Firms, Kinship and Economic Growth in the Kyrgyz Republic[1]

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Abstract

This paper addresses whether kinship networks promote or impede entrepreneurship in the Central Asian Republic of Kyrgyzstan. We conducted a survey of firm managers/entrepreneurs about their business networks, resources they receive from and provide to their contacts, their firm's performance, and the business environment they face. Our data indicate that receiving help from kin connections increases profitability, while providing help to kin decreases it. While kin-reliant firms grow slower than firms with a lower degree of kin assistance, the former grow faster than firms that do not have access to business networks. In addition, kin connections and firm performance are unrelated for firms that have adopted best business practices. Our results demonstrate that directly measuring both receipt and provision of help from/to kin helps resolve the ambiguity of findings in the broader literature regarding the net effects of kin networks on firm performance: the two forms of network use are positively correlated, yet have opposite effects.

I. Introduction

Reliance by entrepreneurs and firm managers on kinship and other social ties for business purposes has important, but unclear implications for economic growth. On the one hand, relational exchange can encourage kin-based favoritism, increase market segmentation, divert profits or other resources away from investment toward redistribution, and complicate the enforcement of contracts due to solidarity concerns (Baland et al 2011, Fafchamps 2004, Grimm et al. 2013, Platteau 2000). Heavy kin reliance can thus produce resource misallocation, inefficiency, and even a poverty trap (Kranton 1996, Hoff and Sen 2006, Platteau 2009). On the other hand, kin and social networks can provide access to asset equity, working capital, or credit when markets do not function well (Khayesi et al. 2014). Relational contracting can solve information and enforcement problems when institutions are weak (Greif 1993). Kinship ties can also coordinate collective action (Munshi 2011) and even promote modernization (Ismailbekova 2017). In some circumstances, then, kin reliance can ameliorate the business environment for entrepreneurs, thereby increasing productive and allocative efficiency and leading to economic growth.

Quantitative studies in Western Europe, the United States and Sub-Saharan Africa find mostly negative or null effects of family ties on business performance (see Table C1 in the Appendix for a summary of these studies), in contrast to mostly positive effects of non-kin networks (e.g., Acquaah 2012, Bertrand et al. 2008, Fafchamps and Minten 2002, Gassie-Falzone 2016, Miller et al. 2009). However, the countervailing effects of kinship may be obscured in the empirical literature for want of detailed data on the assistance entrepreneurs obtain from and provide to kin and close friends in their networks, especially due to the fact that these forms of assistance are typically positively correlated.

We analyze the effects of kinship networks on firm performance in Kyrgyzstan, a poor post-Soviet Central Asian country that occupies intermediate positions globally with respect to indicators of traditionalism, economic performance, and business climate. Forming part of the buckle of China's Belt and Road Initiative, Kyrgyzstan plays a central role in unlocking the challenges of Eurasia, a region with growing importance in the global economy. The "intrafamilial implicit contract" (Ben-Porath 1980, Stark and Lucas 1988, Grimard 1997) may operate differently in this part of the world that has yet to receive close examination. We conducted a survey of 1,000 business owners in the country's two largest cities, obtaining information about their potential and actual receipt of assistance from "in-networks" and their provision of resources to their "out-networks." By simultaneously estimating the effects of in- and out-network use, we show that they have intuitive, opposite-signed effects on firm performance. Specifically, our regressions indicate that kin-based in-network connections have a positive association with profitability in fiscal year 2018, while their kin-based out-network connections have a negative association. These associations are fairly strong, explaining up to one third of a standard deviation in profit margin. Fixed effects regressions using an unbalanced pseudo-panel we constructed based on retrospective data on firm revenue and investment show that firms whose owners have at least one person (kin or otherwise) who could provide business assistance to them (potential in-network) grow faster than firms whose owners report no such persons, in line with the previous literature. However, new firms with kin-dominated in-networks grow more slowly than new firms that report no kin in their potential in-network.

We consider two possible mechanisms linking the two results. If firms need resources on hand to reciprocate the help that they have received, they may underinvest to keep profits (and cash flow) high. More generally, participation in a community-based informal insurance network

may motivate owners to favor cash on hand over reinvesting profits. Our evidence suggests that greater reliance on kin networks reduces the amount of profits that are reinvested, but by magnitudes that are insufficiently large to explain the differential growth rates. The second potential channel is the adoption of best practices according to (Western-style) business education. Using cluster analysis, we classify firms into three groups based on their reported adoption of business practices. We find that the linkage between kin reliance and firm performance is primarily for firms that are less oriented toward best business practices. For firms oriented toward best business practices, we cannot reject the null of no effect. These findings suggest that reliance on kin is not a poverty trap since firms that are oriented towards best business practices are no less likely to use kin connections in the course of their business.

We perform several robustness checks, which are discussed in the main results section, the sensitivity analysis section and the appendix. First, we employ instrumental variables estimation that relies on two identification assumptions: i) that the number of cousins and the number of cousins squared differentially affect in- and out-connections and ii) the number of cousins does not influence firm performance except through the number of kin connections after we control for our set of firm and firm owner characteristics. The IV estimates are larger and less precisely estimated than the OLS estimates, but yield qualitatively similar results. Second, we address measurement error in our dependent variable, given that firms could systematically over or under report revenue and/or profits. We perform nonlinear least squares estimation of a model that allows for both over and under reporting that skew the error distribution (Millimet and Parmeter 2019). We also rerun all of our models on the subsample of firms that our survey enumerators deemed as reporting numbers truthfully. The results are quite similar. Third, we address missing data using a Heckman-type correction, again finding qualitatively similar

results. Finally, we rerun our models controlling for the respondent's clan. Since the role of kin ties could operate through clan culture or access to clan-specific resources, we do not incorporate clan dummies in our main regression. Their inclusion, however, allows us to rule out clan-level factors as the source of the correlation between the network variables and economic performance.

In the next section, we discuss the national context of our study. Section 3 considers prior literature on the effects of kinship networks on business performance and formulates hypotheses. In section 4, we describe our survey. Section 5 discusses our estimation strategy and presents the results. Section 6 concludes.

II. Context

Formerly part 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. The demise of Soviet economic and political institutions (which heavily subsidized large enterprises), the severing of Communist-era trade links, and market reforms led to steep macroeconomic contraction through the end of the 1990s. Positive growth resumed in the 2000s, followed by recessions linked to global and regional developments in 2008 and 2014. The country lost human capital stock when many ethnic Russian citizens emigrated during the 1990s. Since the 2000s, it has experienced mass labor migration, primarily to Russia, and relies heavily on migrant remittances. Kyrgyzstan's first post-Soviet president, Askar Akaev and his successor, Kurmanbek Bakiev, in 2010, were both overthrown by popular uprisings (in 2005 and 2010, respectively), and the incumbent winner of the October 2020 presidential election, Sooronbay Jeenbekov, was ousted during post-election street protests. The 2010 events included widespread violence pitting the

minority Uzbek population against the majority Kyrgyz, particularly in the country's southern regions. Kyrgyzstan's 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, poor protection of property rights, endemic political and economic crises, lack of 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 post-Soviet property redistribution, 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). In addition to these factors, Soviet-era rigidities in infrastructure, disinvestment, low effective domestic demand, and political turmoil make the business environment unfavorable (Ozcan 2008). Possibly as a response, many businesses have a single owner, whose family members occupy managerial positions (Yalcin and Kapu 2008). Political connections are vital for the survival of businessmen faced with the "grabbing hands" of the government and powerful business rivals (Spector 2008). Lack of natural resources (particularly oil and natural gas), poor infrastructure and energy production, sparse population, landlocked, mountainous geography that blocks trade routes, and ethnic, linguistic and regional divisions also pose major challenges to business development. Competition from producers in nearby China undermines 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 some success prior to October 2020 in holding free and fair elections are 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 taken 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 Kyrgyzstan, an important rationale for our empirical focus on them.

The most recent round in Kyrgyzstan of the World Bank-EBRD Business Environment and Enterprise Performance Surveys (BEEPS), a comparative firm-level study featuring multiple transition countries, largely confirms these findings. Among the 270 firms (42 of which had over 100 employees) surveyed in 2013, 36% cited political instability as their greatest obstacle, compared to 8% in Russia in 2012 and the 11% average across all countries for 2010-2017. Corruption is another often-cited "biggest obstacle" (12% in Kyrgyzstan vs. 8% in Russia and 7% overall). Bribe or gift requests by public officials are commonplace, reported by 55% of Kyrgyzstani firms in the process of obtaining an operating license, compared to 7.3% in Russia and 13% in all. Corruption likely drives many Kyrgyzstani firms into the informal sector.

Although the business environment is rather difficult in Kyrgyzstan, one of the poorest countries in the BEEPS sample, it compares favorably to other transition and European countries in several respects important for business growth. Fewer than 5% of Kyrgyzstani firms report access to finance as the biggest obstacle (versus 15% for Russia in 2012, 16% for all countries surveyed 2010-2017). 47% of Kyrgyzstani firms introduced a new product/service, compared to 37% overall. Their exports are on par with those of firms in other countries, at 6% of an average firm's sales. Kyrgyzstani firms also rank high in internet presence and female ownership.

Kin and clan affiliations in Kyrgyz society have long-standing cultural significance, and their importance as a source of resources and well-being has grown in the face of the economic

crisis and formal institutional vacuum that followed the Soviet collapse in 1991 (Ozcan 2008; Yalcin and Kapu 2008). 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). Decisions to do so are motivated more by morality than by instrumental considerations, while amounts given may vary by situational considerations of deservingness, obligation, and ability to pay (Sanghera et al. 2011). Resource allocation through clan ties reproduces inequality over generations (Aldashev and Guirkinger 2019). However, one qualitative study suggests that kin-based networks, while still important, have been weakened by growing inequality and poverty: the rise of a cash-based, market economy has excluded the poor and cast them into subservient positions, while better-off, urbanized Kyrgyzstani citizens now value instrumentally-motivated networks at the expense of traditional ties based on kinship and clan (Kuehnast and Dudwick 2004).

Altogether, Kyrgyzstan occupies an intermediate position with respect to traditional values and market development. The Inglehart-Welzel Cultural Map puts it on par with the African-Islamic grouping, characterized by more traditional and survival-based values, but at one of the least extreme points within this group (Welzel 2013). It ranks 70th on the 2019 Ease of Doing Business Index, ahead of most Sub-Saharan African countries (World Bank 2019). Its intermediate positions regarding kinship ties and market development make Kyrgyzstan an ideal setting for examining whether kinship networks foster or suppress economic growth, because it transcends the usual the high (low) importance of kin/low (high) level of development dichotomy that divides Sub-Saharan Africa from the United States and Western Europe, where most prior empirical studies have been conducted.

Kyrgyzstan shares common features with the other Central Asian countries, including the challenges to entrepreneurship just described, widespread reliance on social networks and kin for many social and economic purposes, the difficult legacies of the Soviet era, and Islamic heritage. Lacking the hydrocarbon resources of Kazakhstan, Turkmenistan, and Uzbekistan, Kyrgyzstan is poorer, similar to Tadzhikistan in this respect. It is considerably more democratic and has a stronger civil society than its neighbors. But all five Central Asian republics have an unfavorable industrial base, and apart from hydrocarbon exports they have much in common. Therefore, our results likely pertain not only to Kyrgyz Republic, but to the Central Asian region more generally.

