Bank Credit and Business Networks

By

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An interesting paper that uses one representation of network ties (interlocking boards of directorate) to show;

(i) the structure of the resulting network, and

(ii) relationships between:
• *network ties* (sometimes weighted by measures of the strength of the tie or the importance of the firms we are tied to) and
• *indicators of financial interactions with the banking sector* (primarily loans to firms and amount of payments past due).

Network Characterization

This could have been an interesting paper by itself. If one thinks network connections bring advantages (and they provide evidence that it does), we might want to find out who has those advantages, as that should throw light on how we might diffuse them more broadly.

Basic findings.

- Almost 2/3 of the firms in selected sample are never linked to any other firm at any point in time. Account for about 15% of loans.

- There is one large network of about 3000 firms (acconts for about 65% of total loans), Almost all of these firms ($\approx$ 2800) are in

the giant network for the entire time period and they account for about 45% of all loans; and the remaining 200 or so slots see lots of entry and exit ($\approx$ 2500 firms).

- The remaining networks vary in size from 2 to 85 firms (20% of total loans).

- Measures of strength of connection is number of common directors, and measures of importance include;
  (i) # of firms directly connected to it,
  (ii) # of firms directly connected to its neighbors, and a
  (iii) # Google page rank which iterates on this (I would have liked to see the formula)

Some Comments.

They drop small firms (under $9,000 in borrowing at beginning of period); 1/4 to 1/5 of all firms. They want a "balanced panel", and the claim is these firms have "noisy" data because often their loan amounts go to zero. Changes the goal from studying the marginal entrant, to studying the marginal entrant who has a loan every period (both before they enter the network and after). The relationships between observables and the unconditional marginal entrant, and the marginal entrant who takes a loan all the time, are likely to be different (relationship to access to loans, investment opportunities). For similar reasons balanced panels have been shown to be problematic even among larger U.S. firms.

Additional details I have liked to know.

• The distribution of the number of directors, both within the "giant network" of firms and outside of it. Maybe condition on the number of directors when comparing in-network and out of network details?

• Relationship of network structure to industry structure. Might throw light on why we have shared directors, and what shared directors bring to the table?

(i) Do connected firms tend to be in the same industry? Director knowledge and ability to assess likely firm performance and pass it on to bank.

(ii) Do connected firms tend to be in industries with buyer-seller relationships between them.

Vertical relationships might insure a steady supply or demand, and hence a reason for thinking the firm will be able to survive the vagaries of the market.

(iii) What are the charactristics of industries that are over-represented and some under-represented (where are shared directors helpful).

• The relationship of network connections to geography. Are directors whose own offices are close to those of the firm being connected better able to monitor the firm?

• The relationship of firm size to; (i) network ties, (ii) loan amounts. Collateral issues, finance constraints on investments.

• More on the characterisitcs of the shared director and how this impacts on the relationships studied (relationship to banks, relationship to governement, foreign ties...).

Empirical Methodology: Relationship Between Network Connections and Financial Indicators.

I think it wise to start a project like this with "reduced form" results. This because we know little about either

- the reasons for the network connections or,

- the model of demand for funds driving loan applications.

Essentially we can not condition on everything driving these processes and do not know appropriate functional forms. This is how I will interpret what they did.

Structure of the reduced form. We want to provide information which will help structure our subsequent thinking.

They wisely use the traditional within between split (or fixed effects): the determinants of the cross-sectional variance are likely to be very different then the time series variance. It bothered me some that they often do not provide details of estimation procedure, particularly because they sometimes put lagged dependent variables on the rhs, and depending on how one does the estimation, this can cause different biases.

They then focus on the "marginal effects", i.e. the within, and that is fine. However I would have liked to have seen the between as well. I.e. the characterization of who is in the network as well as who enters the network is of interest (and they are likely to be related).

They also show other cuts of the data. One that was particularly interesting was the difference between direct and indirect entrants.

An alternative mode of analysis. It might be useful to derive the reduced form explicitly.

I.e. start with a model for (i) investment demand, and (ii) sources of funds. Together this should determines loans. We do not have anything approaching the kind of data we would need to estimate this model.

However we could construct the regresson of the determinants of the resulting demand for loans on the variables we do have, allow explicitly for regression error and then estimate the resulting model. The resulting estimates would not be causal. We would realize that there were unobservable determinants of the major factors determining the quantity of loans

the model generates, and that those factors are likely to be correlated with the observables we do have.

The advantage of going this route is it would force us to think about how other deteminants of loans enter the equation and how those interact with the network variables (industry growth, firm size and past growth, financial characteristics of the firm, characteristic of network connection made....). I think this is what they mean when they say "causal estimate of the net effect of entering the giant network, whether driven by changes in the demand for or the supply of creidt". I would have liked to see it developed more formally.

This for two reasons.

(i) Even if we get to the same equation we will understand better which assumptions were

needed to get us their. Importantly this would also hold for their more complex specifications (like direct and indirect effects).

(ii) It would suggest other variables that could be used (like those cited above), and as a result of using them we might learn more about the economics of the loan process.

Empirical Results.

The basic results are presented very clearly in the paper, and I have no real qualms with them. Here are a few side comments.

Figure 6, Panel A. It would have been interesting to see this cohort by cohort; currently the different points refer to aggregates of different firms, and one thing we would like to see is how a "representative" firm changes its behavior as it becomes connected.

Do we know anything about the terms of the loans?
This was not included in the analysis, and it would be interesting to see if this changes when the firm enters a giant-network, or when the loan is provided by a governement back.

What happens to firms that are delinquent in paying back loans? I.e. what happens to their

future loans? This would go into a model of who becomes delinquent.

Relatedly what is the difference between the loan rates and loan amounts from government banks and others? Foreign banks and domestic banks? Do they differ if a governement appointed director is on the board?

There are a number of very interesting results on; the importance of the strength of the connection, the relationship of the banks a new entrant is connecting to and the origin of the increased loans by the entrant, the importance of the nodes "power" in determining loan amount for the new entrant, the impact of financial shocks, and the impact on loans from exit from the network.