

Firms, Kinship and Economic Growth in Kyrgyz Republic

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Abstract

Private sector development and the entrepreneurial activity that drives it are central to economic growth. In Central Asia, there is a broad consensus that kin ties are important in shaping and/or providing an alternative to formal institutions designed to support the private sector. In this research, we ask whether kinship networks help promote entrepreneurship or impede its development. We conducted a survey of firm managers/entrepreneurs about the nature of their family and friendship networks, what kinds of business and non-business resources they receive from and provide to their various contacts, their firms' performance, and the business environment they face. Our data indicate that firms' profitability is positively associated with in-network use and negatively associated with out-network use. While firms that rely more heavily on kin in their business networks grow more slowly than firms that rely less heavily on kin, they grow faster than firms that do not access business networks for help at all. Incorporating the role of kinship or even, possibly, leveraging kin-ties could improve policy design.

I. Introduction

Traditional institutions, such as clan or tribal structures, govern access to resources on a relational basis. They persist--and can even thrive--in modern states. While these institutions perform important economic and non-economic functions, their rigidity can result in resource misallocation and inefficiency. Hoff and Sen (2006) and Platteau (2009) argue that kinship ties can constitute a poverty trap. In contrast, Ismailbekova (2017) challenges the view that kinship ties have impeded modernization. Therefore, understanding the nature of collective responsibility and joint agency imposed by traditional institutions is key to designing effective policies to foster economic growth (Fafchamps 2016). We aim to further this understanding by investigating

whether and how kinship networks promote or hinder entrepreneurship in Kyrgyz Republic. Specifically, we examine how entrepreneurs' use of kin in business relates to various measures of firm performance, such as profitability and revenue growth.

The pioneering work of Fafchamps (2004) and Platteau (2000) has helped economists understand how kinship and other social ties influence economic growth and market development. On the one hand, kinship networks can solve information and enforcement problems when market institutions are weak (Greif 1993). Kin relations can also provide access to asset equity, working capital, or credit, manage disputes among customers, suppliers, laborers, or credit-givers, and coordinate collective action (Munshi 2011). On the other hand, kin-ties can foster kin-based favoritism, increase market segmentation, dampen incentives to innovate, or make enforcement of transactions more difficult due to forced redistribution or solidarity (Platteau 2000, Grimm et al 2013). Redistributive pressures exerted by kinship networks have been shown to limit private initiative and growth in Sub-Saharan Africa (Baland et al 2011, Grimm et al. 2013, Platteau 2000).

According to the Inglehart-Welzel Cultural Map (based on the 6th Wave of the World Values Survey), the Kyrgyz Republic ranks in the African-Islamic grouping, which is characterized by more traditional and more survival-based values, although it is one of the least extreme points in this group (Welzel 2013). With respect to the business environment and market development, the Kyrgyz Republic earns a global ranking of 70 on the 2019 Doing Business Ease of Doing Business Index, a worse score than Kenya (but ahead of most Sub-Saharan African countries), although it has a slightly higher level of GDP p.c. PPP (World Bank 2019). Therefore, the “intrafamilial implicit contract” (Ben-Porath 1980, Stark and Lucas 1988, Grimard 1997) may, in general, operate differently in Central Asia than in Sub-Saharan Africa,

making Kyrgyzstan an intermediate case of sorts. Since much of the current literature focuses on East and Southeast Asia and Africa, our research fills a gap in the literature by contributing quantitative evidence on the relationship between traditional structures and economic growth in an understudied region of the world.

In addition to its intermediate position in terms of traditional values and market development, the Kyrgyz Republic is also an interesting laboratory to investigate the interaction between kinship and business for two reasons. First, the importance of kin is embedded in and reinforced by a clan structure. Aldashev and Guirkinger (2019) show that access to resources through clan ties leads to persistence in inequality over generations. Surprisingly, this relationship persists despite the modernization efforts of the Soviet Union, which specifically tried to dismantle this traditional institution. Second, the extent of misallocation in the Kyrgyz Republic appears to be large, speaking to the need to better understand how resources are distributed across firms.

Figure 1 shows the empirical distribution of revenue-based total factor productivity (TFPR) for the firms in our survey (described below), calculated following the methods in Klenow and Hsieh (2009). The variance in TFPR (on the basis of industry-specific US capital and labor shares) is a measure of misallocation. A wide distribution means that firms are behaving as if they are facing very different factor prices. For comparison, the left tail of the distribution for the US thins dramatically between $\frac{1}{2}$ and $\frac{1}{4}$, whereas there is still sizeable mass of firms to the left of $\frac{1}{8}$ for the Kyrgyz Republic. Klenow and Hsieh (2009) focus on the standard deviation of this distribution. In 2005, for the US this number is 0.49, for India it is 0.67, and for the Kyrgyz Republic it is 0.93.

When resources are allocated via blood ties rather than through the anonymity of market exchange, we would expect to see misallocation. Figure 2 plots separately the distribution of TFPR for firms that are above and below the median in reliance on kin ties for business. Indeed, those firms that rely on kin ties more pull the distribution to the left. Both types of firms, however, contribute to the fat tails of the distribution. These figures suggest that kinship matters for businesses in the Kyrgyz Republic.

To explore this relationship in a rigorous and quantitative way, we conducted a survey of 1000 firms in Bishkek, the capital city located in the north, and Osh, the major city in southern Kyrgyz Republic. Importantly, we measure both in- and out-networks for specific types of business help and ascertain how each member of the respondent's network or provided or received assistance is related to the respondent. Thus, we can assess the relative importance of extended family and clan vis-à-vis the nuclear family. While it is generally understood that family matters for businesses across the world, our results quantify the relative importance of kin ties and disentangle the relative benefits of using the ties and the costs of being used by them in the Kyrgyz Republic.

We find that firms in-use business kin networks (i.e., those that they draw on for various forms of business-related assistance) have a positive association with profitability, while out-use business kin networks (those to whom they provide business-related assistance) have a negative association. The magnitudes of these associations are fairly large, explaining up to one third of a standard deviation in profit margin (the s.d. of profit margin is 30 percent). We also find that having a business network increases firm growth, but this increase diminishes to the extent that business networks are dominated by kin.

Turning to mechanisms, we focus on two possible channels. The first is directly through reinvestment. If firms need resources on hand to pay back help that they have received, they may not reinvest as much of profits. Similarly, if the firm is used primarily as insurance, then the firm will favor cash on hand relative to investments. We present some suggestive evidence that greater reliance on kin networks reduces the amount of profits that are reinvested, but the magnitudes do not seem large enough to explain the differential growth rates. The second potential channel is through the firm's orientation. If firms are more Western-oriented in terms of business practices, then the firm will separate preferences from production and employ kin networks only to the extent that they are productive for the firm. We find that the above effects are primarily for firms that are less Western-oriented in terms of business practices.

We perform several robustness checks, which are discussed in the main results section, the sensitivity analysis section and the appendix. First, due to the potential endogeneity of in-use and out-use network connections, we use instrumental variables estimation. Our instruments are based on the entrepreneur's number of cousins and use a similar logic as the previous literature. The magnitudes are larger and less precisely estimated but give qualitatively similar results. Second, we rerun all of our results on the subsample of firms that our survey enumerators deemed as reporting numbers truthfully. The results are quite similar. Third, we address the problem of missing data using a Heckman-type correction, and again we find qualitatively similar results.

The rest of the paper proceeds as follows. In the next section, we discuss the previous literature. In section 3, we discuss the national context of our study. Section 4 formulates the hypotheses. In section 5, we describe our survey. Section 6 presents the results. Section 7 concludes.

II. Literature review

In this section, we discuss the economics literature on kinship and business performance. We start with some papers that motivate our interest in kinship and then discuss empirical (mostly quantitative) findings on the influence of entrepreneurs' kin ties on business profitability and growth. One potential explanation for low productivity of firms in developing countries is that they rely too much on kin networks in place of market transactions. Bloom et al. (2010) argue that firms in developing countries have low productivity because they are often badly managed. A common explanation for their poor management is that they fail to delegate decision-making to outsiders and instead rely on family members. As a consequence, firm survival is linked to the survival of the family, and firms fail to exit when they are unprofitable. In addition, nepotism may arise in management decisions and further breed inefficiency. These management strategies are particularly bad for economic growth when firms also face financing constraints. Financing constraints increase the reliance of a firm on family members (to raise capital) as well as limit the ability of more productive firms to enter the market and grow. When entrepreneurs rely on family members to provide resources, whether they be loans, advice, access to suppliers or markets, or discounted labor, they may thereby incur obligations, which they must prioritize over re-investment and sound business practice in the future due to the normative power of kinship ties.

Consistent with these arguments, Nichter and Goldmark (2009) also point out that the vast majority of firms in developing countries are small, and many firms adopt survival instead of growth-oriented strategies. Small family firms that are designed to share risk across a network will also exhibit more risk averse behavior (Platteau 2000).

However, an overreliance on kin networks may be more of a symptom than a cause of low economic growth. In a review paper, Bertrand and Schoar (2006) argue that although family firms often perform worse than non-family firms, family ownership nevertheless persists. For example, when property rights enforcement is weak, Rauch (2013) argues that family firms limit the negative impact of employee spinouts (as opposed to the lack of trusting outsiders as above). Persistence could also occur because the family gives firms cheaper access to resources than the market does, by lowering transactions costs or simply because of altruistic preferences.

Of course, as Dyer Jr. (2006) and Ben Porath (1980) note, there is much variation in the nature of families, firms, and their connections, which is important for understanding relative effects of kinship on firm performance. In the context of owner-operator companies, as opposed to the larger firms that Bloom et al. have in mind, in addition to the kin-ness of business decisions, we also need to consider the role of kin ties for the household. La Ferrara (2010) and Cox and Fafchamps (2007) stress multiple ways that kin ties affect development through household decision-making.

We now turn to the various quantitative studies of the role of family in firm performance. Table 1 classifies the previous studies by type of business network connections (kin, ethnic, social or political); the kind of study (purely descriptive, cross-sectional or panel data, experimental or a meta-analysis); the size and the composition by size of the sample of firms; and the main findings. Across the board, we see mostly positive effects of networks on firm performance when the network connections are non-kin. When networks are kin-based, the effects are mostly negative.

The closest studies to ours are Grimm et al. (2017) and Berrou and Combarous (2012), both of which examine the Sub-Saharan Africa context. They find effects of kin ties, even

though each takes a different approach to measuring the kin-ness of business networks. Grimm et al. (2017) use a proxy variable approach to measure the redistributive pressure of kin by using the number of siblings a business owner has.¹ They then identify two differentiated groups of tailors, those who operate under an insurance regime and those who opt out of the social insurance scheme to focus on economic growth. For firms in the insurance regime, investment declines strongly with the pressure for redistribution. For firms in the growth regime, expected pressure from kin for redistribution does not have any effect on investment decisions. We also show a similar effect for firms in the Republic, only it is for Western-oriented firms (in terms of business practices) that we identify using cluster analysis.

The proxy variable approach is attractive because the number of siblings is determined externally to any firm owner's decisions. However, this does not imply that this measure is exogenous and the number of siblings, in particular, could be correlated with human capital investments and/or other variables that affect individual behavior that are difficult to observe but have nothing to do with the intrafamilial implicit contract.

Berrou and Combarous (2012), in contrast, measure kin ties using an innovative name-generator to map out the personal networks of entrepreneurs in Burkina Faso. They find that the strength of ties has a positive impact on matters for entrepreneurs' economic performance in the informal economy. They argue that all ties matter, but weak ties are less effective in a context of uncertainty and instability. They are not able to address the endogeneity issues that Grimm et al. (2017) are concerned about.

Our study combines the advantages of both approaches. Like Berrou and Combarous (2012), we directly measure the size of networks that entrepreneurs use for specific business

¹ Grimm et al. (2013) also measure kinship ties using proxy variables, the share of the population from the same ethnic group and the share of the population from the same birth region. Gupta et al. (2017) take a similar approach for measuring what they call community networks.

purposes, so we directly capture our variable of interest. And like Grimm et al. 2017, we accept that these explicit links may not be exogenous and may reflect personal characteristics of or unobservable shocks to the entrepreneur. To remedy this, we employ fixed effects and instrumental variables estimation.

Another common finding in this literature that we are able to assess is the potential nonlinearity of the relationship of kin ties to firm performance (Anderson and Reeb 2003, Kowalewski et al. 2010). This potential nonlinearity comes in two forms. First, it may be that low levels of kin involvement have a positive effect on firm performance, but higher levels turn this effect negative. Second, having kin ties at the initial stages of a firm's lifecycle may have a positive effect while more extended involvement in later phases negatively affect firm growth.