III.   Prior Literature and Hypotheses

The literature has not established a robust positive effect of kin ties, as opposed to social ties in general or political ties, on firm performance. Table C1 in the appendix summarizes the previous literature 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 composition of the sample of firms; and the main findings. The closest studies to ours are Grimm et al. (2017) and Berrou and Combarnous (2012), both of which examine the Sub-Saharan African context and find negative effects of kin ties. Like Berrou and Combarnous (2012), we directly measure the size of networks that entrepreneurs use for specific business purposes. And like Grimm et al. (2017), we consider that these explicit links may not be exogenous and may reflect entrepreneur characteristics or unobservable shocks. Our main innovation is to measure actual and potential in-network and actual out-network connections separately, in order to better disentangle the positive and negative effects of kin reliance on firm performance that the previous literature has hypothesized.

Networks of reciprocal exchange can dominate market exchange, with potential detrimental consequences for growth (Kranton 1996). When entrepreneurs rely on family members to provide loans, advice, access to suppliers or markets, discounted labor, or other resources, they may thereby incur obligations, which they prioritize over re-investment and sound business practice due to the normative power of kinship ties. The benefits and costs of obtaining or distributing resources through networks function as implicit prices that guide decision-making. In principle, market prices provide better guidance on the merits of alternative transactions because they better reflect marginal valuations: implicit prices based on kin connections are likely to be more ambiguous and uncertain, imposing additional risk on the firm. Thus, over-reliance on family members rather than outsiders for business advice can yield poor decisions regarding hiring, pricing, suppliers, a typical bane of firms in developing countries (Bloom et al. 2010). When kin connections link firm survival to family survival, unprofitable firms may fail to exit, diverting resources from productive use. This may help explain why most firms in developing countries are small, and many adopt survival instead of growth-oriented strategies (Nichter and Goldmark 2009). Small family firms designed to share risk across a network will also exhibit more risk averse behavior (Platteau 2000). The presumed adverse impact of kin ties and nepotism relative to market considerations on business decisions, particularly with respect to the reinvestment of profits, is at the heart of the conventional wisdom that they are an obstacle to growth.

However, overreliance on kin networks may be more of a symptom than a cause of low growth. After all, family ownership persists despite the purportedly superior performance of non-family firms (Bertrand and Schor 2006). When property rights enforcement is weak, family firms may limit the negative impact of employee spinouts (Rauch 2013). Family members also may

give firms cheaper access to resources than the market due to lower transactions costs or altruistic preferences. Moreover, the effect of kin ties on firm performance may be nonlinear (Anderson and Reeb 2003, Kowalewski et al. 2010). First, low levels of kin involvement could have a positive effect on firm performance, while higher levels turn the effect negative. Second, having kin ties at the initial stages of a firm's life course may have a positive effect while more extended involvement in later phases could negatively affect firm growth.

In addition, the impact of heavy reliance on kin ties may vary by economic context. Where the value of the outside option (transacting in the market) is high, as in the US, we would expect entrepreneurs to access kin networks only when there are clear benefits to doing so. Even when a firm owner has altruistic preferences toward kin, if markets are complete, the separation property should hold: firms maximize the size of the pie and then let preferences determine the flow of profits across kin ties. Helping others should have no effect on profitability. However, when the value of the outside option of transacting in the market is low, the relationship between kin ties and firm performance may be more nuanced. Under incomplete markets, the separation property may no longer hold, and production decisions can depend upon preferences. An otherwise profit maximizing firm may sacrifice profitability for solidarity with kin.

According to BEEPS, discussed in the previous section, Kyrgyz firms face poor conditions with respect to political instability and corruption, but apparently perform reasonably in key indicators of firm development. Kinship ties, for instance, could explain why firms face fewer problems with access to finance. We therefore hypothesize that reliance on kin networks, particularly as it relates to finance, increases firms' profitability.

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. However, the interfamilial implicit contract implies that a business owner who chooses to access kin networks for business help will subsequently face pressure to provide help in turn. When markets are incomplete, meeting such obligations can eventually limit a firm's profitability. In light of these countervailing effects and correlation (due to reciprocity) between receipt and provision of assistance to kin, it's difficult to anticipate the sign of the total effect of turning to kin for help in Kyrgyzstan.

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 use independent measures of in- and out-network use to investigate whether, consistent with theory, the two have opposite associations with firm performance.

How does the reliance on kin networks affect the growth of the firm? If the realized value of obligations is more than that of help received, the firm relying on kin networks should experience a drain on resources that should dampen growth. Conversely, if the realized value of obligations is less than the realized value of help received, the firm should experience a boost to growth relative to those that do not access kin networks. We expect that the timing in the life cycle of the firm of help given and received affects their respective realized values.

IV.   Survey and Data Description

The best publicly available data on Kyrgyz firms, BEEPS (discussed above), is unsuitable for our purposes because it lacks questions about the relationship between kinship and the business

environment, it excludes firms with under 5 employees (the vast majority in Kyrgyzstan), and its sampling technique relies on the official registry of firms, which is unrepresentative of all firms (undercounting smaller and informal sector firms specifically) and quickly outdated. Thus, we designed a survey of firms in Kyrgyzstan on potential and actual kinship and non-kinship network use both to receive and to provide specific forms of assistance, and a sampling strategy to target firms with fewer than 50 employees (including in the informal sector).

To implement our survey, we enlisted 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 conducting surveys and interviews in collaboration with foreign research teams, and expertise on national economic, political, and social institutions in the Kyrgyz Republic. We surveyed 1000 small business owners, randomly chosen from a roster of firms that we assembled by recording all firms in sampled precincts that had visible signage from the street. We selected 10 firms from 60 precincts (randomly selected from 204 precincts) in Bishkek and 40 precincts (randomly selected from 73 precincts) in Osh.[2] Our response rate is 57%, higher than the rates obtained by BEEPS (BEEPS 2010) and World Management Surveys (Bloom et al. 2016) as one might expect given the smaller size of our firms.

Our survey has several limitations. First, our sample is not nationally representative. Second, even though we targeted firms with fewer than 50 employees, larger firms were less likely to respond, in part due to our inability to provide monetary incentives. Therefore, we caution against generalizing our findings to firms with more than 15 employees. Third, our sampling method misses firms that are hiding or difficult to find, and those in isolated locations with low

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[2] Appendix A describes our sampling method in full detail.

population density. These shortcomings, which are common for firm studies in developing

countries and elsewhere, are offset by the advantages of an instrument tailored to our purposes, a

suitable representation of small firms, and a high response rate.

IV.i. Key variables

Our main dependent variables measuring 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, as de Mel et al. (2009) recommend. We focus on

profitability instead of return on assets because in our context asset valuations are likely to

produce more measurement error[3], investors care about profitability, and firms may differ in

their risk environment, creating additional measurement issues when assets are used.

Our second measure of firm performance is revenue growth, which addresses the

previous literature's association of kin networks with survival orientation. We used retrospective

data to construct this variable. For each firm, we potentially observe revenue for the first full

year of the firm's life, the second full year and the years of 2017 and 2018. We thus have at least

two observations of year-by-year growth and up to four observations of revenue growth.

Even with the best methods to ensure high quality data, firms without formal accounting

or required disclosure of financial accounts may hide or distort financially sensitive information.

Measurement error in the dependent variable is typically a minor concern unless it is correlated

with the key independent variables, our network variables.[4] While factors that affect under/over

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[3] In Kyrgyzstan standard capital valuations are less familiar than sales, and thus likely to introduce more measurement error. Also, over/under reporting of revenue and profits is likely to be in the same direction, mitigating the error in their ratio.

[4] Concerns about measurement error depend on how the data are used. If we were to, for example, estimate how much tax revenue the Kyrgyz government should be collecting from firms in Bishkek and Osh, then underreporting would be a more serious problem.

reporting or nonresponse could be entirely idiosyncratic, our estimation strategy (discussed below) accounts for systematic under/over reporting or selective nonresponse.

Key independent variables

The main explanatory variables are based on batteries of questions concerning a firm owner's use of business and personal networks. Network variables are ego-centric and derived from pre-specified links between the firm owner and their business and social contacts. For business in-networks, we asked how many family, friends, clan members and others (respectively) the firm owner could turn to (potential network) and has turned to (actual network) for each of four kinds of assistance: a loan, help with a dispute, help with government bureaucracy, and finding suppliers or clients. For business out-networks, we asked how many people in each of the same categories the firm owner provided with: jobs, business advice or help, favorable supplier or customer terms, and housing or other material support in the last two years.

For aggregate measures of in- and out-network use, we weight each type of help equally and sum across all categories within the two respective domains. These measures are similar to ego-centric network degree (number of persons in one's network), but they count multiple types of help received from or provided to the same person multiple times: for example, receiving four types of help from one person is equivalent to receiving one type of help from four people. In essence, each type of help represents a separate network, whose degrees are then summed up to capture the total business in- and out-networks. Full network data, although preferable, are costly to collect. For certain types of questions, such as assessing the risk sharing properties of the network, our measures are unsuitable, but for our research question they have the advantage of

measuring reliance on kin for and provision to kin of *specific forms of* business assistance. Our categories of assistance, while not exhaustive, cover a wide range.

As a validity check, we constructed an alternative measure. We asked respondents to name five specific individuals who had given them business help and to indicate the importance of the help by provided by each on a scale from 1 to 4. The average importance of help from these individuals correlates with the total actual in-network connections at 0.42, with a p-value under .01. Our preferred measure captures variation in the importance of network help.

Additional variables:

In addition to collecting a wide array of information on the demographic and socioeconomic characteristics of the firm owner, we what clan (*uruu*) they belong to. We elicited open responses due to the changing meaning of clan identity in Kyrgyz society. Of the 771 ethnic Kyrgyz, we received 253 distinct responses including "I don't know" (99 firms) and "Refuse to answer" (22 firms). Clearly, some respondents reported subclan and/or other meanings of clan than the set of 40 tribes. For the subclans that we could identify, we then created a new variable with 45 distinct responses, including the "I don't know" and "Refuse to answer". We include this broad measure as a control variable to rule out variations in clan membership as a confounding variable.

We obtained 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 a webpage, a dedicated email account, a dedicated bank account, a tax identification number, and formal registration papers, and 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 so all these measures 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), intermediate (386, or 41%), and low (304 or 32%) levels of best business practices and formalization, based on the cluster-specific means on all the constitutive variables. Validation tests 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 degree of "best practices and formalization" variable based on the cluster assignments in our models, both additively and, in some cases, in interaction with network usage.

IV.ii. Descriptive statistics

Table 1 presents the number of firms by industry type in our sample. We have a wide variety of types of firms, from IT services to wholesale food. Manufacturing firms constitute only 3.3% of our sample, which is unsurprising given our focus on small companies.[5] The modal firm is a grocery store. Overall, our sample appears to represent the distribution of enterprises as observed on the ground.

Panel A of Table 2 presents descriptive statistics for our sample of firms. The average turnover is 390,558 Kyrgyz Soms (2010)[6], or roughly 10,000 USD (2019). Revenue, however,

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[5] In 2015, 3.5% of US firms with less than twenty employees were manufacturing firms according to the 2018 Small Business Profile of the US Small Business Administration.
[6] FRED uses 2010 as the benchmark year for the calculation of Kyrgyz Republic's CPI. To convert to 2019 Soms, multiply by

ranges from 11,044 Soms (2010) to nearly 8 million. The average profit margin is 52 percent, 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 considerably. The smallest firms employ only the owner-operator; the largest: 121 workers (not necessarily full-time).

Panel B of Table 2 presents descriptive statistics on the firm owners. Their ages range from 18 to 78, with an average of 41, 62% are female, and 46% have some higher education, a sign that limited opportunities for professional employment push many highly educated Kyrgyzstanis into self-employment, like in many transition countries.

