# Integration in the Absence of Institutions: China-North Korea Cross-Border Exchange

Stephan Haggard
The Graduate School of International Relations and Pacific Studies
University of California, San Diego
shaggard@ucsd.edu

Jennifer Lee
Peterson Institute for International Economics
jlee@piie.com

Marcus Noland
Peterson Institute for International Economics and the
East-West Center
mnoland@piie.com

Abstract

This paper is based on an unprecedented survey of more than 300 Chinese enterprises that are doing or have done business in North Korea. Institutional weakness deters integration; deters investment relative to trade; and inhibits trade finance. Given the weakness of formal institutions and the apparent reliance on hedging strategies, the rapid growth in exchange witnessed in recent years may prove self-limiting, as the effectiveness of informal institutions erode and the risk premium rises unless offset by a concomitant strengthening of formal institutions. Institutional improvement could have significant welfare implications, affecting the volume, composition, and financial terms of cross-border exchange.

20 March 2011

JEL: P3, P33, F15, F36

Keywords: economic integration, property rights, institutions, transition, China, North Korea

Paper prepared for the workshop Transitional Economies: Progress and Pitfalls, East-West Center, 18 February 2011. We would like to thank the Asian Development Bank and the Smith-Richardson and MacArthur Foundations for financial support, and for participants at the workshop for helpful comments on an earlier draft.

History provides fascinating examples of dispersed traders who managed to organize institutions to support exchange, even over long distances, in the absence of state protection of property rights and contracting (Milgrom, North and Weingast 1990; Greif 1993; Greif, Milgrom, and Weingast 1994). Such examples are not limited to history. The development and comparative economics literature yields a number of contemporary examples, from trans-African trade (Kennedy 1988) to the emergence of contracting in transitional economies such as Vietnam (McMillan and Woodruff 1999a, b). Yet while some exchange is possible without such protection, even under the risk of expropriation, the institutional environment to support an efficient level of trade is demanding: it requires that merchants act collectively to impel the sovereign to abjure expropriation to the ultimate benefit of both the traders and the sovereign.

There is empirical evidence that such agreements, and the institutions that support them, have quantitatively significant effects on cross-border exchange. Using a gravity model, Anderson and Marcoullier (2002) find that corruption and imperfect contract enforcement dramatically reduce international trade. A ten percent rise in a country's index of transparency and impartiality leads to a five percent increase in import volumes ceterus paribus. Cross-border investment may be even more sensitive to such considerations: Wei (2000) found that an increase in the corruption level from that of Singapore to that of Mexico had the same negative effect on inward FDI as raising the tax rate by fifty percentage points. While private actors may be able to devise mechanisms to facilitate trade in weakly-institutionalized environments, the level of exchange will be sub-optimal and institutional improvements could have significant pay-offs.

Economic integration between China and North Korea represents a remarkable natural experiment for exploring these issues. Traditionally, trade between the two centrally-planned economies was determined politically and was relatively small. The breakup of the Soviet Union and the dissolution of the Eastern Bloc and the apparent inability of the North Korean leadership to adjust to changing circumstances contributed to an implosion of North Korea's economy and a famine that killed as many as one million people, around five percent of the pre-crisis population (Haggard and Noland 2007). The inability of the state to provide food under the existing socialist compact forced small-scale social units—households, work teams, local government and party offices, even military units—to engage in entrepreneurial behavior to secure food.

One aspect of this coping behavior was the development of decentralized cross-border barter trade for food. This barter was eventually monetized and spread to a much broader array of both goods and actors. This "marketization from below" led to a dramatic expansion in bilateral trade (figure 1), but in a cross-border setting characterized by the apparent absence of conventional property rights protections, formal dispute adjudication mechanisms, even a published tariff schedule—in short, all of the institutions deemed necessary for efficient exchange.

This paper is based on an unprecedented survey of more than 300 Chinese enterprises that are doing or have done business in North Korea. The results provide some insight both into how firms manage the risks associated with weak institutions and the particular constraints such weaknesses place on bilateral trade and investment. There are essentially two sorts of Chinese enterprises doing business in North Korea: large state-owned enterprises with long-standing relationships with their North Korean counterparts, and a larger number of small, essentially private businesses (regardless of their specific legal status in China) that restrict themselves primarily to trading activities.

The large majority of firms in our survey—nearly 90 percent--report being able to make a profit in North Korea. Moreover, their assessments of the future at the time of the survey were generally positive; most respondents indicated that they regarded the trend toward liberalization as irreversible.[1] Nonetheless, Chinese appraisals of the North Korean business environment are generally negative and manifest fear of expropriation of investments made in North Korea. A large majority of the respondents complain about infrastructure issues—most notably historic ban on cell phone use which is beginning to ease—but respondents also complain about the nature of the regulatory environment, the risk of arbitrary changes in rules and practices and lack of reliable dispute adjudication. As a result, Chinese enterprises limit their exposure, generally choosing trading over investing, conducting transactions in China, holding their North Korean counterparts to tight settlement terms, and demanding payment primarily in US dollars or Chinese yuan.

[1] Since the survey was conducted in October and November 2007, a number of changes have occurred in North Korean economic policy, most notably a chaotic currency reform undertaken in November 2009 (Haggard and Noland 2010a). It is unknown whether the respondents would answer in the same way today.

Bribery and corruption are pervasive features of the business environment, and might be seen as a rational response to the lack of property rights protection. Bribe payments constitute a political means of assuring protection. However, there is some evidence that firms face a greater likelihood of economic predation as their size increases. The limited scale of Chinese operations and the reluctance of firms to invest or even to engage in anything more than spot-market transactions appear endogenous to the absence of property rights protection and pervasive corruption.

In the absence of formal institutions for dispute settlement, there is some evidence that Chinese businesses may seek to protect themselves from official predation via informal networks of other firms. Recourse to other firms rather than either North Korean or Chinese authorities may constitute an example of how private traders can use reputational mechanisms to protect themselves. But it is again important to emphasize the suboptimal nature of these arrangements; most firms that have had disputes with their counterparties report a low level of satisfaction with the outcome.

In sum, institutional weakness deters integration; deters investment relative to trade; and inhibits normal trade finance. Given the weakness of formal institutions and the apparent reliance on hedging strategies, the rapid growth in exchange that we have seen in recent years may prove self-limiting, as the effectiveness of informal institutions erode and the risk premium rises unless offset by a concomitant strengthening of formal institutions. Institutional improvement would clearly have significant welfare implications, affecting the volume, composition, and financial terms of cross-border exchange.

**Who Are the Participants?**

The results reported here are derived from a survey of 303 enterprises conducted in October and November 2007. All the firms in the survey operated in the Chinese provinces of Jilin and Liaoning, although they were not necessarily headquartered there. (Details of the survey implementation are provided in the appendix.) Two hundred and fifty of the firms (82 percent) were engaged in trade or investment with North Korea at the time of the survey. A control group of 53 firms drawn randomly from firms operating in the two provinces were not doing business in North Korea at the time of the survey; 43 (14 percent) had never engaged in cross-border exchange with North Korea, and a small share (10 firms, or 3 percent of the total sample) had previously engaged in trade or investment but had withdrawn. Those engaged in cross-border exchange constitute a sample of convenience, culled from a variety of sources. These firms are engaged in importing, exporting, investment and the permutations and combinations of these three activities (figure 2). Nonetheless, pure exporters make up the largest group. Most are relatively small private enterprises (figure 3), and most have initiated cross-border exchange with North Korea since 2000 (figure 4). However there is a distinct minority of a dozen large state-owned enterprises (SOEs), some of which have been doing business with North Korea for more than a quarter-century.

There are a number of salient differences between the firms that are not doing business in North Korea and those that are, starting with size. Of those doing business in North Korea, 55 percent have 1-10 employees and 91 have 100 or less. The point is even clearer if we focus on revenue: 28 percent of firms doing business in North Korea had sales revenues of less than 100,000 renminbi, around $12,000. Most of the firms doing business with North Korea are clearly small entities. By contrast, 42 percent of the firms not doing business in North Korea had more than 100 employees. Six—11 percent of the sample of 53—have more than 1000 employees and 13—nearly a quarter of them—report sales revenues of more than 50 million renminbi, about $6 million.

Ownership patterns also vary. Fifty-eight percent of the firms doing business in North Korea are private enterprises, and another 14 percent are sole proprietorships; only 3 percent are foreign. By contrast, the not-doing-business sample includes a different mix of ownership structures, with 38 percent foreign firms and only 28 percent accounted for by private enterprises and sole proprietorships. Interestingly, there were not many SOEs in either sample (5 percent in the “doing business” sample, 4 percent in the “not doing business” sample) although joint stock companies—which frequently have government participation--accounted for about 21 percent of the first group and 26 percent of the second group.