As we have noted, the literature suggests that family networks may differ in their impact from non-family networks. Fafchamps and Minten (2002) find that relationships with other traders and with potential lenders both raise productivity, but family relationships, in contrast, appear to reduce it. Using World Bank Enterprise Surveys, Gassie-Falzone (2016) finds that family members in ownership/management are an obstacle in Albania. Acquah (2012) shows that for large firms in Ghana, nonfamily firms outperform family firms because non-family firms are more attractive to politicians because it is easier for politicians to influence these firms and political connections are valuable. For Thailand, Bertrand et al. (2008) focus on the nuclear family structure, much like Grimm et al. (2017), and show that firms run by families with more sons perform worse. For South Korea, Miller et al. (2009) report that there is no difference between family and non-family network connections. In contrast to these negative or null effects, Khayesi et al. (2014) find for small and medium firms in Uganda that kin networks lower the cost of access to resources.

Despite the negative effects (on average) of family networks, Table 1 shows that there are many studies that show other networks, political, social, and ethnic, have positive effects on firm performance. In their classic study on agricultural traders in Madagascar, Fafchamps and Minten (1998) document how personal relationships matter quite a bit, but many of the important connections are not kin-based. In particular, Fafchamps and Quinn (2013) exogenously induce network connections among business owners and find a positive impact of these connections across a variety of firm performance measures. Therefore, understanding why business networks in the Kyrgyz Republic are primarily kin-based is a crucial policy issue.

III. Context

Formerly one of the fifteen republics of the USSR, the Kyrgyz Republic became an independent country for the first time in its history when the Soviet Union collapsed at the end of 1991. As in other former Soviet republics, the demise of Soviet economic and political institutions (which heavily subsidized large enterprises) and the severing of Communist-era trade links led to market reforms and a steep macroeconomic contraction that lasted until the end of the 1990s. Positive growth resumed in the 2000s, though the economy was hit by recessions in connection with global and regional developments in 2008 and 2014. The country lost a considerable portion of its human capital stock due to the emigration to Russia of many of its ethnic Russian citizens during the 1990s. Since the 2000s, it has experienced massive labor migration, primarily to Russia, and relies heavily on migrant remittances. It experienced violent political conflicts associated with the overthrow of the first post-Soviet president, Askar Akaev, in 2005, of his successor, Kurmanbek Bakiyev, in 2010, and inter-ethnic strife pitting the minority Uzbek population against the majority Kyrgyz, particularly in regions in the south of the country, in the wake of Bakiyev's ouster. Its population is currently about 6.3 million.

Private businesses in Kyrgyzstan face a number of challenges that are common to post-Soviet (“transition”) economies: weak rule of law and poor protection of property rights, endemic political and economic crises, lack of a traditional entrepreneurial culture and institutions due to Soviet-era restrictions, rampant predatory, rent-seeking behavior on the part of government officials, including collusion between officials and insider beneficiaries of property redistribution after the Soviet collapse, high labor turnover, and lack of access to credit through formal lending institutions (Spector 2008, 2018; Yalcin and Kapu 2008; Radnitz 2010; Aziz et al. 2013; Botoeva and Spector 2013; Spector and Botoeva 2017). Ozcan (2008) describes the unfavorable business environment in post-Soviet Kyrgyzstan, marked by massive uncertainty due to official corruption and poorly defined property rights, Soviet-era rigidities in infrastructure, disinvestment and low effective domestic demand, and political turmoil. Possibly as a response, Yalcin and Kapu (2008) observe that many businesses have a single owner and managerial positions are occupied by family members of the owner(s). Spector (2008) highlights the importance of political connections for the survival of businessmen in Kyrgyzstan in the face of the “grabbing hands” of the government and powerful business rivals. Some of these problems are exacerbated in Kyrgyzstan due its lack of natural resources (particularly oil and natural gas), poorly developed infrastructure and energy production sector, its sparse population, its landlocked, mountainous geography (which impedes its ability to participate in foreign trade), and its ethnic, linguistic and regional divisions. Competition from producers in nearby China also poses a barrier to the development of domestic industry (Spector 2018).

On the brighter side, long-standing economic, cultural, military, and migration ties to Russia, some foreign investment (recently, from China in particular, but historically also from Russia, Turkey, and the United States), and a recent record of peaceful, relatively free and fair

elections are all more advantageous aspects of the business environment. Although the large- and medium-sized enterprise sector has never recovered from the Soviet collapse, small productive shops (for example, in the apparel industry) and trading firms have arisen that take advantage of opportunities to form regional business networks and export to Russia and Turkey (Botoeva and Spector 2013; Spector 2018). Thus, small businesses represent the main driver of potential economic growth in the country, which is an important rationale for our empirical focus on them in this study.

The World Bank-EBRD Business Environment and Enterprise Performance Surveys (BEEPS), which is a firm-level survey of a representative sample of the formal private sector in Eastern European and Central Asian transition economies plus some additional “benchmark” European countries, largely confirms these findings. The 2013 Kyrgyz Republic survey, the most recent round, consisted of 270 firms, 42 of which had more than 100 employees. By far, the most frequently reported biggest obstacle was political instability (36% of firms did so, compared to 8% in Russia in 2012 and 11% for all countries over the period of 2010-2017). Corruption was also more likely to be reported as the biggest obstacle in Kyrgyz Republic than in other countries (12% report corruption as the biggest obstacle vs. 8% in Russia and 7% in all). The frequency of bribe or gift requests by public officials is also much higher than in other countries. For example, 55% of firms reported that they were expected to give gifts when meeting with government officials to obtain an operating license, compared to 7.3% in Russia and 13% in all. Perhaps as a response to the level of corruption, many firms in Kyrgyz Republic operate in the informal sector.²

² The new BEEPS for Kyrgyz Republic has now been posted and we plan to update these figures.

These figures suggest that the business environment is rather difficult in Kyrgyz Republic. It is one of the poorest countries among those surveyed. However, firms in Kyrgyz Republic compare favorably to firms in other transition and European countries across a number of important dimensions for firm growth. Fewer than 5% report access to finance as the biggest obstacle (compared to 15% for Russia in 2012, 16% for all countries averaged over the 2010-2017 period). With respect to innovation, 47% introduce a new product/service, compared to 37% in all countries. In terms of exporting, 6% of sales were exported directly in the average firm, a proportion that is on par with other countries in the survey. Kyrgyz firms also compare favorably in internet presence and female ownership.

Accounts of social networks and kinship relations more generally in Kyrgyzstan during the post-Soviet era often emphasize the long-standing cultural significance of kin and clan affiliations in Kyrgyz society and their growing importance as a source of resources and well-being in the face of the economic crisis and formal institutional vacuum that followed the Soviet collapse in 1991. Individuals are expected to give money and other support to members of their kin networks, particularly to fund elaborate wedding banquets and funeral ceremonies (Reeves 2012), and their decisions to do so are motivated more by morality than by instrumental considerations, while the amounts given may vary by situational considerations of deservingness, obligation, and ability to pay (Sanghera et al. 2011). However, one qualitative study suggests that although kin-based networks remain important, they have been weakened by growing inequality and poverty: with the rise of a cash-based, market economy the poor are increasingly excluded or cast into subservient positions, while better-off, urbanized Kyrgyz citizens (among whom most entrepreneurs would number) have now turn to instrumentally-motivated networks at the expense of traditional ties based on kinship and clan (Kuehnast and Dudwick 2004).

IV. Hypotheses

In this section, we first present several hypotheses on how kinship networks can affect firm performance and then we discuss alternative explanations consistent with an observed relationship between kin networks and firm performance.

As Kranton (1996) has shown, networks of reciprocal exchange can dominate market exchange. Businesses rely on personal networks to solve information and enforcement problems as well as to access financing and other resources. When networks are formed along family lines, the stronger bonds can lead to greater trust as well as greater pressure to redistribute resources to those in the family either as nepotism or as social insurance.

Broadly speaking, when the value of the outside option of transacting in the market is high, as it is in the US, for example, we would only expect entrepreneurs to access kin networks when there are clear benefits to doing so. Even when a firm owner has altruistic preferences toward kin, if markets are complete, we would expect the separation property to hold. Firms would then maximize the size of the pie and then let preferences determine the flow of profits across kin ties. We would then expect that helping others should have no effect on profitability.

When the value of the outside option of transacting in the market is low, however, we would expect a much more nuanced relationship between kin ties and firm performance. When markets are incomplete, the separation property may no longer hold and production decisions can depend upon preferences. We would expect an otherwise profit maximizing firm to make decisions that sacrifice profitability for solidarity with kin.

Which do we expect to dominate in the Kyrgyz Republic? As mentioned in the introduction, the Kyrgyz Republic is an intermediate case in terms of market development and governance institutions, on one hand, and strength of kin ties, on the other. Thus, it's difficult to

sign the net effect. The interfamilial implicit contract may impose certain obligations on a business owner, represented by these in- and out-business links. Reciprocity implies that a business owner who chooses to access kin networks for business help will likely also face pressure to provide help in turn. However, in principle, an entrepreneur who turns to kin networks for assistance but does not face future requests from kin to provide such assistance in return may well experience a strong benefit from the in-network use without incurring the cost of out-network assistance. This logic calls for distinguishing between the use of in-network business help-seeking and the use of out-network business assistance provision, which we specifically designed our survey to do. The reciprocity inherent in kinship networks implies the two should be positively correlated across some time horizon (particularly as firms age and requests for reciprocation begin to arrive), but the correlation is unlikely to be perfect. We exploit the independent measures of in- and out-network use to show that, consistent with theory, the two have opposite associations with firm performance.

According to BEEPS, discussed in the previous section, Kyrgyz firms face worse conditions with respect to political instability and corruption, but do not appear to perform worse in key indicators of firm development. Kinship ties, for instance, could explain why firms face fewer problems with access to finance. According to this hypothesis, then, we would expect that reliance on kin networks, particular as it relates to finance, should positively affect firms' profitability. If the network is based on reciprocal exchange, receiving business help will result in an obligation to help others. When markets are incomplete, this obligation can negatively affect a firms' profitability.

How does the reliance on kin networks affect the growth of the firm? If the total value of obligations is more than the total value of help received, the firm relying on kin networks should

experience a drain on resources that should dampen growth. Conversely, if the total value of obligations is less than the total value of help received, the firm should experience a boost to growth relative to those that do not access kin networks.

Having presented our main hypotheses, we now discuss what else could explain a positive or negative relationship between the number of kin connections and firm performance. The first explanation concerns unobserved shocks to the firm or the firm owner's household.

Unfortunately, our data do not allow us to track unanticipated shocks by the firm. Our measure of kin connections could just proxy for these unobservable shocks, such that if we were able to control for these shocks, we would observe no relationship between kin connections and firm performance. In this case, we would observe a relationship between firm performance and kin connections even when there is no difference in firm performance depending on whether a firm accesses the market or family. However, one would expect in-network connections to be positively correlated with negative firm-level economic shocks (and hence negatively correlated with firm performance) and out-network to be positively correlated with positive economic shocks (and hence positively correlated with firm performance). Moreover, Fafchamps and Lund (2002) present evidence that the flow of resources across household networks does respond to idiosyncratic and covariate shocks. This implies that network structure is not neutral and could still have a direct effect on performance when the separation property does not hold.

V. Survey and Data Description

While BEEPS is clearly useful for making international comparisons, the survey misses key parts of the picture for the Kyrgyz Republic. First, there are no questions about the relationship between kinship and business environment. Second, the sampling technique is based on the official registry of firms, which is problematic for several reasons: firms that enter the official

registry and survive are not representative of all firms, many firms appear in the official registry but no longer exist and most firms in the official registry, especially those of smaller size, report address and contact information that differs from the actual location of the firm and current contact information of the firm owner. And third, firms with fewer than 5 employees, the vast majority of firms, are excluded from the BEEPS sample. For all these reasons, we designed and administered a comprehensive survey of firms in the Kyrgyz Republic that i) focuses on how kinship networks may influence businesses and incorporates potential and actual network use, as well as out-network assistance; ii) targets firms with fewer than 50 employees, including those in the informal sector; and iii), asks retrospective questions to enable quasi-panel analysis. Our survey has several notable drawbacks, some of which we discuss in more detail below. First, we only survey firms in the two main cities, Bishkek and Osh. Second, our limited ability to encourage firms to participate means that we have fewer larger firms. Third, our sampling method misses firms that are hiding or are difficult to find, and those in isolated locations with low population density.