Panel C of Table 2 presents descriptive statistics on our measures of potential and actual networks. A typical firm owner has 8 connections in their potential in-network, four of which they have actually used at some point, and has provided assistance to 11 out-network connections in the last two years.[7] On average, 16% of startup financing is provided by kin, but most self-financed their own startup investments.

Entrepreneurs' networks in Kyrgyz Republic are heavily kin-based: on average 67% of business connections are with relatives (Figure 1); very few are with clan members or people from the same village who are not relatives. In contrast, kin are about 25% of small business owners' business networks in the United States (Anderson et al. 2005), and in Burkina Faso (Berrou and Combarnous 2012). The predominance of kin in our respondents' business networks makes it difficult to separately estimate the effect of total network size from that of kin ties. Figures 2 and 3 show the different types of help for kin-based and choice-based (non-kin) links.

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[7] Recall that 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.

Financing is the main assistance received from both kin and, to a lesser extent, non-kin business connections.

Each type of help is mainly received from kin (Table 2, Panel D). Yet kin are not as predominant in out-networks, underscoring that business owners are important sources of social support for community members.

Table 2, Panel E shows the number of kin connections for old and new firms, where we define new firms as ones started in 2016 or 2017. Kin-based in-connections are very similar for old and new firms, both in the number and composition of help received. Kin-based out-connections, however, are more numerous for older firms and qualitatively different in the types of demands that older firms face, most likely reflecting the greater average success that these firms demonstrate by having survived longer.

We conducted auxiliary analyses of our survey data that showed evidence of significant mis-allocation by Kyrgyz firms, the persistence of kin-based network use throughout the life of the firm (as represented by strong effects of kin-based start-up financing on subsequent in- and out-network use) and variability in firm owners' orientations toward business criteria versus kin support norms in decision making. See Appendix B for details. In sum, resources are not efficiently allocated in the Kyrgyz private sector, this may be due to the persistence of kin ties in business networks, and hypothetical decision-making vignettes indicate considerable variability in the relative importance Kyrgyzstani entrepreneurs place on business and familial interests, all of which call for our deeper analyses of how the use of business networks to receive and provide assistance relates to firm performance.

V.   Estimation and Results

V.i. 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, which always include firm-type fixed effects, cohort fixed effects, and firm location (Osh or Bishkek). In some specifications, we also include the value of a firm's assets and the number of employees. Firm owner controls are sex, age, whether the firm owner has some higher education, ethnicity, religion, language of the interview and region of birth.

Even when measurement error in the dependent variable is purely idiosyncratic, if it is systematically under or over-reported, then our estimates could be biased. We address under/over reporting using two different approaches. First, following Millimet and Parmeter (2019) we use Nonlinear Least Squares estimation that explicitly allows for a skewed error distribution. The error term has an additional component $\exp(Z_i \delta)u_i$, where Z contains scaling factors (we use firm owner characteristics as well as assets) and u_i is taken from an unknown distribution with mean μ, which can be positive or negative. Second, we rely on local enumerators assessments of whether respondents seemed to report figures truthfully, re-estimating our models using only the subsample of firms they deemed completely truthful (about 60% of the sample). Considering that these two approaches are entirely different, if both provide similar estimates to the main ones, it is reasonable to conclude that systematic over- or under-reporting is not driving our results.

Our measure of kin connections could be endogenous due to reverse causality, omitted variables and/or measurement error. 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-

network links or those who emphasize business criteria ideologically may systematically undervalue the help they receive. Therefore, we use Two-stage Least Squares, with the entrepreneur's number of cousins and number of cousins squared as instrumental variables. Number of cousins should be correlated with kin connections (and, given the kin-heavy nature of networks in this context, total network connections) but uncorrelated with firm performance except insofar as it predicts kin network usage. The squared term improves the fit of the first stage and serves as a second instrument when we have two network variables on the RHS. This alternative estimation strategy, while not without its own set of econometric concerns, allows us to view the OLS estimates in a different light to make better inferences regarding the true relationship between kin ties and firm performance.

To estimate 2SLS, we use the following specification:

2. 2SLS: i. $kin\ connections_i = \alpha_1 + \lambda(cousins)_i + \kappa(cousins^2)_i + \gamma_1 X_i + u_i$

   ii. $firm\ performance_i = \alpha_2 + \beta(kin\ connections)_i + \gamma_2 X_i + \varepsilon_i$

This specification accommodates first order dependence between the error term, ε_i , and kin connections provided that the variables *cousins* and *cousins²* are relevant (predictive of kinship network strength) and valid instruments (only affect firm performance through their effect on kinship network connections). Since number of cousins could be correlated with variables that influence human capital investments of an entrepreneur's parents and/or beliefs about risk or other traditional beliefs that affect firm performance other than the reliance on kin, we control for the entrepreneur's age, education, ethnicity, religion and region of birth.[8] Since our first stage predictions could be poor, we include the AR statistic. The first stage, however, is of interest on

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[8] We also have data on parental education and poverty status of the entrepreneur at age 12 as well as an entrepreneur's attitude toward risk. Controlling for these variables does not qualitatively change our results, but we do not include them in the set of controls because of missing data for these variables.

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 increase the likelihood of kin links because on average the more kin one has the greater the number of kin who can provide business assistance. In the second theory, a firm with a greater number of cousins might, due to reciprocity, anticipate increased future demand for assistance for each actualized link for assistance received. The firm owner with more cousins may thus choose to draw on fewer kin links for assistance. We present the first stage relationship in Table C2 for both actual in- and actual out-network kin connections. We see the same U-shaped relationship, supporting the second theory. Increasing the number of cousins at first reduces the number of kin connections and then increases the number of kin connections. The estimated minimum is lower for actual out-connections than actual in-ones.

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 inconsistent time periods for our data on *actual* in- and out-networks, we take the proportion of business contacts in a firm's *potential* in-network (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 in-network (Has network). This measure is less dependent on the time period and still captures the kin-ness of business networks.

In addition to the recall error inherent 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. Instead we assume that survival 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 (Figure C1 shows that differential growth rates of new and old firms is primarily driven by changes in the size of the firm as one would expect). We also control for unobserved time-invariant characteristics that affect firm revenue by including firm fixed effects.

3. OLS: $\ln Firm\ Revenue_{it} = \alpha_i + \beta^{Prop/New}(Proportion\ kin)_i * New\ firm_i * t + \beta^{Prop}(Proportion\ kin)_i * t + \beta^{New}(New\ firm)_i * t + \beta^{Has/New}(Has\ Network)_i * New\ firm_i * t + \beta^{Has}(Has\ Network)_i * t + \gamma X_{it} + \varepsilon_{it}$

We also encounter missing data on business revenue, business income and some control variables. Only four out of five firms provided data on revenue and profits in 2018. While selection into those who responded depends, in part, on 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. In the sensitivity analysis section, we present some robustness exercises that account for missing data.

V.ii Main Results

Table 3 presents the regression results for profit margin, our preferred measure of firm performance. In the first column model, we include only the actual in-network variable, in line with much of the previous literature. The models reported in columns 2-6 also include the actual out-network variable, directly capturing these two different effects on firm performance, with firm owner (columns 3 and 4) and additional firm (5 and 6) controls. Columns 4 and 6 present our 2SLS estimates using the number of cousins and the number of cousins squared as instrumental variables. We also include confidence intervals that are robust to weak instruments presented beneath the standard errors.

In all the specifications, the coefficient on the actual in-network variable is positive and statistically significant at the 1% level, while the coefficient on the actual out-network variable is negative and statistically significant at either the 1% or 5% level. These estimates confirm that kin networks affect firm performance both in positive and negative ways and, hence, suggest a failure of the separation property. 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, a one s.d. increase in the number of actual in-network kin 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 actual out-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 actual in-network. Assuming ex-ante a one-to-one reciprocal relationship, the benefits of receiving help from network connections appear to outweigh the costs of providing help to them. The 2SLS estimates paint an even more beneficial picture of kin network use since the magnitude of the coefficient on actual in-network kin connections increases relatively more than the one for actual out-network ones. The increase in magnitude of the 2SLS estimates relative to the OLS ones could be explained by measurement error. Alternatively, the effects could be stronger for the subpopulation of compliers, firm owners who would experience a change in the number of kin connections in response to a change in the number of members in the extended family.

The coefficient on male is not statistically significant, indicating no gender gap in profitability. We also find a robust, counterintuitive 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 4 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.

The results in Table 5 yield insights into how firm connections impact firms at different stages in the lifecycle. We allow for heterogeneity in the effects of both in and out connections by whether or not a firm began before 2015. In column 2, we see that in-connections improve firm performance for both new and old firms. Out-connections worsen firm performance for old, but not new firms. This result holds when we add additional controls in columns 3 and 5. The IV results in columns 4 and 6 present inconclusive evidence and we cannot reject the hypothesis that the effects of kin connections on firm performance are the same for old firms and new firms. The first stage is weak and we do not trust these results.[9]

To model revenue growth 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

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[9] The weak first-stage reflects the demands on the data to identify differential arrival rates of in- and out-connections for new and old firms from the variation in the number of cousins.

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, the 277 firms started 2017 drop out of the analysis because they only have one full fiscal year of operation. We also model growth using just 2017 and 2018, for which data are more complete. We discuss how retrospective attrition and missing data might affect our results in the sensitivity analysis 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. We assume that the parameter estimates for old firms are more subject to 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. We control for firm-type specific growth rates (columns 2 and 3) and restrict the sample to 2017 and 2018 observations (column 3). All growth rates are interpreted with respect to the omitted category, an old firm with no business network, kin or otherwise, whose growth rates are contrasted to those of five other categories. 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 effects are strong in magnitude: 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 17.4% more. 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. Restricting attention to only 2017 and 2018 observations yields similar results. However new firms with all-kin networks are not statistically distinguishable from old firms without business networks in terms of annual growth from 2017 to 2018. This finding fits the arguments in Alger and Weibull (2008), that having any type of network is better than autarchy, but a network of coerced altruism through the family leads to slower firm growth than one without such coercion.

We repeat the exercise reported in columns 1-3 but with new firms defined as ones established in 2014-2016 (columns 4-6). 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, which is clearly a factor. 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.

Ideally, we would capture a measure of firm networks at a firm's origin and then measure how it changes (grows) at subsequent time periods. Instead, we only measure kin connections at the time of the survey, which represents different points in our firms' life cycles due to their different starting dates. Our one consistent measure of network use at the same firm age is kin-based startup financing, which positively predicts the use of kin connections at subsequent stages (see Table B2). We do not rely solely on this measure because it only captures one type of help, albeit an important one, and most firms in our sample are self-financed. Firms with external

financing grow faster than self-financed firms, similar to the previous result (Table 7). However, we cannot reject that firms with no kin-based external financing and firms that have 100% kin-based external financing grow at different rates. In fact, the estimated growth rate is lower for non-kin financed firms, which we suspect reflects the cost differential of borrowing. This relationship dissipates over time and only holds true for new firms, consistent with beneficial effects of family finance in the infancy of a firm's life being tied to obligations that have a negative impact on firm performance later in a firm's life.

V.iii. Mechanisms

How does a greater reliance on kin networks affect overall firm performance and 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/cannot 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). Table 8 shows that the relationship between reinvestment and in- and out-networks is mostly negative, suggesting that firms that rely more on kin ties in their business networks reinvest a smaller share of their profits. In the column 2 specification, the coefficient on the in-network use is not statistically significant, while the coefficient on the actual out-network is statistically significant at the 1% level. An additional out-network connection reduces reinvestment by 0.74 percentage points. One standard deviation in actual out-network ties decreases reinvestment rate by one quarter of a standard deviation. Thus, while not large, the effect is economically significant.