Core activities also vary. Fully 54 percent of the firms doing business in the DPRK report that they are involved principally in trading; another 5 percent identify themselves as diversified groups that have trading operations. By contrast, only 26 percent of the firms not doing business in North Korea are trading companies, with a much higher representation of firms involved in manufacturing (49 percent of those not doing business as opposed to only 8 percent of those doing business). Among the other activities represented by the firms doing business in North Korea are—in descending order—construction (16 percent), services (10 percent), and agriculture (6 percent).

The traders were asked about the most important product that they exchanged with their largest customer or supplier. The findings comport broadly with what we know about bilateral trade at the time of the survey. For exporters, the major products included construction materials (including upholstery; 13 percent); apparel and clothing (11 percent); grain and edible oils (10 percent) and chemicals and electrical equipment (8 percent each). On the import side, the product mix is much more concentrated, with aquatic products accounting for nearly 30 percent of major products from major suppliers, with metal and metal products (27 percent) and wood and wood products (18 percent) accounting for significant shares; indeed, these three product categories together account for almost 75 percent of the top imports from the dominant supplier.

Among investors, the most frequently cited motivations are to expand business in the domestic market (29 percent), to sell there (21 percent) or to exploit natural resources (27 percent). Only 23 percent are locating in North Korea as an export platform, either back to China (13 percent) or to third markets (10 percent). We interpret these results to reflect in part prevailing incentives and the limited opportunities for export-oriented investment.

The vast majority of the enterprises in the sample doing business in North Korea are Chinese (98 percent), though around 20 percent of the control group report being headquartered outside of China, mostly in Japan or South Korea. Forty percent of the respondents report that their chief executive officer (CEO) can speak Korean. This share is virtually identical across both the firms currently doing business in North Korea and those which are not.

While our understanding of the Chinese participants is relatively complete, our understanding of their North Korea counterparts is much weaker. Figure 5 reports the Chinese firms' responses to a question about the legal status of their primary North Korean counterparty, broken down by importers, exporters, and investors. In all three cases, the majority of respondents report that SOEs are their main counterparties, although this may well encompass entities of very different sorts.[2] Nonetheless, interesting differences emerge. Pure exporters

[2] The category "SOE" encompasses entities and economic behaviors of at least three different types. The first are SOEs engaged in their traditional, legally-sanctioned lines of business. The second are SOE's whose managers have exploited the company's legal status and resources to

report a wider array of North Korean counterparties, including Chinese brokers, private firms and individual entrepreneurs. These actors have played an important role in making emerging markets in North Korea for imported consumer goods and even intermediates. Importers, and particularly investors, report a much greater dependence on official entities: SOEs, government bureaus and the military.

**Subjective Assessments of the North Korean Business Environment**

The Chinese firms surveyed generally have a negative assessment of the business environment in North Korea. Among the firms not doing business in North Korea at the time of the survey, by far the most frequently cited reason was lack of familiarity with the North Korean market (87 percent agree or strongly agree). Fifty-five percent cite lack of familiarity with the country more generally and 57 percent cited the weakness of the North Korean economy. However, just over half (51 percent) cited the poor reputation of DPRK policies and 45 percent cited the poor reputation of North Korean firms.

Among those doing business in North Korea, almost 88 percent report that they are able to make a profit. Is this success a political artifact, a result of Chinese government support for trade and investment with the DPRK? In fact, few businesses (and none of the SOEs, surprisingly) report any support from the Chinese government for their activities. Seven percent of the respondents indicated that they received special tariff reductions or exemptions, presumably under Chinese provisions for preferences for local firms engaged in small magnitude "border trade." A handful of firms report receiving trade insurance, investment guarantees, or preferential finance. But government support, narrowly construed, does not appear to play a key role in enabling exchange.

---

initiate non-traditional and in some cases completely unrelated (and even illicit) lines of business. Third, entrepreneurs affiliate with SOE's for political protection (Haggard and Noland 2007); the "SOE" may in fact be a shell for an effective joint venture partnership. Similar uncertainty about the true nature of the enterprise exists for other types of counterparties that are reported in the survey such as North Korean government offices. Indeed, it is possible that the Chinese firm itself does not even know the true "inside story" regarding its North Korean counterparty.

Respondents do see some positives in the operating environment. Among the firms doing business in the country, a slight majority believe that it is getting easier to do business in North Korea.[3] About 50 percent cite the reduction in trade barriers and the emergence of general markets as positive features in the operating environment. It is possible that at the time of the survey, the business environment was seen as improving, perhaps because of progress on the nuclear issue and the staging of a second summit North-South summit just prior to the survey. It may also be the case that learning takes place: agreement with the statement that North Korea regulations make it hard to do business is negatively correlated with length of involvement with North Korea at the 10 percent level.[4]

However, we also asked the firms doing business in North Korea a series of ten questions about the factors that impede their business (figure 6). Most firms report problems with infrastructure; large majorities indentify the ban on cell phones (86 percent) and inadequate infrastructure (79 percent) as constraints. However, regulation is also a major hindrance, with 79 percent citing changing regulations, 70 percent citing the nature of regulations, and just over 60 percent reporting that it is impossible to do business outside the special economic zones and that there is expropriation risk.[5]

We can assess the effects of these perceptions on entry by comparing the attitudes of those doing business in North Korea with those not doing business there. Some factors do not exhibit significant differences between the two sets of firms because firms of both sorts have strongly adverse assessments along these dimensions; for example, the differences with respect to the quality of infrastructure and the barriers posed by weak telecommunications do not show significant differences. However, there are statistically significant differences in their views of North Korea along several other dimensions directly related to the institutional environment.

---

[3] As noted earlier, a number of changes have occurred in North Korean economic policy since the survey was conducted and it is not known whether the respondents still hold these views.

[4] This finding held for all those doing business and the subsample of traders, though not for investors.

[5] Since the survey was conducted, the ban on cell phones has been lifted with the Egyptian firm Orascom introducing domestic cellular service through most of the country (Noland 2009). How fully addressed the foreign firms' potential need for international connections is unknown.

Firms not doing business are more likely to report that the depreciating currency poses a barrier to their business, but are also more likely to see high taxes and the regulatory environment (at the 1 percent level), and the perceived difficulty of doing any business outside the special economic zone (at 5 percent level) as barriers. Perceptions of a problematic business environment potentially deter entry.

Among those firms doing business, those engaged in trade are more likely to agree (at the five percent level) with the statement that is it too risky to invest because of potential expropriation, suggesting that such fears push firms away from investment and toward trading modalities. Likewise investors complain even more frequently (at the five percent level) than traders about high taxes (at the 10 percent level), which could be interpreted broadly as a proxy for government-related costs of doing business.

**Corruption, Dispute Resolution, and Settlement Terms**

The survey provides evidence of the business environment in North Korea that goes beyond subjective assessments to corruption, the weakness of dispute resolution and the effects of the environment on the terms of financial settlement. The findings on corruption are consistent with evidence from refugee surveys, including testimonies of former state and party officials, of high—and possibly rising--levels of corruption in North Korea, (Haggard and Noland 2010b, Kim 2010).

Most of the Chinese firms report having to get some kind of permission or approval from some level of the North Korean government to do business in North Korea, though there are differences across types of firm. All of the Chinese SOEs reporting obtaining permission, but 29 percent of the private businesses report that they did not obtain any permission or approval by the North Korean government before starting business.  Only 9 percent of investors—six firms—report that they have no need of government approval. By contrast 29 percent of traders and 47 percent of those who are engaged only in exports to North Korea report that they have no need of government approval to operate.

A majority of the firms in our survey report a need to bribe to do business (55 percent). However investors are much more likely to report a need to bribe (73 percent) than traders (54 percent) or those engaged in exporting only (44 percent); these differences between investors and traders and exporters is significant at the 1 percent level. We also asked about actual bribe costs, and the differences between investors and traders are once again clear. Nineteen percent of the firms report spending more than 10 percent of revenues on bribes, but more than half of investors (53 percent) report spending more than 10 percent of annual revenues on bribes. These differences presumably reflect the greater complexity of entering as an investor, the more extensive contact with local officials, and the greater risk of expropriation.[6]

Disputes appear to be fairly common. A critical feature of the institutional environment is the capacity of investors and traders to resolve disputes. The survey permitted respondents engaged in multiple types of business to characterize each of their principal business relationships separately, for example, allowing a single firm to report on relations with its main import, export, and investment partner. Twenty-one percent of these relationships had generated disputes. The pattern of disputes was fairly uniform across types of business relationships: exporters (19 percent), importers (24 percent), and investors (23 percent). But if we compare investors with those who export only, we once again see evidence of the hold-up problems posed by the weak property rights environment. Fully 41 percent of investors report disputes, while only 4 percent of exporters do. Weak dispute settlement appears to push firms back to less risky, "cash and carry" transactions.