To carry out the data collection phase of the project, we enlisted the help of Crossroads Central Asia, a Bishkek-based NGO and think tank specializing in economic and political analysis and social science data collection, whose staff includes Western-trained Kyrgyzstani professionals with extensive experience implementing surveys and interviews in collaboration with foreign research teams, and expertise on national economic, political, and social institutions in the Kyrgyz Republic.

We developed the survey instrument in several steps. First, we carried out 20 structured interviews with small business owners (12 in Bishkek, 8 in Osh), in which a professional local interviewer (native-speaker of Kyrgyz and Russian) asked a series of questions about the history

of informants' business activities (including sources of the original business idea, startup capital, initial hires, and growth trajectory of their current business), their use of kin and non-kin resources for various business purposes, the types of business and non-business support and favors they provide to kin, their experiences and general views of the advantages and disadvantages of using kin relations for such purposes and giving them that type of help, their education and family backgrounds, and their assessments of the current business climate. These interviews yielded a range of perspectives on our key topics of interest, pointing to variation among small business owners in their approach to drawing on kin for business help and providing them with support. We also learned about the different types of support and assistance (in both directions) that appeared to be more and less common, based on these qualitative interviews. Thus, the interviews gave us some insights into what specific questions to ask.

We then prepared a pilot version of the survey, in which we included some questions from other firm surveys, but also wrote original questions specifically designed to get at our research questions and to reflect some specificities of the Kyrgyz Republic context (for example, the specific types of licensing and tax reporting requirements that Kyrgyzstani small businesses face). The pilot instrument was translated into Kyrgyz and Russian (few business owners even in Osh, where there is a large Uzbek minority, do not speak one of these two languages), and it was pretested with 12 respondents in Bishkek and 8 in Osh. Based on the results of the pretest, we revised the instrument for clarity, comprehensibility, and length. We consulted with our partners at Crossroads Central Asia on such issues as whether certain questions were too politically or economically sensitive to include in the instrument without alarming respondents, which response categories would be most intelligible to respondents (for example, it took many discussions to arrive at the optimal way to ask about members of the respondent's network who

are of the same clan or from the same village, because these are both somewhat more complicated and ambiguous concepts in the Kyrgyz Republic than in other contexts where similar studies have been conducted), and whether some questions should be re-formulated (most often, simplified), given our target population.

Our goal was to survey 1000 small business owners. The sample was drawn using the following procedures. First, lists were prepared of all 204 electoral precincts in Bishkek and all 73 in Osh. Then, 60 precincts were randomly selected in Bishkek and 40 in Osh. This distribution by city was based on the target distribution of the sample across cities, which was determined based on the larger size and greater number of businesses in Bishkek, but also a concern to have a sufficient number of firms to analyze between- and within-city differences. In each randomly selected precinct, field workers employed by Crossroads Central Asia conducted a census of all businesses which identified, based on initial contacts with employees, those that have under 50 employees. For all such businesses, field workers recorded their names and addresses. This yielded a total of 4080 businesses (2457 in Bishkek, 1623 in Osh) identified by the field workers as having fewer than 50 employees, for an average of roughly 41 per precinct in each city, with a minimum of 2 and a maximum of 176 in individual precincts. In the final step, the lists were stacked and a step procedure combined with a random start number was used to draw a random sample of businesses in each precinct with each precinct proportionately represented, as well as a random sample of substitute firms to be contacted as replacements for firms that either refused to participate or could not be contacted. Interviewers were then assigned to specific business names and addresses, and instructed to make a minimum of three attempts to contact the business owner and invite him or her to take part in the survey. Replacements were

permitted if the initially sampled firm's owner refused to participate or could not be contacted after three tries.

Trainings of supervisors and interviewers were held in Bishkek and Osh by the project managers of Crossroads Central Asia under the supervision of the co-principal investigator. The trainings explained the aims of the study, reviewed the sampling procedures, went through the instrument question by question, and clarified skip logic, standard missing value codes, and ensured that field personnel understood procedures for eliciting informed consent and protecting the rights of human subjects. In the course of interviewer training, additional changes to some questions were suggested by the interviewers, at times based on their prior experiences interviewing business owners, and some of these were implemented prior to finalization of the instrument. Also, during the training it became clear that many questions would not be relevant for firms that were less than one year old, so an initial filter question was added to ascertain whether the business had been in operation prior to 2018. This introduced a challenge in the fieldwork phase, because the census had not obtained this information; so, some originally sampled firms had to be replaced because they had started up in 2018 or 2019. The field version was prepared in Russian (based on the Russian-language pilot version) and translated into Kyrgyz (eventually, 468 respondents opted to complete the survey in Kyrgyz, 532 in Russian). Interviewers were provided with a cover letter from the director of Crossroads Central Asia explaining the purpose of the study, identifying the research team and the funding source, and requesting participation. Respondents were offered modest cell-phone top-up cards as a moderate incentive to participate.

Field work began on April 22, 2019, and concluded on May 30, 2019. Interviewers reported several common problems in fieldwork: owners of larger firms were more likely to

refuse (in most cases simply expressing lack of interest in the survey and/or lack of time), respondents most often balked at answering questions about their firm's finances and details about their family and kin (in some cases, they could be persuaded to provide answers by reassurances from interviewers about the confidentiality of the study and reminders about the larger aims of the study), and in some cases interviews were subject to frequent interruption because they generally took place at the site of the firm while business activity was underway. Overall, 1000 surveys were completed, as planned. The response rate was 56.2%, with reasons for non-response distributed as follows: 574 refusals, 195 non-contacts during 3 attempts, 3 cases where a sampled business listed in the census could not be located, and 7 "other" reasons.

For quality control, first, supervisors accompanied interviewers on a random 5% of completed interviews. Then, an additional randomly chosen 15% of respondents were contacted by phone by supervisors to verify that the survey had been completed, on the specified date, check responses to 4-5 questions for conformity with the answers recorded by the interviewer, and obtain evaluations of the interviewer's conduct. Third, an additional 10% of respondents, again randomly chosen, were visited in person by field supervisors, who used the same procedures to verify completion of the interview by the correct respondent. All completed survey forms were visually checked by supervisors for irregularities or systematic response patterns suggestive of interviewer fraud or other misconduct. No cases of interviewer misconduct were uncovered. Data entry, variable construction, and initial cleaning for consistency and logic were completed by June 20, 2019.

Altogether, the advantages of these data collection procedures include randomization at two levels (selection of precincts and selection of respondent firms within precincts), removal of interviewer discretion from the sampling procedure, non-reliance on official registry lists (which

are often obsolete and which by design omit unregistered businesses), and thorough quality control. The response rate is at least satisfactory, given that the study population consists of people who tend to be busy and the incentives to participate were minimal. The preponderance of refusals among non-responses suggests that, indeed, the primary obstacle to participation was the busy schedule and lack of material incentives to participate among business owners, particularly large ones. The corresponding low levels of non-response due to non-contact and other reasons suggest that the census was performed effectively, though not without a small number of errors. It is, to be sure, quite possible that some businesses were hidden to the census enumerators: for example, business conducted in homes or in apparently abandoned buildings. The exclusion of such businesses from the sampling frame may introduce bias, though we lack strong priors about its direction. We do know, based on the accounts of interviewers, that owners of larger businesses were more likely to refuse, which indicates that smaller firms are over-represented in our sample. However, we lack official or other data on the local distributions of firm sizes that could be used to correct for this source of bias using weights. We control for firm size in our multivariate analyses, which should alleviate at some of the impact of the size-bias of our sample on our findings. It may also be the case that less easily observed (by interviews visiting the firms) characteristics such as revenue, or reliance on kin, are also associated with non-response, but we have no way to measure the direction or the magnitude of any bias of this nature.

In sum, although (like many firm studies in developing countries and elsewhere), our sample is not perfect, it nonetheless has several important advantages, a reasonable response rate given the context, and no evident systematic bias. Moreover, as we show in the next section, sample distributions and descriptive measures all appear to be within expected ranges, which

lends confidence to our data collection procedures. Non-response on particular questions (as opposed to associations between non-participation and variables of central analytical interest) is another potential source of bias, which we seek to take into account in a series of sensitivity analyses of our key findings.

V.i. Key dependent and independent variables

Our main dependent variables on firm performance are profitability and revenue growth. Profitability is defined as profits divided by revenue. Both business revenue and profits are directly elicited from the respondent following the advice of de Mel et al. (2009). We focus on profitability instead of return on assets for several reasons. First, we believe there is less concern about measurement error with respect to a normalization by sales as opposed to a normalization by asset value. Much greater information is needed to construct a value of assets measure, especially in this context where standard valuations of capital may be less familiar. Second, profitability is what investors care about. Third, firms may differ in the risk environment creating, an additional source of measurement error when assets are used. Two firms with the same expected return and the same profitability may have very different return on assets (ROA) in any given time period. Of course, this variability is of intrinsic interest but this is not our focus at this time. Our measure of revenue growth requires the use of retrospective data, which is not ideal, but it is arguably the key outcome of interest given the previous literature's concern about the relationship between reliance on kin networks and a survival orientation.

The main explanatory variables of interest are based on a battery of questions concerning a firm owner's use of business and personal networks. Network variables are ego-centric and derived from the pre-specified links between the firm owner and their business and social contacts. For business in-networks, we asked questions on the number of persons within each of

the following categories from whom the firm owner could turn to (potential network) and actually has turned to (actual network) to for each of four kinds of help: family, friends, clan members and others. The types of help are receiving a loan, help with a dispute, help with bureaucracy, and finding suppliers or clients. For business out-networks, we asked about providing the same four kinds of help, plus providing jobs to others.

In all the baseline measures, we weight each dimension of help equally and sum across all categories. Using ego-centric degree (a count of the number of people in the network) is a reasonable approach, although full network data, which is costly to collect, are preferable. A potential shortcoming of this measure is a firm owner receiving four types of help from one person is treated equivalently as a firm owner who receives one type of help from four people. For certain types of questions, such as assessing the risk sharing properties of the network, this would be a poor measure, but for our research question it serves as a rough and ready measure of reliance on kin for specific business purposes. Although our categories of help are not exhaustive, they cover a wide range.

The first striking pattern in our data is the kin-ness of firms' networks. The average firm's business in-network consists of 67% kin-based links as shown in Figure 4. For comparison, Anderson et al. (2005) find that among small firms in the US entrepreneur's business networks consist of about 25% kin. Berrou and Combarnous (2012) also find entrepreneurial networks consist of about 25% kin in Burkina Faso. One empirical issue with the networks being primarily kin-based is that it will be difficult to separately estimate the effect of total network size from that of kin ties. Figure 5 shows the different types of help for kin-based links. Firms mostly rely on their business networks for financing. Figure 6 breaks down the type

of help for choice-based (non-kin) links and we see that financing is still the main type of help, but less so for choice-based links than kin-based links.

Our survey included a range of measures of the degree to which firms have implemented formal practices associated with successful businesses in Western contexts: the percentage of employees who are paid, the percentage of paid employees who have formal contracts, whether sales receipts are provided always, sometimes, or never, whether the business has the following: a webpage, a dedicated email account, a dedicated bank account, a tax identification number, and formal registration papers, whether the owner is familiar with competitors' prices, reports having paid a bribe for business purposes, has done research on why former customers left, and offers sales or discounts to attract new customers. After standardizing the scales of these individual measures (so they all run from 0 to 1), we performed a k-means cluster analysis, specifying a 3-cluster solution, using the Euclidean distance between an observation's values on the variables and the means for the cluster to optimize cluster assignment. The optimal 3-cluster solution yielded clusters corresponding to, respectively, high (257, or 27% of valid observations), medium (386, or 41%), and low (304 or 32%) levels of Western-model formalization, based on the cluster-specific means on all the constitutive variables. In turn, we performed a series of validations, all of which confirmed that the clusters performed as we would expect them to, in terms of associations with performance measures and other associated variables (full details of these results are available upon request.) Accordingly, we use the resulting three-category "formalization" variable based on the cluster assignments in our models, both additively and, in some cases, in interaction with network usage.