The second mechanism we consider is the firm's orientation toward formalization and best business practices. Echoing the literature's emphasis on survival- versus growth-oriented firms, we investigate whether a firm's orientation can influence the effects that we uncover. The distinction between survival and growth is potentially problematic, not least because it runs the risk of selecting on the dependent variable. We instead measure the orientation of the firm with respect to formalization and business practices. Do firms that have adopted best business practices and are more formalized experience different effects of kin networks? Our cluster analysis grouped firms into three categories representing low, intermediate, and high degrees of adopting best business practices, reasoning that firms more oriented to best practices should be more selective in their use of networks for business purposes and 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.

Kin networks have no effect for firms in the high-degree cluster (Table 9). For those in the intermediate cluster, we find only a positive effect of actual in-network, but no negative effect for actual out-networks. For those in the low-degree cluster, we find both the positive effect of actual in-networks and the negative effect of actual out-networks as before. We also see that profit margins are lower for firms that adapt more best business practices, suggesting a more competitive environment and/or expansion of investment.

V.iv. Sensitivity Analysis

To remedy potential over- or under-reporting of revenue and profits, we re-estimate the models reported in Tables 3 and 6 using the subsample of firm owners deemed truthful when reporting numbers by the enumerators. The results are quite similar despite losing over a third of the observations (Tables C3 and C4). However, the loss of observations exacerbates the finite

sample issues facing 2SLS estimation and we do not get meaningful estimates, as both coefficients and standard errors increase dramatically.

An alternative approach to tackle systematic under/over reporting is to allow for a skewed error distribution, following Millimet and Parmeter (2019). We reestimate columns 1 and 2 of Tables 3 and 4 using nonlinear least squares estimation with an additional error component that depends on a firm's assets and employment as well as firm owner's sex, age, ethnicity, region of birth, and preferred language as scaling variables that affect measurement error. The results (Table C5) suggest that firms, on average, underreport. This underreporting is minimal for profit margin and on the order of about 15% for profits, suggesting that firms under/over report profits and revenue in the same direction. More importantly, the estimated coefficients on our network variables and the corresponding standard errors are quite similar to those using OLS estimation, indicating that LHS measurement error does not undermine our analysis.

Next, we address the problem of missing data. Columns 1, 2, 4, 5 of Table C6 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 for 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. For the former we simply use the same variables as in the IV estimation. For the latter, we propose two variables that proxy the information environment the firm operates in. The first is whether a family member would have information the amount of a hypothetical windfall, and the second is whether the firm is an owner operator.[10] 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. We then re-estimate 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 actual in- and actual out-network variables are similar to the estimates in column 4 of Table 3. Thus, there are no systematic differences in how the network variables affect firm performance by whether firms reported all or incomplete data.

Tables C7 and C8 show checks for robustness to our treatment of all types of network help as equal. For this exercise, we disaggregate by type of help for the in (out)-network variable while keeping the out (in)-network variable in its aggregated form. Most types of help have coefficients that are statistically significant, and all have the correct sign. Furthermore, the

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[10] We also did inverse probability weighting, following the approach of Horowitz and Manski. 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.

magnitudes correspond to our intuition about which type matters more, e.g. loans for in-network help and labor for out-network.

We re-estimated the models reported in Table 3 after adding a set of dummy variables indicating the clan to which the respondent belongs (Table C9). The results are very similar, suggesting that there is both variation in the relationship between kin ties and entrepreneurial decisions within clan and the importance of these relationships transcend clan boundaries. Finally, for the growth regression, we reconstructed our network variable to reflect the fact that as firms age the proportion of potential connections that are kin-based decays. Figure C2 demonstrates the linear and local polynomial fit on proportion kin and firm age. We regress the proportion kin on the number of years a firm has and then use this estimate to "recenter" a firm's proportion to a level that it would have been if had started in 2014. We then rerun the specifications corresponding to Table 5 and get very similar results (Table C10).

VI.   Conclusion

Reliance on kin relations for business assistance is especially important for firm survival and growth in countries, like Kyrgyzstan, featuring difficult business environments. Accordingly, the business networks of small firms in our sample are overwhelmingly kin-based. Understanding why is a crucial policy issue, because the nature of collective responsibility and joint agency imposed by traditional institutions can either foster or hinder economic growth (Fafchamps 2016).

The richness of our data allows us to investigate the benefits and costs of kin ties in entrepreneur's business networks. We find that in-networks (which provide assistance) and out-networks (which receive assistance), while certainly correlated, have opposing relationships with firm performance. Previous studies that have only used one direction of network connections to

study the importance of networks may therefore have had difficulty in establishing an effect. Firms that can access kin ties for business assistance grow faster than firms that must exclusively rely on self-help or impersonal market transactions, but slower than those firms that can better draw on non-kin ties. We find no evidence that kin-based start-up financing is disadvantageous for future growth.

We investigate two channels through which kin ties can affect firm performance. First, we find that both in-network and out-network use are negatively associated with both realized and planned reinvestment rates, suggesting that the firm may purposefully try to maintain high profit margins to have a source of cash flow. This cash could serve as a buffer for a risk-averse firm or to finance informal insurance. Second, a firm's orientation may be towards survival and not toward growth. Firms that more consistently apply best business practices exhibit no relationship between their kin connections and firm performance, suggesting that business education may improve efficiency directly, by encouraging business practices, and indirectly, by delinking kin-related benefits and obligations from decisions that affect firm performance. Instead of discouraging kinship influence on business, policy advice might leverage kin ties to support business incubation provided that entrepreneurs eventually adopt best business practices as the firm matures and they gain experience.

Given the growing evidence that other kinds of networks, political, social, and ethnic, have positive effects on firm performance (Fafchamps and Quinn 2013), the persistent dominance of kinship networks in Kyrgyzstan and elsewhere remains a puzzle. To fully understand the value of kin-based networks, more research should carefully analyze the dynamics of the benefits and costs. In particular, kin networks may be more effective in garnering resources for young firms, but impose a growing cost as firms mature. The

intrafamilial implicit contract could suffer from a ratchet effect (that market transactions or choice-based interpersonal implicit contracts clearly avoid). Firms that begin to adhere to best business practices earlier in their lifecycle could mitigate this ratchet effect and spur economic growth without abandoning their reliance on kin.

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Figure 1: Pie chart of social structure of actual in-network business links
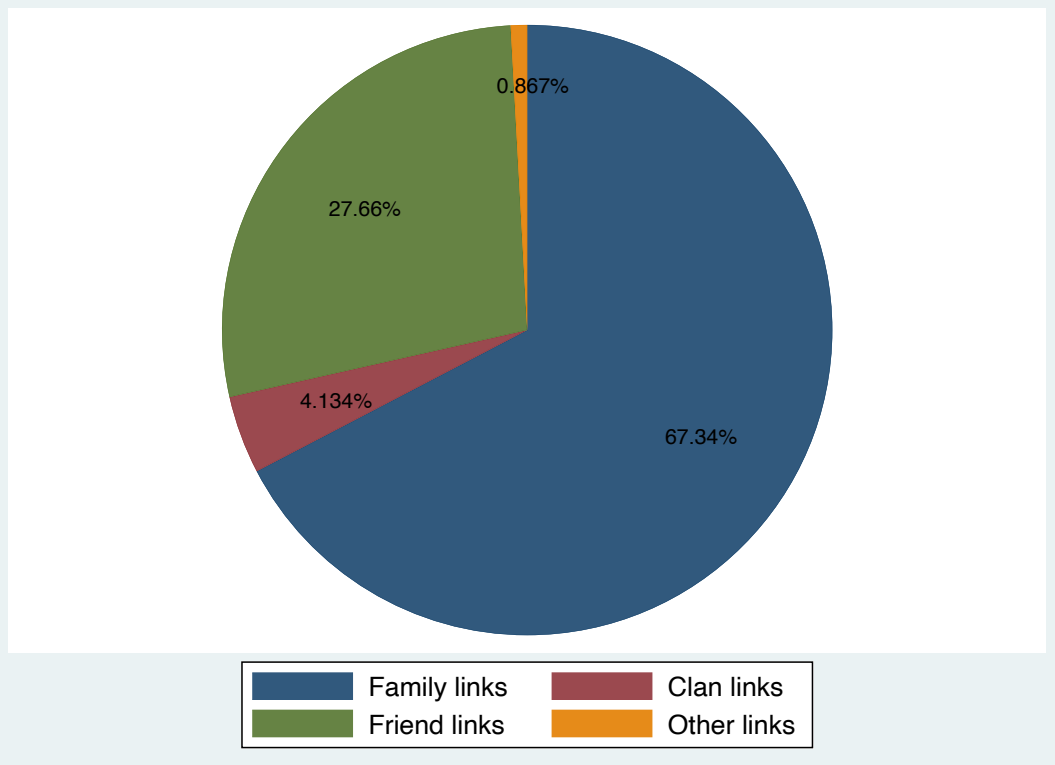
Figure 2: Pie chart of kinds of help in kin-based actual in-network business links
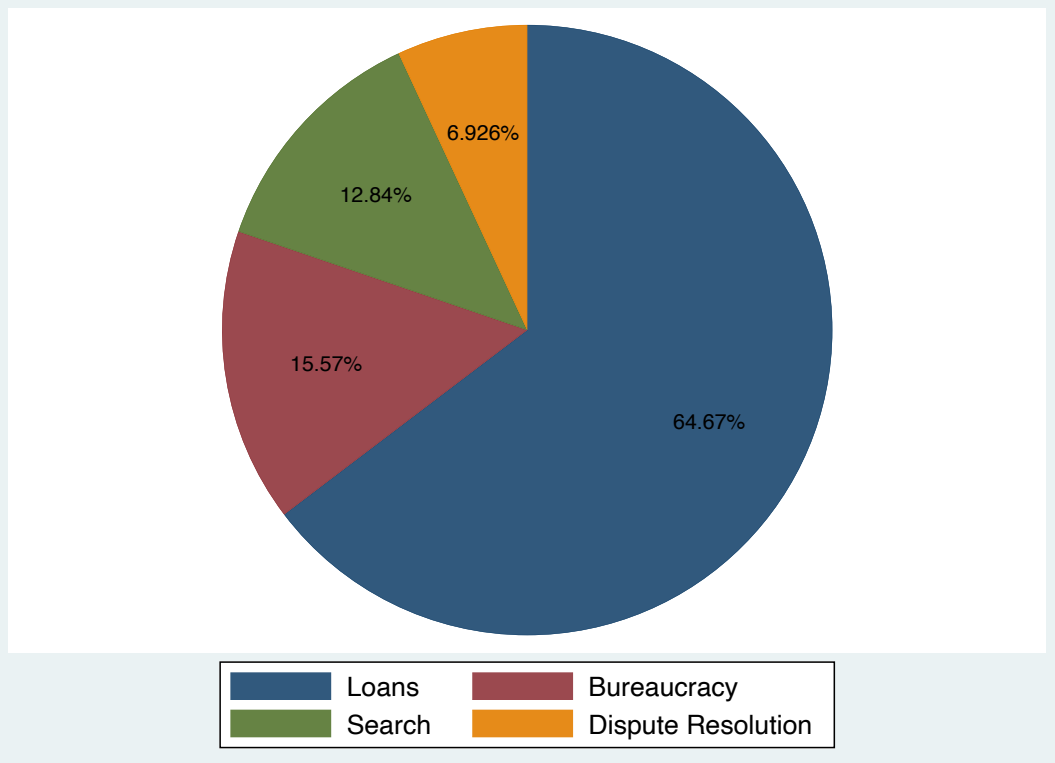
Figure 3: Pie chart of kinds of help in choice-based actual in-network business links
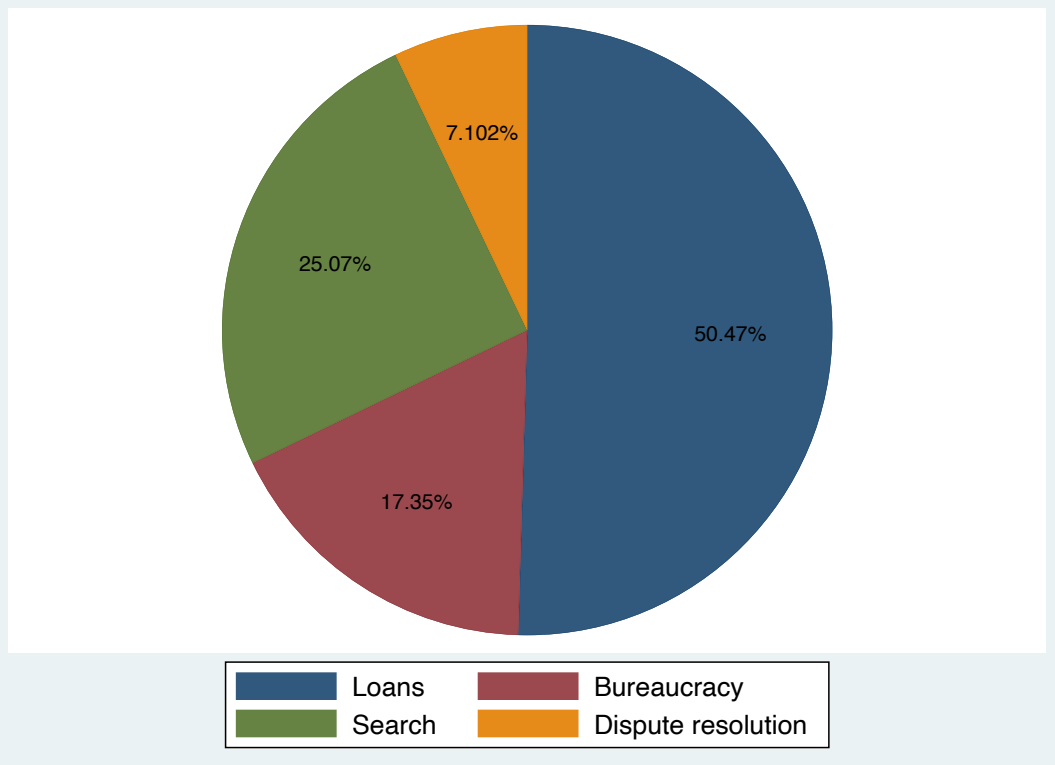
Table 1: Number of firms by industry type