When asked how they would resolve a dispute, the pattern of responses across exporters, importers and investors differed in predictable but interesting ways; we focus here on the differences between exporters and investors. More than one-quarter of exporters indicated that there were no third parties from which they could seek help. To the extent that they did believe there was recourse, it was entirely on the Chinese side of the border: twenty percent indicated that they would seek help from Chinese government officials, 19 percent other Chinese companies or business associations, and 17 percent the Chinese court system.[7] Although the

---

[6] This pattern of response appears to be borne out of experience. The responses are similar for the quitters; they do not appear to have distinctly harsh views of North Korea. Among the firms that had never done business in North Korea, most were uncertain about the need to bribe to do business; 37 percent thought that bribery was necessary and 12 percent not. The firms never having done business in North Korea have lower perceptions of the incidence of bribery at the 5 percent level of statistical significance.

[7] Multiple responses for dispute resolution modalities were permitted. If the modality figures are calculated as a share of total responses (not number of enterprises), the exports results are

number of disputes reported on the part of pure exporters was small (only 5 of 113 “pure” exporters), their pessimism was warranted; none of the five reported they were satisfied with the process of dispute resolution.

For the investors, more than one-third would try to settle matters privately (35 percent), appeal to North Korean local officials (31 percent), and Chinese officials (22 percent), presumably reflecting the far greater importance of North Korean officials in settling investment disputes that involve a physical presence in North Korea on the part of the foreign investor. It is also notable that the share reporting that they would appeal to local officials (31 percent) exceeded that of provincial officials (16 percent) and central government officials (12 percent), a pattern consistent with the reduction in central control which was a byproduct of the “reform from the bottom up” aspect of North Korea’s transition.[8]

However, whatever the investors thought ex ante, their disaffection after the fact is high; 77 percent report that they were not satisfied with the way the dispute was settled (and recall that the share of investors reporting disputes was also much higher than firms involved in export only). When asked about how they would settle disputes in the future, preferences suggest that local and provincial officials may be more willing to protect property rights than their higher ups. Investors who experienced disputes showed a greater proclivity to pursue resolution of future disputes through appeals to local (32 percent v. 19 percent) and provincial officials (25 percent v. 7 percent).

A final feature of the operating environment that speaks to issue of credibility has to do with settlement terms. None of the traders report doing any business in North Korean won. While this might reflect simple exchange rate risks, a long history of currency revaluations—culminating in the conversion of December 2009—suggests that the risk is also political. Most

---

Chinese government officials (13 percent), other Chinese firms or business association (12 percent), and Chinese courts (11 percent). For imports the results are private negotiation (23 percent), North Korean local officials (12 percent), and Chinese officials (9 percent). For investors the results were private negotiation (21 percent), local North Korean officials (18 percent), and Chinese officials (13 percent). In no case did the North Korean court system share of responses reach 10 percent.

[8] In the past year the North Korean government has tried to reverse this trend, specifically centralizing the foreign investment approval process.

Chinese exporters to North Korea use Chinese yuan as the settlement currency (55 percent), possibly reflecting the preference of small traders to paid in local currency, followed by US dollars (34 percent), and barter (8 percent). Imports, by contrast, are settled primarily in US dollars (52 percent), followed by Chinese yuan (29 percent), and barter (15 percent). The more frequent use of US dollars in the import trade relative to the export trade may reflect the preferences of sellers who want to get paid in home and/or conveniently usable currencies; it could also reflect the distinctive preferences of North Korean SOEs (more highly represented among Chinese importers' counterparties) and/or the North Korean government which may desire to earn convertible currency that does not have to be spent in China.

Finally, settlement terms are typically very tight, reflecting lack of trust and credit. Less than 5 percent of the traders report extending credit to their suppliers. Most trade is settled at time of delivery; the next most frequently occurring moment of payment is at time of order placement. Less than ten percent of import and five percent of export transactions occur more than 30 days after delivery. Given dissatisfaction with dispute settlement, it is not difficult to infer that fears of hold-up have had highly adverse effects on the provision of credit.

**Entry, Exit, and Modality**

The questions naturally arise as to what distinguishes enterprises that enter the market from those that choose not to and to what determines those who enter and subsequently leave. A related question is what characteristics are associated with choices regarding different types of business activity: what drives whether firms choose to export and import, or whether they choose to invest or engage in some more complex combination of business activities. Investing clearly involves much more substantial hold-up risk and we would therefore expect the property rights, contracting and regulatory environment to matter more.

The survey generates not only a rich set of data on firm characteristics and experiences but also on perceptions of the business environment. Probit regressions estimated on entry are summarized in Table 1. Ownership type and size matter: as shown in specification 1.1, private ownership is positively associated with entry, and size, as measured by number of employees, is negatively associated with entry. This relationship is specified slightly differently in specification

1.2 with a similar result: firms choosing to engage in business with North Korea are smaller and more likely to be private than their counterparts.

With respect to business activity, service providers are deterred from entry. This could be because of North Korean regulations that create explicit entry barriers, but it could also be because service activities require a local presence which is more risky than arms-length trade transactions in the North Korean context.[9]

Also of interest is what does not appear to matter. Variables relating to enterprises' sources of funding were statistically uncorrelated with entry. In regressions not reported in the interests of brevity, neither provincial location nor having a headquarters in a border town are statistically significant nor is having a chief executive officer (CEO) who speaks Korean. Both of these characteristics might be associated with being more informed about the North Korean business environment or making more nuanced risk assessments, yet they neither incline firms toward or away from doing business.

The perception or knowledge of the necessity for bribery to do business with North Korea was uncorrelated with entry (firms that entered the North Korean market have a similar perceptions to those which have not with approximately 70 percent of both groups believing that bribery is needed to do business with North Korea) though as we will see below there is evidence that the respondents' ex ante assessments may have underestimated the actual extent of corruption in North Korea. We also investigated how appraisals of the North Korean business environment affect the likelihood of entry. In this regard we confront a fundamental problem with the data in this particular context although not in some other subsequent applications. In principle, we would like to know how firms' ex ante assessments of particular risks affect their propensity to enter. With respect to the 260 enterprises with current or past experience in North Korea, however, we have appraisals informed by experience ex post. Econometrically the values of these regressors may not be pre-determined violating the classical assumption of the independence of the error term and rendering the coefficient estimates inconsistent.

With this caveat acknowledged, specification search suggested that there were three of these variables correlated with entry: views regarding the falling value of the North Korean

---

[9] That said, North Korea's largest private investment has been by the Egyptian cellular telephone operator Orascom in a joint venture with a North Korean government entity (Noland 2009).

currency, high taxes, and ability to make a profit. As shown in table 1, there is some evidence that the responses on taxes and profitability are correlated with entry holding firm characteristics constant, with enterprises which believe that taxes are too high being deterred from entry and those expecting to make profits entering. If we were able to observe true ex ante assessments of the business environment, the list could well be longer.

We are not only interested in whether these enterprises enter the North Korean market but how they do so. There are seven modality combinations (export-only, export and invest, export and import, etc.) and our sample contains some enterprises in each cell. In principle, we could model this as an unordered polychotomous response model (and indeed tried) but the limited numbers of observations in some cells make this effectively impossible in practice.

Instead, we have adopted the more tractable approach of analyzing the decision to invest, conditional on the decision to enter (table 2). Specification search suggested that the unavailability of outside funds was negatively associated with a decision to invest, though the statistical significance of this relationship is not borne out in specifications 2.1 and 2.2. The results confirm the observation of quite different types of entrants, with larger firms--as measured either by sales or employment (2.1)—and the small, private category (2.2) proving more likely to invest. Construction firms are less likely to invest. Again, this could be due to either statutory prohibitions or the particular risks of formal or informal expropriation associated with this line of business activity.

Having a Korean-speaking CEO is uncorrelated with investing (as it was with entry) and having a headquarters in a border town is actually *negatively* correlated with investing once firm characteristics are taken into account. If we take proximity as a proxy for information, knowing more about North Korea appears to deter investment.