Panel A of Table 2 presents descriptive statistics for our sample of firms. The average turnover is 390,558 Kyrgyz Soms (2010), or roughly 10,000 USD (2019). The range in revenue

is quite larger, from a minimum of only 11044 Kyrgyz Soms (2010) to a maximum of nearly 8 million. The average profit margin is 52 percent, a value that is high but not unusual for smaller firms in developing countries. A typical firm employs close to 3 workers. The average value of assets is roughly twice that of average revenue and also varies quite substantially. The smallest firm consists of one worker, the owner-operator, and the largest firm has 121 workers (not necessarily full-time). Panel B of Table 2 presents descriptive statistics of the firm owners. The average age of our firm owners is 41. The youngest is 18 and the oldest is 78. Most of our firm owners are female (62%). In terms of schooling, 46% have some higher education, an indication of how limited opportunities for professional employment have pushed many highly education Kyrgyzstanis into self-employment, a typical phenomenon in transition countries. Panel C of Table 2 presents descriptive statistics on the firm owners' potential and actual networks that we discussed above. A typical firm owner has 8 connections in their potential in-network, four of which they have taken advantage of 4 at some point. (Note that, as we explain above, our network unit is actually a person-by-type-of-help measure, not simply a count of persons who can provide any type of help. We refer to these as "connections" for brevity.) The number of out-network use connections is overall larger, at 11 connections in the last two years. On average, 16% of startup financing is done by kin, but most of our firms self-financed their own startup investments.

V.ii. Data quality

Having described the data and how they were collected, we turn now to the natural question of the quality of the data. Even when, as we have done, researchers employ the best possible methods to ensure high quality data, firms without formal accounting or required

disclosure of financial accounts are not always forthcoming about financially sensitive information.

One could and should be skeptical about how accurate our data are. As a first cut, we consider whether the data produce sensible results. In Table A1 of the appendix, we include results from a basic production function, similar to ones that are used to generate the estimates of capital and labor shares for the US data referenced earlier. Our rough and ready measures perform fairly well.

To what extent data quality is a serious issue depends upon the intended use of the data. If we were to, for example, estimate how much tax revenue the Kyrgyz government should be collecting from firms in Bishkek and Osh, then we would need to think seriously about the level of underreporting. We could construct simulations based on the assumption that those firms deemed truthful had less bias than those not deemed truthful, for example. From an econometric perspective, however, the level of underreporting is not the immediate concern. Measurement error of the dependent variable matters primarily if this error is correlated with the network variables (which themselves may also suffer from measurement error).

A second approach to assure the reader about data quality is based on the perceptions of the local enumerators. We asked enumerators whether the respondent seemed truthful or not in reporting figures. In the appendix, we redo all of our main tables only on the sample that are deemed completely truthful (about 60%).

Neither of the above approaches allow us to address the problem of missing data. Only four out of five firms are able/willing to provide data on revenue and profits in 2018. While selection into those who responded certainly, in part, depends upon various idiosyncratic factors that, on balance, have no bearing on the level of revenue or profits, it is reasonable to think that

selection is not ignorable. After we present our econometric approach, we will discuss how we handle the problem of missing data.

V.iii. Vignettes

Before turning to the econometric specifications, we discuss a series of vignettes that we posed to firm owners concerning the tradeoff between family and business. These vignettes allow us to consider our research question in a controlled and direct manner, albeit using hypothetical data. For the first vignette, we asked firm owners the following: imagine a situation in which the owner of a similar business to yours must decide between offering work to a 1) highly qualified candidate whom he/she does not know or 2) a less qualified candidate who is the son of a cousin. Who should the business owner hire? Our respondents answered the son of the cousin 27.4% of the time.

The second vignette asks about the following situation: the owner of a business like yours must decide between 1) buying goods from a firm belonging to his uncle or 2) buying the same goods from another firm, the owner of which he does not know but at a savings of 10% of the cost of the good. Which firm should the owner buy the materials from? 30.5% of the respondents answer the from the firm belonging to the business owner's uncle.

Finally, we asked about the following situation: The owner of a business like yours had a profitable year and plans to reinvest the profits by making a large purchase of goods for the firm. Imagine that the business owner knows that one of his close relatives needs the means to have a wedding, should the business owner prefer to loan that member of the family the money instead of reinvesting the profits as planned? 60.4% of respondents answered that they prefer to loan the money to the family member. While these vignettes are hypothetical, they demonstrate, first, that firm owners are aware of these tradeoffs, and, second, there is variation in how dependent

business decisions are on kin ties, with majorities endorsing business considerations over family obligations in some circumstances.

V.iii. Econometric specifications

We estimate the relationship between firm performance and kin networks using Ordinary Least Squares. Specifications take the following form:

1. OLS:
$$firm\ performance_i = \alpha + \beta(kin\ connections)_i + \gamma X_i + \varepsilon_i$$

where firm performance and kinship network strength of firm i are measured as described above and X_i is a vector of firm-level controls. We use a parsimonious set of control variables. The firm-level controls that we always include are firm-type fixed effects, cohort fixed effects, and the city where the firm is located (Osh or Bishkek). In some specifications, we also include the value of a firm's assets and the number of employees. The firm owner controls that we use are sex, age, whether or not the firm owner has some higher education, ethnicity, religion, language of the interview and region of birth.

Our measure of kin connections could be endogenous due to measurement error on the LHS if, for example, firms that over or underestimate their performance have systematically different levels of kin connections. Moreover, without a clear sense about the relationship between kin connections and misreporting, the bias could go either way. The more common problem of measurement error on the RHS is also a possibility and both classical and non-classical error are plausible, i.e. there may be random under or over assessments of help in the mental accounting of in and out links or those with greater entrepreneurial attitudes may systematically undervalue the help that they receive. We also cannot rule out that our regressions suffer from omitted variable bias.

We use an alternative estimation strategy as a diagnostic tool to determine how plausible some of these scenarios are: Two-stage Least Squares, where the entrepreneur's number of cousins and number of cousins squared serve as instrumental variables. The number of cousins should be correlated with kin connections (or total network connections in an environment where social connections tend to be primarily kin-based) but uncorrelated with individual firm owner characteristics and firm performance except insofar as it predicts kin network usage. We use the squared term to improve the fit of the first stage as well as serve as a second instrument when we have two network variables on the RHS. This alternative estimation strategy, while certainly suffering from its own set of econometric concerns, allows us to view the OLS estimates in a different light and hopefully make some progress on understanding how realistic any of the above scenarios are.

To estimate 2SLS, we use the following specification:

$$\begin{aligned}
2. \text{ 2SLS: } \quad & \text{i. } \textit{kin connections}_i = \alpha_1 + \lambda(\textit{cousins})_i + \kappa(\textit{cousins}^2)_i + \gamma_1 X_i + u_i \\
& \text{ii. } \textit{firm performance}_i = \alpha_2 + \beta(\textit{kin connections})_i + \gamma_2 X_i + \varepsilon_i
\end{aligned}$$

In this specification, we can accommodate first order dependence between the error term, ε_i , and kin connections provided that the variables *cousins* and *cousins*² are relevant (correlated with kinship network strength) and they are valid in that they only affect firm performance through their effect on kinship network strength. As Conley et al. have shown, the 2SLS estimates can still be meaningful even when there are small violations of validity. The main concern we have is that our first stage is likely to be weak: in the US setting, for example, there would be little reason to expect business networks to depend upon an entrepreneur's number of cousins, especially once we control for the age, ethnicity, religion, region of birth, etc. We will therefore include the AR statistic. The first stage, however, is of interest on its own because there are two

different theories of change as a firm owner gains more cousins. In the first theory, one, quite mechanically, expects that the number of cousins increases the likelihood of kin links. In the second theory, a firm with a greater number of cousins might anticipate the arrival of future demand for links if an additional kin link is added. To the extent that these future links have less value, the firm with more cousins may have fewer kin links.

Our final specification takes advantage of the retrospective data on firm revenue, income, assets and employment in the previous year and the first and second years of business to investigate firm growth. Due to the variety of time periods that we have data on, we switch to a more structural measure of networks. We take the proportion of business contacts that a firm could potentially ask for help that are kin (Proportion kin). For those that report no potential contacts, we assign a zero and we include a separate dummy variable that indicates those that have a business network (Has network). This measure is rather independent of the time period and still capture the kin-ness of business networks.

In addition to aggravated recall error in retrospective data, we face the problem that we only observe those firms that survive. Since firm survival could be a function of kin networks, our estimates could be biased. Without any baseline sample of firms, we cannot estimate a survival function. Our approach is instead to assume that selection bias is worse among older firms than newer ones. We then allow for separate effects of kin networks on firm growth by old and new firms, controlling for the differential growth rates for new and old firms. The panel structure of the data also permits controlling for unobserved time-invariant characteristics that affect firm revenue by including individual fixed effects.

$$3. \text{ OLS: } \ln \text{ Firm Revenue}_{it} = \alpha_i + \beta^{Prop/New} (\text{Proportion kin})_i * \text{New firm}_i * t +$$

$$\beta^{Prop}(Proportion\ kin)_i * t + \beta^{New}(New\ firm)_i * t + \beta^{Has/New}(Has\ Network)_i * \\ New\ firm_i * t + \beta^{Has}(Has\ Network)_i * t + \gamma X_{it} + \varepsilon_{it}$$

Of course, firm survival is not the only missing data problem we face. More generally, we encounter missing data on business revenue, business income and some control variables. In the sensitivity analysis section we present some robustness exercises that specifically account for missing data.

VI. Results

In this section, we discuss the main empirical findings. Before turning to the main results, we first look at the nature of the network variables and, in particular, the persistence of such structures in our context. Next, we will present the findings on firm performance using cross-sectional data from 2018. We then discuss the results on firm growth using the retrospective data to construct a pseudo-panel. In all specifications, we control for firm cohort and the type of business activity as well as the city where the firm is located. We present specifications without (odd columns) and with (even columns), the set of firm owner controls. These are age, sex, any higher education, ethnicity, religion, marital status, language of interview and region of birth.

Table 3 illustrates the persistence of kin ties in business relations. While we would expect to observe this relationship in our context, it nevertheless is important to verify. The dependent variables are the three network variables that we will use in subsequent analysis, the number of kin-based business connections in the in-use-network (columns 1 and 2), the number of kin-based business connections in the out-use-network (columns 3 and 4) and the share of the business in-network that is kin-based (columns 5 and 6). The variable that we use to track kin influence in business upon a firm's inception is the share of startup investment financed by kin.

We control for the share of startup investment that is self-financed, the size of the startup investment and the initial level of employment and asset value.

In columns 1 and 2, we see that one s.d. in kin financing results in an additional one-third of an in-use kin connection and the estimate is statistically significant at the 5% level. The coefficient changes little when we add firm owner controls. Larger firms at inception in terms of number of workers and size of initial investment also have more kin-based connections. In columns 3 and 4, we find that one s.d. in kin financing results in nearly an additional half a connection in out-use kin connections and the estimate is statistically significant at the 10% level. Again, we see a similar pattern with respect to the initial size of firms. Finally, in columns 5 and 6, we turn to our best measure of kinship-ness of business networks. We see that one s.d. in kin financing increases the proportion of in-business network connections that are kin-based by .05, about one-fifth of a s.d. and the estimate is statistically significant at the 1% level. Interestingly, initial firm size does not predict kinship-ness of business networks. Thus, there is evidence of persistence and some evidence of reciprocity, since the initial kin influence relates to both in and out-network use connections.

Table 4 presents our first set of main results using profit margin, our preferred measure of firm performance, as the dependent variable. In the first column, we include only the in-use network variable in line with much of the previous literature. In columns 2-6, we also include the out-use network variable to capture these two different effects on firm performance. In columns 3 and 4, we include the set of firm owner controls and, in columns 5 and 6, we also include the additional firm controls. Columns 4 and 6 present our 2SLS estimates using the number of cousins and the number of cousins squared as instrumental variables. Since we anticipate that the

first stage is likely to be weak, we have also included confidence intervals that are robust to weak instruments presented beneath the standard errors.

In all the specifications, the coefficient on the in-use network variable is positive and statistically significant at the 1% level, while the coefficient on the out-use network variable is negative and statistically significant at either the 1% or 5% level. These estimates are therefore consistent with kin networks affecting firm performance both in positive and negative ways and, hence, suggest a failure of the separation property. On the face of it, the positive effect on profitability appears to outweigh the negative effect, indicating that profit maximizing firms are wise to take advantage of their kin relations in business. Using the estimates in column 2, one s.d. increase in the number of in-use kin network ties (4.5) is associated with a 6.6 increase in the profit margin, an economically significant effect. The magnitude might appear to be extremely large in the context of the US, but one should keep in mind that the average profitability is about 50% in our sample. For out-use network ties, we find that one s.d. increase (9.5) is associated with a 3.6 decrease in profit margin, which is also an economically significant effect but weaker than the in-use network. Under the assumption of ex-ante one to one reciprocal relationship, the benefits appear to outweigh the costs. The 2SLS estimates paint an even more beneficial picture on kin network use since the magnitude of the coefficient on in-use increases relatively more than the one for out-use. The increase in magnitude of the 2SLS estimates relative to the OLS ones could be explained by measurement error, or alternatively, that the effects are stronger for the subpopulation of compliers, those firm owners that experience an increase in the number of kin connections in response to having additional members in the extended family.

