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NEWCOMERS SLIP-IN: THE ROLE OF COMPETITION NETWORKS IN CONSTRAINING INCUMBENTS AND FACILITATING NEWCOMER ENTRY

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Abstract

Research has primarily focused on explaining how firm-specific factors affect entry, leaving more room for understanding how incumbent competitive dynamics shapes new entry. In this paper we study the effect of incumbent competition on new firm entry by building on competitive dynamics theory and adopting a network-perspective on competition. We propose that newcomers are more likely to enter competition networks which constrain incumbent firms. Newcomers enter such networks because chances of competitive responses are reduced when incumbents are constrained. We argue that network structures have unique constraining effects on incumbents and this in turn affects newcomer entry. Specifically, newcomer entry increases with increase in network density and decreases with increase in tie-strength. Network size has a negative moderating effect on the effect of network density. We test and validate our hypotheses using panel data of commercial banks over twenty-three years. The results extend the boundaries of competitive dynamics theory to include newcomers, contribute to the emerging stream of competition networks research and add a new dimension to the discussion on incumbent inertia. Our results are also relevant to help regulators and managers understand the nature of competition in markets of interest to them.

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ABSTRACT

Research has primarily focused on explaining how firm-specific factors affect entry, leaving more room for understanding how incumbent competitive dynamics shapes new entry. In this paper we study the effect of incumbent competition on new firm entry by building on competitive dynamics theory and adopting a network-perspective on competition. We propose that newcomers are more likely to enter competition networks which constrain incumbent firms. Newcomers enter such networks because chances of competitive responses are reduced when incumbents are constrained. We argue that network structures have unique constraining effects on incumbents and this in turn affects newcomer entry. Specifically, newcomer entry increases with increase in network density and decreases with increase in tie-strength. Network size has a negative moderating effect on the effect of network density. We test and validate our hypotheses using panel data of commercial banks over twenty-three years. The results extend the boundaries of competitive dynamics theory to include newcomers, contribute to the emerging stream of competition networks research and add a new dimension to the discussion on incumbent inertia. Our results are also relevant to help regulators and managers understand the nature of competition in markets of interest to them.

INTRODUCTION

The critical role of new firms in fostering Schumpeterian innovation and competition makes them an important area of academic research. Research in strategy has primarily focused on explaining how firm-specific factors affect entry, leaving more room for understanding how incumbent competitive dynamics shapes new entry (Fuentelsaz, Gomez and Polo, 2002). Specifically, even though research on competitive dynamics has made significant progress in understanding competitive behaviour of large, incumbent firms (Markman and Phan, 2011), how competitive dynamics among incumbents affects new firms warrants greater attention (Chen, 2011). In this paper we study the effect of incumbent competition on new firm entry by building on competitive dynamics theory and adopting a network-perspective on competition.

Recent research in competitive dynamics have started adopting a network perspective on competition (Hsieh and Vermeulen, 2014; Skilton and Bernandes, 2014). Following Skilton and Bernandes (2014), we define competition networks as “patterns of interdependence between rivals that emerge from direct competition.” This perspective treats direct competition between two firms as a competitive tie. In other words, two firms directly competing with each other are bound by a competitive tie. Such a network perspective enables at least two levels of analysis – one, at the level of the firm (ego-centric network) and two, at the level of the market (entire competition network within the market). While previous studies on competition networks have been restricted to firm level networks, we extend the level of analysis of competition network research by studying entire competition networks at the market-level. We argue that competition networks have unique constraining effects on incumbents and this in turn affects newcomer entry. Specifically, we argue that it is easier for newcomers to slip-in unnoticed if incumbents are occupied fighting amongst each other.

Competition networks can influence new firm entry by affecting competitive responses of incumbents. Actions of new entrants are likely to be shaped by the way they expect incumbent firms to respond (Fan, 2010). Competition networks may constrain actions of incumbent firms. Firms in dense competitive networks may not respond to new entrants, because such an action would mean affecting many other incumbents and triggering unwanted competitive responses. Moreover, competition networks may affect diffusion of competitive practices and lead to contagion of competitive traits within the industry (DiMaggio and Powell, 1983; Borgatti and Halgin, 2011). This implies that incumbent firms embedded within competition networks may be expected to respond in a similar manner.