Specification searches suggested that expectations of the need to bribe were *positively* correlated with investing (though the relationship is statistically insignificant in the table 2 regressions) as are assessments of the inadequacy of infrastructure. For the reasons related to simultaneity outlined above, these results should not be given a causal interpretation (i.e. bribery does not lead to more investment). Nonetheless, the results are intriguing. They suggest that firms which have invested in local operations and developed a more extensive understanding of the North Korean economy have a more keen appreciation of the ubiquity of corruption (and the inadequacy of infrastructure) than their presumably less well-informed peers.

Finally, we added four variables relating to dispute resolution. After examining the pattern of coefficients on the 12 possible modalities for dispute resolution, in the interests of parsimony they were grouped into four blocks: North Korean informal political resolution—direct appeals to North Korean officials; the North Korean courts, a formal method of dispute resolution; Chinese official channels, both the courts and political appeals; and finally dispute resolution through informal Chinese third party networks such as industry associations. The coefficients are relative to an omitted category than is defined by completely private informal dispute resolution such as direct bilateral negotiation.

The results reported in table 2 are quite interesting. The expectation that one could appeal to North Korean officials for dispute resolution is positively associated with investing; citing formal adjudication through the courts has no impact. Likewise, the availability of Chinese dispute resolution mechanisms, while possibly valuable in the case of trade, have no impact on the decision to invest where, after all, the action is taking place in North Korean sovereign territory. Finally, the expectation of having to rely on informal Chinese third party mechanisms is negatively associated with actually investing.

In sum, investment is done by larger firms, possibly with external finance, that believe that they can make direct appeals to North Korean officials to resolve disputes. Belief in the efficacy of Chinese authorities in coming to their support in the case of disputes has no effect on investment; although China-North Korea trade is often treated as highly political, the firms that have invested appear to recognize that they are on their own. They have possibly learned that the infrastructure is even worse than expected and the need to engage in bribery even greater. But they have also accepted that bribery is an integral part of the operating environment, apparently believing that the benefits of bribery in terms of securing political connections and support outweighs its financial costs.

Finally, in the interests of completeness, in table 3 we report results on exit. Statistically this is quite challenging insofar as we have only 10 firms in the data set that quit North Korea. Manufacturing firms are more likely to have quit the North Korean market after entering. If one controls for size, SOEs are more likely to quit, but this result is fragile.

**Regulation and corruption**

The trade and investment environment of North Korea is adversely affected by both macroeconomic policy (the depreciation of the exchange rate; perceived tax rates) and the inadequacy of physical infrastructure. But some of the concerns clearly relate to the nature of the regulatory environment, arbitrary and capricious changes in policy and the consequent need to bribe public officials in order to conduct business. What firms are most adversely affected by these constraints and what are their strategies for dealing with them?

Table 4 reports regressions on the question about whether regulations make it hard to conduct business in North Korea; 70 percent of the surveyed enterprises agreed or strongly agreed with this statement. The results are reported in two forms. In specifications 4.1 and 4.2, the dependent variable is a binary variable taking the value 1 if the respondent agreed or strongly agreed with the statement that regulations were a problem. In specifications 4.3 and 4.4, the values of the dependent variable run from 1 (totally disagree) to 4 (totally agree) and the regressions are estimated using an ordered probit estimator. In both cases, a positive coefficient is associated with greater sensitivity to regulatory obstacles.

Many of the results with respect to firm characteristics are subtle and possibly not robust. Nonetheless, they suggest that small firms are most likely to find the regulatory environment a problem. Small, private firms appear particularly sensitive (4.2, 4.4); medium-sized firms measured by sales appear advantaged relative to small firms (4.1, 4.3). SOEs appear relatively untroubled (4.1), which may reflect size or the ability of such firms to draw on their political connections in order to operate. Despite the fact that small firms engage in activities that reduce risk, such as focusing solely on exports and avoiding contact with officials, they nonetheless are more likely to view the regulatory environment as hostile. As in the previous cases, neither the location of headquarters nor the ability of the CEO to speak Korean had an impact.

One apparently robust result is that enterprises that have expected to be able to avail themselves to Chinese dispute settlement mechanisms appear disillusioned. There is evidence in specifications 4.1 and 4.2, that firms with the expectation of using the North Korean court system have relatively positive assessments of the business environment, though this result does not hold up in the ordered probit specifications. It is not clear whether these expectations are informed by experience.

A pervasive response to the weakness of the property right regime is to engage in bribery. Regressions on the propensity to bribe are reported in table 5. Again, they are reported as both simple and polychotomous ordered probits. We find that firms engaged in trading, which involves the least exposure to North Korea and indeed can be conducted within China, feel less compulsion to bribe. But there is also some evidence that larger firms perceive a greater need to bribe, evidenced by the statistical significance of three of the four employment dummy variables in specifications 5.1 and 5.3, and the statistically significant negative coefficient on the small, private firm status in 5.2. One interpretation of this result is that larger firms face more substantial hold-up problems and that the state is predatory. Once an operation reaches a certain size, North Korean officials begin to prey upon it. This is consistent with other evidence of economically predatory behavior by the state apparatus (Haggard and Noland 2011). In the extreme, the size of operations could well be endogenous to predation; the small size of firms doing business with North Korea, as well as the nature of their operations, is a result of the constraints placed on firm growth by the prospects of bribery.[10]

Again, perceptions of recourse to dispute settlement are interesting. Enterprises that believe that they can appeal to either Chinese or North Korean official institutions to manage disputes show no less likelihood to believe in the necessity of bribery to conduct business. The one apparently robust result is that that those firms who believe that they have recourse to informal Chinese third-party dispute settlement are less likely to report a need to bribe to conduct business. One interpretation is that if a firm is embedded in a network, and the North Koreans become aware of it, this may deter predation. Such networks may in effect act like a reputational mechanism that raises the costs to North Korean officials of extorting individual firms.

If this interpretation is correct, it has potentially intriguing implications for the evolution of China-North Korea cross-border integration. As the number of participants increases, so does the effective degree of anonymity, presumably eroding the effectiveness of such reputation-based sanctions. This suggests that over time, the growth in exchange may have a self-limiting aspect as the risk premium on doing business in North Korea rises unless offset by a concomitant strengthening of formal institutions.

---

[10] Specification searches suggested that firms engaged in services and construction are unusually bribe-prone, though the evidence presented in table 5 is not compelling on that point. This could possibly relate to the greater propensity for enterprises in these business lines to require a local presence to conduct operations.

An alternative way of looking at this is that the results on dispute settlement (and the suggestive though statistically insignificant results for service and construction firms) are simply proxies for investment. When status as an investor is added to the specification, the statistical significance of dispute settlement and sectoral activity variables indeed disappears (5.5 – 5.8). The result that size is correlated with the propensity to bribe holds up, however.

A final cut at this issue can be taken by examining fears of expropriation directly (table 6). As previously, we obtain the result that small or small private firms distinctly fear predation. There is some evidence that firms that expect to need to engage in bribery are uniquely concerned about expropriation, as are enterprises headquartered in border towns, suggesting that such fear may be borne of knowledge. As in the previous results regarding investment, enterprises expecting to rely on Chinese authorities for dispute resolution appear to understand that such channels will be ineffective once in North Korea and are apprehensive of expropriation, while firms that believe that they can rely on North Korean political connections are less perturbed.

**Conclusion**

This paper has used an unprecedented survey of Chinese businesses operating in North Korea to explore the nature of growing cross-border ties in a setting characterized by weak institutions and property rights protections in particular. The Chinese enterprises generally have negative appraisals of the North Korean business environment, with large majorities invoking not only the inadequacy of the physical infrastructure but the problematic nature of the regulatory environment. In response these firms have adopted various hedging strategies including limiting their activity to trading and to exporting in particular; these transactions involve less exposure to North Korea and can even be undertaken in China. Such hedging is particularly acute among small and small private enterprises, and firms that do not believe that they can call upon political connections in North Korea. Transactions are undertaken in ways that suggest limited trust, including not only settlement in hard currencies but very stringent payment terms and limited credit, in effect "cash-and-carry."

Bribery and corruption are common. There is some evidence that the likelihood of predation is correlated with size, which could add a self-limiting aspect to the expansion of cross-border integration. Firms may limit the scale of involvement in order to fly beneath the radar of a predatory state.

The survey indicates that Chinese firms receive little support from the government, and have a limited belief in the ability of their government to protect them in the face of disputes. In the absence of formal institutions, there is some evidence that Chinese businesses may seek to protect themselves from predation via informal networks capable of imposing reputational penalties on North Korean actors.