Interestingly, while the coefficient on male is positive, it is not statistically significant and we fail to find a gender gap in profitability. We also find a potentially counterintuitive

robustly negative effect of education on profit margin, but this is easily explained in a world of imperfect markets. More educated firm owners with better access to credit or possibly more trust in markets reinvest and expand more driving down the profit margin. It also might be the case that many higher-educated entrepreneurs were “pushed” into self-employment by low wages in state-sector professional jobs (like teaching, medicine, scientific research and engineering in state firms). In Russia and other transition countries, this was especially typical in the 1990s and could be a more persistent phenomenon in Kyrgyzstan. People who are pushed into self-employment rather than choosing it are going to be less effective at it.

Table 5 shows that there is a similar relationship if we just focus on profits, controlling for capital and labor. The advantage of this specification is that we can estimate the return on investing in capital and labor using the coefficients on assets and workers. The real return on assets is about 1% and hiring an additional worker would increase profits by 10% on average.

Next, we switch from the cross-sectional variation to within-firm variation. To do this, we construct an unbalanced pseudo-panel using retrospective data for the first and second fiscal years of the firm as well as revenue from 2017 and 2018, giving us potentially four observations per firm. We have 650 firms that were started in 2014 or earlier and hence would have had at least four full fiscal years to observe. Of these, we have complete revenue data on 439 firms. If we restrict attention to just the two most recent years, 2017 and 2018, we have 733 firms that started in 2016 or earlier and, of these, we have complete revenue data on 559 firms, a similar but slightly smaller proportion of firms than those that report any revenue data at all (801 out of 1000 firms). Due to our fixed effects estimation strategy, those firms with only one observation drop out of the analysis. Hence, those 277 firms that started in 2017 are excluded since we only have one full fiscal year of operation. Because the data are more complete for 2017 and 2018, we

will run specification that just uses these years. We discuss how this retrospective attrition and missing data, more generally, affect our results in the robustness section.

Table 6 presents the results on business growth from fixed effects regressions that account for selection by allowing separate growth effects for new and old firms. As discussed in the previous section, our assumption is that the old firms' effects should suffer more from selection bias. The dependent variable is logged revenue and each time-invariant variable has been interacted with time. We focus on three extreme types of firms: those with no in-network, those with an in-network that consists of no kin and those with an in-network that consists of only kin. In columns 2-3, we control for firm-type specific growth rates. Column 3 restricts the sample to observations in 2017 and 2018. All growth rates are interpreted with respect to the omitted category, an old firm with no business network, kin or otherwise. That is there are five effects of interest: growth rate for old firms with a business network consisting of no kin, the growth rate for old firms with a business network consisting of only kin, the growth rate for new firms with no business network, the growth rate for new firms with a business network consisting of no kin, and the growth rate for new firms with a business network consisting of only kin. New firms with business networks grow faster than new firms without a network. This latter group of firms grow at a similar rate as old firms without business networks. The magnitudes of the effect are arresting: a new firm with a no-kin business network grows 84% more than an old firm with no network, whereas a new firm with an only-kin business network grows at a smaller but still hefty rate of 17.4%. Old firms with no-kin networks grow 10.5% more than old firms with no networks and we cannot reject the null that old firms with all-kin networks grow at similar rates as old firms with no network. (Average growth rate of small firms in US 9% in 2018 CITE). We see a similar pattern if we restrict attention to only 2017 and 2018 observations. However new

firms with all-kin networks are no longer statistically distinguishable from old firms without business networks. This finding fits the arguments in Alger and Weibull (2008), that having any type of network is better than autarky, but a network of coerced altruism through the family leads to slower firm growth than one without such coercion.

In columns 4-6, we repeat the exercise in columns 1-3 except that we redefine new firms to be ones established in 2014-2016. The year 2014 is chosen because this would be the newest firm that could have all four years of observation. Extending the definition to include two more years will increase the selection bias at play and we would like to check whether this is indeed the case. Selection clearly is playing a role here. Indeed, we see that networks still matter for new firms, but we no longer can statistically distinguish between a new firm with no-kin business network and one with an all-kin business network. The coefficient on the interaction term between new firm and the proportion of in-network that is kin-based even turns from negative to positive. The results are consistent with positive selection on kin networks as the business matures.

VI.i. Mechanisms

Tables 7 and 8 attempt to dig into the mechanisms. Why does a reliance on kin networks lead to lower overall firm growth? We return to the cross-sectional data to explore two possible mechanisms. The first is reinvestment. If firms have a high profit margin because they do not/can not expand, then we would expect a negative relationship between the network variable and reinvestment. Our survey provides data on the amount of 2018 profits that were reinvested in the firm in 2019 (we also asked about plans to reinvest 2019 profits in 2020 and find similar results using this variable instead). Table 7 shows that the relationship between in-use and out-use kin networks is mostly negative, although the coefficients are not very robust across the different

specifications, particularly for the one on the in-use network variable. The findings suggest that firms that rely more on kin ties in their business networks reinvest a smaller share of their profits. In column 2, the coefficient on the in-use network is not statistically significant, while the coefficient on the out-use network is statistically significant at the 1% level. An additional out-use network to a relative reduces reinvestment by 0.74 percentage points. One standard deviation in out-use network leads to a decrease of about one-quarter of a s.d. in reinvestment rate. Thus, while the magnitude is not large, it is still economically significant.

The second mechanism that we consider is through Western-orientation and formalization. Echoing the literature's emphasis on survival-based firms versus growth-oriented firms, we investigate whether a firm's orientation can influence the effects that we uncover. Since we find the distinction between survival and growth a little problematic, not least because it runs the risk of selecting on the dependent variable, we instead opt for asking questions about the orientation of the firm with respect to Western business practices. That is, we ask do firms that appear to have adopted a Western business model experience different effects of kin networks. We performed cluster analysis to group firms into three types expressing the degree of Western-orientation. More Western-oriented firms might be more selective in their use of networks for business purposes as well as less likely to violate the separation property. At the same time, they might operate in more competitive environments and have greater access to markets, which would drive down the profit margin. Table 8 presents the results. Interestingly, we see no kin network effect for firms in the most Western-oriented cluster. For those in the intermediate cluster, we find only a positive effect of in-use business network, but no negative effect for out-use networks. For those in the least Western-oriented cluster, we find both the positive effect of in-use networks and the negative effects of out-use networks as before. We also

see that, as the firm becomes more Western-oriented, the profit margins fall, suggesting a more competitive environment and/or possibly reflecting expansion of investment.

VI.ii. Sensitivity Analysis

In Tables A2 and A3, we redo Tables 3 and 5, respectively, on the subsample of those firm owners that are deemed truthful when reporting numbers by the enumerators. The results are quite similar despite losing over a third of the observations. The drop in observations, however, puts a lot of strain on the 2SLS estimation and we do not get meaningful estimates as both the coefficients and the standard errors blow up.

In columns 1, 2, 4, 5 of Table A4, we present estimates of the probability of having missing observations for our dependent variables. In the first and second columns, the indicator of a missing observation takes a value of one if any of the values on revenue and profits for any of the years that we ask about are missing. In the fourth and fifth columns, the indicator of a missing observation takes a value of one if the values on revenue and profits for the year 2018 are missing. Columns 1 and 4 use the two main network variables and columns 2 and 5 use cousins and cousins squared. In columns 1 and 4, we report the F-test on whether they can be excluded. We fail to reject the null in the first definition of missing but can reject the null under the second definition. Given that there may also be selection on other variables, including unobservable ones, we take the problem of missing data seriously and employ a Heckman-type correction procedure, outlined in Wooldridge (2010).

For this exercise, we need two sets of instrumental variables, one set that can be excluded from the profitability regression and the other set that can be excluded from both the profitability and the first-stage regression. The former set of variables are simply the ones that we use in the IV estimation. For the latter set of variables, we propose two variables that should capture the

information environment that the firm operates in. The first is a response to one of the vignette questions in which a firm hypothetically receives a windfall gain and the respondent should indicate whether a family member would have information about the firm's windfall amount and the second is whether the firm is an owner operator.³ Columns 2 and 5 show that both of these variables are negatively related to the probability of having missing data and we strongly reject the null that we can exclude them from the selection equation, no matter which definition of missing that we use. We then proceed to reestimate the effects of the network variables on profitability using 2SLS and including the inverse Mills ratio from the selection equation. In columns 3 and 6, we see that the coefficient on the inverse Mills ratio is not statistically different from zero and the coefficients on both the in-use and out-use network variables are similar to the estimates in column 4 of Table 3. Thus, there does not appear to be systematic differences in how the network variables affect firm performance across those firms that reported all data and those that only partly reported.

VII. Conclusion

Given the difficult business environment in the Kyrgyz Republic, in part due to the Soviet institutional legacy, reliance on business networks is especially important for firm survival and growth. We find that the business networks of small firms in Kyrgyz Republic are

³ We plan to do more sensitivity analysis before any draft will be more widely circulated. In addition to the exercises that we report, we have also done some initial work using inverse probability weighting. We follow the approach of Horowitz and Manski, in which we use the probability of being missing conditional on our control variables divided by the probability of being missing conditional on our control variables and the set of variables that capture the information environment as weights in our main regressions. For the cross-sectional data, we get qualitatively similar results, but we prefer the Heckman approach for reasons already discussed. We've also done IPW for the panel data using weights that do not vary over time and get qualitatively similar results. We still need to allow for the selection process to vary over time. We also plan to run specifications that use a few additional control variables (we omitted a few like household income per capita because of missing data). Finally, we plan to perform bounds analysis.

overwhelmingly kin-based. Similar to accessing the market to obtain resources and using prices to guide decision-making, firms that access their business networks, and in particular, their relatives, to obtain resources also face a set of benefits and costs such that these implicit prices guide decision-making. In a market setting, if prices are doing their job, it is straightforward to evaluate the merits of a transaction; with kin, implicit prices, even when network transactions are purely instrumental, are more ambiguous and uncertain so that accessing the network may not unambiguously offer net benefits to the firm.

The richness of our data allows us to demonstrate the benefits and costs of kin ties in entrepreneur's business networks. We find that in-use and out-use networks, while certainly correlated, have opposing relationships with firm performance, as one might expect. Thus, previous studies that have only used one dimension to study the importance of networks may have had difficulty in establishing an effect. We also find that relative to firms that exclusively rely on the market, firms that are able to access their kin ties in business grow faster, but their growth is not as fast as those firms that have non-kin ties that they can access for business help. More research is needed to understand the dynamics of these benefits and costs. In particular, kin networks may be more effective in garnering resources for young firms, but impose an increasingly severe cost as firms mature. The interfamilial implicit contract may suffer from a ratchet effect that the choice-based interpersonal implicit contract does not.