Competition networks may also affect the ease with which new firms can access existing factor-markets (Markman, Gianiodis, Buchholtz, 2009). For example, dense competition networks may increase development and liquidity of existing labour markets. Strong and liquid labour markets may reduce the need for firm-specific investments in development of human capital, thus enabling new firms to enter more easily.

We develop and test our hypotheses on a sample of commercial banks from an emerging economy (India) which underwent liberalization in 1991. Liberalization of banking in the country removed regulatory entry barriers and created opportunities for newcomers to enter the industry. By studying variation in competition networks and the propensity of newcomers to enter, we are able to test our propositions regarding the effect of competition networks on entry of new firms. We use a panel dataset comprising the population of commercial banks in India for a period of twenty-three years from 1992 to 2014.

Our findings indicate that newcomer entry increases with increase in network density and decreases with increase in tie-strength. Network size has a negative moderating effect on the effect of network density. More generally, our results indicate that the structure of

competition in an industry may also matter in explaining why incumbents may respond inadequately to industry newcomers. These results are complementary to suggestions by previous researchers about the reasons behind why incumbent firms fail to respond to newcomers in the industry.

We contribute to research in three distinct ways. First, we contribute to the literature on new firm entry by focussing on the role of competitive dynamics between incumbents. Second, we extend the analysis of competition dynamics theory from incumbents to new firms and contribute to the literature of competition networks by raising the level of analysis from ego-networks to competition networks at the market-level. Third, we extend understanding of competitive constraints faced by incumbents. This can help in a deeper understanding of why some incumbent firms may not be able to respond to new entrants, or may do so in a constrained fashion. We see this analysis as complementary to existing explanations of incumbent inaction like customer power (Christensen and Bower, 1996), competitive blind spots (Zajac and Bazerman, 1991) or entrenched routines (Nelson and Winter, 1982).

In studying competition networks, our results not only contribute to academic research on competitive dynamics and newcomer entry, but also have practical implications. Regulators around the world typically aim to improve competition within industries for a more level playing field. Managers and firms, on the other hand, manoeuvre in order to avoid competition, because increasing competitive rivalry in an industry is thought of as reducing the profit potential of firms. Therefore, it is important for regulators and managers to understand the kind of competitive structures that are likely to increase newcomer entry and those that are likely to impede newcomer entry. We address these issues by building on existing competitive dynamics theory and adopting a network perspective on competition.

BACKGROUND

Industrial-organization, sociological and dynamic views of competition

Research following the industrial organization tradition characterizes competition as market concentration of incumbent firms. Such studies relate market structure to entry of new firms, typically focusing on entry barriers and competitive actions taken by incumbents after new firms enter. However, a market structure approach has limited explanatory power because entry of new firms vary across time and conventional measures of entry barriers cannot explain entry (Geroski, 1995). Moreover, competitive responses of incumbents are selective, and this selectivity cannot be explained by traditional market structure theory (Geroski, 1995). Sociological approaches to competition too, indicate that firms may consider only some new firms as relevant competition (White, 1981). Competition may also be socially constructed and thus, traditional market structure approaches may not work. Firms may have their own perceptual maps of market rivalry (Porac, Thomas, Wilson, Paton, and Kanfer, 1995), which may affect their competitive responses to new entrants.

Thus, previous research from a sociological standpoint indicates that conventional measures of market structure may be an inadequate representation of competitive rivalry that new firms can expect upon entry. Conceptualizing competition as a dynamic process over time may help in a truer representation of the effects of competition on new firm entry in existing markets. Competitive dynamics is concerned with explaining the actions of firms and responses of their competitors. Most research on competitive dynamics has usually focussed on explaining competition between existing firms in the industry (Chen 1996; Baum and Korn, 1999; Gimeno, 2004). Surprisingly, few studies focus on the relationship between new firms and incumbent competition. In this paper, we build on existing competitive dynamics

theory and extend its boundaries to focus on the relationship between incumbent competition and new firms.

Competition as a network

Research into competitive dynamics has generally focussed on the firm-level or the dyadic level (Chen, 1996). Competition creates interdependencies between firms through patterns of action and response (Gimeno and Woo, 1996; Baum and Korn, 1999; Tsai, Su and Chen, 2011) and such relations between firms have been studied at the dyadic and triadic level (Gimeno, 2004; Madhavan, Gynawali and He, 2004). When two firms directly compete with each other, they are connected by a competitive tie. Within a given market boundary, a competition network structure arises from patterns of such ties between firms. In this study, we follow Skilton and Bernandes (2014) and define competition networks as “the relational structures of interdependence between rivals that emerge from direct competition.”

