is also expected to be positive. The next variable is *cash1* represents reported payment system problems, which was noted in Section 3 as one of the key country-specific business environment constraints in Uzbekistan. If SMEs identify payment system problems as a major constraint for smooth operation and growth of their businesses, they would be expected also to have a lower chance of obtaining formal credit.

The next variable is *gender*. A cross-country empirical study by Muravyev *et al.* (2009) found that, compared to male-managed companies, female-managed companies were less likely to get formal credit; hence, the coefficient of this variable is expected to have a negative sign. Regional dummy variables are used to reflect the higher per capita income level in Tashkent, the capital city and financial centre of the country. It is expected that SMEs operating in the other two regions, *tash\_obl* being the Tashkent region and *fergh* being the Ferghana region, might have a slight disadvantage in obtaining formal credit. Sectoral dummies reflect the composition of the sample, but there is no *a priori* expectation of the sign of the coefficients of the variables for industry and construction, trade, services, and agriculture.

The three categorical variables, *gov\_connect*, *bribe*, and *bzinbrpl*, attempt to capture the effect of interpersonal networks on the probability of obtaining formal credit. The main target variable is *gov\_connect*, but the variables *bribe* and *bzinbrpl* might also be important in capturing interpersonal relations. But, it is important to note that bribing is more likely to occur when one does not have connections as mutual unpaid obligations will dominate when one has contacts. Still, people who have contacts may be introduced to others with whom they have no contact, in which case bribe becomes appropriate and hence may serve as an (imperfect) substitute for contacts. Approximately 34% of sampled SMEs reported bribes to public officials in the past. Operating a business in one's birth place could also improve the chances of developing interpersonal relations with bank officers as well as government officials, whereas this variable could also measure discrimination against migrant business owners. Around 23% of the SMEs in the sample do not operate in their owners'

birthplace, and the figure is slightly higher in the Tashkent city, around 30%. Consequently, positive signs are expected on the coefficients of all these three variables.

**<Table 4>**

Firstly, Model 1 is estimated using all available observations in the sample; missing values in some variables reduce the number of usable observations to 331. Estimated parameter values, and corresponding odds ratios, of this model are reported in the third and fourth columns of Table 4, and indicate that, with few exceptions, most have the expected signs and are statistically significant.<sup>5</sup> Variables *age* and *bsness\_exper* and their respective squared terms, and *cash1* and *lnsales* have expected signs and are statistically significant at 5% level; *expnd\_d* also has the anticipated sign and is statistically significant at the 1% level. The coefficient estimate of the Tashkent region dummy has the opposite sign but is only marginally significant; whereas although the sign of the Ferghana region dummy is consistent with the data, it is statistically insignificant. Of the sector dummy variables, only that for the services sector is significant at 5% level; its negative sign can perhaps be explained by the fact that the services sector is one of the least capital-intensive sectors. The interpersonal network variables all have the expected signs. Estimated parameters of *gov\_connect* and *bzinbrpl* are statistically significant at 5% level, implying that having interpersonal connections matters for SMEs in obtaining bank credit. In terms of odds ratios, the odds of success for *gov\_connect* and *bzinbrpl* variables is 2.33 and 2.55 respectively. However, although the sign of the coefficient of *bribe* is consistent with the data, it is not statistically significant. To investigate this question in more depth, we also estimated various factors affecting the probability of offering bribe, which are reported in Appendix 2. These results indicate that smaller SMEs with inferior firm characteristics offer bribe more systematically, which could partly explain statistical insignificance of *bribe* in our estimations. This contrasts with the importance of *gov\_connect* which seems to be more important for larger SMEs as further discussion below will show. In addition, it is also possible that *bribe* measures the evidence of bribing minor government officials, not bank officers, in the past, whereas *gov\_connect* and *bzinbrpl* capture possible prior and current connections and relationships. In this



sense, the variable *bribe* might not be a strong proxy for interpersonal connections that currently matter. Also, discrete nature of such exchanges indicate that they are likely to be carried out between unrelated parties, requiring only limited future commitment from either parties beyond specific transactions they are currently involved in. Further, there is a degree of possible overlap between the bribe and the government connections variables. Although they both may require some form of pecuniary reward in exchange for favours, interpersonal links such as government connections are the more valuable of the two, as they can be used repeatedly in future and may produce potentially continuous benefits to the parties involved in the network, including gaining access to bank credit which is not explicitly controlled by government officials.

These preliminary estimation results pass basic diagnostic checks; for example, the likelihood ratio and the Hosmer and Lemeshow Goodness-of-fit tests. Yet it is likely that the observed higher application and success rates for SMEs with government connections could be due to self-selecting behaviour of the borrowers. Consequently, two alternative models with different sub-samples are estimated to deal with the issue. The first sub-sample is conditioned upon applying for formal finance, and the second conditioned upon expressing a need for external finance (Cavaluzzo *et al.*, 2002; Blanchard *et al.*, 2008; Muravyev *et al.*, 2009).

One consideration is that because SMEs without government connections may be less optimistic about their chances of obtaining formal credit, they would be less likely to apply for a bank loan. As a result, although their share in the general pool of credit applicants would be lower, the proportion of SMEs with stronger creditworthiness characteristics amongst the applicants in this group would be higher, as they would be less likely to anticipate refusal, leading to the *underestimation* of the importance of having government connections (Cavalluzzo *et al.*, 2002, p. 670; Blanchflower *et al.*, 2003, p.930).

As an alternative, successful applications for formal credit relative to SMEs with unmet credit needs could be examined, because that involves both self-excluded borrowers along with rejected applicants. Given that SMEs with government connections are more optimistic and are more likely to

apply for a bank credit, this would lead to the *overestimation* of the importance of having government connections. Following Cavalluzzo *et al.* (2002) and Muravyev *et al.* (2009) we use both approaches to deal with this possible sample selection bias, respectively providing lower and upper bounds of prejudice against SMEs without government connections in gaining access to formal credit.

Table 4 also reports estimation results for Model 2, which uses only a sub-sample of formal credit use, conditional upon applying for bank credit (a lower bound of prejudice), and Model 3, which uses a slightly larger sub-sample of formal credit use, conditional upon expressing a need for external finance (an upper bound of prejudice). As expected, the coefficient estimate of the main target variable *gov\_connect* is smaller in Model 2 (0.78) than in Model 3 (0.85) and is significant at the 13% level in the former and the 5% level in the latter. In terms of the odds ratio, everything else equal, this implies that the odds of receipt of formal credit for SMEs with government connections, compared to those without, increase from 2.18 in Model 2 to 2.34 in Model 3. Similarly, the odds of success for *bzinbrpl*, which is statistically significant in all three models, increases from 2.45 in Model 2 to 4.06 in Model 3.

Although the statistical and economic significance of *gov\_connect*, a proxy variable for interpersonal relations, is suggestive of misallocation of scarce resources in the context of the social capital literature, equation (1) has been re-estimated for slightly different dependent variables to seek further empirical support for our argument. Results of these estimations, which are presented and discussed in Appendix 3, indicate that although having government connections improves SMEs' access to formal credit, they are not necessarily associated with entrepreneurs' ability to expand their businesses.

We also carried out further checks for model specification and robustness of our results, including inspecting consistency of our main findings across various sub-samples. These, which are reported and discussed in detail in Appendix 4, also confirm that government connections matter, especially benefiting larger, longer-established, and wealthier enterprises. Moreover, the sensitivity

analysis of the marginal effects of our target variables at various representative values of other important variables such as *lnsales* and *cash1*, which are discussed in more depth in Appendix 5, suggests that the impact of interpersonal connections is stronger for larger enterprises. For example, for an SME with government connections, the probability of obtaining formal finance increases from 13% to 17% when the value of *lnsales* moves from minus 1 s.d. to plus 1 s.d. from the mean value of the variable.