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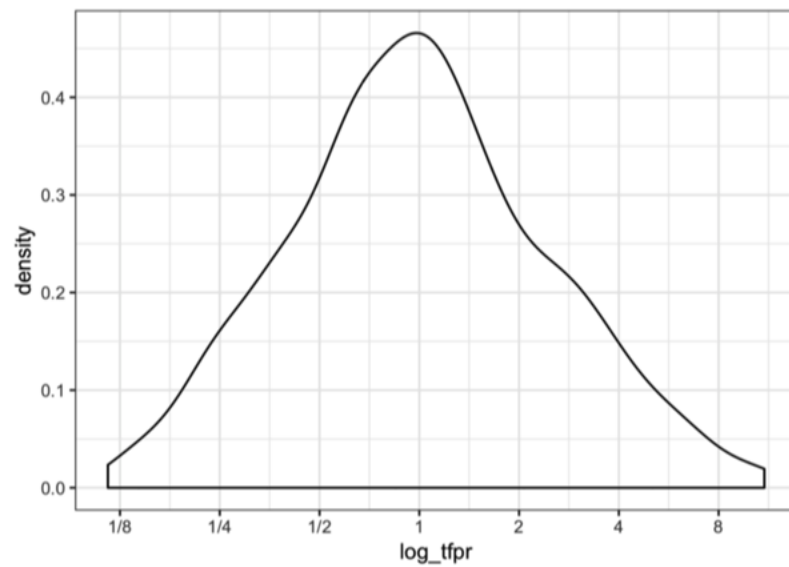
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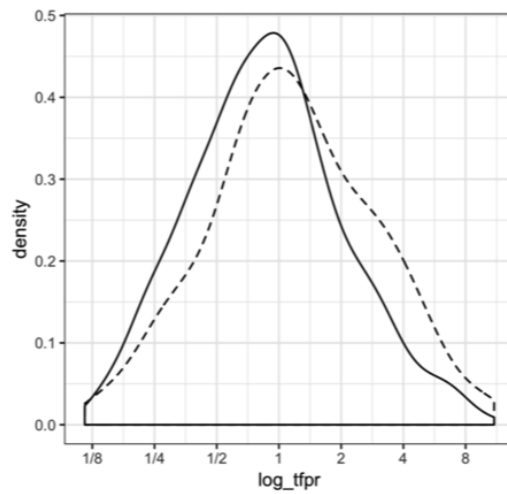
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Figure 1: Misallocation among Kyrgyz firms



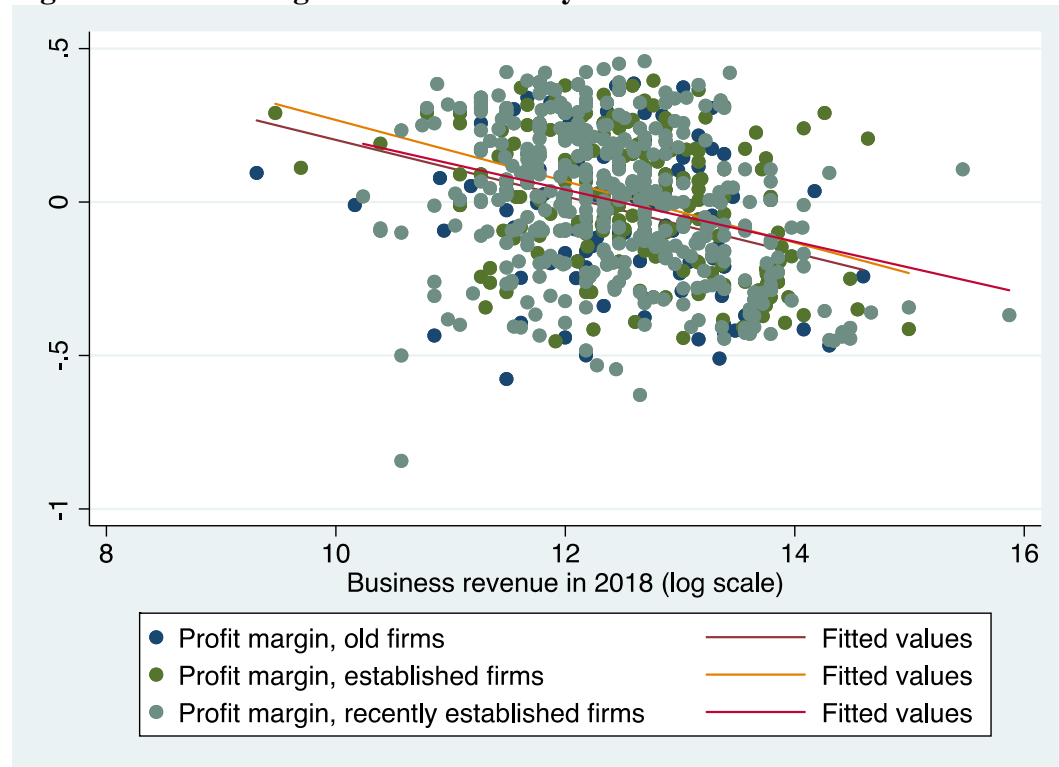
Notes: This figure plots the probability density of TFPR in logs. TFPR is constructed using our survey data on revenue, assets and labor as well as US capital and labor shares by industry. See Klenow and Hsieh (2009) for details.

Figure 2: Misallocation and Business in-Networks



Notes: The probability densities of TFPR in logs are shown separately for firms that more heavily rely on kin in their business networks and those that less heavily rely on the them. The solid line represents above the median level of kin connections and the dashed line represents below the median level of kin connections.

Figure 3: Profit Margin and Firm Size by Cohort



Notes: The figure presents the scatter plot of profit margin (demeaned by business type and location) and business revenue in 2018 (in logs). Fitted values are presented separately for old firms (started in 2010 or earlier), established firms (started between 2010 and 2015) and recently established firms (establish in 2015 or later)