Yet as cross-border integration proceeds, presumably so does the number of participants and with this expansion the effective degree of anonymity, may degrade the efficacy of reputation-based sanctions. This raises the possibility of another self-limiting aspect of the growth of cross-border exchange, as the risk premium on doing business in North Korea rises unless offset by a concomitant strengthening of formal institutions.

Intriguing in this context is recent formation of a North Korean supra-cabinet body to oversee foreign direct investment approvals under a 10-year plan announced in January 2011. The positive interpretation of this development is that this body could potentially constitute a one-stop shop for investment approval and put a stop to the cascading corruption that our survey results indicate deters investment. Alternatively, the composition of this group could also be read as a map of the regime's internal political economy, specifically the organizations and factions best positioned to benefit from the extraction of rents from foreign investors.

## Appendix

A pilot survey was conducted in September 2007 using a survey instrument designed by the authors with the actual interviews conducted by the Horizon Research Consultancy Group. Horizon was responsible for securing any local permits and ensuring that the survey was conducted according to ESOMAR rules (http://actrav.itcilo.org/actrav-english/telearn/global/ilo/guide/iccmar.htm). The final survey was conducted during October and November 2007. The predominant means of conducting the survey was through face-to-face interviews, though some interviews were conducted by telephone. The success rate in conducting the interviews was around 7 percent. Among the reasons that interviews could not be conducted were refusal by the enterprise to participate prior to or doing the interview or inability to establish contact with the enterprise and the unavailability of the person within the enterprise eligible to respond according to the survey instrument (chairman, manager etc.). The data—and particularly firm addresses—were subject to post-survey verification by random spot-checking.

Given that there are no known or available registries of all Chinese firms doing business with North Korea, the sample of firms doing business with North Korea was of necessity a sample of convenience. The sample was developed using North Korean, Chinese and Western press accounts, authors' interviews in Northeast China in the summer of 2007 as well as information gathered by the Horizon Group in the process of the pilot and interviews with other firms. The sample universe was defined as enterprises operating in Jilin and Liaoning provinces due to the practical impossibility of implementing the survey on a nationwide basis, particularly with respect to the control group of firms not doing business in North Korea.

The design involved a survey of 300 firms, with 250 doing business in North Korea and 50 not doing business in North Korea; in the end, we had 53 responses from firms not doing business in North Korea. We defined firms doing business with North Korea to include those that were involved in trading (import, export or both), investment, or that maintained representative offices in North Korea. Those not doing business included 10 firms that had done business and had quit ("the quitters") and 43 that had never done business with North Korea ("the never-weres").

The survey began with a pilot of 30 firms from Jilin and Liaoning provinces (20 firms doing business in North Korea and 10 firms not doing business in North Korea). Although it was understood this was a sample of convenience, enterprises reflecting a broad distribution of size, sector, and provincial location were targeted. Following the successful completion of the pilot—which did not require fundamental modification of the survey—we were able to transit directly to the full survey and all of the pilot firms were included in the final 300 firms. Once the sample of 250 enterprises operating in North Korea was completed, the control group was selected by randomly sampling business registries for Jilin and Liaoning provinces.

**References**

Anderson, James E., and Douglas Marcouiller. 2002. “Insecurity and the Pattern of Trade: An Empirical Investigation,” *The Review of Economics and Statistics,* May, 84(2): 342-52.

Greif, Avner. 1993. "Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition." *American Economic Review*, 83, 3 (June): 525-48.

Greif, Avner, Paul Milgrom, Barry R. Weingast. 1994. “Coordination, Commitment, and Enforcement: The Case of the Merchant Guild,” *The Journal of Political Economy,* August, 102(4): 745-76.

Haggard, Stephan and Marcus Noland. 2007. *Famine in North Korea: Markets, Aid, and Reform*. New York: Columbia University Press.

Haggard, Stephan and Marcus Noland. 2010a. “The Winter of Their Discontent: Pyongyang Attacks the Market,” *Policy Brief 10-1.* Washington: Peterson Institute for International Economics.

Haggard, Stephan, and Marcus Noland. 2010b. Reform from below: Behavioral and institutional change in North Korea. *Journal of Economic Behavior and Organization* 73, no. 2: 133–152.

Haggard, Stephan and Marcus Noland. 2011. *Witness to Transformation: Refugee Insights into North Korea*. Washington: Peterson Institute for International Economics.

Kennedy, Paul. 1988. *African Capitalism: The Struggle for Ascendancy*. Cambridge: Cambridge University Press.

Kim, Byung-yeon. 2010. “Markets, Bribery, and Regime Stability in North Korea,” *EAI Asia Security Initiative Working Paper* no. 4 (April). Seoul: East Asia Institute.

McMillan, John and Christopher Woodruff. 1999a. “Interfirm Relationships and Informal Credit in Vietnam,” *The Quarterly Journal of Economics.* 114(4): 1285-1320.

McMillan, John and Christopher Woodruff. 1999b. “Dispute Prevention without Courts in Vietnam,” *Journal of Law, Economics and Organization.* 15(3): 637-58.

Milgrom, Paul R. Douglas C. North and Barry R. Weingast. 1990. “The Role of Institutions in the Revival of Trade: the Law Merchant, Private Judges, and the Champagne Fairs,” Economics and Politics 2, 1 (March): 1-23.

Noland, Marcus. 2009. “Telecoms in North Korea: Has Orascom Made the Connection?,” *North Korea Review* (Spring).

Wei, Shang-Jin. 2000. “How Taxing is Corruption on International Investors?,” *The Review of Economics and Statistics*, 82:1 1-11.

## Tables and Figures

**Table 1. Enterprises that entered into business relationship with DPRK (binary, includes companies that quit and exited)**

| | (1.1) | (1.2) |
|---|---|---|
| Ownership of firm: Private | 1.181* | |
| | (0.640) | |
| Ownership of firm: State owned enterprise | 0.973 | 0.194 |
| | (0.841) | (0.644) |
| Number of Employees: 11-100 | -0.810 | |
| | (0.576) | |
| Number of Employees: 101 plus | -1.403** | |
| | (0.582) | |
| Small private firm: 1-10 employees | | 1.016** |
| | | (0.495) |
| Sector: Manufacturing | -0.710 | -1.156*** |
| | (0.504) | (0.429) |
| Sector: Services | -1.338** | -1.282** |
| | (0.573) | (0.529) |
| Falling value of NKW - problem for business | -0.444 | -0.694 |
| | (0.502) | (0.462) |
| Tax in North Korea is too high | -0.836* | -0.697* |
| | (0.429) | (0.382) |
| Able to make profit in North Korea | 1.079** | 0.802* |
| | (0.482) | (0.436) |
| | | |
| Observations | 174 | 174 |
| Log likelihood | -24.33 | -28.11 |
| Chi-squared | 38.68 | 31.12 |
| Pseudo R-squared | 0.443 | 0.356 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

**Table 2. Enterprises that invested in DPRK**
**(binary: 1=invest in DPRK 0=did not invest in DPRK)**

| | (2.1) | (2.2) |
|---|---|---|
| **No external funding** | -0.359 | -0.364 |
| | (0.243) | (0.240) |
| **Number of employees: 11-100** | 0.756*** | |
| | (0.258) | |
| **Number of employees: 101 plus** | 0.948** | |
| | (0.431) | |
| **Small private firms: 1 to 10 employees** | | -0.740*** |
| | | (0.250) |
| **Sales value: 10-50 million RMB** | 0.840** | 0.858** |
| | (0.355) | (0.354) |
| **Sector: Construction** | -1.789** | -1.764** |
| | (0.871) | (0.879) |
| **Headquarter city bordering DPRK** | -0.675* | -0.663* |
| | (0.382) | (0.375) |
| **CEO speaking Korean** | 0.026 | 0.016 |
| | (0.248) | (0.248) |
| **Need bribe to do business with DPRK** | 0.174 | 0.202 |
| | (0.265) | (0.263) |
| **Infrastructure is a problem for our business** | 0.657* | 0.640* |
| | (0.359) | (0.356) |
| **Dispute settlement - DPRK political sources** | 0.680** | 0.713*** |
| | (0.275) | (0.273) |
| **Dispute settlement - DPRK court** | 0.100 | 0.041 |
| | (0.438) | (0.431) |
| **Dispute settlement - Chinese government and court** | -0.361 | -0.374 |
| | (0.298) | (0.296) |
| **Dispute settlement - Chinese companies** | -0.730** | -0.701* |
| | (0.367) | (0.362) |
| | | |
| **Observations** | 178 | 178 |
| **Log likelihood** | -79.01 | -79.71 |
| **Chi-squared** | 68.10 | 66.71 |
| **Pseudo R-squared** | 0.301 | 0.295 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