Sector	Type	Number of firms
Manufacturing	Food	27
Manufacturing	Garments/Textiles	3
Manufacturing	Other	3
Retail	Grocery	295
Retail	General	185
Retail	Home products	32
Retail	Clothing	10
Retail	Medical	25
Retail	Other	11
Wholesale	Food	35
Wholesale	Clothing	10
Wholesale	Other	48
Services	Auto	47
Services	Personal care	109
Services	Child care	1
Services	Education	8
Services	Clothing	17
Services	Hotel/Restaurants	71
Services	IT/Business	16
Services	Medical	15
Services	Entertainment	8
Services	Real estate	2
Services	Construction	7
Services	Financial	1
Services	Other Repair	14

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
Owner-operator firm	0.33	0.47	0	1	1000
Birth year of firm	2013.13	4.92	1993	2017	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
Mother has higher ed.	0.23	0.42	0	1	989
Father has higher ed.	0.25	0.43	0	1	987
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
Potential In-Network Business Connections	8.17	13.14	0	138	1000
Potential In-Network Proportion that is Kin	0.69	0.27	0	1	810
Actual In-Network Business Connections	4.06	6.93	0	75	1000
Actual In-Network Kin Business Connections	2.68	4.45	0	47	1000
Actual Out-Network Business Connections	11.17	16.67	0	197	1000
Actual Out-Network Kin Business Connections	6.12	9.47	0	145	1000
Startup Share Financed by Kin	0.16	0.35	0	1	998
Startup Share of Employment that is Kin	0.85	0.26	0.07	1	1000

Panel D: Proportion of business connections that are kin-based by type of help

	Actual In-				
	Loans	Bureaucracy	Search	Disputes	
Proportion kin	0.76	0.71	0.60	0.71	
	Actual Out-				
	Work	Favorable terms	Discounts	Advice	Housing
Proportion kin	0.57	0.48	0.45	0.53	0.79

Panel E: Number of connections for new and old firms in total and by type of help

	Actual In-network Kin	Actual In-network Total	Types of help from	Loans	Search	Bureaucracy	Dispute Resolution	
New Firms	2.72	4.04	**Kin:**	**1.37**	**0.58**	**0.43**	**0.35**	
Old Firms	2.64	4.07		**1.25**	**0.62**	**0.40**	**0.37**	
	Actual Out-network Kin	Actual Out-network Total	Types of help to	Work	Overpay Supplier	Buyer Discounts	Business Advice/help	Basic needs
New Firms	**5.43**	**9.88**	**Kin:**	**0.56**	2.21	0.60	**1.03**	**1.01**
Old Firms	**6.66**	**12.18**		**0.76**	2.37	0.48	**1.43**	**1.62**

Bold type indicates differences in means statistically significant at the 5% level.

Table 3: Profit margin

VARIABLES	OLS (1)	OLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)
Actual In-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]
Actual Out-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 4: Profits

VARIABLES	OLS (1)	OLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)
Actual In-Network Kin	1,692.34	3,144.60**	2,739.25**	19,639.48*	2,785.20**	17,523.74*
	[1,188.861]	[1,360.781]	[1,393.423]	[10,468.917]	[1,390.612]	[9,753.445]
Actual Out-Network Kin		-1,752.82***	-1,768.77***	1,057.70	-1,773.17***	1,011.20
		[604.367]	[620.461]	[1,567.741]	[619.546]	[1,536.152]
Assets	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
	[0.004]	[0.003]	[0.004]	[0.004]	[0.004]	[0.004]
Workers	16,333.57***	16,872.98***	15,760.32***	11,365.28***	15,744.76***	11,574.24***
	[3,231.527]	[3,319.057]	[3,374.659]	[4,341.484]	[3,439.384]	[4,257.825]
Male			9,532.54	14,125.08	9,511.63	13,669.05
			[10,212.090]	[12,154.872]	[10,241.565]	[11,832.026]
Age of respondent (in years)			551.08	886.09*	573.09	799.48*
			[426.316]	[487.806]	[429.307]	[479.509]
Some higher education			-1,683.21	-2,835.19	-1,173.76	-3,208.42
			[9,857.098]	[12,056.684]	[9,918.771]	[11,867.727]
Currently Married			12,496.71	-8,125.93	13,395.82	-6,283.85
			[10,863.349]	[14,083.630]	[10,890.095]	[13,892.879]
Language of interview Russian			-4,483.60	-26,416.49**	-5,396.07	-25,322.37**
			[9,747.793]	[11,807.132]	[9,770.182]	[11,471.643]
Firm located in Bishkek	36,288.45***	34,116.95***	-724.73	11,680.44	7.77	11,472.68
	[10,549.458]	[10,691.986]	[20,083.926]	[22,391.898]	[19,979.738]	[21,981.358]
Partnership					6,843.79	21,254.52
					[35,848.487]	[36,809.551]
LLC					57,863.00	88,133.19*
					[43,126.768]	[46,233.037]
Firm owns place of business					1,778.69	-1,984.42
					[2,475.147]	[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		5.93
				0.036		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 5: Firm performance, Life-cycle and Kin Ties

VARIABLES	OLS (1)	OLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)
Actual In-Network Kin	1.01***	1.51***	1.51***	4.89*	1.50***	4.73*
	[0.261]	[0.266]	[0.272]	[2.565]	[0.271]	[2.489]
Actual Out-Network Kin		-0.64***	-0.68***	-0.83***	-0.68***	-0.82***
		[0.110]	[0.114]	[0.269]	[0.114]	[0.271]
Actual In-Network Kin*New Firm	0.30	-0.39	-0.50	1.68	-0.50	1.70
	[0.377]	[0.404]	[0.403]	[5.947]	[0.404]	[5.642]
Actual Out-Network Kin*New Firm		0.84***	0.86***	-0.54	0.85***	-0.50
		[0.230]	[0.232]	[2.988]	[0.236]	[2.756]
Male			1.49	0.90	1.53	0.97
			[1.993]	[2.662]	[1.997]	[2.654]
Age of respondent (in years)			0.09	0.11	0.10	0.11
			[0.080]	[0.098]	[0.081]	[0.101]
Some higher education			-5.85***	-6.99***	-5.80***	-6.95***
			[1.927]	[2.330]	[1.945]	[2.313]
Currently Married			0.37	-2.62	0.47	-2.51
			[2.091]	[2.866]	[2.110]	[2.868]
Language of interview Russian			1.42	-1.74	1.37	-1.68
			[1.879]	[2.401]	[1.879]	[2.397]
Firm located in Bishkek	1.03	0.32	-1.31	0.69	-1.27	0.65
	[1.856]	[1.825]	[3.494]	[4.141]	[3.496]	[4.076]
Partnership					-3.38	-3.90
					[10.110]	[12.501]
LLC					4.00	4.90
					[7.846]	[6.785]
Firm owns place of business					0.16	-0.01
					[0.519]	[0.827]
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						
Observations	772	772	772	705	772	705
R-squared	0.119	0.142	0.179		0.179	

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 6: Business Growth

	FE	FE	FE	FE	FE	FE
	New Firm: Established in 2016			New Firm: Established 2014-2016		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES						
New firm	0.02	0.04	-0.12	0.09***	0.09**	0.06
	[0.039]	[0.050]	[0.084]	[0.027]	[0.038]	[0.087]
Has Potential Network	0.09***	0.10***	0.13*	0.09***	0.09***	0.16*
	[0.026]	[0.036]	[0.077]	[0.025]	[0.036]	[0.097]
Proportion of potential network that is kin	-0.11***	-0.11***	-0.16*	-0.11***	-0.12***	-0.27***
	[0.033]	[0.038]	[0.095]	[0.031]	[0.036]	[0.094]
Has Potential Network*New Firm	0.52***	0.47**	0.57***	0.17***	0.17***	0.15
	[0.194]	[0.197]	[0.217]	[0.039]	[0.048]	[0.105]
Proportion of potential network that is kin*New firm	-0.39	-0.33	-0.34	0.03	0.05	0.11
	[0.243]	[0.244]	[0.268]	[0.081]	[0.083]	[0.096]
Assets	0.16**	0.11	-0.01	0.11	0.07	-0.04
	[0.073]	[0.071]	[0.083]	[0.073]	[0.067]	[0.082]
Workers	-0.00	-0.02	0.02	-0.01	-0.03	0.01
	[0.022]	[0.030]	[0.016]	[0.016]	[0.025]	[0.017]
Effect size for different types of firms:						
New firm, no network	0.02	0.04	-0.12	0.09***	0.09**	0.06
	[0.039]	[0.050]	[0.084]	[0.027]	[0.038]	[0.087]
New firm, no-kin potential network	0.64***	0.61***	0.59***	0.35***	0.35***	0.38***
	[0.19]	[0.19]	[0.21]	[0.04]	[0.05]	[0.11]
New firm, all-kin potential network	0.14*	0.16**	0.09	0.27***	0.28***	0.22**
	[0.08]	[0.08]	[0.09]	[0.07]	[0.08]	[0.11]
Old firm, no-kin potential network	0.09***	0.10***	0.13*	0.09***	0.09***	0.16*
	[0.026]	[0.036]	[0.077]	[0.025]	[0.036]	[0.097]
Old firm, all-kin potential network	-0.015	-0.016	-0.029	-0.026**	-0.023	-0.11
	[0.012]	[0.027]	[0.088]	[0.012]	[0.026]	[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: Business Growth and Startup financing