The study of competition as a network is an emerging area. Research in this stream has only studied ego-networks of firms and adopted the firm as the unit of analysis. However, we go beyond this by studying the entire competition network and adopt the market as the unit of analysis. In the study of firm-specific networks, Hsieh and Vermeulen (2014) find that competition structures between an incumbent firm’s competitors affects the firm’s inclination to follow its competitors into a new market. However, this analysis is conducted at a firm-level and studies the behaviour of only incumbent firms. More recently, Skilton and Bernandes (2014) proposed and tested a theory of the effect of competition network structures on product market entry by firms. They draw on social network theory to explain the consequences of competition networks on product-market entry by firms. Their analysis too, is based on ego networks of incumbent firms. Our paper contributes to the stream of competition network research by adopting a higher-level of network analysis.

Competition networks can affect new entry in different ways. Actions of new entrants are likely to be shaped by the way they expect incumbent firms to respond (Fan, 2010). The responses of incumbent firms, in turn depend on the nature of their existing competitive environment. One view suggests that incumbent firms are constrained by their dependence on current customers; incumbent firms have to devote resources towards satisfying needs of existing customers, and this prevents them from responding effectively to new entrants (Christensen and Bower, 1996). Such an argument implicitly assumes that customers have power over incumbent firms. However, what gives large customers power over incumbent firms? Presumably, one of the factors could be the existence of competition in the industry. Competition in the marketplace would increase options for customers and give them a bargaining advantage over incumbent firms. Customers may have more influence over firms as industry competition increases, and in turn, constrain the actions of incumbent firms. Certain kinds of competition network structures may constrain incumbent firms more than other kinds of structures, thus making it easier for newcomers to enter. If incumbent firms are indeed constrained by certain competition network structures, then we should see more entry of new firms into these competition networks.

[INSERT FIGURE 1 ABOUT HERE]

THEORY AND HYPOTHESIS

Networks are normally conceptualised as interactions involving cooperation between actors. However, not all interactions in social life need to involve cooperation between actors. Actors may compete with each other in given settings; for example, university students may cooperate with each other within the classroom but compete with each other in external job markets. Competition may be more explicit in organizations, with firms contesting each other in product markets. Since competitive interactions are an important part of organizational life, it is important to study networks arising out of competition and their implications on

economic transactions. Competition networks give rise to interdependence between firms because a focal firm's actions affect other firms connected to it, and vice-versa. Such interdependence gives rise to patterns of action and response which are studied within the competitive dynamics literature (Chen, 1996; Gimeno and Wu, 1996; Baum and Korn, 1999; Tsai, Su and Chen, 2011). Competition-networks research has moved beyond the dyadic level and has focussed on ego- networks of firms (Skilton and Bernandes, 2014) and the structure of competition networks between the direct competitors of a focal firm (Hsieh and Vermeulen, 2014). We extend this stream of research by studying competition networks at the level of the market.

Competition networks can have different implications. Firstly, firms can gain access to new information by observing their direct competitors. By observing competitors, firms can learn about new technologies or best practices, which may lead to the diffusion of these practices within the industry over time (Westphal, Gulati and Shortell, 1997). Thus, competition networks may facilitate the spread of information even if firms do not cooperate with each other. However, one difference between cooperation and competition networks is that firms may need to infer signals by observing their direct competitors in competition networks. On the other hand, in cooperation networks, information may be exchanged more explicitly between firms. For example, alliance partners may share information about an upcoming technology with each other. While cooperation networks may restrict information exchanges to firms participating in the alliance, competition networks may allow market signals to be read by all firms competing with a focal firm. Thus, competition networks may affect diffusion of practices (DiMaggio and Powell, 1983) and this may lead to contagion of competitive traits within the industry (Borgatti and Halgin, 2011). Future competitive dynamics within a particular industry may, in this way, be affected by current structures of competition networks in the industry.

Second, competition networks may affect the actions of incumbents by directing their attention to their immediate networks rather than to others with whom they do not compete. Incumbent firms may merely copy each other's responses to new entrants (Fan, 2010). Managers may observe their direct competitors and develop a cognitive model of which firms constitute competition and which do not (Porac et al, 1995). To this extent, rivalry between firms may be socially constructed. Such a cognitive model of competition in managers' minds may shape their patterns of actions and responses and therefore influence competitive dynamics. Goldfarb and Xiao (2011) examine the effects of managerial ability on competitive actions by creating a structural econometric model based on behavioural game theory. They find that heterogeneity in managers' ability to conjecture competitor behaviour is an important determinant of a firm's competitive actions. This implies that competition networks may shape managers' outlooks and this in turn may affect the competitive behaviour of their firms in the future.