### **Concluding Remarks**

Interpersonal networks are often associated with improving market exchange and resource allocation (Dasgupta, 2005). In the area of development finance, for example, interpersonal relationships have been used positively in forming peer-monitoring-based microcredit institutions which provide credit to individuals excluded from formal credit (Morduch, 1999; see also a study by Helliwell and Putnam, 2000). Nevertheless, Stiglitz (2001), Rose (2001), and Dasgupta (2009) all emphasise the importance of a balanced interaction of impersonal markets as well as bureaucratic institutions. Where markets are thin or suppressed, bureaucratic state institutions lack credibility, and rules and laws are dysfunctional, rent-seeking behaviour may become prevalent as agents try to profit from the web of interpersonal relations. Post transition, market-based exchanges have intensified, and formal bureaucratic organisations have gained importance, in most post-communist economies like Uzbekistan. However, the latter still fail to operate impartially, predictably, and according to the rule of law.

Our findings from a survey of SMEs in Uzbekistan seem to support this argument. The evidence shows that the proportion of SMEs expressing a need for external finance is lower for enterprises with government connection than their counterparts; but, conditional upon applying for formal credit, their success rate is higher than that of SMEs without government connections. On average, a larger proportion of SMEs with government connections obtained bank credit than those without government connections but, compared with the latter group, a smaller proportion of the former group had carried out business expansion since their inception. Various models estimating the

probability of obtaining bank credit also show that SMEs with government connections are more than twice likely than those without to be in receipt of formal credit. In terms of marginal effects, having government connections improves the chances of obtaining formal finance by around 20%.

The concept of unequal access to formal finance, widely discussed in the literature, refers to a disproportionately higher portion of resources being channelled to larger enterprises. Our results show that, when the modern economic structure is not mature, even the smaller portion of formal finance left for SMEs can be distributed unequally; but in this case, a disproportionately higher portion of limited formal finance will be allocated to SMEs with interpersonal links to minor government officials and possibly with bank officers, with potential implications for resource allocation and growth.

Since the later 1990s, policy making in this area in Uzbekistan has focused mainly on increasing the flow of formal finance to the SME sector, including funds attracted from international financial institutions (IFIs). For example, almost all commercial banks in the country have dedicated loan departments offering small business loans. These are financed from sources which include a compulsory 25% deduction from bank profits, targeted off-budget government funds, and loans from IFIs; and for commercial banks, they are further incentivised by tax benefits for revenues generated by credit activities in this sector. Even if these policies were effective, which is debatable without appropriate empirical evidence, our findings make a strong case against the efficiency of their ultimate outcome. This suggests that policy-makers should be concerned not only about measures that facilitate increased availability of formal finance, but also, and more importantly, about longer-term improvements in capacity building. Explicitly, they should focus on establishing more transparent and efficient bureaucratic organisations whose impartial role is to ensure the rule of law. Otherwise, public officials in otherwise impersonal bureaucratic organisations will continue using rigidity of rules and regulations as an excuse for rent-seeking. Thus, entrepreneurs lose incentives to use prices, rules and regulations as signals, relying instead, where coincidentally

possible, on interpersonal networks of relationships with bureaucrats, which results in misallocation of scarce credit resources.

An important caveat, however, is that, despite passing various robustness checks, our findings only confirm existence of a statistical correlation and not of a theoretical causation. For example, in a relevant and interesting paper, Li (1996, p.16) demonstrates that under imperfect market conditions and limited rule of law, entrepreneurs may consciously and actively look for government connections hoping to gain access to resources and/or to ease various business constraints. This then could incentivise public officials either i) to increase complexity of regulations to gain more rents, hindering growth prospects, or ii) to make them feel de-facto stakeholders in businesses rather than “short-termist bribe-takers” (Li, 1998, p.395), resulting in the adoption and implementation of business-friendly regulations, hence fostering growth prospects. Frye and Shleifer (1997) make a strong case for the former, a ‘grabbing hand’, version of the argument in the context of the Russian experience (see also Hunt and Laszlo, 2011, and Seker and Yang, 2014 for more general cases), while Li (1998) makes a strong case for the latter, a “helping hand”, version in the context of the Chinese experience. But, Li (1998, see also Li *et al.*, 2008) also emphasises that the “helping hand” version is specific only to China due to its administrative reforms which, by granting permissions allowing bureaucrats to quit bureaucracy and join the business sector, incentivised the bureaucrats to implement pro-growth reforms.

## Endnotes

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1. Social capital is more extensive than interpersonal networks (Fedderke *et al.*, 1999), but, according to Dasgupta (2005, p.S10) the leaner definition provided here is better suited for study of the potentially conflicting roles of social capital in economic processes.

2. Each index ranges from 1 to 4.33, where 1 represents no or little change from a centrally planned economy and 4.33 represents a standard typical of an industrialised market economy. Further information can be found in EBRD (2000).

3. Restrictions imposed by monetary authorities limit the amount of cash that can be withdrawn from commercial banks' accounts with the central bank, despite having sufficient balances. This cash money squeeze has led to a discounted exchange rate for non-cash money, on average requiring a premium of 8-10% to convert to cash in Tashkent, and a lot more in the provinces (Ruziev and Midmore, 2014).

4. Representativeness of female entrepreneurs in the SME sample and possible measurement errors are discussed in Appendix 4.

5. Since our sample size is relatively small, we use 10% as a borderline significance level.

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**TABLES:**

**Table 1. Summary statistics of Main Variables**

<i>Variables</i>	<i>Description</i>	$\mu$	$\sigma$	<i>N</i>
<i>frmfin_main</i>	1 if SMEs obtained bank credit in the last five years, 0 otherwise	0.21	0.41	498
<i>age</i>	Age of SME's head in 2010	42.81	10.97	502
<i>age22</i>	Age squared divided by 100	19.53	9.71	502
<i>bsness_exper</i>	Business experience, which is the age of SME in 2010, since the start-up	8.13	11.26	499
<i>bsness_exper22</i>	bsness_exper squared divided by 100	1.93	7.19	499
<i>educ</i>	SME head's education	17.15	2.95	500
<i>lnsales</i>	Natural log of average sales revenues for the last six months	15.43	1.85	411
<i>expnd_d</i>	1 if SMEs sales revenues increased compared to the previous year, 0 otherwise	0.59	0.49	439
<i>cash1</i>	1 if SMEs indicate the payment systems problems to be of at least some importance in constraining their operation and growth, 0 otherwise	0.67	0.47	502
<i>gender</i>	1 if SME's head if female, 0 otherwise	0.17	0.38	502
<i>tash</i>	1 if SME operates in the Tashkent city, 0 otherwise	0.60	0.49	502
<i>tash_obl</i>	1 if SME operates in the Tashkent region, 0 otherwise	0.20	0.40	502
<i>fergh</i>	1 if SME operates in the Ferghana region, 0 otherwise	0.20	0.40	502
<i>indust</i>	1 if SME operates in the manufacturing or construction sectors, 0 otherwise	0.40	0.49	502
<i>agri</i>	1 if SME operates in the agricultural sector, 0 otherwise	0.10	0.30	502
<i>srvs</i>	1 if SME operates in the services sector, 0 otherwise	0.30	0.46	502
<i>trd</i>	1 if SME operates in the trade sector, 0 otherwise	0.20	0.40	502
<i>needcr_main</i>	1 if SME expressed a need for external finance, 0 otherwise	0.53	0.50	502
<i>invstd</i>	1 if SME undertook investment in business expansion, 0 otherwise	0.70	0.46	502
<i>crdappl1</i>	1 if SME applied for bank credit in the last five years, 0 otherwise	0.37	0.48	502
<i>gov_connect</i>	1 if SME senior managers, and/or their friends and/or relatives held or still hold a senior position with a government institution, 0 otherwise	0.21	0.41	498
<i>bribe</i>	1 if SME senior manager ever offered bribe to government officials to get things done, 0 otherwise	0.33	0.47	453
<i>bzinbrpl</i>	1 if SME operates at the birthplace of SME's head, 0 otherwise	0.77	0.43	502

Note:  $\mu$  refers to mean and  $\sigma$  to standard deviation; N is the number of observations.