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	0.25***	0.23***	0.17**	0.24***	0.21***	0.17***
	[0.074]	[0.074]	[0.074]	[0.036]	[0.039]	[0.062]
Has Startup finance	0.00	-0.02	-0.07	-0.01	-0.03	-0.16
	[0.017]	[0.021]	[0.073]	[0.016]	[0.020]	[0.106]
Proportion of finance that is kin	0.04	0.06*	0.16*	0.03	0.05*	0.23**
	[0.027]	[0.029]	[0.084]	[0.026]	[0.029]	[0.115]
Has Startup finance*New Firm	-0.04	0.00	0.04	0.02	0.05	0.13
	[0.113]	[0.115]	[0.138]	[0.061]	[0.065]	[0.140]
Proportion of startup finance that is kin*New firm	0.19	0.14	0.01	0.04	0.02	-0.12
	[0.204]	[0.210]	[0.243]	[0.069]	[0.072]	[0.166]
Assets	0.17**	0.13*	-0.02	0.12	0.08	-0.06
	[0.074]	[0.070]	[0.085]	[0.073]	[0.067]	[0.083]
Workers	0.00	-0.03	0.03	-0.01	-0.03	0.02
	[0.024]	[0.031]	[0.021]	[0.017]	[0.025]	[0.020]
Effect size for different types of firms:						
New firm, self-finance only	0.25***	0.23***	0.17**	0.24***	0.21***	0.17***
	[0.074]	[0.074]	[0.074]	[0.036]	[0.039]	[0.062]
New firm, no-kin finance	0.21**	0.21**	0.13	0.24***	0.23***	0.15**
	[0.19]	[0.09]	[0.10]	[0.05]	[0.05]	[0.072]
New firm, all-kin finance	0.45***	0.41**	0.31	0.31***	0.31***	0.26***
	[0.08]	[0.17]	[0.19]	[0.04]	[0.037]	[0.092]
Old firm, no kin finance	0.00	-0.02	-0.07	-0.01	-0.03	-0.16
	[0.017]	[0.021]	[0.073]	[0.016]	[0.020]	[0.106]
Old firm, all-kin finance	0.04**	0.04	0.09	0.02	0.02	0.08
	[0.02]	[0.025]	[0.06]	[0.02]	[0.024]	[0.070]
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	1,383	1,383	964	1,383	1,383	964
R-squared	0.048	0.125	0.167	0.159	0.217	0.188
Number of Firms	572	572	568	572	572	568
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 8: Reinvestment

VARIABLES	OLS (1)	OLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)
Actual In-Network Kin	-0.41**	0.17	0.22	-3.26*	0.26	-3.24**
	[0.194]	[0.255]	[0.282]	[1.672]	[0.288]	[1.652]
Actual Out-Network Kin		-0.74***	-0.73***	-1.20	-0.72***	-1.04
		[0.175]	[0.195]	[2.179]	[0.194]	[2.060]
Male				0.29	2.01	-0.46	1.83
				[2.487]	[2.964]	[2.474]	[3.008]
Age of respondent (in years)				0.13	0.18	0.14	0.20*
				[0.105]	[0.118]	[0.107]	[0.117]
Some higher education				3.87	6.20**	3.59	6.24**
				[2.424]	[2.865]	[2.421]	[2.938]
Currently Married				2.82	5.75	2.79	5.59
				[2.858]	[5.279]	[2.868]	[5.281]
Language of interview Russian				3.01	6.60	3.15	6.16
				[2.547]	[4.639]	[2.537]	[4.420]
Firm located in Bishkek	-19.56***	-20.58***	-20.88***	-21.37***	-21.36***	-21.39***
	[2.511]	[2.473]	[3.998]	[7.143]	[4.007]	[7.033]
Partnership					18.99**	14.00
					[8.679]	[10.999]
LLC					-17.61*	-14.40
					[10.683]	[13.724]
Firm owns place of business					-0.49	0.68
					[0.645]	[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		3.90
				0.118		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 9: Kin Networks, Orientation and Performance

	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)
VARIABLES				
Actual In-Network Kin	1.38**	1.77***	2.00***	2.00***
	[0.604]	[0.574]	[0.609]	[0.615]
Actual In-Network Kin *Intermediate degree	0.01	-0.26	-0.60	-0.61
	[0.643]	[0.633]	[0.668]	[0.676]
Actual In-Network Kin *High degree	-1.71**	-1.33	-1.64*	-1.63*
	[0.844]	[0.849]	[0.890]	[0.892]
Actual Out-Network Kin		-0.49*	-0.63**	-0.63**
		[0.261]	[0.266]	[0.266]
Actual Out-Network Kin *Intermediate degree		0.34	0.46	0.45
		[0.339]	[0.342]	[0.343]
Actual Out-Network Kin *High degree		-0.22	-0.09	-0.09
		[0.310]	[0.305]	[0.306]
Intermediate degree of best practices	-4.06	-5.12*	-4.11	-4.19
	[2.824]	[3.104]	[3.142]	[3.150]
High degree of best practices	-1.99	-2.36	-2.42	-2.32
	[3.580]	[3.840]	[3.909]	[3.927]
Effect size for different types of firms:				
In-Network for firms with low degree	1.38**	1.77***	2.00***	2.00***
	[0.604]	[0.574]	[0.609]	[0.615]
In-Network for firms with intermediate degree	1.40***	1.50***	1.39***	1.39***
	[0.228]	[0.270]	[0.269]	[0.267]
In-Network for firms with high degree	-0.32	0.17	-0.24	-0.24
	[0.876]	[0.890]	[0.930]	[0.933]
Out-Network for firms with low degree		-0.49*	-0.63**	-0.63**
		[0.261]	[0.266]	[0.266]
Out-Network for firms with intermediate degree		-0.15	-0.17	-0.18
		[0.213]	[0.212]	[0.214]
Out-Network for firms with high degree		-0.36	-0.26	-0.27
		[0.380]	[0.377]	[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 A: Survey Instrument

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 the 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.

Given that the study population consists of people who tend to be busy and the incentives to participate were minimal, one cannot expect a tremendously high response rate. By using highly trained, locally based professional interviewers, we obtained a rather high response rate of 56.2%. This is substantially higher, for example, than the response rate of the 2008 implementation of BEEPS in Kyrgyzstan was 16.9% (calculated from BEEPS 2010, p.146) and the 2013 BEEPS. Researchers who conducted another survey of entrepreneurs in Kyrgyzstan did not report the response rate for that survey (Aziz et al. 2013). Globally, Bloom et al. (2016) report an average response rate for World Management Surveys of firms in developing countries is 40%, a substantially shorter survey to administer than ours (Management and Organizational Practices Survey, a closed-ended, email-based survey, achieves a response rate of 80%). Lupu and Mitchelitch (2018), a metastudy on survey methods employed in household surveys in developing countries find an average response rate of 74%. We would expect firms to have a lower response rate than households. Moreover, the most common sampling method used is multistage area sampling (which we do) combined with a "random" walk within an area (which we do not). Our sampling procedure is superior given the well-known problems with random walk sampling and one would expect a higher response rate for the random walk approach.

In any case, although high response are generally desirable, extensive studies by survey methodologists have concluded that there is no direct or simple connection between response rates and non-response bias, despite the common misconception that lower response rates automatically introduce more bias (Biener et al. 2004; Groves and Peytcheva 2008; Holbrook et al. 2008). These studies show that extraordinary measures to induce reluctant respondents to participate may produce poorer quality data and that non-response bias is best understood as item-specific rather than as a function of overall non-response, and that in many cases declining response rates for specific surveys have had no impact on the accuracy of parameter estimates. In our case, we lack any independent benchmark data (e.g. on the demographic characteristics of small-firm owners in Bishkek and Osh) that can be used to validate the representative of our sample or derive post-sampling weights. 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. We lack strong priors as to the directions of potential biases introduced by non-random non-response: for example, it is equally plausible that owners of less successful firms would disproportionately refuse to participate (because of embarrassment at the poor performance of their firms) as it is that owners of more successful firms would (because of a desire to conceal their firms' success or simply because they are more busy.) Lacking either a good theory as to the direction of potential bias or a means of assessing bias empirically, we are left with no alternative other than to treat our sample as representative, and our unusually high overall response rate for a firm survey in Kyrgyzstan is, if anything, reassuring regarding the soundness of our field procedures.

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. 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.

Appendix A References

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Appendix B: Supplementary motivation for our research question
    a. Evidence of misallocation

If firms are accessing family networks to obtain and distribute resources, then we would expect to see misallocation due to differences in implicit and market prices. We assess misallocation using an accounting exercise outlined in Klenow and Hseih (2009). We fit a production function using labor and capital shares fixed at the corresponding US industry level and then calculate the residuals to get TFPR (revenue-based total factor productivity).[11] Table B1 shows results from a basic production function (i.e. estimating factor shares as opposed to using US ones). Our rough and ready measures of capital and labor perform fairly well.

Figure B1 exhibits the empirical distribution of TFPR (on the basis of industry-specific US capital and labor shares) for the firms in our survey. The variance in TFPR 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 ½ and ¼, whereas there is still sizeable mass of firms to the left of 1/8 for the Kyrgyz Republic. Klenow and Hseih (2009) focus on the standard deviation of this distribution: in 2005, it was 0.49 for the United States and 0.67 for India, compared to 0.93 for the Kyrgyz Republic in 2018.[12]

Figure B2 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

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[11] To match our data to US counterparts, we relied on the following sources: Components of Value Added by Industry [Millions of dollars], Bureau of Economic Analysis, Release Date: November 01, 2018, https://apps.bea.gov/iTable/iTable.cfm?ReqID=51 and 2017 NAICS Structure (Excel file), https://www.census.gov/eos/www/naics/ . Following Klenow and Hsieh we first calculated the distributions of TFPR and TFPQ, then trimmed off the top and bottom percentiles, and then recalculated the distributions.
[12] These differences are merely suggestive. While these values account for differences across industry types, the overall composition of industry types represented in the three different countries could explain some of the differences.

distribution. These figures suggest that kinship matters for businesses in the Kyrgyz Republic, bearing both advantages and disadvantages for individual firms. However, without a clear counterfactual, it is not possible to ascertain whether there would have been more or less misallocation in a regime of lower reliance on kin in entrepreneurial decisions.

b. Persistence of kin connections

If the role of kin networks persists across the life course of the firm, we would expect to see a positive association between kin participation in startup financing and subsequent use of kin connections for business purposes. We regressed our three network variables—the number of kin-based business connections in the in-network (Table B2, columns 1 and 2), the number of kin-based business connections in the out-network (columns 3 and 4) and the share of the business in-network that is kin-based (columns 5 and 6)—on the share of startup investment financed by kin, controlling 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. One s.d. in kin financing results in an additional one-third of an actual in-network kin connection and the estimate is statistically significant at the 5% level. The effect persists net of firm owner controls. Larger firms at inception in terms of employees and initial investment also have more kin-based connections. One s.d. in kin financing results in nearly half an additional actual out-connection, and the estimate is statistically significant at the 10% level. The pattern with respect to the initial size of firms is similar: one s.d. in kin financing increases the proportion of in-business network connections that are kin-based by about one-fifth of a s.d., and the estimate is statistically significant at the 1% level. Initial firm size does not predict kin-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.

c. Vignettes

We posed a series of vignettes to firm owners to see how they view the tradeoff between family and business. The first vignette was a situation in which the owner of a similar business to the owner's 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 involved a choice by the business owner 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.