**Table 3. Enterprises that quit after engaging in business with DPRK (binary)**

| | (3.1) | (3.2) |
|---|---|---|
| **Ownership of firm: Private** | 5.239*** | 5.459 |
| | (0.621) | (0.000) |
| **Ownership of firm: State owned enterprise** | 5.214 | 5.496*** |
| | (0.000) | (0.610) |
| **Number of Employees: 11-100** | | -0.078 |
| | | (0.355) |
| **Number of Employees: 101 plus** | | 0.403 |
| | | (0.485) |
| **Sector: Manufacturing** | 1.087** | 0.956** |
| | (0.444) | (0.485) |
| **Sector: Trade** | 0.115 | 0.162 |
| | (0.368) | (0.374) |
| | | |
| **Observations** | 247 | 247 |
| **Log likelihood** | -37.85 | -37.39 |
| **Chi-squared** | 8.018 | 8.955 |
| **Pseudo R-squared** | 0.0958 | 0.107 |

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

**Table 4. Regulations in North Korea make it hard to do business**

| | Binary | | Categorical | |
|---|---|---|---|---|
| | (1=yes 0=no) | | (1=totally disagree - 4=totally agree) | |
| | (4.1) | (4.2) | (4.3) | (4.4) |
| **Ownership of firm: Private** | -5.743 | -6.263*** | -0.908* | -1.222** |
| | (0.000) | (0.547) | (0.504) | (0.532) |
| **Ownership of firm: State owned enterprise** | -5.519*** | -5.547 | -0.106 | -0.099 |
| | (0.520) | (0.000) | (0.651) | (0.638) |
| **Funding source: Relatives and friends** | -0.852** | -0.878** | -0.906*** | -0.919*** |
| | (0.429) | (0.429) | (0.328) | (0.328) |
| **Funding source: No external fund** | -0.389 | -0.404 | -0.566*** | -0.569*** |
| | (0.253) | (0.254) | (0.186) | (0.186) |
| **Small private firm: 1-10 employees** | | 0.701** | | 0.439* |
| | | (0.299) | | (0.238) |
| **Sales value: 10-50 million RMB** | -0.782** | | -0.501** | |
| | (0.318) | | (0.252) | |
| **Sales value: 50 million RMB plus** | -0.267 | | -0.133 | |
| | (0.523) | | (0.400) | |
| **Dispute settlement - DPRK political sources** | 0.061 | 0.041 | -0.190 | -0.193 |
| | (0.284) | (0.281) | (0.205) | (0.204) |
| **Dispute settlement - DPRK court** | -0.913** | -0.884** | -0.362 | -0.347 |
| | (0.404) | (0.400) | (0.303) | (0.303) |
| **Dispute settlement - Chinese government and court** | 0.849*** | 0.867*** | 0.603*** | 0.610*** |
| | (0.291) | (0.291) | (0.193) | (0.193) |
| **Dispute settlement - Chinese companies** | -0.180 | -0.194 | -0.165 | -0.173 |
| | (0.285) | (0.283) | (0.212) | (0.211) |
| **Observation** | 214 | 214 | 214 | 214 |
| **Log likelihood** | -98.77 | -99.06 | -241.3 | -241.6 |
| **Chi-squared** | 25.20 | 24.62 | 29.36 | 28.79 |
| **Pseudo R-squared** | 0.113 | 0.111 | 0.0573 | 0.0562 |

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

**Table 5. Need bribe to do business with DPRK**

| | Binary (1=yes 0=no) | | Categorical (1=totally disagree - 4=totally agree) | | Binary (1=yes 0=no) | | Categorical (1=totally disagree - 4=totally agree) | |
|---|---|---|---|---|---|---|---|---|
| | (5.1) | (5.2) | (5.3) | (5.4) | (5.5) | (5.6) | (5.7) | (5.8) |
| **Investing in DPRK** | | | | | 0.380 | 0.413* | 0.395** | 0.446** |
| | | | | | (0.243) | (0.240) | (0.194) | (0.192) |
| **Number of employees: 11-100** | 0.339* | | 0.373** | | 0.254 | | 0.289* | |
| | (0.203) | | (0.165) | | (0.210) | | (0.170) | |
| **Number of employees: 101 plus** | 0.305 | | 0.570* | | 0.184 | | 0.446 | |
| | (0.391) | | (0.314) | | (0.400) | | (0.319) | |
| **Small private firms: 1 to 10 employees** | | -0.245 | | -0.283* | | -0.161 | | -0.199 |
| | | (0.197) | | (0.161) | | (0.203) | | (0.166) |
| **Sector: Construction** | -0.610* | -0.620* | -0.277 | -0.313 | -0.526 | -0.525 | -0.191 | -0.211 |
| | (0.358) | (0.356) | (0.286) | (0.285) | (0.365) | (0.363) | (0.289) | (0.289) |
| **Sector: Services** | -0.538 | -0.561 | -0.397 | -0.440 | -0.519 | -0.534 | -0.371 | -0.406 |
| | (0.370) | (0.368) | (0.291) | (0.292) | (0.372) | (0.371) | (0.292) | (0.293) |
| **Sector: Trade** | -0.506* | -0.518* | -0.454** | -0.503** | -0.488* | -0.490* | -0.428** | -0.465** |
| | (0.278) | (0.271) | (0.209) | (0.204) | (0.280) | (0.273) | (0.209) | (0.205) |
| **Dispute settlement: DPRK political sources** | 0.406 | 0.423* | 0.232 | 0.269 | 0.316 | 0.320 | 0.134 | 0.151 |
| | (0.251) | (0.249) | (0.198) | (0.196) | (0.259) | (0.257) | (0.204) | (0.203) |
| **Dispute settlement: DPRK court** | -0.262 | -0.291 | 0.282 | 0.258 | -0.293 | -0.317 | 0.252 | 0.232 |
| | (0.365) | (0.362) | (0.303) | (0.303) | (0.371) | (0.368) | (0.305) | (0.304) |
| **Dispute settlement: Chinese government and cou** | -0.138 | -0.141 | -0.222 | -0.230 | -0.140 | -0.140 | -0.216 | -0.221 |
| | (0.220) | (0.220) | (0.181) | (0.181) | (0.221) | (0.221) | (0.182) | (0.181) |
| **Dispute settlement: Other Chinese companies** | -0.449* | -0.448* | -0.366* | -0.370* | -0.378 | -0.370 | -0.290 | -0.284 |
| | (0.252) | (0.251) | (0.209) | (0.209) | (0.256) | (0.255) | (0.213) | (0.212) |
| **Observation** | 201 | 201 | 205 | 205 | 201 | 201 | 205 | 205 |
| **Log likelihood** | -123.2 | -123.9 | -257.0 | -258.8 | -122.0 | -122.4 | -254.9 | -256.1 |
| **Chi-squared** | 19.08 | 17.71 | 24.29 | 20.73 | 21.55 | 20.71 | 28.42 | 26.16 |
| **Pseudo R-squared** | 0.0719 | 0.0667 | 0.0451 | 0.0385 | 0.0812 | 0.0780 | 0.0528 | 0.0486 |

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

**Table 6. Risky to invest as assets may be expropriated**

| | Binary | | Categorical | |
|---|---|---|---|---|
| | (1=yes 0=no) | | (1=totally disagree - 4=totally agree) | |
| | (1) | (2) | (3) | (4) |
| **Small private firms: 1 to 10 employees** | 0.557** | 0.485** | 0.352** | 0.302* |
| | (0.231) | (0.237) | (0.171) | (0.175) |
| **Sales value: 10-50 million RMB** | -0.619** | -0.588** | -0.641*** | -0.610** |
| | (0.298) | (0.298) | (0.246) | (0.248) |
| **Sales value: 50 million RMB plus** | 0.387 | 0.518 | 0.078 | 0.118 |
| | (0.486) | (0.512) | (0.359) | (0.361) |
| **Sector: Construction** | -0.873** | -0.929** | -0.905*** | -0.939*** |
| | (0.372) | (0.384) | (0.343) | (0.347) |
| **Sector: Diversified Group** | | | -0.779** | -0.792** |
| | | | (0.380) | (0.381) |
| **Sector: Services** | | | -0.629** | -0.672** |
| | | | (0.312) | (0.314) |
| **Sector: Trade** | | | -0.417* | -0.435* |
| | | | (0.228) | (0.229) |
| **Headquarter city bordering DPRK** | | | 0.422* | 0.478** |
| | | | (0.238) | (0.242) |
| **Need bribe to do business with DPRK** | 0.624*** | 0.653*** | | |
| | (0.222) | (0.231) | | |
| **Dispute settlement: DPRK political sources** | | -0.470* | | -0.349* |
| | | (0.275) | | (0.206) |
| **Dispute settlement: DPRK court** | | 0.204 | | 0.218 |
| | | (0.419) | | (0.313) |
| **Dispute settlement: Chinese government and court** | 0.690*** | 0.873*** | 0.517*** | 0.635*** |
| | (0.260) | (0.290) | (0.189) | (0.203) |
| **Dispute settlement: Other Chinese companies** | | -0.265 | | -0.284 |
| | | (0.308) | | (0.220) |
| **Observation** | 184 | 184 | 203 | 203 |
| **Log likelihood** | -96.01 | -94.20 | -243.7 | -241.5 |
| **Chi-squared** | 28.93 | 32.55 | 31.54 | 35.87 |
| **Pseudo R-squared** | 0.131 | 0.147 | 0.0608 | 0.0691 |