**Table 2. Summary statistics of Main Variables by Government Connections**

<i>Variables</i>	<i>SMEs without Government Connections</i>			<i>SMEs with Government Connections</i>			<i>Difference between the Means</i>
	$\mu_N$	$\sigma_N$	$N_N$	$\mu_G$	$\sigma_G$	$N_G$	$\mu_N - \mu_G$
<i>frmfin_main</i>	0.19	0.39	382	0.29	0.46	106	-0.10**
<i>Age</i>	42.61	10.96	386	43.35	11.38	106	31.65
<i>age22</i>	19.35	9.66	386	20.01	10.23	106	-0.66
<i>bsness_exper</i>	7.61	9.66	384	10.45	15.96	105	-2.84**
<i>bsness_exper22</i>	1.51	4.90	384	3.62	12.47	105	-2.11***
<i>Educ</i>	17.08	2.96	384	17.22	3.02	106	-0.14
<i>Lnsales</i>	15.35	1.85	307	15.61	1.84	95	-0.26
<i>expnd_d</i>	0.59	0.49	332	0.63	0.49	98	-0.04
<i>cash1</i>	0.67	0.47	386	0.64	0.48	106	0.03
<i>Gender</i>	0.18	0.39	386	0.13	0.34	106	0.05
<i>tash</i>	0.65	0.48	386	0.40	0.49	106	0.25***
<i>tash_obl</i>	0.18	0.38	386	0.30	0.46	106	-0.12***
<i>fergh</i>	0.18	0.38	386	0.30	0.46	106	-0.12***
<i>indust</i>	0.40	0.50	386	0.41	0.49	106	-0.01
<i>agri</i>	0.09	0.29	386	0.14	0.35	106	-0.05
<i>srvs</i>	0.30	0.46	386	0.31	0.47	106	-0.01
<i>trd</i>	0.22	0.41	386	0.14	0.35	106	0.08*
<i>needcr_main</i>	0.54	0.50	386	0.51	0.50	106	0.03
<i>invstd</i>	0.67	0.47	386	0.80	0.40	106	-0.13***
<i>crdappl1</i>	0.35	0.48	386	0.46	0.50	106	-0.11**
<i>bribe</i>	0.33	0.47	346	0.34	0.48	99	-0.01
<i>bzinbrpl</i>	0.78	0.41	386	0.73	0.45	106	0.05

Note:  $\mu$  refers to mean and  $\sigma$  to standard deviation; N is the number of observations. \*\*\* refers to 1%, \*\* to 5% and \* to 10% level of significance in two-tailed t-test.

**Table 3. Information on Investment and Financing Options of the SMEs in the Sample.**

	All SMEs			SMEs with Government Connections			SMEs without Government Connections		
	<i>Number of SMEs</i>	<i>Percent of Total Sample</i>	<i>Percent of the Previous Row</i>	<i>Number of SMEs</i>	<i>Percent of Total Sample</i>	<i>Percent of the Previous Row</i>	<i>Number of SMEs</i>	<i>Percent of Total Sample</i>	<i>Percent of the Previous Row</i>
<b><i>SMEs which:</i></b>									
Undertook Investment since Their Start Up	347	70.0%	-	85	17.1%	-	262	52.8%	-
Need External Finance	263	53.0%	75.8%	54	10.9%	63.5%	209	42.1%	79.8%
Applied for Formal Credit	185	37.3%	70.3%	49	9.9%	90.7%	136	27.4%	65.1%
Obtained Formal Credit	103	20.9%	55.7%	31	6.3%	63.3%	72	14.6%	52.9%

Note: Total number of observations used in these calculations varies Between 492 and 496 due to some missing values of respective variables.

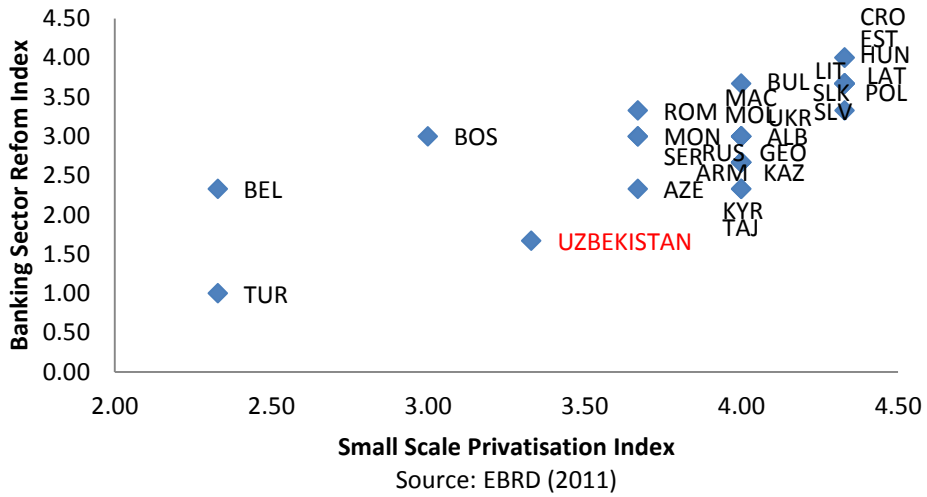
**Table 4. Credit Use: Probability of Holding a Formal Credit**