The third vignettes posited that after a profitable year the owner of a business like the respondent's wants to reinvest the profits by making a large purchase of goods for the firm, but also 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 the prefer to loan the money to the family member. Although hypothetical, these vignettes demonstrate, that firm owners are aware of these tradeoffs and that there is variation in how dependent business decisions are on kin ties, with majorities endorsing business considerations over family obligations in some circumstances.

Appendix B References

Hsieh, C., & Klenow, P. (2009). "Misallocation and Manufacturing TFP in China and India." *The Quarterly Journal of Economics, 124*(4), 1403-1448.

Figure B1: Misallocation among Kyrgyz firms
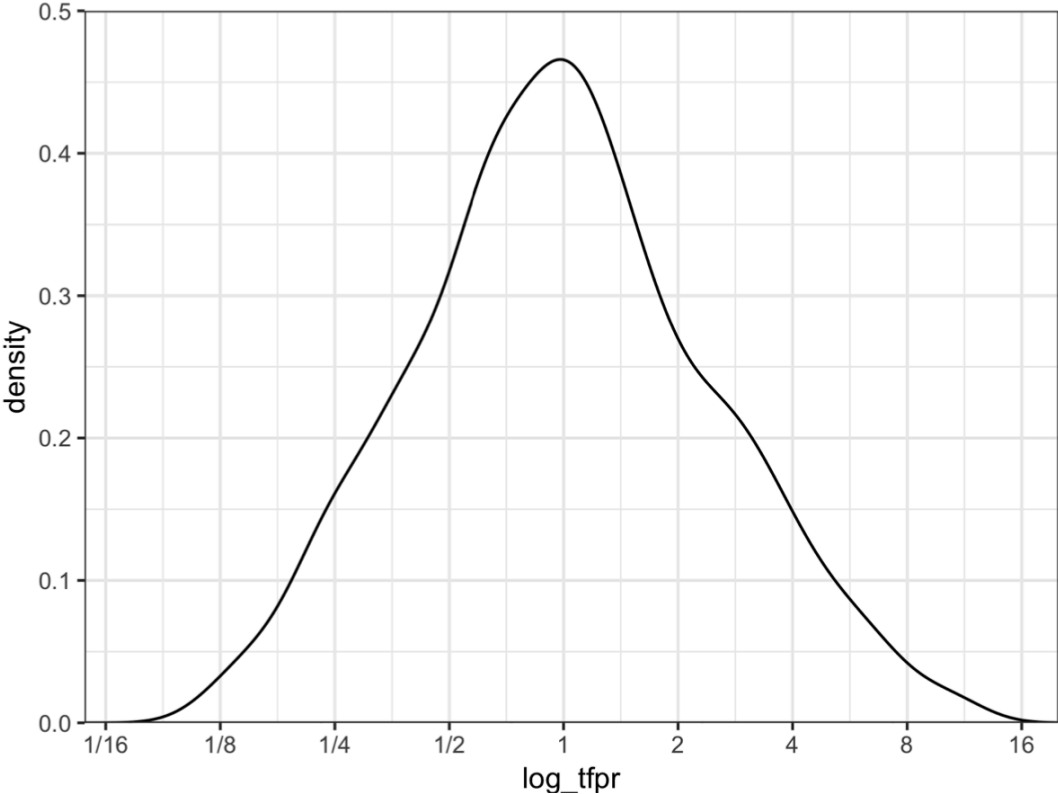
Notes: This figure plots the probability density of TFPR in logs. TFPR is constructed using our survey data on revenue, assets and labor as well as US capital and labor shares by industry. See Klenow and Hseih (2009) for details.

Figure B2: Misallocation and Business in-Networks
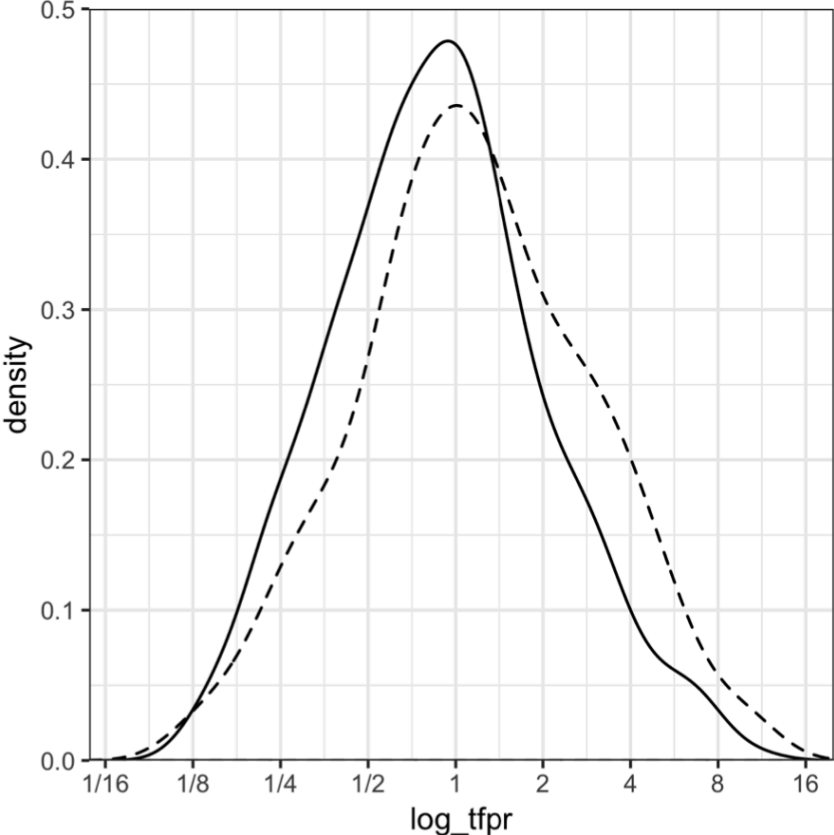
Notes: The probability densities of TFPR in logs are shown separately for firms that more heavily rely on kin in their business networks and those that less heavily rely on the them. The solid line represents above the median level of kin connections and the dashed line represents below the median level of kin connections.

Table B1: Production Function

VARIABLES	OLS (1)	OLS (2)	OLS (3)
Assets (in logs)	0.09***	0.09***	0.09***
	[0.030]	[0.030]	[0.030]
Workers	0.10***	0.09***	0.09***
	[0.017]	[0.018]	[0.018]
Male		0.11	0.11
		[0.072]	[0.072]
Age of respondent (in years)		-0.00	-0.00
		[0.003]	[0.003]
Some higher education		0.17**	0.17**
		[0.071]	[0.071]
Currently Married		0.15*	0.16*
		[0.081]	[0.081]
Language of interview Russian		-0.10	-0.10
		[0.070]	[0.070]
Firm located in Bishkek	0.44***	0.20	0.20
	[0.069]	[0.134]	[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 B2: 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. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Appendix C: Additional Figures and Tables
Figure C1: Profit Margin and Firm Size by Cohort
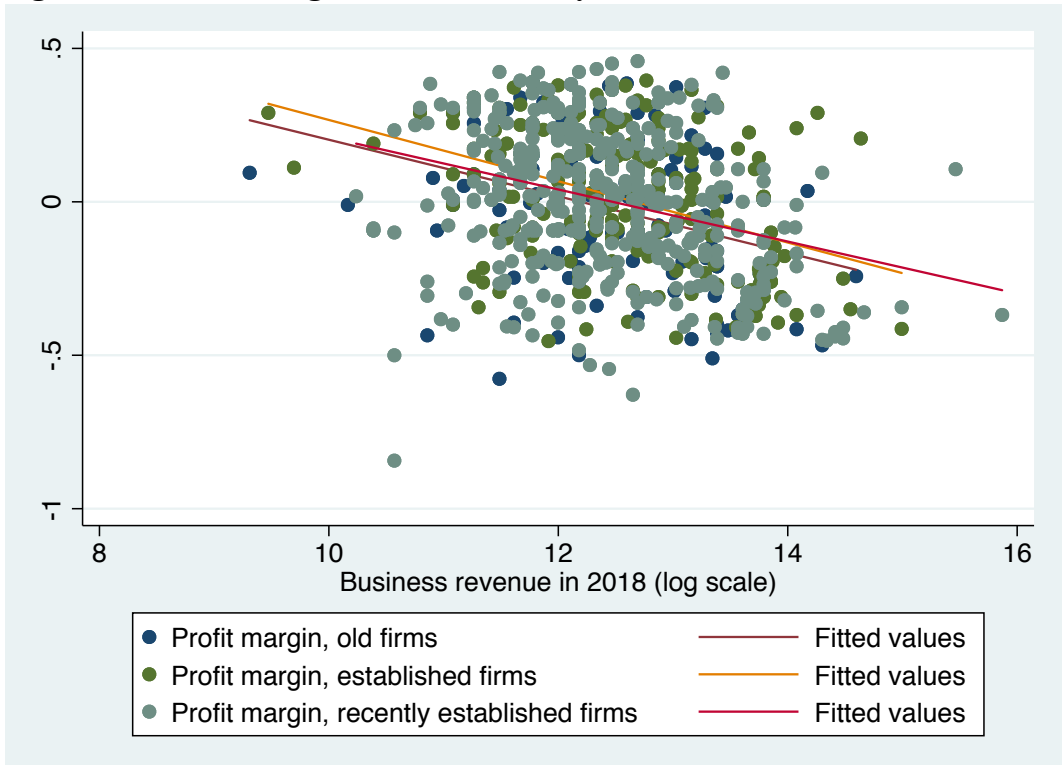
Notes: The figure presents the scatter plot of profit margin (demeaned by business type and location) and business revenue in 2018 (in logs). Fitted values are presented separately for old firms (started in 2010 or earlier), established firms (started between 2010 and 2015) and recently established firms (establish in 2015 or later)

Figure C2 : Kin proportion of Business Networks across firm cohorts
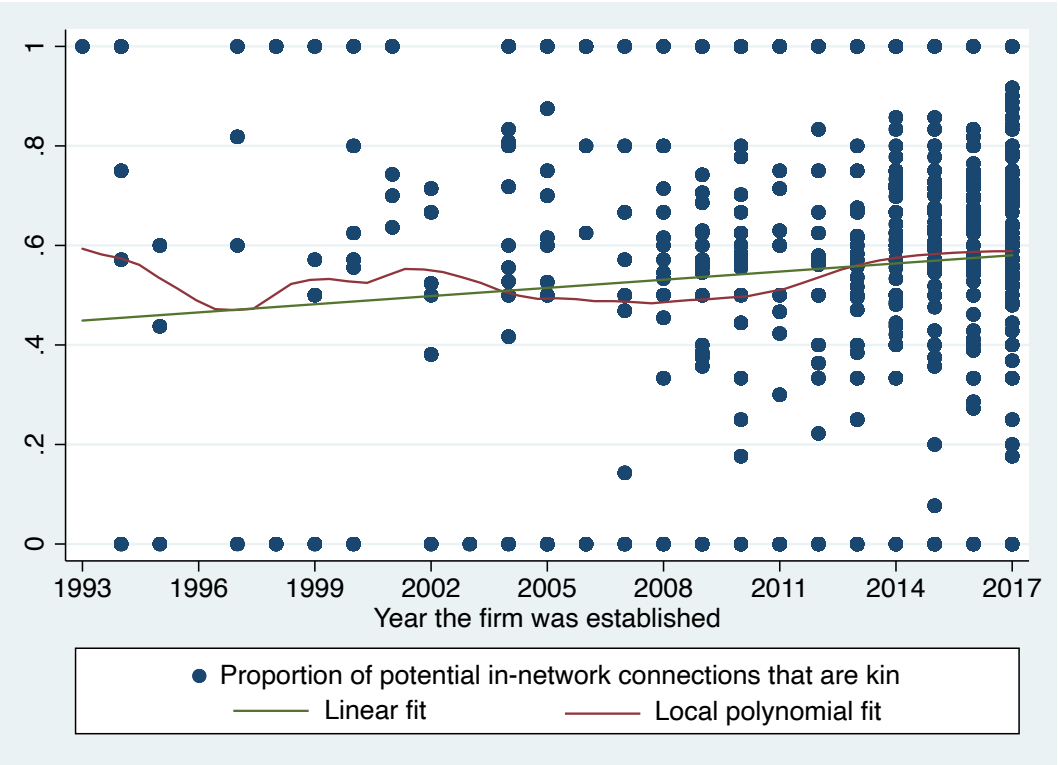
Table C1: Literature on Networks and Firm Growth