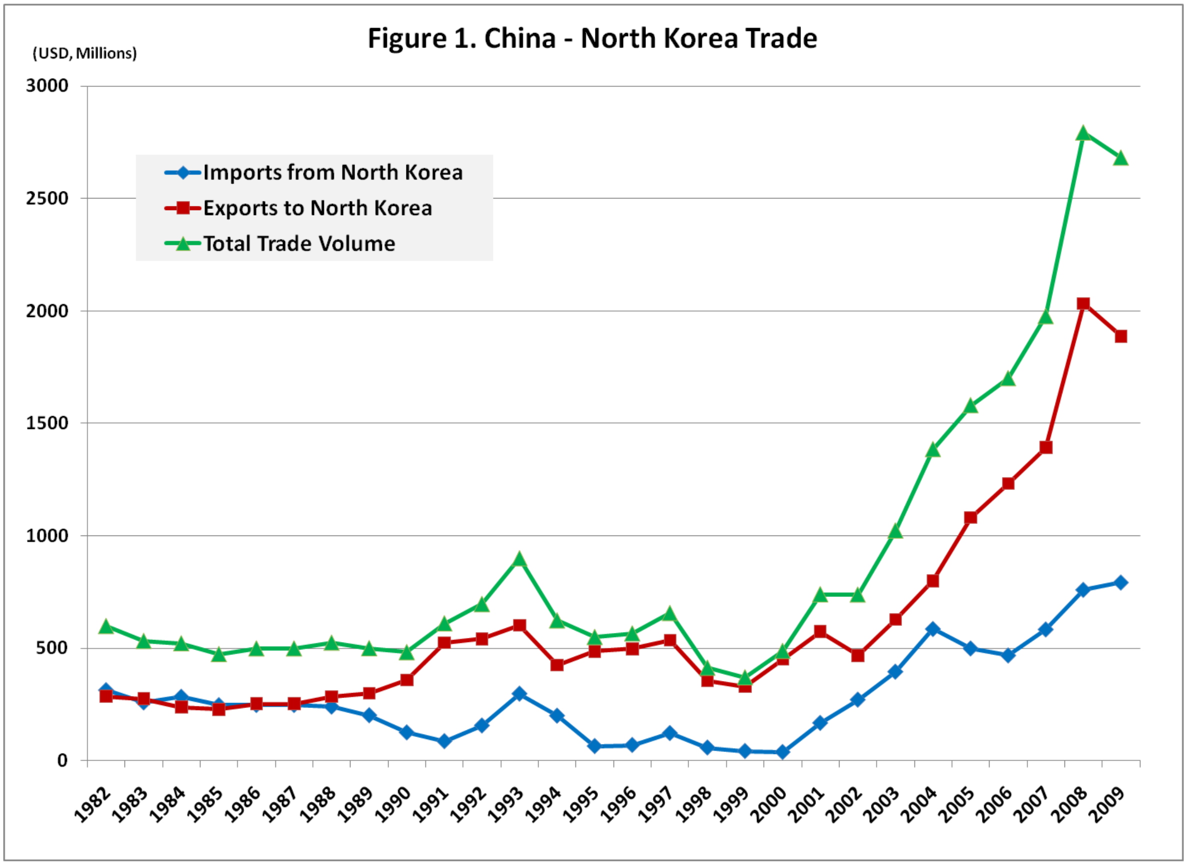


Figure 1. China - North Korea Trade
(USD, Millions)
3000
2500
2000
1500
1000
500
0
Imports from North Korea
Exports to North Korea
Total Trade Volume
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

**Figure 2. Composition of 250 enterprises doing business with North Korea**

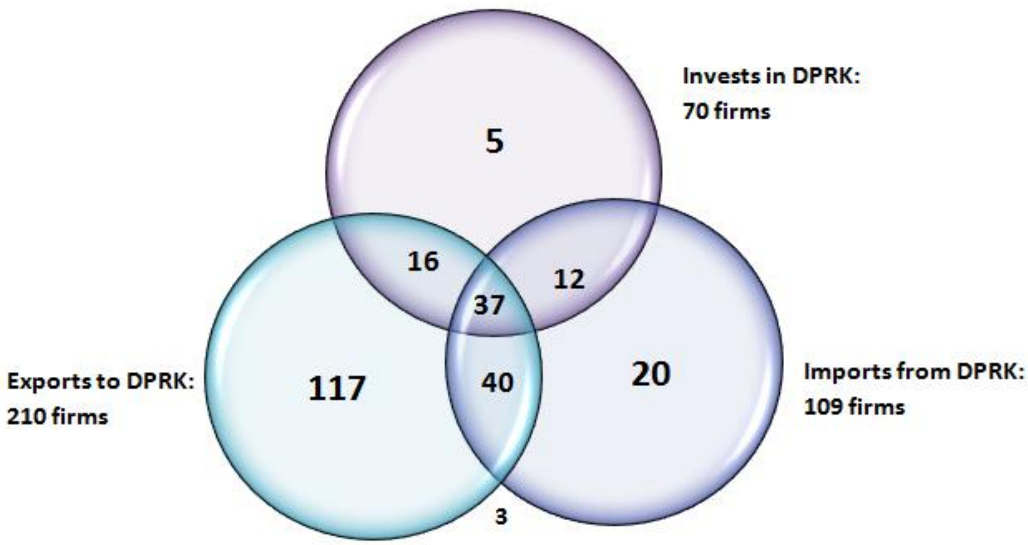
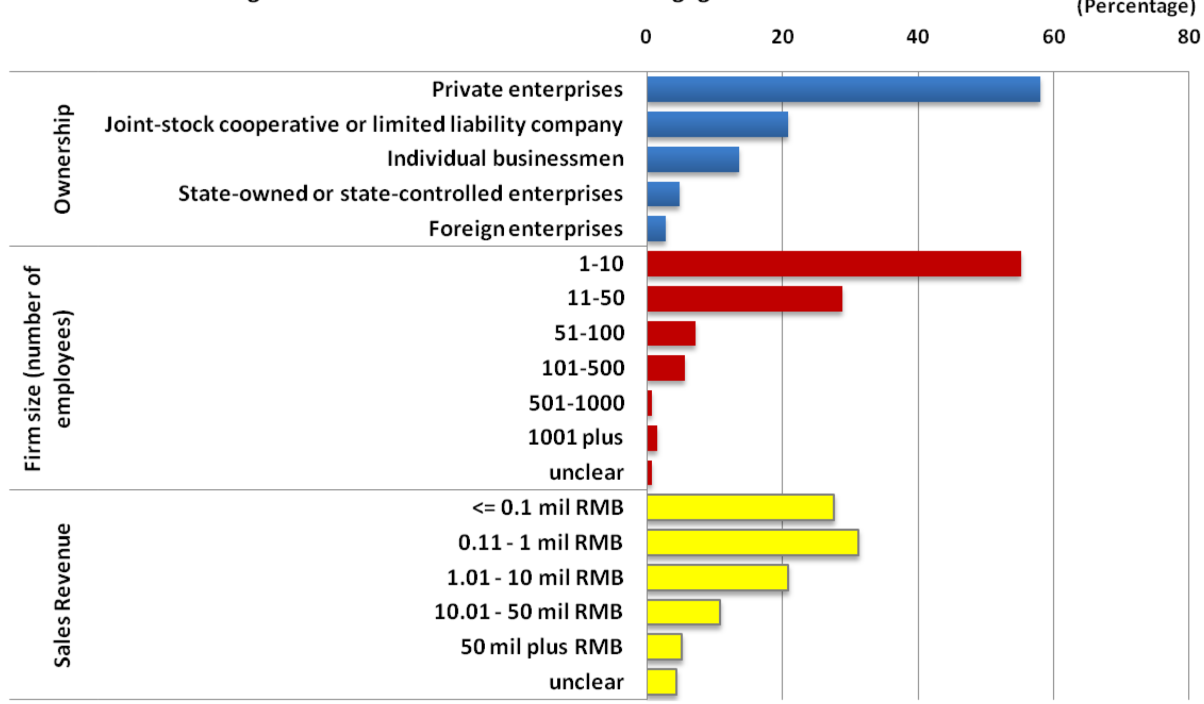