Figure 4: Pie chart of social structure of in-use business links

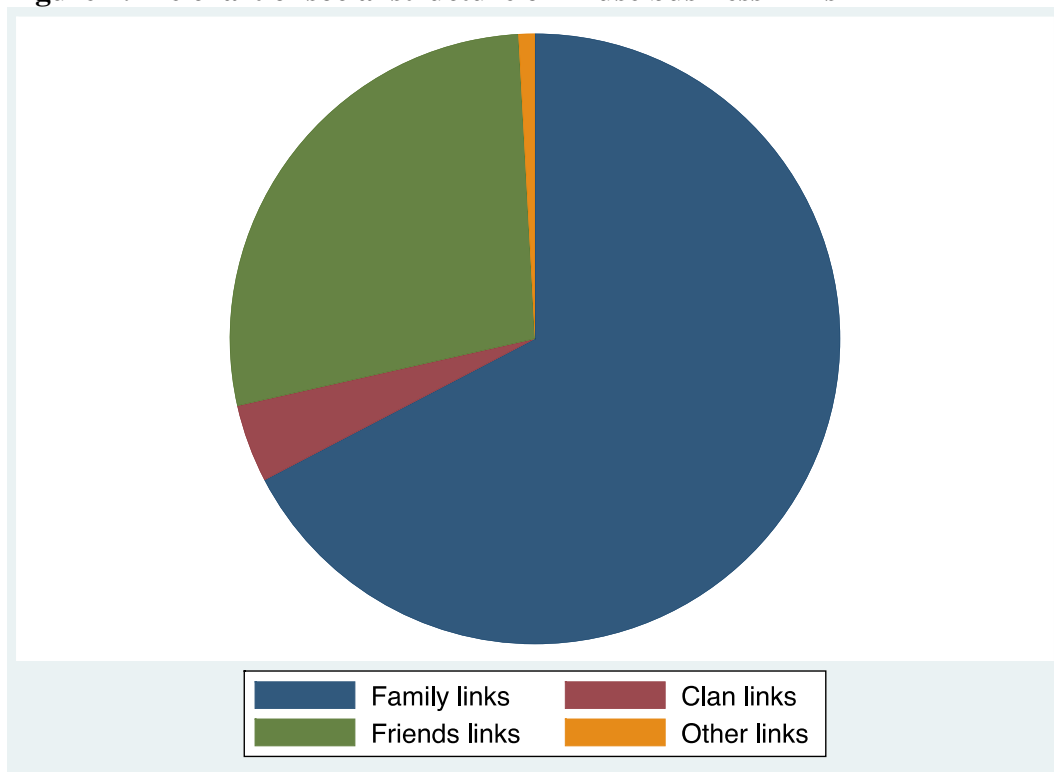


Figure 5: Pie chart of kinds of help in kin-based in-use business links

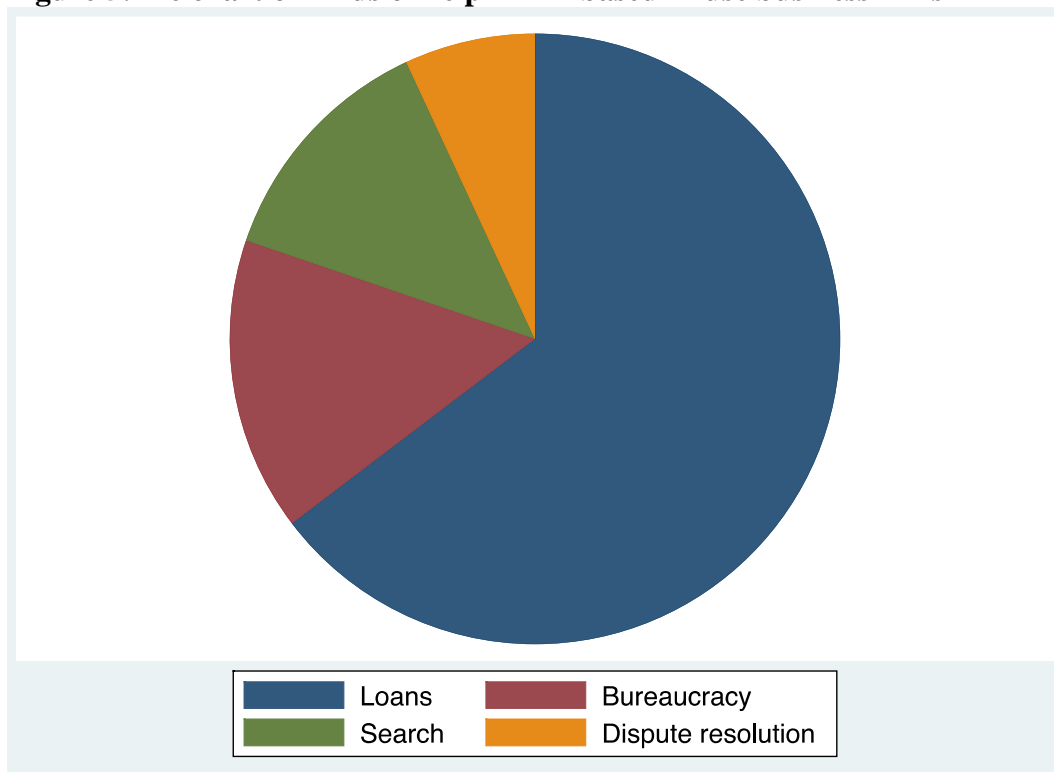


Figure 6: Pie chart of kinds of help in choice-based in-use business links

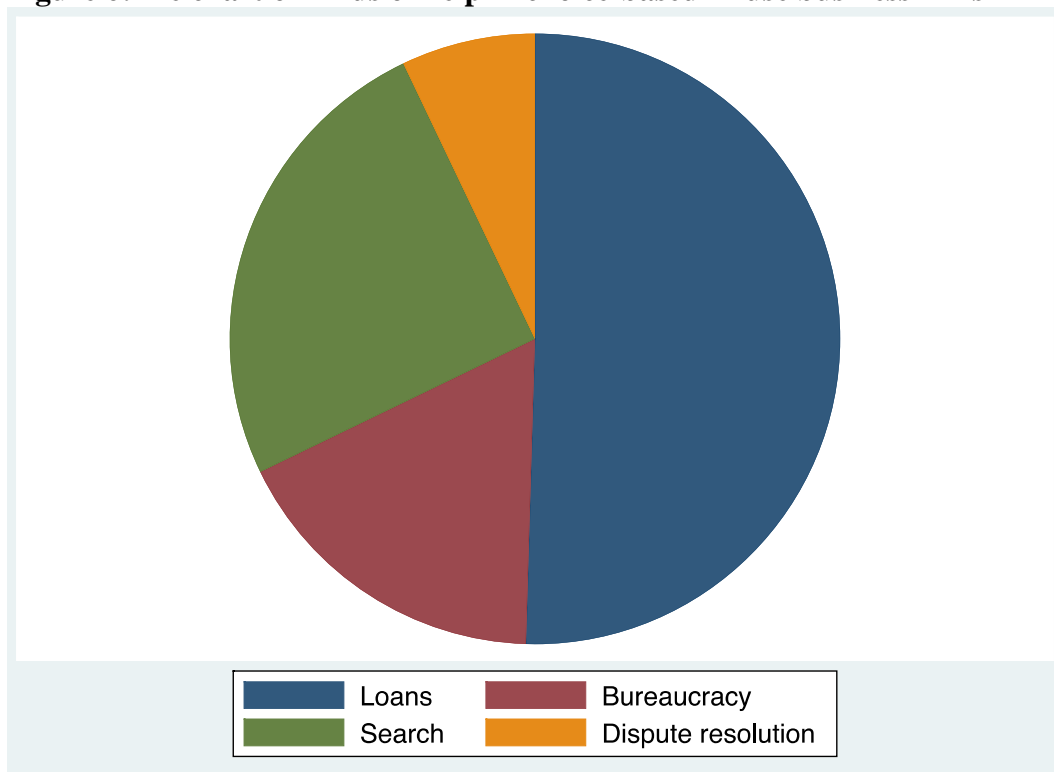


Table 1: Literature on Networks and Firm Growth

Author, Year	Network Type	Method	Data	Finding
Nguyen & Nordman, 2017	Family	C	IVS	- (technical efficiency)
Gassie-Falzone, 2016	Family	B	IVML	- (performance)
Acquaah, 2012	Family	B	IIL	- (performance)
Kowalewski et al., 2010	Family	C	IIIL	Mixed (U-shaped effect)
Miller et al., 2009	Family	B	IIL	Null
Bertrand et al., 2008	Family	B	IIIL	- (performance)
Anderson and Reeb, 2003	Family	B	IIIL	Mixed (U-shaped effect)
Fafchamps and Minten, 2002	Family/Social	D	IIIS	Mixed (- for family, + for social)
Fafchamps and Minten, 1998	Family/Social	A	IIIS	Mixed (- for family, + for social)
Khayesi et al. 2014	Kinship	D	IISM	+ (performance)
Alsosa et al., 2014	Kinship	A	IS	+ (startup, spinoff firms)
Grimm et al., 2017	Kinship	C	IIIS	Mixed (+ growth-oriented, - subsistence-oriented)
Grimm et al., 2013	Kinship	B	IVS	- (firm size, investment)
Gupta et al., 2017	Ethnicity	C	IVM	+ (growth)
Gil and Hartmann, 2011	Ethnicity	B	IISM	+ (specialization, profitability)
Biggs & Shah, 2006	Ethnicity	B	IISML	+ (startup size, productivity, growth)
Fisman, 2003	Ethnicity	B	IISML	+ (credit access)
Biggs and Raturi, 2001	Ethnicity	B	IIIML	+ (informal credit access)
Fafchamps, 2000	Ethnicity	D	IISM	+ (informal credit access)
Li et al., 2008	Political	B	IVL	+ (credit, performance)
Fisman, 2001	Political	D	IL	+ (market value)
Dai et al., 2018	Social	D	IVSM L	+ (profits)
Nguyen & Le, 2018	Social	B	IVSM	+ (export propensity)
Burt & Oppen, 2017	Social	B	IIIML	+ (startup funding)
Kuépiéa et al., 2016	Social	D	IIIS	+ (profitability)
Kemeny et al., 2016	Social	D	IIIML	+ (growth)
Li et al., 2015	Social	B	IIISM	+ (performance)
Stam et al., 2014	Social	F	NA	+ (performance)
Ayako et al., 2014	Social	C	IIS	+ (sales, skills)
Fafchamps & Quinn, 2013	Social	E	IIIS	+ (performance, capital)
Qian & Kemelgor, 2013	Social	B	ISML	Mixed (U-shaped effect)
Horton et al., 2012	Social	B	IIIML	+ (executive pay, performance)
Berrou & Combarnous, 2012	Social	B	IIISM	+ (performance, given strong ties)
Eisingerich et al., 2010	Social	A	IISML	+ (performance, innovation)
Chipika & Wilson, 2006	Social	A	ISM	+ (productivity)
Zaheer & Bell, 2005	Social	B	IIL	+ (performance, given structural holes)
Uzzi, 1999	Social	A	IL	+ (formal credit)

Key:

Method:	A	Case Studies and Descriptive Statistics
	B	Cross-Sectional Firm Survey
	C	Panel Firm Survey
	D	Quasi-Experimental: IV, Matching, Event Study, etc.
	E	Experimental
	F	Meta-analysis
Data:	I	< 50 firms
	II	51 to 200 firms
	III	201 to 1000 firms
	IV	> 1000 firms
Firm Size:	S	Micro and Small Enterprises
(designations	M	Medium Enterprises
variously defined)	L	Large Enterprises
Finding:	+	Measure of network strength positively associated with firm performance
(outcome variable	-	Measure of network strength negatively associated with firm performance
in parentheses)	Mixed	Measure of network strength has mixed association with firm performance
	Null	Inconclusive findings

Table 2: Summary statistics**Panel A: Descriptive Statistics of Firms**

Variable	Mean	SD	Min	Max	N
Business Revenue in 2018	390558	492034	11044	7795752	801
Business Profit in 2018	165505	179795	-89443	3118301	804
Profit Margin in 2018 (%)	52.03	23.80	-33.33	98.90	772
Business Assets in 2018	799651	1829455	190.68	38800000	920
No. of workers in 2018	2.85	4.53	1	121	1000
Located in Bishkek	0.6	0.49	0	1	1000

Panel B: Descriptive Statistics of Firm Owners

Variable	Mean	SD	Min	Max	N
Age	40.97	12.18	18	78	1000
Sex, Male=1	0.38	0.49	0	1	1000
Some higher education	0.46	0.49	0	1	1000
Currently Married	0.79	0.41	0	1	1000
Ethnic Minority	0.23	0.42	0	1	1000
Muslim	0.95	0.23	0	1	1000
Russian language	0.53	0.49	0	1	1000
Dependency ratio	0.85	0.76	0.67	6	998
Poor at age 12	0.29	0.45	0	1	932
HH income p.c.	77442	77986	60000	800000	555

Panel C: Descriptive Statistics of Firm Owners' Networks

Variable	Mean	SD	Min	Max	N
Business In-Network	8.17	13.14	0	138	1000
Business In-Network Kin	0.69	0.27	0	1	810
Business In-Use Network	4.06	6.93	0	75	1000
Business In-Use Network Kin	2.68	4.45	0	47	1000
Business Out-Use Network	11.17	16.67	0	197	1000
Business Out-Use Network Kin	6.12	9.47	0	145	1000
Startup share financed by Kin	0.16	0.35	0	1	998
Startup share employment Kin	0.85	0.26	0.07	1	1000

Table 3: Persistence of Business Networks

Dependent variable =	Business In-Network Kin-based Connections		Business Out-Network Kin-based Connections		Share Business In-Network Kin-based	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES						
Kin share of external startup finance	0.84**	0.89**	1.32*	1.41*	0.13***	0.13***
	[0.346]	[0.371]	[0.701]	[0.735]	[0.034]	[0.035]
Share startup self-financed	0.01***	0.01*	0.02***	0.01*	0.00	0.00
	[0.004]	[0.003]	[0.007]	[0.007]	[0.000]	[0.000]
Startup investment (in logs)	0.28***	0.18**	0.18	0.12	0.00	0.00
	[0.086]	[0.091]	[0.203]	[0.208]	[0.010]	[0.010]
Initial Workers	0.33***	0.29***	0.42**	0.38*	-0.01	-0.00
	[0.109]	[0.102]	[0.212]	[0.198]	[0.008]	[0.008]
Initial Assets (in logs)	0.04	0.05	0.56**	0.57**	0.02	0.02
	[0.140]	[0.142]	[0.222]	[0.231]	[0.011]	[0.012]
Male		0.08		0.11		-0.04
		[0.322]		[0.707]		[0.028]
Age of respondent (in years)		-0.00		0.00		-0.00
		[0.013]		[0.023]		[0.001]
Some higher education		0.17		-0.11		0.02
		[0.306]		[0.652]		[0.027]
Currently Married		0.81**		1.78***		-0.00
		[0.334]		[0.686]		[0.032]
Language of interview Russian		1.01***		2.38***		0.00
		[0.237]		[0.671]		[0.028]
Firm located in Bishkek	1.04***	-0.34	0.03	-1.52	-0.15***	-0.12**
	[0.378]	[0.422]	[0.689]	[1.291]	[0.026]	[0.049]
Firm owner controls	No	Yes	No	Yes	No	Yes
Cohort and Business-type Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	866	866	866	866	866	866
R-squared	0.121	0.247	0.129	0.189	0.128	0.157

Notes: The dependent variables are business in-network kin-based connections in columns 1 and 2, business out-network kin-based connections in columns 3 and 4 and share of business in-network that is kin-based in columns 5 and 6. Firm owner controls are gender, age, education, ethnic group, religion, birth location, marital status, language of interview. Additional firm controls are legal type and whether the firm owns the place of business. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Profit margin

	OLS (1)	OLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)
VARIABLES						
Business In-Use Network Kin	1.17*** [0.198]	1.48*** [0.211]	1.42*** [0.212]	5.52*** [1.943]	1.41*** [0.211]	5.39*** [1.880]
Business Out-Use Network Kin		-0.38*** [0.120]	-0.41*** [0.124]	-0.89** [0.449]	-0.42*** [0.124]	-0.89** [0.441]
Male			1.40 [1.999]	0.87 [2.482]	1.46 [2.003]	0.87 [2.496]
Age of respondent (in years)			0.10 [0.080]	0.11 [0.095]	0.10 [0.082]	0.11 [0.096]
Some higher education			-5.81*** [1.949]	-6.90*** [2.307]	-5.74*** [1.967]	-6.91*** [2.328]
Currently Married			0.47 [2.100]	-2.71 [2.686]	0.61 [2.118]	-2.61 [2.670]
Language of interview Russian			1.32 [1.889]	-1.65 [2.341]	1.26 [1.889]	-1.55 [2.301]
Firm located in Bishkek	1.11 [1.852]	0.50 [1.848]	-1.14 [3.517]	1.19 [3.873]	-1.11 [3.518]	1.14 [3.863]
Partnership					-4.37 [10.202]	-2.17 [10.535]
LLC					3.88 [7.884]	5.29 [6.541]
Firm owns place of business					0.25 [0.514]	-0.14 [0.594]
Firm owner controls	No	No	Yes	Yes	Yes	Yes
Additional firm controls	No	No	No	No	Yes	Yes
Cohort and Business-type Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
AR statistic of joint significance				9.91 0.007		9.97 0.007
Observations	772	772	772	705	772	705
R-squared	0.119	0.130	0.166		0.167	

Notes: The dependent variable is profit margin in 2018. Firm owner controls are gender, age, education, ethnic group, religion, birth location, marital status, language of interview. Additional firm controls are legal type and whether the firm owns the place of business. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Profits

	OLS (1)	OLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)
VARIABLES						
Business In-Use Network Kin	1,692.34 [1,188.861]	3,144.60** [1,360.781]	2,739.25** [1,393.423]	19,639.48* [10,468.917]	2,785.20** [1,390.612]	17,523.74* [9,753.445]
Business Out-Use Network Kin		-1,752.82*** [604.367]	-1,768.77*** [620.461]	1,057.70 [1,567.741]	-1,773.17*** [619.546]	1,011.20 [1,536.152]
Assets	0.01*** [0.004]	0.01*** [0.003]	0.01*** [0.004]	0.01*** [0.004]	0.01*** [0.004]	0.01*** [0.004]
Workers	16,333.57*** [3,231.527]	16,872.98*** [3,319.057]	15,760.32*** [3,374.659]	11,365.28*** [4,341.484]	15,744.76*** [3,439.384]	11,574.24*** [4,257.825]
Male			9,532.54 [10,212.090]	14,125.08 [12,154.872]	9,511.63 [10,241.565]	13,669.05 [11,832.026]
Age of respondent (in years)			551.08 [426.316]	886.09* [487.806]	573.09 [429.307]	799.48* [479.509]
Some higher education			-1,683.21 [9,857.098]	-2,835.19 [12,056.684]	-1,173.76 [9,918.771]	-3,208.42 [11,867.727]
Currently Married			12,496.71 [10,863.349]	-8,125.93 [14,083.630]	13,395.82 [10,890.095]	-6,283.85 [13,892.879]
Language of interview Russian			-4,483.60 [9,747.793]	-26,416.49** [11,807.132]	-5,396.07 [9,770.182]	-25,322.37** [11,471.643]
Firm located in Bishkek	36,288.45*** [10,549.458]	34,116.95*** [10,691.986]	-724.73 [20,083.926]	11,680.44 [22,391.898]	7.77 [19,979.738]	11,472.68 [21,981.358]
Partnership					6,843.79 [35,848.487]	21,254.52 [36,809.551]
LLC					57,863.00 [43,126.768]	88,133.19* [46,233.037]
Firm owns place of business					1,778.69 [2,475.147]	-1,984.42 [3,071.730]
Firm owner controls	No	No	Yes	Yes	Yes	Yes
Additional firm controls	No	No	No	No	Yes	Yes
Cohort and Business-type Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
AR statistic of joint significance				6.65 0.036		5.93 0.052
Observations	751	751	751	685	751	685
R-squared	0.221	0.230	0.263		0.266	

Notes: The dependent variable is business profits in 2018. Firm owner controls are gender, age, education, ethnic group, religion, birth location, marital status, language of interview. Additional firm controls are legal type and whether the firm owns the place of business. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Business Growth