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	IVSML	+ (profits)
Nguyen & Le, 2018	Social	B	IVSM	+ (export propensity)
Burt & Opper, 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 C2: First stage

VARIABLES	Actual In-network kin connections		Actual Out-network kin connections	
	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)
Number of cousins	-0.0624***	-0.0633***	-0.0658*	-0.0670*
	[0.015]	[0.015]	[0.035]	[0.035]
Number of cousins squared	0.0004***	0.0004***	0.0007**	0.0007**
	[0.000]	[0.000]	[0.000]	[0.000]
Estimated Minimum	78	79	47	48
Firm owner controls	Yes	Yes	Yes	Yes
Additional firm controls	No	Yes	No	Yes
Cohort and Business-type Fixed Effects	Yes	Yes	Yes	Yes
Observations	884	884	884	884
R-squared	0.275	0.279	0.191	0.201

Notes: The dependent variable is Actual In-network kin connections in the first two columns and Actual Out-network kin connections in the last two columns. The estimated minimum refers to the point in which the number of cousins begins to have a positive effect on the number of connections, according to the estimates. Firm owner controls and cohort and business-type fixed effects are included in all regressions.

Table C3: Profitability and Kinship: Honest respondents only

VARIABLES	OLS (1)	OLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)
Actual In-Network Kin	1.16***	1.57***	1.41***	46.59	1.42***	52.22
	[0.448]	[0.492]	[0.499]	[184.261]	[0.493]	[227.518]
Actual Out-Network Kin		-0.47***	-0.52***	-6.53	-0.52***	-6.78
		[0.130]	[0.136]	[22.077]	[0.137]	[25.597]
Male			1.44	-8.71	1.44	-9.12
			[2.588]	[37.297]	[2.598]	[43.513]
Age of respondent (in years)			0.12	0.29	0.13	0.43
			[0.099]	[0.648]	[0.100]	[1.235]
Some higher education			-5.93**	-24.45	-5.77**	-24.11
			[2.321]	[72.184]	[2.356]	[78.577]
Currently Married					0.12	-18.60
					[2.535]	[76.255]
Language of interview Russian					-0.39	-8.69
					[2.283]	[40.315]
Firm located in Bishkek	-1.39	-2.49	-3.40	40.18	-3.47	47.09
	[2.407]	[2.418]	[4.464]	[197.986]	[4.479]	[248.296]
Partnership					0.95	57.08
					[14.124]	[291.435]
LLC					3.93	11.22
					[7.119]	[62.968]
Firm owns place of business					0.56	5.23
					[0.652]	[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 C4: Firm Growth and Kinship: Honest respondents only

	FE	FE	FE	FE	FE	FE
	New Firm: Established in 2016			New Firm: Established 2014-2016		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES						
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 Potential 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 potential 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 Potential 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 potential 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 potential 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 potential 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 potential 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 C5: Non-linear least squares estimation with skewed error distribution

Dependent variable=	Profit margin in 2018		Profits in 2018	
	NLLS	NLLS	NLLS	NLLS
	(1)	(2)	(3)	(4)
VARIABLES				
Actual In- Network Kin	1.45***	1.38***	3399.44***	3139.48**
	[0.26]	[0.20]	[1171.04]	[1394.96]]
Actual Out- Network Kin	-0.37***	-0.35***	-1690.98***	-1827.41***
	[0.12]	[0.11]	[535.96]	[512.87]
Expected mean of asymmetric error	-0.001	-0.004	-16175.44	-24992.75
	[0.002]	[1.79]	[17472.91]	[26288.14]
Firm owner controls	No	Yes	No	Yes
Cohort and Business-type Fixed Effects	Yes	Yes	Yes	Yes
Observations	722	722	741	741

Notes: Robust standard errors are reported in brackets. Scaling variables are the firm's assets, employment and location and the firm owner's age, ethnicity, sex, education, preferred language, and region of birth. For the profits regression, we trim the top and bottom 1% of the distribution.

Table C6: 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
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES						
Family would have info	-0.05	-0.06		-0.04	-0.02	
	[0.041]	[0.043]		[0.030]	[0.030]	
Owner-operator	-0.17***	-0.19***		-0.12***	-0.12***	
	[0.039]	[0.040]		[0.025]	[0.025]	
Actual In-network kin	-0.00		4.93***	0.00		5.38***
	[0.005]		[1.682]	[0.003]		[1.842]
Actual Out-network kin	0.00*		-0.85**	0.00*		-0.97**
	[0.002]		[0.418]	[0.001]		[0.445]
Cousins		0.00***			0.00	
		[0.002]			[0.001]	
Cousins squared		-0.00**			-0.00	
		[0.000]			[0.000]	
Inverse Mills ratio			3.40			5.90
			[5.270]			[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	

Table C7: Profit margin: Network measures by types of received help

VARIABLES	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)
Actual In- Network Kin: Loans	2.79*** [0.450]				2.61*** [0.650]
Actual In- Network Kin: Bureaucracy		1.77 [1.110]			-1.92 [1.190]
Actual In- Network Kin: Search			3.53*** [0.719]		1.12 [1.070]
Actual In- Network Kin: Dispute				2.91*** [0.793]	1.64* [0.956]
Actual Out-Network Kin	-0.34*** [0.130]	-0.18 [0.132]	-0.36*** [0.125]	-0.26* [0.134]	-0.42*** [0.127]
Firm owner controls	Yes	Yes	Yes	Yes	Yes
Additional firm controls	No	No	No	No	No
Cohort and Business-type Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	772	772	772	772	772
R-squared	0.165	0.133	0.155	0.143	0.175

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 C8: Profit margin: Network measures by types of help given

	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	OLS (6)
VARIABLES						
Actual In- Network Kin	1.19***	1.16***	1.17***	1.20***	1.11***	1.25***
	[0.194]	[0.214]	[0.198]	[0.195]	[0.195]	[0.220]
Actual Out- Network Kin: Work	-2.26***					-1.36*
	[0.772]					[0.809]
Actual Out- Network Kin: Overpaid		-0.10				-0.01
		[0.193]				[0.194]
Actual Out- Network Kin: Discounts			-0.97**			-0.39
			[0.466]			[0.370]
Actual Out- Network Kin: Advice				-1.21***		-0.69
				[0.429]		[0.447]
Actual Out- Network Kin: Housing					-1.14***	-0.63
					[0.386]	[0.443]
Firm owner controls	Yes	Yes	Yes	Yes	Yes	Yes
Additional firm controls	No	No	No	No	No	No
Cohort and Business-type Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	772	772	772	772	772	772
R-squared	0.165	0.154	0.157	0.165	0.165	0.174

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 C9: Profitability and kinship: Controlling for clan

VARIABLES	OLS (1)	OLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)
Actual In- Network Kin	1.08***	1.46***	1.38***	6.27**	1.36***	6.14**
	[0.241]	[0.244]	[0.242]	[2.505]	[0.243]	[2.407]
Actual Out- Network Kin		-0.46***	-0.51***	-0.87**	-0.51***	-0.87**
		[0.116]	[0.117]	[0.392]	[0.118]	[0.388]
Male			1.30	0.12	1.36	0.11
			[2.091]	[2.794]	[2.093]	[2.805]
Age of respondent (in years)			0.13	0.13	0.14*	0.12
			[0.082]	[0.104]	[0.084]	[0.106]
Some higher education			-4.75**	-7.17***	-4.63**	-7.16***
			[2.045]	[2.539]	[2.063]	[2.555]
Currently Married			0.54	-3.54	0.68	-3.49
			[2.195]	[3.138]	[2.205]	[3.117]
Language of interview Russian			0.94	-1.39	0.83	-1.37
			[1.954]	[2.301]	[1.957]	[2.268]
Firm located in Bishkek	-0.96	-1.60	-2.21	-0.45	-2.19	-0.39
	[2.512]	[2.498]	[3.668]	[3.882]	[3.663]	[3.864]
Partnership					-0.73	3.00
					[11.294]	[11.770]
LLC					2.62	4.05
					[8.638]	[6.988]
Firm owns place of business					0.43	-0.17
					[0.544]	[0.654]
Firm owner controls	No	No	Yes	Yes	Yes	Yes
Additional firm controls	No	No	No	No	Yes	Yes
Clan, Cohort and Business-type Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	768	768	768	701	768	701
R-squared	0.173	0.188	0.224		0.225	

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 C10: Business Growth: Accounting for decay in kin proportion

	FE	FE	FE	FE	FE	FE
	New Firm: Established in 2016			New Firm: Established 2014-2016		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES						
New firm	0.02	0.03	-0.12	0.09***	0.09**	0.06
	[0.039]	[0.050]	[0.084]	[0.027]	[0.037]	[0.088]
Has Potential Network	0.12***	0.11***	0.15*	0.10***	0.10***	0.11
	[0.027]	[0.035]	[0.078]	[0.027]	[0.036]	[0.094]
Proportion of potential network that is kin	-0.13***	-0.14***	-0.19**	-0.13***	-0.13***	-0.19*
	[0.032]	[0.037]	[0.094]	[0.031]	[0.036]	[0.108]
Has Potential Network*New Firm	0.50**	0.46**	0.55**	0.19*	0.19*	0.29*
	[0.194]	[0.197]	[0.216]	[0.109]	[0.111]	[0.154]
Proportion of potential network that is kin*New firm	-0.36	-0.31	-0.31	-0.04	-0.03	-0.17
	[0.242]	[0.243]	[0.266]	[0.143]	[0.142]	[0.205]
Assets	0.15**	0.11	-0.01	0.10	0.07	-0.03
	[0.073]	[0.071]	[0.083]	[0.072]	[0.067]	[0.081]
Workers	-0.01	-0.02	0.02	-0.01	-0.03	0.01
	[0.022]	[0.031]	[0.016]	[0.016]	[0.026]	[0.017]
New firm, no-kin potential network	0.64***	0.60***	0.58***	0.39***	0.38***	0.46***
	[0.19]	[0.19]	[0.21]	[0.10]	[0.10]	[0.15]
New firm, all-kin potential network	0.14*	0.15**	0.08	0.22***	0.22***	0.10
	[0.08]	[0.08]	[0.09]	[0.05]	[0.05]	[0.11]
Old firm, all-kin potential network	-0.014	-0.025	-0.038	-0.022**	-0.027	-0.08
	[0.01]	[0.026]	[0.087]	[0.011]	[0.026]	[0.11]
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	0.108	0.165	0.185	0.211	0.255	0.199
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.