Third, competition networks may affect the functioning of factor markets (Markman, Gianiodis, Buchholtz, 2009). Competition is normally conceptualised within product-markets that firms operate in. However, because input resources are critical to competitive advantage (Barney, 1991), it is likely that competition in product-markets may spillover to factor markets. This in turn will impact firms' access to resources and affect future competitive dynamics (Chen, 1996). Over time, factor markets will tend to be shaped by competitive forces. An example of effect of competition on factor-markets could be the operation of labour markets. Competition networks may cause more or less liquidity in labour markets. For example, Marx, Singh and Fleming (2015) study the implications of non-compete agreements - which are enforced by firms in order to prevent employees from joining their competitors - on migration of knowledge workers within the US. They find that employee non-compete agreements encourage the migration of workers from states where such

contracts are enforceable to states where they are not. Thus, empirical evidence too, seems to suggest that competition networks may have a bearing on factor markets, which in turn could influence competitive dynamics.

Effect of Network Density

We now examine the structural properties of competition networks and their effects on incumbents and competitive dynamics. The first structural property that we evaluate is density of the competition network that firms are embedded in. Density affects information flows through the network and thereby can affect how firms behave. A dense network implies that actors within the network are increasingly interconnected with each other. At one extreme limit, all firms within the network compete with each other. This implies that the network density is equal to one. At the other extreme is a condition in which no firm competes with each other – the network becomes completely disconnected with density equal to zero. In practice, we should expect networks to have density values between zero and one. Increasing density implies that more firms are competing with each other and therefore a larger set of firms have access to market signals within the industry. Therefore, with increasing density of the network, firms increasingly converge on their levels of access to market signals.

Moreover, increasing density within the network implies that networks tend to become more closed. Network closure may constrain firms in the kinds of actions they can take (Coleman, 1988). As density in the network increases, firms may find it difficult to take unilateral action because their individual actions would affect a large part of the network, thus triggering a risk of contagion of competitive actions. Therefore, for individual firms, undertaking individual action may mean a risk of triggering a competitive retaliation within the whole industry. Thus, it is likely that firms embedded in dense competitive networks are

more constrained due to the prospects of competitive retaliation than firms in less dense networks. Furthermore, dense competition networks are likely to be nested with well-developed factor markets. When firms compete with each other in product-markets, it is likely that their competition spills over to factor markets (Markman, Gianiodis, and Buchholtz, 2009). This in turn, means that factor markets are more likely to be more efficient with standardised procedures and with a higher quality of human capital.

These conditions offered by dense competition networks may help new entrants. New entrants may be able to take advantage of the constraints faced by incumbent firms. Since incumbents embedded in dense competition networks are constrained in the competitive actions that they can take, it implies that such networks may be more conducive for new entrants, at least from the perspective of expected competitive reactions from incumbents. Such a situation may allow new entrants to ‘slip-in’ without invoking severe competitive responses from constrained incumbents. Moreover, since factor markets serving such networks are likely to be well developed, new entrants need not spend extra time and effort setting up their supply chains in factor markets. This gives an added economic logic for new entrants to enter dense networks rather than sparse networks. Therefore we hypothesise:

Hypothesis 1: Entry of newcomers increases with increase in density of competition networks.

Effect of Tie Strength

Even if many firms compete with each other in a dense network, some of these firms may compete with each other more than they do with others. Consider a network of four firms A, B, C and D in which all firms compete with each other; density of such a network is equal to one. However, within this network, firm A could compete with firm B to a greater extent as compared to its competition with firms C and D. Such an analysis could be conducted on all

firms within the competition network and consequently, one can understand the extent of competition within the network by measuring strength of ties between pairs of firms. If density of ties is a reflection of the breadth of competition in the network, average tie strength is a reflection of the depth of competition within the network. Skilton and Bernandes (2014) propose that tie strength may be important along with density of ties in the competition network, because ties in a network may differ in their importance.