VARIABLES	FE	FE	FE	FE	FE	FE
	New Firm: Established in 2016			New Firm: Established 2014-2016		
	(1)	(2)	(3)	(4)	(5)	(6)
New firm	0.02 [0.039]	0.04 [0.050]	-0.12 [0.084]	0.09*** [0.027]	0.09** [0.038]	0.06 [0.087]
Has Business Network	0.09*** [0.026]	0.10*** [0.036]	0.13* [0.077]	0.09*** [0.025]	0.09*** [0.036]	0.16* [0.097]
Proportion of business network that is kin	-0.11*** [0.033]	-0.11*** [0.038]	-0.16* [0.095]	-0.11*** [0.031]	-0.12*** [0.036]	-0.27*** [0.094]
Has Business Network*New Firm	0.52*** [0.194]	0.47** [0.197]	0.57*** [0.217]	0.17*** [0.039]	0.17*** [0.048]	0.15 [0.105]
Proportion of business network that is kin*New firm	-0.39 [0.243]	-0.33 [0.244]	-0.34 [0.268]	0.03 [0.081]	0.05 [0.083]	0.11 [0.096]
Assets	0.16** [0.073]	0.11 [0.071]	-0.01 [0.083]	0.11 [0.073]	0.07 [0.067]	-0.04 [0.082]
Workers	-0.00 [0.022]	-0.02 [0.030]	0.02 [0.016]	-0.01 [0.016]	-0.03 [0.025]	0.01 [0.017]
New firm, no-kin business network	0.64*** [0.19]	0.61*** [0.19]	0.59*** [0.21]	0.35*** [0.04]	0.35*** [0.05]	0.38*** [0.11]
New firm, all-kin business network	0.14* [0.08]	0.16** [0.08]	0.09 [0.09]	0.27*** [0.07]	0.28*** [0.08]	0.22** [0.11]
Old firm, all-kin business network	-0.015 [0.012]	-0.016 [0.027]	-0.029 [0.088]	-0.026** [0.012]	-0.023 [0.026]	-0.11 [0.104]
Business-type specific growth rate	No	Yes	Yes	No	Yes	Yes
Only 2017 and 2018 Obs.	No	No	Yes	No	No	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,384	1,384	965	1,384	1,384	965
R-squared	0.092	0.151	0.183	0.200	0.246	0.200
Number of Firms	573	573	569	573	573	569
Number of New Firms	131	131	131	299	299	299

Notes: The dependent variable is log of business revenue in a given year. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Reinvestment

	OLS (1)	OLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)
VARIABLES						
Business In-Use Network Kin	-0.41** [0.194]	0.17 [0.255]	0.22 [0.282]	-3.26* [1.672]	0.26 [0.288]	-3.24** [1.652]
Business Out-Use Network Kin		-0.74*** [0.175]	-0.73*** [0.195]	-1.20 [2.179]	-0.72*** [0.194]	-1.04 [2.060]
Male			0.29 [2.487]	2.01 [2.964]	-0.46 [2.474]	1.83 [3.008]
Age of respondent (in years)			0.13 [0.105]	0.18 [0.118]	0.14 [0.107]	0.20* [0.117]
Some higher education			3.87 [2.424]	6.20** [2.865]	3.59 [2.421]	6.24** [2.938]
Currently Married			2.82 [2.858]	5.75 [5.279]	2.79 [2.868]	5.59 [5.281]
Language of interview Russian			3.01 [2.547]	6.60 [4.639]	3.15 [2.537]	6.16 [4.420]
Firm located in Bishkek	-19.56*** [2.511]	-20.58*** [2.473]	-20.88*** [3.998]	-21.37*** [7.143]	-21.36*** [4.007]	-21.39*** [7.033]
Partnership					18.99** [8.679]	14.00 [10.999]
LLC					-17.61* [10.683]	-14.40 [13.724]
Firm owns place of business					-0.49 [0.645]	0.68 [0.907]
Firm owner controls	No	No	Yes	Yes	Yes	Yes
Additional firm controls	No	No	No	No	Yes	Yes
Cohort and Business-type Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
AR statistic of joint significance				4.28 0.118		3.90 0.142
Observations	686	686	686	631	686	631
R-squared	0.173	0.199	0.243		0.252	

Notes: The dependent variable is percent of profits in 2018 that are reinvested in 2019. Firm owner controls are gender, age, education, ethnic group, religion, birth location, marital status, language of interview. Additional firm controls are legal type and whether the firm owns the place of business. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Kin Networks, Orientation and Performance

VARIABLES	OLS (1)	OLS (2)	OLS (3)	OLS (4)
Business In-Use Network Kin	1.38** [0.604]	1.77*** [0.574]	2.00*** [0.609]	2.00*** [0.615]
Business In-Use Network Kin *Cluster 2	0.01 [0.643]	-0.26 [0.633]	-0.60 [0.668]	-0.61 [0.676]
Business In-Use Network Kin *Cluster 3	-1.71** [0.844]	-1.33 [0.849]	-1.64* [0.890]	-1.63* [0.892]
Business Out-Use Network Kin		-0.49* [0.261]	-0.63** [0.266]	-0.63** [0.266]
Business Out-Use Network Kin *Cluster 2		0.34 [0.339]	0.46 [0.342]	0.45 [0.343]
Business Out-Use Network Kin *Cluster 3		-0.22 [0.310]	-0.09 [0.305]	-0.09 [0.306]
Cluster 2	-4.06 [2.824]	-5.12* [3.104]	-4.11 [3.142]	-4.19 [3.150]
Cluster 3	-1.99 [3.580]	-2.36 [3.840]	-2.42 [3.909]	-2.32 [3.927]
In-Network for firms in Cluster 2	1.40*** [0.228]	1.50*** [0.270]	1.39*** [0.269]	1.39*** [0.267]
In-Network for firms in Cluster 3	-0.32 [0.876]	0.17 [0.890]	-0.24 [0.930]	-0.24 [0.933]
Out-Network for firms in Cluster 2		-0.15 [0.213]	-0.17 [0.212]	-0.18 [0.214]
Out-Network for firms in Cluster 3		-0.36 [0.380]	-0.26 [0.377]	-0.27 [0.379]
Firm owner controls	No	Yes	Yes	Yes
Additional firm controls	No	No	No	Yes
Cohort and Business-type Fixed Effects	Yes	Yes	Yes	Yes
Observations	738	738	738	738
R-squared	0.133	0.148	0.187	0.189

Notes: The dependent variable is profit margin in 2018. Firm owner controls are gender, age, education, ethnic group, religion, birth location, marital status, language of interview. Additional firm controls are legal type and whether the firm owns the place of business. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Appendix

Table A1: Production Function

	OLS	OLS	OLS
	(1)	(2)	(3)
VARIABLES			
Assets (in logs)	0.09*** [0.030]	0.09*** [0.030]	0.09*** [0.030]
Workers	0.10*** [0.017]	0.09*** [0.018]	0.09*** [0.018]
Male		0.11 [0.072]	0.11 [0.072]
Age of respondent (in years)		-0.00 [0.003]	-0.00 [0.003]
Some higher education		0.17** [0.071]	0.17** [0.071]
Currently Married		0.15* [0.081]	0.16* [0.081]
Language of interview Russian		-0.10 [0.070]	-0.10 [0.070]
Firm located in Bishkek	0.44*** [0.069]	0.20 [0.134]	0.20 [0.134]
Partnership			0.29 [0.207]
LLC			0.44** [0.190]
Firm owns place of business			0.00 [0.018]
Firm owner controls	No	Yes	Yes
Additional firm controls	No	No	Yes
Cohort and Business-type Fixed Effects	Yes	Yes	Yes
Observations	749	749	749
R-squared	0.190	0.230	0.234

Notes: The dependent variable is log business revenue in 2018.

Table A2: Profitability and Kinship: Honest respondents only

	OLS (1)	OLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)
VARIABLES						
Business In-Use Network Kin	1.16*** [0.448]	1.57*** [0.492]	1.41*** [0.499]	46.59 [184.261]	1.42*** [0.493]	52.22 [227.518]
Business Out-Use Network Kin		-0.47*** [0.130]	-0.52*** [0.136]	-6.53 [22.077]	-0.52*** [0.137]	-6.78 [25.597]
Male			1.44 [2.588]	-8.71 [37.297]	1.44 [2.598]	-9.12 [43.513]
Age of respondent (in years)			0.12 [0.099]	0.29 [0.648]	0.13 [0.100]	0.43 [1.235]
Some higher education			-5.93** [2.321]	-24.45 [72.184]	-5.77** [2.356]	-24.11 [78.577]
Currently Married					0.12 [2.535]	-18.60 [76.255]
Language of interview Russian					-0.39 [2.283]	-8.69 [40.315]
Firm located in Bishkek	-1.39 [2.407]	-2.49 [2.418]	-3.40 [4.464]	40.18 [197.986]	-3.47 [4.479]	47.09 [248.296]
Partnership					0.95 [14.124]	57.08 [291.435]
LLC					3.93 [7.119]	11.22 [62.968]
Firm owns place of business					0.56 [0.652]	5.23 [21.446]
Firm owner controls	No	No	Yes	Yes	Yes	Yes
Additional firm controls	No	No	No	No	Yes	Yes
Cohort and Business-type Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	497	497	497	450	497	450
R-squared	0.157	0.175	0.227		0.229	

Notes: The dependent variable is profit margin in 2018. Firm owner controls are gender, age, education, ethnic group, religion, birth location, marital status, language of interview. Additional firm controls are legal type and whether the firm owns the place of business. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table A3: Firm Growth and Kinship: Honest respondents only

	FE	FE	FE	FE	FE	FE
	New Firm: Established in 2016			New Firm: Established 2014-2016		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
New firm	0.08*	0.13**	-0.05	0.10***	0.07	0.11
	[0.047]	[0.059]	[0.127]	[0.027]	[0.046]	[0.104]
Has Business Network	0.13***	0.13***	0.19**	0.12***	0.13***	0.24**
	[0.032]	[0.039]	[0.094]	[0.031]	[0.038]	[0.116]
Proportion of business network that is kin	-0.15***	-0.15***	-0.23*	-0.15***	-0.15***	-0.35***
	[0.039]	[0.045]	[0.124]	[0.037]	[0.042]	[0.125]
Has Business Network*New Firm	0.51*	0.40	0.52*	0.16***	0.17***	0.11
	[0.282]	[0.289]	[0.305]	[0.043]	[0.058]	[0.133]
Proportion of business network that is kin*New firm	-0.38	-0.29	-0.32	0.08	0.10	0.12
	[0.345]	[0.353]	[0.357]	[0.102]	[0.108]	[0.121]
Assets	0.15*	0.06	-0.06	0.11	0.03	-0.09
	[0.083]	[0.081]	[0.090]	[0.082]	[0.077]	[0.090]
Workers	-0.02	-0.06**	0.02	-0.03*	-0.07***	0.02
	[0.019]	[0.025]	[0.024]	[0.015]	[0.021]	[0.026]
New firm, no-kin business network	0.71***	0.66**	0.66**	0.38***	0.37***	0.46***
	[0.276]	[0.28]	[0.28]	[0.04]	[0.05]	[0.14]
New firm, all-kin business network	0.18*	0.22**	0.11	0.30***	0.32***	0.23*
	[0.10]	[0.11]	[0.11]	[0.095]	[0.102]	[0.13]
Old firm, all-kin business network	-0.02	-0.017	-0.037	-0.03**	-0.025	-0.12
	[0.013]	[0.027]	[0.105]	[0.013]	[0.027]	[0.12]
Business-type specific growth rate	No	Yes	Yes	No	Yes	Yes
Only 2017 and 2018 Obs.	No	No	Yes	No	No	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	949	949	664	949	949	664
R-squared	0.121	0.233	0.183	0.210	0.305	0.199
Number of Firms	392	392	390	392	392	390

Table A4: Profitability and Kinship: Missing data

	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
	Missing DV in any possible year		Profit margin	Missing DV in 2018		Profit Margin
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Family would have info	-0.05 [0.041]	-0.06 [0.043]		-0.04 [0.030]	-0.02 [0.030]	
Owner-operator	-0.17*** [0.039]	-0.19*** [0.040]		-0.12*** [0.025]	-0.12*** [0.025]	
In-use business network kin	-0.00 [0.005]		4.93*** [1.682]	0.00 [0.003]		5.38*** [1.842]
Out-use business network kin	0.00* [0.002]		-0.85** [0.418]	0.00* [0.001]		-0.97** [0.445]
Cousins		0.00*** [0.002]			0.00 [0.001]	
Cousins squared		-0.00** [0.000]			-0.00 [0.000]	
Inverse Mills ratio			3.40 [5.270]			5.90 [5.085]
Firm owner controls	Yes	Yes	Yes	Yes	Yes	Yes
Additional firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Cohort and Business-type Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	980	864	688	970	852	676
Pseudo R-squared	0.257	0.246		0.222	0.196	
F-test, network variables	3.29			4.61		
p-value	0.193			0.0996		
F-test, information variables	19.32	21.33		20.25	21.72	
p-value	0.00	0.00		0.00	0.00	