Figure 3. Firm characteristics of those engaged in business with DPRK



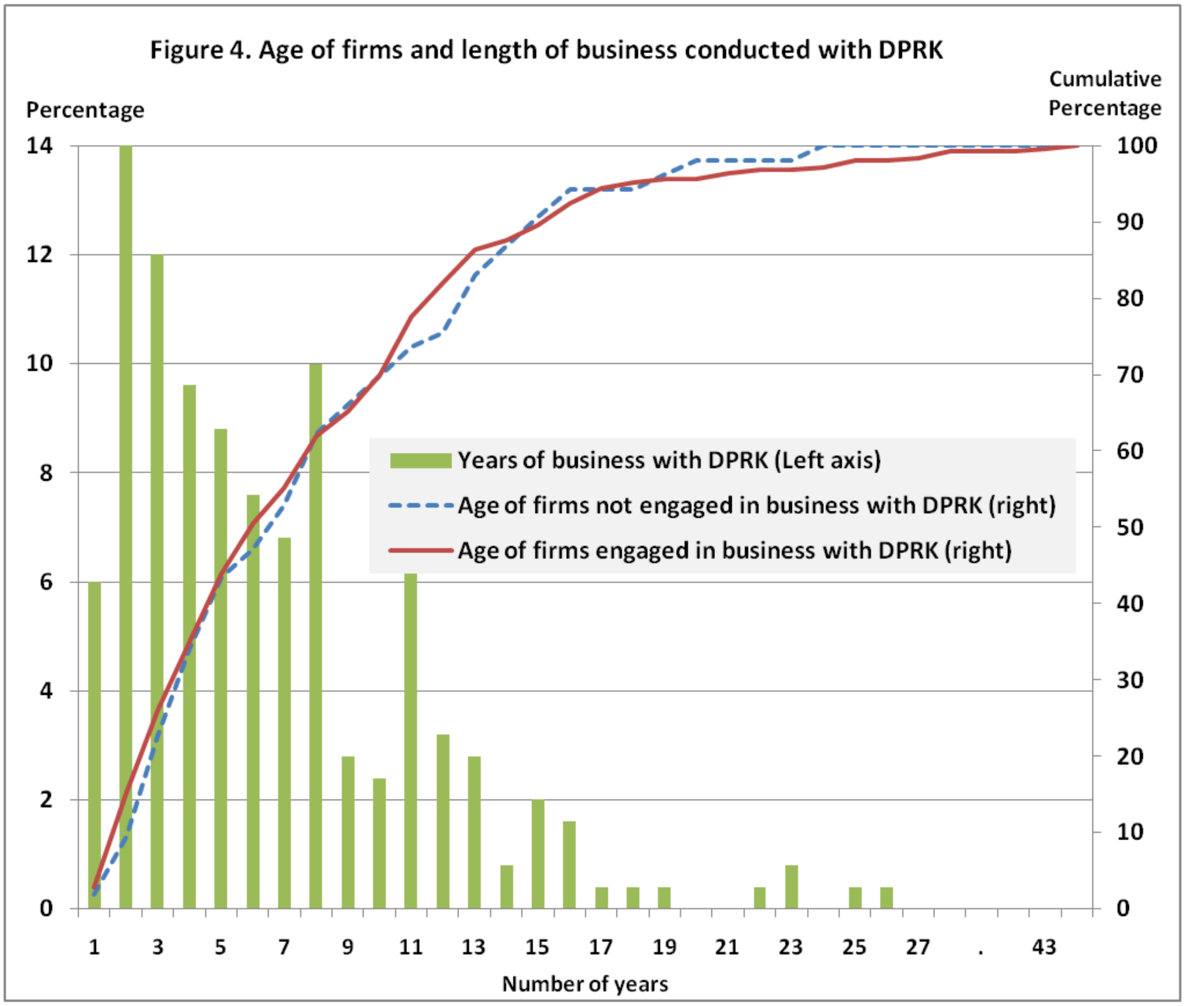


Figure 4. Age of firms and length of business conducted with DPRK
Percentage
Cumulative Percentage
14
12
10
8
6
4
2
0
100
90
80
70
60
50
40
30
20
10
0
Years of business with DPRK (Left axis)
Age of firms not engaged in business with DPRK (right)
Age of firms engaged in business with DPRK (right)
1
3
5
7
9
11
13
15
17
19
21
23
25
27
.
43
Number of years

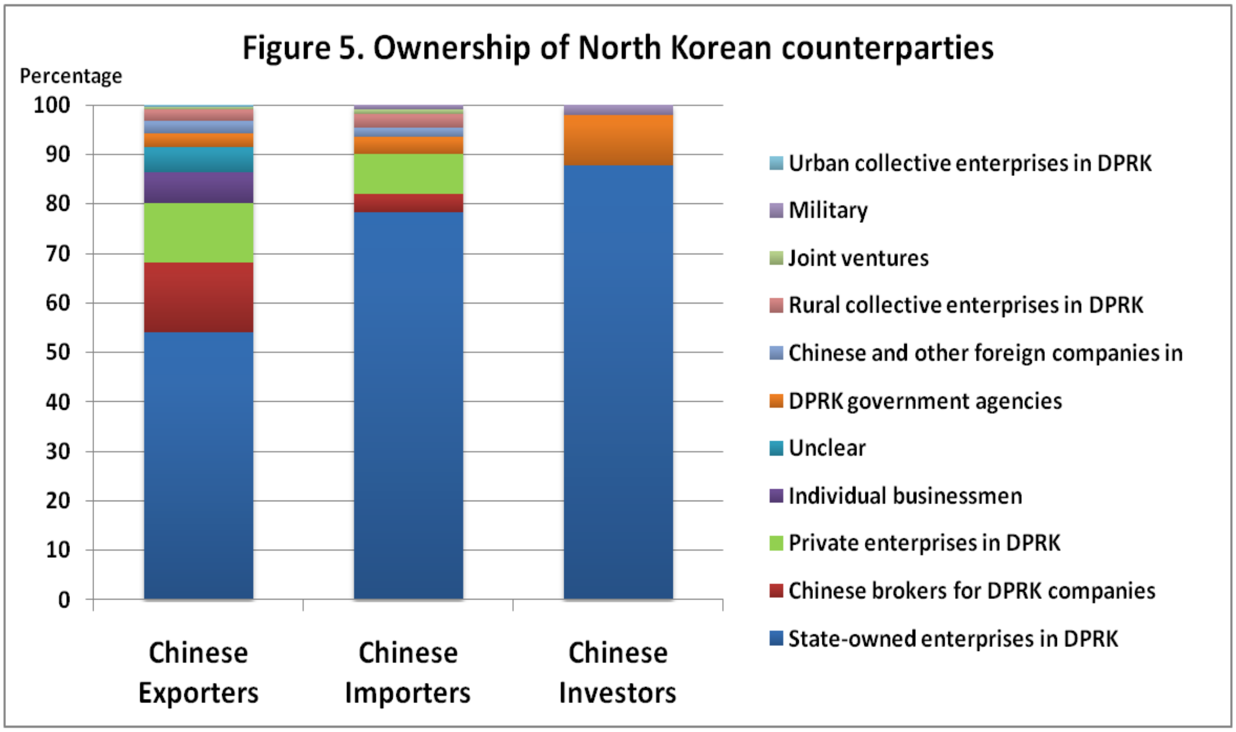


Figure 5. Ownership of North Korean counterparties
Percentage
100
90
80
70
60
50
40
30
20
10
0
Chinese Exporters
Chinese Importers
Chinese Investors
Urban collective enterprises in DPRK
Military
Joint ventures
Rural collective enterprises in DPRK
Chinese and other foreign companies in
DPRK government agencies
Unclear
Individual businessmen
Private enterprises in DPRK
Chinese brokers for DPRK companies
State-owned enterprises in DPRK

**Figure 6. Perception of DPRK business environment: those doing business with DPRK (share of those who agree with statement)**