Predictors	Expected Sign (+/-)	Model 1		Model 2		Model 3	
		Logit Coeff. with S.E.	Odds Ratio	Logit Coeff. with S.E.	Odds Ratio	Logit Coeff. with S.E.	Odds Ratio
<i>Constant</i>		- 10.15*** (3.20)	–	- 8.09* (4.91)	–	- 6.54* (4.04)	–
<i>Age</i>	+	0.25** (0.13)	1.28	0.21 (0.20)	1.24	0.06 (0.16)	1.06
<i>age22</i>	-	- 0.28** (0.14)	0.75	- 0.22 (0.23)	0.80	0.06 (0.18)	0.94
<i>business_exper</i>	+	0.07** (0.03)	1.07	0.06 (0.05)	1.06	0.09 (0.14)	1.09
<i>business_exper22</i>	-	- 0.11** (0.05)	0.90	- 0.11 (0.08)	0.90	0.14 (0.16)	0.87
<i>Educ</i>	+	- 0.07 (0.06)	0.94	- 0.05 (0.08)	0.95	- 0.08 (0.07)	0.92
<i>Insales</i>	+	0.21** (0.10)	1.24	0.22 (0.14)	1.24	0.24** (0.13)	1.29
<i>expnd_d</i>	+	0.88*** (0.35)	2.41	0.38 (0.48)	1.47	0.25* (0.13)	2.08
<i>cash1</i>	-	- 0.81** (0.34)	0.44	- 1.18*** (0.48)	0.31	- 1.06** (0.46)	0.35
<i>gender</i>	-	0.45 (0.41)	1.57	0.23 (0.60)	1.26	0.44 (0.52)	1.56
<i>tash_obl</i>	-	0.66* (0.40)	1.94	1.05* (0.56)	2.85	0.86 (0.57)	2.37
<i>fergh</i>	-	- 0.25 (0.49)	0.78	0.83 (0.66)	2.30	0.02 (0.54)	0.98
<i>agri</i>	+/-	- 0.85 (0.58)	0.43	- 1.85*** (0.74)	0.16	- 1.09 (0.77)	0.34
<i>svcs</i>	+/-	- 1.18** (0.51)	0.31	- 0.82 (0.70)	0.44	- 0.38 (0.60)	0.68
<i>trd</i>	+/-	0.23 (0.47)	1.26	0.12 (0.62)	1.12	0.33 (0.62)	1.39
<i>gov_connect</i>	+	0.84** (0.36)	2.33	0.78 (0.51)	2.18	0.85** (0.44)	2.34
<i>Bribe</i>	+	0.42 (0.33)	1.52	- 0.11 (0.44)	0.90	0.47 (0.42)	1.59
<i>bzinbrpl</i>	+	0.93** (0.41)	2.55	0.90 (0.56)	2.45	1.40** (0.62)	4.06
<b>Overall Model Evaluation and Tests</b>							
Log-likelihood value		$\chi^2$ (d.f.) -143.38		$\chi^2$ (d.f.) - 75.80		$\chi^2$ (d.f.) -87.50	
Likelihood ratio test		65.00 (17)***		34.96 (17)***		39.68 (17)***	
Pseudo R squared		0.19		0.19		0.19	
Hosmer and Lemeshow Goodness-of-fit test		6.24 (8)		10.11 (8)		5.70 (8)	
Correctly predicted		80.97%		69.63%		73.43%	
Number of Observations		331		135		175	

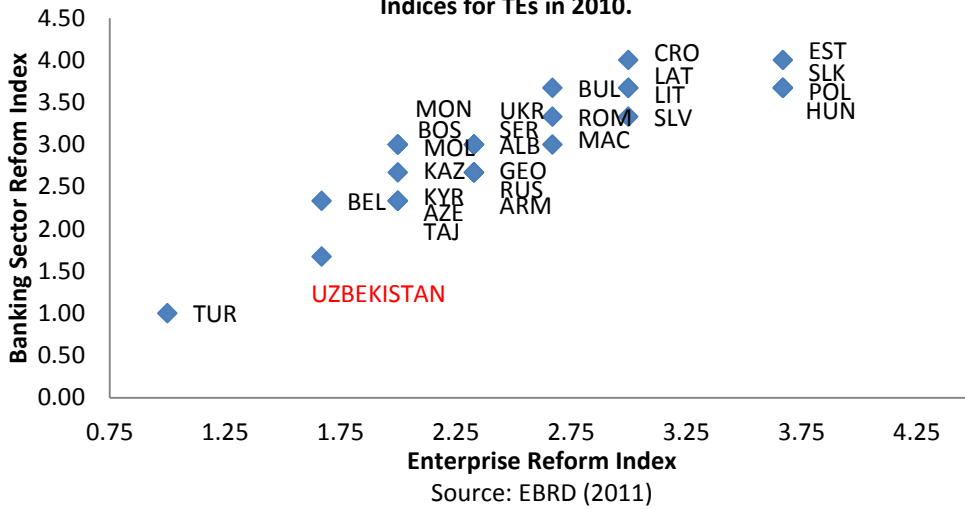
Notes: Models estimated using Stata 11; \*\*\* refers to significant at 1%, \*\* significant at 5%, and \* significant at 10% levels respectively. Model 1 uses all available data from the full sample (general). Model 2 includes only observations conditional upon applying for credit (lower bound). Model 3 includes only observations conditional upon expressing need for credit (upper bound).

**FIGURES:**

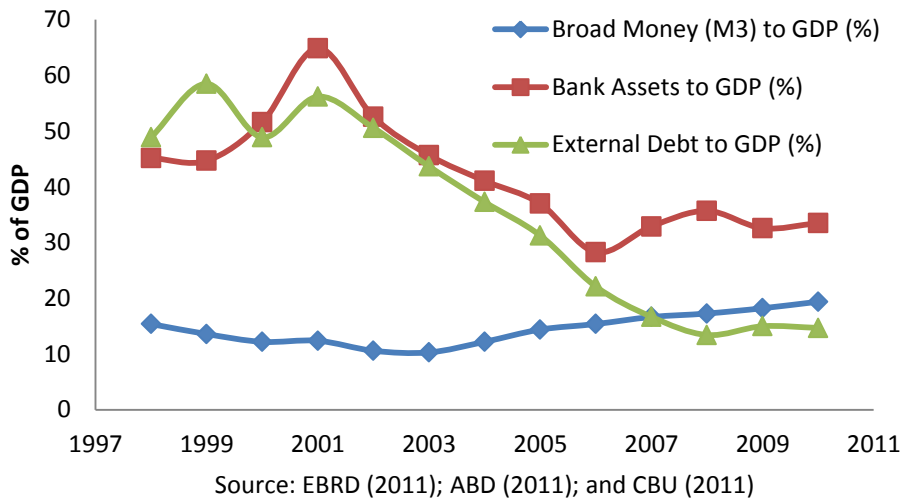
**Figure 1. EBRD's Banking Sector Reforms and Small Scale Privatisation Indices for TEs in 2010.**



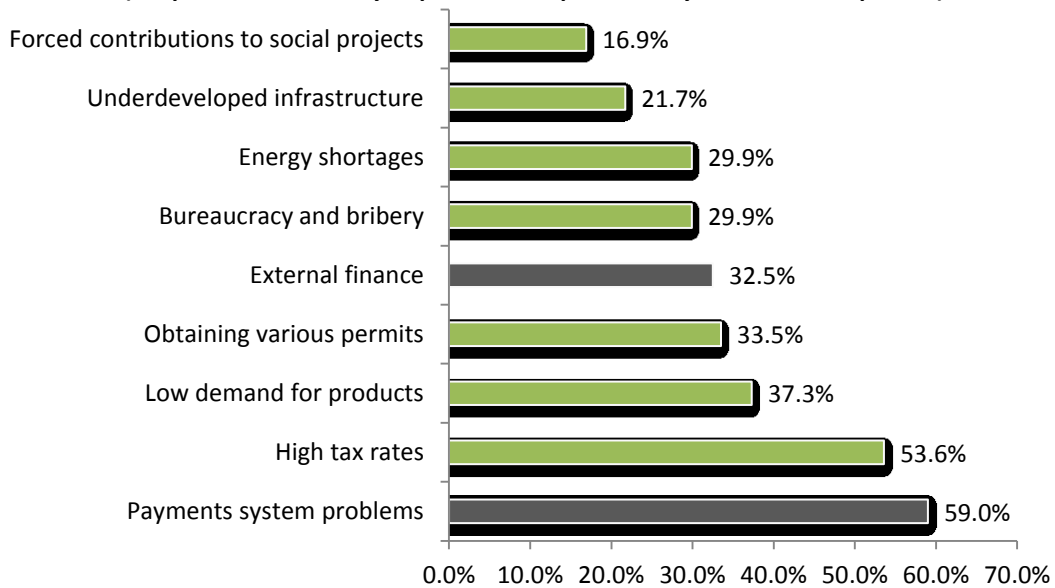
**Figure 2. EBRD's Banking Sector Reform and Enterprise Restructuring Indices for TEs in 2010.**