Previous research on multimarket competition can give some idea as to what the effects of tie strength within a network may be. Most research in this area has studied competition from a dyadic perspective i.e. the effect of multimarket competition between two firms. Empirical studies have shown that competitive actions between two firms has an inverted U-shaped relationship with the extent of market overlap between them (Baum and Korn, 1999). Therefore, this implies that as the market overlap between two firms increases, competitive rivalry between firms may reduce after a certain limit because of mutual forbearance between them. Furthermore, increasing multimarket competition may also lead to conditions that help collusion between firms. In a game-theoretic model, Bernheim and Whinston (1990) show that increasing market contact between firms may relax incentive constraints that limit collusion between them. Therefore, previous research also indicates that increase in depth of competition may lead to collusion between incumbent firms. Such collusion could also lead to incumbent firms erecting entry barriers for new entrants (Porter, 1979). In effect, this may mean that as incumbent firms increase their depth of competition with each other, they are more likely to collude with each other and this may result in entry barriers for new entrants. These entry barriers may manifest in various forms – for example, incumbents may lobby with regulators to enforce standards that favour incumbents and act against new entrants or they may affect the operation of labour markets for newcomers. Such actions may keep out new entrants. Thus, there is reason to expect that increasing tie-strength

in the competition network may reduce the chances of entry of newcomers. Therefore, we hypothesise:

Hypothesis 2: Entry of newcomers decreases with increase in average tie-strength of competition networks.

Moderating effect of Network Size

The discussion until now has not considered the effect of crowding in a given network, or more specifically, the size of the network. Network size is determined by the number of actors in the network. As the number of actors in the network increase, product-market coverage will increase. Previous research indicates that large competition networks stimulate more product-market entries by incumbent firms and the rate of product-market entries by incumbent firms increase as their ego network size increases (Skilton and Bernardes, 2014). This implies that incumbent firms would have already covered most segments of the product-market in large networks. Previous research also indicates that operating in niche or new product segments is important for the survival of new firms (Fan, 2010). Therefore, newcomers will have lesser incentives to enter large networks in which most sub-markets or niches would already be occupied.

Apart from being an important control variable in our analysis, network size is also likely to moderate the effect of network density. For networks of equal densities, information and market signals will take more time to propagate through larger networks, and this may reduce some of the competitive constraints faced by firms. Simply put, we would expect incumbent firms in a small network to be more constrained than incumbent firms in a large network of equal density. Thus, because of decrease in incentives for newcomers and reduction in competitive constraints on incumbents, the effect of density on newcomer entry is likely to be more in small networks rather than large networks. Therefore, we hypothesise:

Hypothesis 3: Network size has a negative moderating effect on the relationship between network density and newcomer entry.

DATA AND METHODS

Empirical Setting and Data Sources

Our setting for this study is the commercial banking industry in India. India's banking regulator is its central bank, the Reserve Bank of India (RBI). The Banking Regulation Act, 1949, an act passed by the Government of India gives the RBI the power to oversee and regulate the functioning of commercial banks in the country. India's banking sector has seen huge changes on account of policy decisions by the RBI, and, since 1991 the number of banks has grown considerably. Commercial banks in India are state-owned, privately-owned domestic banks or privately-owned foreign banks. As of 2013, there were 89 commercial banks operating in India with more than 90,000 offices across the country, employing more than a million people. The prospects for banking growth in India is still huge with banks having an opportunity to capture the business of almost 600 million people¹.

The growth of the banking sector in the last two decades in India has been helped by the liberalization in branch banking policies. The banking industry in India has grown at a rapid pace over the past few years. New banks have sprung up, existing banks have quickly added new branches to their network and more people in the country have gained access to banking services. This growth in the industry has been helped by technological improvements and changes in traditional banking channels. Such an institutional setting makes it attractive to study competitive dynamics and competition networks. Moreover, it is the aim of the RBI to foster competition and innovation in the banking industry and therefore studying

¹ https://www.rbi.org.in/scripts/BS_SpeechesView.aspx?Id=871

competition within this industry can be fruitful. In a recent talk at the 4th C.K. Prahalad Memorial Lecture, RBI Governor Raghuram Rajan noted ²,

“In order to get sustained growth, we need more competition, especially from new entrants who are in a better position to reach hitherto excluded parts of our economy. After a decade of no new entry, we will see two new private banks this year, and a large number of payment banks and small finance banks next year. Licensing is likely to go on tap.