**Figure 3. Selected Financial Sector Indicators in Uzbekistan.**

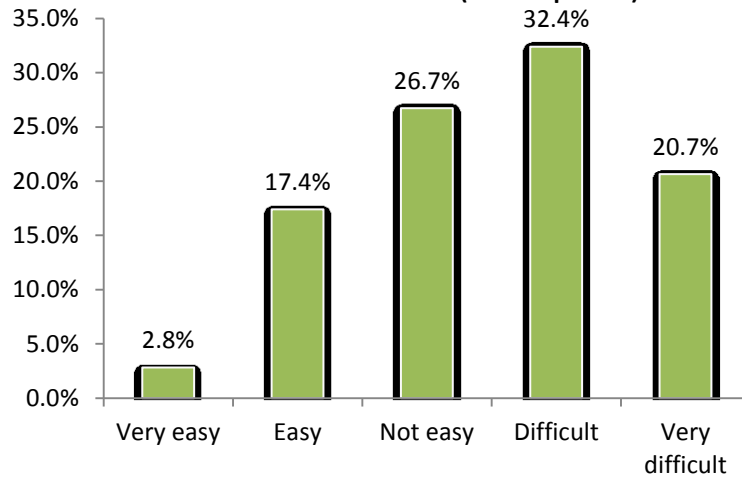


**Figure 4. Major Obstacles to Enterprises' Operation and Growth ("Important" and "Very Important" Responses Only out of 502 Responses).**

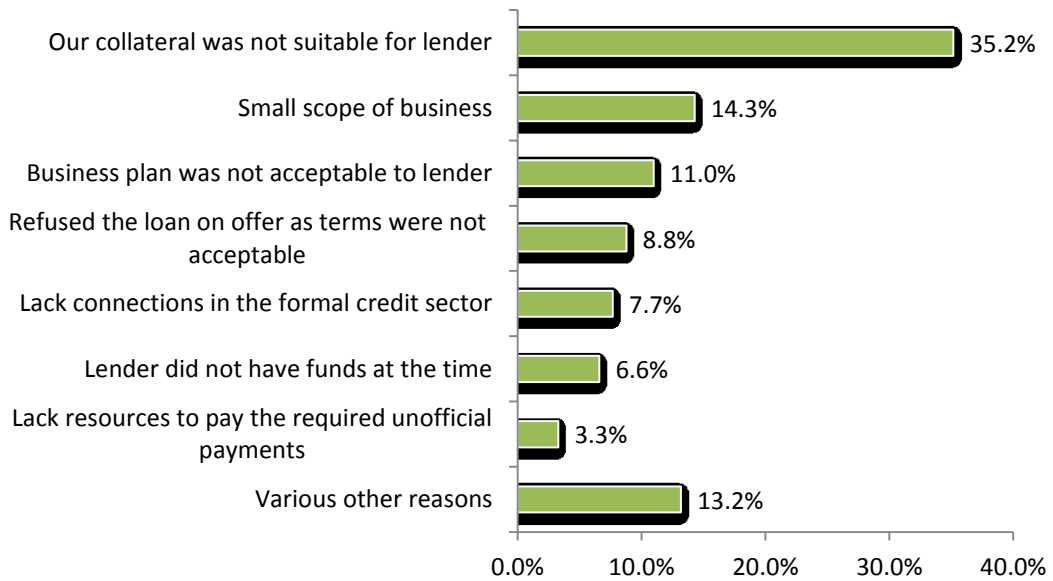




**Figure 5. Enterprises' Subjective Evaluation of Their Access to Bank Credit (460 Responses).**



**Figure 6. Main Reasons for Rejection of Application (99 responses, multiple responses possible).**



## **APPENDICES:**

### **Appendix 1**

#### **Data Source and Construction**

Table A1 shows how per capita output varies in the fourteen administrative regions in Uzbekistan. The city of Tashkent is the most prosperous administrative region, with per capita output more than two and a half times higher than the national average; the only other region that enjoys similar levels of prosperity is Navoiy, with its concentration of the country's largest gold mining corporations.

#### **<Table A1>**

To capture any possible differences in business environments which may influence enterprises' access to and use of formal finance, the primary data sample of 502 SMEs is drawn from the core capital city region (301 observations) and two other regions, the Tashkent region (101 observations) and the Ferghana region (100 observations). Self-employed private entrepreneurs, enterprises providing financial services, and enterprises with more than 100 employees were excluded from the sample.

Use of the State Register of Enterprises and Organisations as a sampling source was impractical because of the infrequency of its updating, so it was impossible to ascertain whether some of the listed enterprises had moved premises or had gone out of business. Instead, the sample was drawn from local business directories, using a stratified random sampling approach. To obtain representative samples from each sector of the economy we chose 40% of the observations from the manufacturing and construction sectors, 30% from the services sector, 20% from the trade sector, and 10% from the agricultural sector. Agriculture was accorded a lower weighting because production quotas, price controls, and subsidised credits are still common in the sector, and it remains one of the least reformed parts of the economy (Lerman, 2008). The survey questionnaire

was piloted in November 2010 and, after making appropriate modifications, the full survey was carried out in December 2010 using face-to-face interviews, with 20% of the respondents contacted by telephone later on for quality control purposes.

## **Appendix 2**

### **Bribe Models**

Table A2 shows the results of models estimating the probability of offering bribe for the full sample (Model 4) and a sub-sample conditional upon applying for formal credit (Model 5). Focussing on Model 5, coefficients of the variables *age*, *age22*, *educ*, *cash1*, and *expnd\_d* are all statistically significant. As for the interpretation of the signs of these variables, the results imply that: youngest and oldest SME owners, better educated SME owners, and SMEs facing payments system problems are more likely to bribe the officials; and the probability of offering bribe falls as sales revenues (*expnd\_d*) increases. These, combined with the fact that, although insignificant, *lnsales* also has a negative sign, imply that firm size and superior firm characteristics reduce probability of offering bribe to public officials. Further, with respect to *cash1*, it is more practical for larger SMEs to effect most of their input and wage payments, and also get paid for their outputs, through their bank accounts. In other words, since it is the smaller SMEs which face payments problems the most, the observed positive sign of *cash1* re-enforces our conclusion about the importance of firm size. Hence, these results shed further light as to why the bribe variable might be insignificant in our main estimations (although this does not seem to deter the sampled SMEs from enthusiastically applying for formal credit as evidenced by the statistical significance of *bribe* in the credit application model as shown in Model 6 in Table A2).

**<Table A2 >**

## **Appendix 3**

### **Models for Business Expansion**

Results of the models for business expansion are reported in Table A3 below. In Model 7 and Model 8, the dependent variable takes the value of 1 if SMEs expressed a need for external finance, which is used here as a proxy for enterprises' growth potential, and 0 otherwise: Model 7 uses all available observations, while Model 8 uses observations conditional upon SMEs undertaking business expansion since their inception. The dependent variable in Model 9 takes the value of 1 if SMEs undertook investment in business expansion since their inception, 0 otherwise. Of the three proxies for interpersonal connections, only the coefficient of *bzinbrpl* is statistically significant in all three models. The main target variable *gov\_connect* has the expected positive sign in all three models, but is not statistically significant in any of them.

<Table A3>

#### Appendix 4

##### Further Checks for Model Specification and Robustness of the Results

An alternative approach for dealing with the self-selection issue, particularly when conditional sub-samples cannot be drawn, is to use more sophisticated maximum likelihood estimators such as the Heckman-type probit model. This estimates the credit use and credit application equations jointly, also assuming the joint normality of their error terms and non-zero correlation ( $\rho$ ) between them (Cavaluzzo *et al.* 2002; Cavaluzzo and Cavaluzzo, 1998). If the latter condition is not satisfied, i.e.  $\rho=0$ , the results from general models are considered unbiased and consistent (Wooldridge, 2002). However, estimation of this model requires identification of a variable which affects the probability of credit application in the selection model, but does not belong to the main of model credit use in its own right. Unfortunately the choice of instruments available for this variable in our dataset is limited. The most promising variable is the response to the question about '*low demand for products*', which could be interpreted as a measure of overconfidence (or risk aversion): we conjecture that, due to asymmetric information problems, banks' knowledge of the actual nature of market demand for enterprises' products is always less than that of the borrowers. Since most enterprises suffering from low demand for their products will select themselves out from applying

for formal credit, enterprises that suffer more from low demand for their products but still apply for formal credit can be described as overconfident if they are unconcerned about the possibility that banks may find this out. For example, 187 enterprises in the sample complained of low demand for their products being 'important' or 'very important' problem, but 54 of these still applied for formal credit. Although the smaller proportion of these SMEs applied for formal credit (29% compared to 42% of the counterpart group), more than half of them were not detected by banks. Hence the variable, coded 1 if enterprises reported this factor as an 'important' or 'very important' obstacle to the operation and growth of their businesses, and 0 otherwise was included in the credit application part of the model. The results of the model, which are reported in Table A4.1 show that the coefficient of the target variable *gov\_connect* and that of *bzinbrpl* are statistically significant at 5% level. Although the instrumental variable in the selection equation is statistically significant at around 2%, and the null hypothesis of 'no systematic difference between the coefficients of general and Heckman models' (the Hausman test) is also rejected at less than 1% level of significance, the correlation coefficient between the error terms of the main and selection equations is statistically significant only at 13%. Nevertheless, the results from the Heckman model are not fundamentally different from those obtained using univariate models. For example, once converted into logit coefficient using rough guides, e.g.  $0.54 \times 1.6 = 0.86$  (from which an odds ratio of 2.37 can also be derived), the estimated magnitude of the *gov\_connect* coefficient is also comparable to those obtained in logit models in Table 4 in the main text. Incidentally, this observation is in line with the findings of Cavalluzzo *et al.* (2002) and Muravyev *et al.* (2009) who, despite having a somewhat richer dataset, did not find fundamentally different results in their estimations of Heckman-type models. The findings, however, are not suggestive of the absence of selection problems as the similarity of the estimates with and without selection correction may also be the result of statistical problems (Kennedy, 2003, p.291; Wooldridge, 2006, pp. 609-11) and/or because the instrument of our choice is not strong enough.

**<Table A4.1>**

The missing variable problem is another issue which may affect results, particularly differences in the creditworthiness of enterprises, including detailed data on entrepreneurs' personal wealth. Banks usually require carefully drafted business plans and feasibility studies from SMEs when considering their loan applications, along with historic financial performance indicators. They also consider the personal wealth of business owners which can be drawn upon should the company finances deteriorate significantly. Variables already included, such as owner age, business experience and education will capture at least some of the features of creditworthiness, personal wealth, and entrepreneurial drive and skill. But, incomplete characterisation of these factors may still have potential impact on our results. There is also a possible measurement error with the gender term, which is statistically insignificant and has a counter-intuitive positive sign in Models 1, 2, and 3. Some studies investigating gender discrimination in SME finance such as Cavaluzzo *et al.* (2002) and Muravyev *et al.* (2009, see also Blanchard *et al.*, 2008) show that Models 2 and 3 can deal with negative discrimination and positive selection effects with respect to the gender term by providing the upper and lower bounds of gender discrimination, which both papers find to be negative and statistically significant in relation to the US and International SME finance data respectively. In our view, the gender term may be insignificant in our estimation due to a lack of credibility of bureaucratic institutions in protecting private property rights. Because of a fear of possible misappropriation, Uzbek businessmen are known to commonly register titles of their high value properties such houses, cars, and sometimes even their businesses, in the name of their close relatives, these often being female. Hence, the insignificance of the gender term may not necessarily indicate absence of gender discrimination as the sample of female SME owners used in this study may not be fully representative of the female entrepreneurs in the SME population.

Consequently, the approach proposed by Blanchflower *et al.* (2003) and Muravyev *et al.* (2009) of carrying out several further regression estimations on various sub-samples is used. First, the sample is divided according to enterprise size and age, respectively. Larger and more established enterprises are likely to rely on businesses' rather than owners' resources to repay obligations. In

terms of enterprise size, two sub-samples are identified; SMEs with less than 10 employees and those with more than 10 employees, respectively. As for SME age, the first sub-sample includes SMEs established less than four years ago, with the rest of the available observations in the second sub-sample. Second, the dataset contains a variable which measures respondents' subjective evaluation of their access to bank credit from 1 to 5: 1 being very easy and 5 very difficult. Since wealthier business owners are less likely to be constrained by lack of external finance, they are also less likely to complain about access to bank credit. Therefore, again the data is split into two sub-samples: the first sub-sample contains SMEs with 'very easy' and 'easy' responses, and the second contains the rest.

The estimation results from these sub-samples are reported in Table A4.2. Models 1, 2, and 3 in Table A4.2 are identical to those reported in Table 4 in the main text; for brevity, only results of the main target variable *gov\_connect*, are reported. This shows that the sign of the government connections variable is correctly predicted in all estimations. The magnitudes of the coefficients are not radically different in most of the estimations, with the exception of Model 2 in Panel A and Panel C. It is possible that some of the observed differences might also be due unintentional loss of observations because of missing data, especially in relation to Models 2 and 3 which already use restricted number of observations conditional, respectively, upon application for credit, and expressing the need for credit. In general, parameter estimates of the sub-samples for larger, longer-established, and wealthier enterprises appear to be greater.

**<Table A4.2>**

## **Appendix 5**

### **Sensitivity of Marginal Effects of Main Target Variables**

Table A5.1 presents marginal effects of our two key target variables, *gov\_connect* and *bzinbrpl*, using Marginal Effects at Means (MEMs) and Average Marginal Effects (AMEs) methods. Given relative consistency of our results across various models, the model we choose here is the

probability of holding formal credit conditional upon expressing need for external finance (Model 3). Using the MEMs method, the results show that for an "average" SME with government connections, the probability of obtaining formal credit is 18% higher than that for a similar SME with no government connections. And, for an "average" SME that operates at its owner's birthplace, the probability of obtaining formal credit is 21% higher. But, the drawback of the MEMs approach is that while there *can* be an SME surviving in business for 7.86 years, and whose owner is 42.09 years old, there can be no SME with *gov\_connect* at 0.25 (figures are the mean values of these variables respectively). This issue can be dealt with by using the AMEs approach which uses the actual observed values for the dummy variables for the entire sample when computing a predicted probability for each observation, and then averages the predicted values. The method in effect compares two hypothetical populations which have the same values on the other independent variables in the model (Williams, 2012, p.323). As can be seen from the fourth column of Table A5.1, the AME methods produces results which are only marginally different from those reported using the MEM approach in the second column of Table A5.1.

**<Table A5.1>**

But, since all the data, not just the means, are used in the calculation of marginal effects, even the AMEs is not free from criticism (Cameron and Trivedi, 2010). So, to complement the shortcomings of the MEMs and AMEs methods, we also check the sensitivity of our main results using representative values of two key covariates, i.e. *lnsales* (proxy for SME size) and *cash1* (proxy for cash/payment system problems). These results are reported in Tables A5.2 and A5.3. The results from Table A5.2 indicate how much the marginal impact of *gov\_connect* and *binplbr* on holding formal credit changes when the values of *lnsales* move one standard deviation (s.d.) from its mean value. Results show that magnitude of marginal effects of both variables increases as the values of *lnsales* go up, confirming our earlier observation that the importance of interpersonal connections strengthens as the size of the SMEs increases. In other words, interpersonal connections become increasingly important as the enterprise size gets larger. Table A5.3 adds another piece of useful



information to this analysis. It shows that payment system problems (*cash1=1*) are less important for larger SMEs. For example, as can be seen from Column 6 in Panel I of Table A5.3, if an SME with government connections that is minus 1 s.d. from the mean *lnsales* value, is facing payments system (cash) issues, this will reduce the importance of having government connectedness by 5%. However, for an SME with similar attributes, but with plus 1 s.d. from the mean *lnsales* value, this difference is only 1%. And a similar trend is observed for *bzinplbr*, which can be seen in Panel II of Table A5.3. These results also indicate that, given payment system problems, interpersonal connections become increasingly important as the size of SMEs increases.

**<Tables A5.2 and A5.3>**

## APPENDIX TABLES:

### APPENDIX 1

**Table A1. Distribution of National Output Across Regions in Uzbekistan, 2010.**

	Annual Output, Billion <i>Soums</i>	Population, Million (2009)	Output per Capita, Thousand <i>Soums</i>
Karakalpakstan	1389.8	1.62	856.26
Namangan	2426.6	2.24	1084.22
Surkhandarya	2229.3	2.05	1085.13
Samarkand	3813.1	3.09	1233.73
Djizhak	1389.1	1.11	1253.93
Khorezm	1944.1	1.55	1257.34
Ferghana	4095.5	3.05	1343.36
Syrdarya	1008.3	0.71	1423.35
Andizhan	3679.6	2.52	1457.50
Kashkadarya	4865.1	2.59	1878.71
Bukhara	3376.0	1.60	2109.08
Tashkent Region	5571.1	2.57	2168.76
Navoiy	3276.6	0.85	3876.26
City of Tashkent	9820.1	2.22	4422.07
Uzbekistan	48884.3	27.77	1760.51

Source: Statistical Review of the Republic of Uzbekistan (2010)

## APPENDIX 2

**Table A2. Probability of Offering Bribe and Applying for Formal Finance  
(Logit Coefficients with Standard Errors)**

<i>Predictors</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>
<i>Constant</i>	1.48 (2.26)	7.63 (4.7)	- 7.37*** (2.50)
<i>Age</i>	- 0.09 (0.08)	- 0.36* (0.19)	0.20** (0.09)
<i>age22</i>	0.08 (0.09)	0.40* (0.22)	- 0.25** (0.11)
<i>business_exper</i>	0.002 (0.03)	0.01 (0.05)	0.04 (0.03)
<i>business_exper22</i>	0.008 (0.04)	0.01 (0.08)	- 0.07 (0.04)
<i>Educ</i>	0.05 (0.05)	0.12** (0.07)	- 0.05 (0.04)
<i>Insales</i>	- 0.02 (0.08)	- 0.13 (0.14)	0.16** (0.08)
<i>expnd_d</i>	- 0.37 (0.25)	- 0.93** (0.45)	0.88*** (0.28)
<i>cash1</i>	0.56** (0.27)	1.19*** (0.45)	- 0.07 (0.28)
<i>gender</i>	0.39 (0.34)	0.72 (0.56)	0.27 (0.35)
<i>tash_obl</i>	- 0.05 (0.33)	0.03 (0.53)	0.01 (0.34)
<i>fergh</i>	- 1.46*** (0.40)	- 0.73 (0.64)	- 0.78** (0.39)
<i>agri</i>	0.28 (0.47)	-0.46 (0.71)	0.22 (0.45)
<i>srvs</i>	- 0.18 (0.36)	0.19 (0.68)	- 0.94*** (0.38)
<i>trd</i>	- 0.49 (0.41)	- 0.81 (0.61)	0.36 (0.39)
<i>gov_connect</i>	0.01 (0.31)	- 0.28 (0.48)	0.61** (0.30)
<i>Bribe</i>	-	-	0.61** (0.27)
<i>bzinbrpl</i>	- 0.17 (0.30)	0.03 (0.53)	0.53* (0.32)
<b>Overall Model Evaluation and Tests</b>			
	$\chi^2$ (d.f.)	$\chi^2$ (d.f.)	$\chi^2$ (d.f.)
Log-likelihood value	- 199.65	-80.40	-197.78
Likelihood ratio test	33.97***	24.78***	53.80***
Pseudo R squared	0.08	0.13	0.12
Hosmer and Lemeshow Goodness-of-fit test	3.12 (8)	7.78 (8)	5.14 (8)
Correctly predicted	67.80%	68.38%	68.07%
Number of Observations	332	136	332

Notes: Models estimated using Stata 11; coefficient standard errors are reported in brackets; \*\*\* refers to significant at 1%, \*\* significant at 5%, and \* significant at 10% levels respectively. In Models 4 and 5, the dependant variable takes the value of 1 if SME senior manager ever offered bribe to government officials to get things done, 0 otherwise; Model 5 includes observations conditional upon applying for credit only. In Model 6, the dependant variable takes the value 1 is SMEs applied for formal finance, 0 otherwise.

APPENDIX 3

Table A3. Probability of Undertaking Business Expansion and Needing Formal Finance  
(Logit Coefficients with Standard Errors)

Predictors	Model 7	Model 8	Model 9
<i>Constant</i>	- 2.73 (2.22)	- 1.98 (2.75)	- 6.40 (2.51)
<i>Age</i>	0.13 (0.08)	0.11 (0.10)	0.08 (0.09)
<i>age22</i>	- 0.15 (0.09)	-0.14 (0.11)	- 0.08 (0.09)
<i>business_exper</i>	0.02 (0.03)	0.01 (0.04)	0.04 (0.05)
<i>business_exper22</i>	- 0.08 (0.06)	- 0.10 (0.09)	- 0.04 (0.05)
<i>Educ</i>	- 0.01 (0.04)	0.01 (0.05)	0.01 (0.05)
<i>Insales</i>	0.01 (0.08)	- 0.02 (0.10)	0.24*** (0.10)
<i>expnd_d</i>	- 0.31 (0.25)	- 0.56* (0.31)	0.41 (0.29)
<i>cash1</i>	0.46* (0.26)	0.40 (0.33)	0.45 (0.30)
<i>gender</i>	0.20 (0.32)	0.47 (0.40)	- 0.06 (0.37)
<i>invstd</i>	0.48* (0.28)	- -	- -
<i>tash_obl</i>	- 0.65** (0.33)	- 0.50 (0.39)	1.02** (0.42)
<i>fergh</i>	0.19 (0.36)	0.57 (0.46)	0.40 (0.40)
<i>Agri</i>	- 0.28 (0.44)	- 0.18 (0.53)	- 0.42 (0.51)
<i>srvs</i>	- 0.64* (0.35)	- 0.87 (0.42)	0.10 (0.39)
<i>trd</i>	0.07 (0.39)	- 0.19 (0.51)	- 0.82** (0.41)
<i>gov_connect</i>	0.14 (0.29)	0.21 (0.35)	0.31 (0.35)
<i>bribe</i>	0.25 (0.26)	0.40 (0.31)	0.48 (0.30)
<i>bzinbrpl</i>	0.56* (0.30)	0.88** (0.37)	0.64* (0.35)
<b>Overall Model Evaluation and Tests</b>			
Log-likelihood value	$\chi^2$ (d.f.) -211.80	$\chi^2$ (d.f.) -147.32	$\chi^2$ (d.f.) - 172.75
Likelihood ratio test	35.44(18)***	38.77(17)***	40.51(17)***
Pseudo R squared	0.08	0.12	0.11
Hosmer and Lemeshow Goodness-of-fit test	6.45 (8)	5.54 (8)	3.97 (8)
Correctly predicted	62.35%	64.61%	73.49%
Number of Observations	332	243	332

Notes: Models estimated using Stata 11; coefficient standard errors are reported in brackets; \*\*\* refers to significant at 1%, \*\* significant at 5%, and \* significant at 10% levels respectively. In Models 7 and 8, the dependant variable takes the value of 1 if SMEs express need for external finance, 0 otherwise; Model 7 includes all of the available observations in the sample; Model 8 uses only observations if SMEs undertook business expansion. In Model 9, the dependant variable takes the value 1 is SMEs invested in business expansion, 0 otherwise.

APPENDIX 4

**Table A4.1. Credit Use: Probability of Holding a Formal Credit (Heckprobit Coefficients with Standard Errors)**

<i>Predictors</i>	<i>Main Model: Credit Use</i>	<i>Selection Model: Credit Application</i>
<i>Constant</i>	- 6.21*** (2.26)	- 4.23*** (1.48)
<i>Age</i>	0.15* (0.09)	0.13** (0.06)
<i>age22</i>	- 0.17* (0.11)	- 0.15** (0.07)
<i>business_exper</i>	0.04* (0.02)	0.03* (0.02)
<i>business_exper22</i>	- 0.07* (0.04)	- 0.05* (0.03)
<i>Educ</i>	- 0.04 (0.04)	- 0.02 (0.03)
<i>Insales</i>	0.13* (0.07)	0.08* (0.05)
<i>expnd_d</i>	0.48** (0.23)	0.49*** (0.17)
<i>cash1</i>	- 0.52** (0.26)	- 0.05 (0.17)
<i>gender</i>	0.18 (0.27)	0.17 (0.21)
<i>tash_obl</i>	0.47 (0.30)	0.08 (0.21)
<i>fergh</i>	0.07 (0.36)	- 0.36 (0.24)
<i>Agri</i>	- 0.74* (0.45)	- 0.02 (0.28)
<i>svvs</i>	- 0.73** (0.32)	- 0.54** (0.23)
<i>trd</i>	0.14 (0.29)	0.17 (0.24)
<i>gov_connect</i>	0.54** (0.24)	0.36* (0.18)
<i>bribe</i>	0.18 (0.22)	0.39*** (0.16)
<i>bzinbrpl</i>	0.52* (0.26)	0.33** (0.20)
<i>lw_dmd_dum</i>	-	- 0.36** (0.15)
Likelihood ratio test of the independence of equations ( $\rho=0$ )		$\chi^2$ (d.f.) 2.68 (1)
Heckman test for the absence of systematic difference between the coefficients of univariate and bivariate models		62.63 (17)***
<b>Overall Model Evaluation and Tests</b>		$\chi^2$ (d.f.)
Log-likelihood value		-269.52
Likelihood ratio test		35.05 (17)***
Number of Observations		331

Notes: Models estimated using Stata 11; coefficient standard errors are reported in brackets; \*\*\* refers to significant at 1%, \*\* significant at 5%, and \* significant at 10% levels respectively.

**Table A4.2. Probability of Holding Formal Credit: Estimation Results from Sub-samples**

	Model 1		Model 2		Model 3	
<b>Panel A. Enterprise size sub-samples</b>						
	More than 10 employees	Less than 10 employees	More than 10 employees	Less than 10 employees	More than 10 employees	Less than 10 employees
<i>gov_connect</i>	0.996* (0.573)	0.543 (0.551)	0.064 (0.951)	1.570 (0.989)	0.835 (0.747)	0.615 (0.735)
N. Obs.	135	196	67	68	72	92
<b>Panel B. Enterprise age sub-samples</b>						
	5 years or above	4 years or under	5 years or above	4 years or under	5 years or above	4 years or under
<i>gov_connect</i>	1.243*** (0.502)	1.061 (0.667)	1.096 (0.705)	0.932 (1.171)	1.205** (0.622)	0.808 (0.953)
N. Obs.	182	149	53	82	97	78
<b>Panel C. Access to financing sub-samples</b>						
	Access Easy	Access Difficult	Access Easy	Access Difficult	Access Easy	Access Difficult
<i>gov_connect</i>	1.000 (0.878)	0.562 (0.468)	-	0.765 (0.631)	1.371 (1.330)	0.496 (0.548)
N. Obs.	64	244	16	94	34	141

Notes: Models 1, 2, and 3 are identical to those reported in Table 4 in the main text; for brevity, only the results of the target variable, government connections, are reported. Panel A reports the estimates from sub-samples split on the basis of enterprise size, Panel B from sub-samples split on the basis of enterprise age. For Panel C, the sample is split on the basis of enterprises' subjective evaluation of their access to formal finance. No result is reported for Model 2 in Panel C under 'Access Easy' due to low number of observations.

\*\*\* refers to significant at 1%, \*\* significant at 5%, and \* significant at 10% levels respectively.

## Appendix 5

**Table A5.1. Marginal Effects of *Gov\_connect* and *Bzinbrpl* using Marginal Effects at Means (MEMs) and Average Marginal Effects Methods.**

	MEMs		AMEs	
	<i>Marginal Effects</i>	<i>p-value</i>	<i>Marginal Effects</i>	<i>p-value</i>
<i>Gov_connect</i>	0.18	0.07	0.15	0.06
<i>Bzinbrpl</i>	0.21	0.00	0.20	0.00

**Table A5.2. Marginal Effects of *Gov\_connect* and *Bzinbrpl* Given Representative Values of *Lnsales*.**

Representative Values of <i>Lnsales</i> :	<i>Gov_connect</i>		<i>Bzinbrpl</i>	
	<i>Marginal Effects</i>	<i>p-value</i>	<i>Marginal Effects</i>	<i>p-value</i>
<i>Minus 1 s.d. from the mean</i>	0.13	0.07	0.16	0.01
<i>Mean</i>	0.16	0.06	0.20	0.00
<i>Plus 1 s.d. from the mean</i>	0.17	0.05	0.24	0.01

**Table A5.3. Marginal Effects of *Gov\_connect* and *Bzinbrpl* Given Representative Values of *Lnsales* and *Cash1* Variables.**

Panel I. <i>Gov_connect</i>					
Representative Values of <i>Lnsales</i> :	<i>Cash1 = 1</i>		<i>Cash1 = 0</i>		Difference between the two M.E.s
	<i>Marginal Effects</i>	<i>p-value</i>	<i>Marginal Effects</i>	<i>p-value</i>	
<i>Minus 1 s.d. from the mean</i>	0.12	0.09	0.17	0.06	0.05
<i>Mean</i>	0.15	0.07	0.18	0.05	0.03
<i>Plus 1 s.d. from the mean</i>	0.17	0.06	0.18	0.04	0.01
Panel II. <i>Bzinbrpl</i>					
Representative Values of <i>Lnsales</i> :	<i>Cash1=1</i>		<i>Cash1=0</i>		Difference between the two M.E.s
	<i>Marginal Effects</i>	<i>p-value</i>	<i>Marginal Effects</i>	<i>p-value</i>	
<i>Minus 1 s.d. from the mean</i>	0.13	0.01	0.23	0.01	0.10
<i>Mean</i>	0.18	0.00	0.27	0.01	0.09
<i>Plus 1 s.d. from the mean</i>	0.22	0.00	0.29	0.01	0.07