Incumbents have expressed fears about unfair competition. Competition is only unfair if it is not on the same playing field. In fact, new entrants have no privileges that incumbents do not already enjoy. We hope, though, that the new entrants will find innovative ways of giving customers better services at lower prices, thus shaking up and changing the banking sector for the better.”

Thus, our empirical setting is based in an environment of fast growing banks facing a huge potential for further growth guided by increasing liberalization in the regulatory environment, and is a good setting to test our concepts of competition and networks. There is a good variation in the types of banks – for example, considering age as a variable, the oldest bank in our sample is more than a hundred years old, whereas the youngest bank is merely two years old. Moreover, because this industry is closely regulated, banks have mandatory reporting requirements to the RBI and we have more confidence in the quality of our dataset. Indeed, RBI data has been previously used by researchers like Kozhikode and Li (2012) and Burgess and Pande (2005).

Our data sources comprise multiple reports issued by the RBI. We use the directory of branches of commercial banks in India which contains a list of the postal addresses of all commercial bank branches in India setup from 1934 till 2015. We first construct a panel dataset relating to bank branch entry by year across different districts in India. A district is an administrative division in India; currently there are more than 650 districts across the country. Every district is classified into different zones depending on the population. These zones are – metropolitan, urban, semi-urban and rural. A state is made up of multiple districts; currently there are 29 states (administered by individually elected state governments) and 7 union

² https://rbi.org.in/Scripts/BS_SpeechesView.aspx?Id=976

territories (administered by the central government) in India. We calculate bank presence in every district, state and zone over time.

Our final panel dataset comprises competition networks of all commercial banks in every state within the country for the period 1991-2014. Thus, we have population level data on competition networks of commercial banks in every state. We consider states as our unit of analysis for networks because every state represents a unique market with a different institutional environment and a key decision point for new entrants is in choosing which states to enter. We follow previous research which has also used states as the unit of analysis which studying entry of commercial banks in India (Kozhikode and Li, 2012). Our focus in this study is on commercial banks; regional rural banks and co-operative banks are excluded³ because the nature of banking activity carried out by them is different from regular commercial banks.

Methods

We want to investigate the effects that competition networks have on entry of newcomers. In order to do this, we construct a panel dataset of newcomer entries across states from 1991 until 2014. We choose this timeframe because it represents a period after India's economic liberalization in 1991.

Our dependent variable is the number of entries by newcomers in a particular state in a particular year. The explanatory variables include those relating to structures of competition networks of states – density and tie strength. In order to examine the effects of competition networks on newcomer entry we choose to study variation within a state over time. This is because we expect individual state specific effects to play a significant role in determining

³ Regional rural banks are setup by the state to primarily serve rural areas of India with basic banking services. Co-operative banks provide services to specific communities or localities.

newcomer entry. States may have idiosyncratic factors which determine their entry of newcomers over time. While it is possible to control for some state-specific effects by including appropriate control variables, many other effects are likely to be unobserved and therefore our estimates may be biased. Therefore, we opt for a more conservative design and choose to study within-group variances in our dependent variable. Since we are not as much concerned with population mean effects as we are with marginal effects conditional on state fixed effects and other regressors, we choose to run a fixed effect panel regression.

The nature of our dependent variable is count data, and therefore we choose a count panel model specification (Cameron and Trivedi, 2010). The usual choice is a Poisson model with robust standard errors. However, because we want to be cautious about the effect of overdispersion in our data, we also specify a negative binomial panel model⁴. Our fixed effects panel model reduces the chances of there being bank-related omitted variables that we do not observe.

Variables

Dependent Variable

Our dependent variable measures the number of newcomers in a particular year. We calculate this variable for every state in every year within our panel. A newcomer is a bank that has entered the network for the first time. Thus, a bank can enter a particular network only once. Because we study post-liberalization changes, we only consider the time period after 1991 (India underwent major policy reforms in 1991 in order to move towards a liberalized economy). The number of newcomers in a particular state in time 't' is calculated as the difference between the total number of banks in time 't' minus the total number of banks in

⁴ The negative binomial FE estimator is unusual among FE estimators because it is possible to estimate the coefficients of time-invariant regressors in addition to time-variant regressors (Cameron and Trivedi, 2010); therefore our results for these estimations will include a constant term.

time ‘t-1’. Since no bank ever leaves a state, we do not have any problems in adopting this formula. Thus, for state s in time t:

$$\text{Newcomer Entry}_{st} = \text{Number of banks}_{s,t} - \text{Number of banks}_{s,t-1}$$

Key Explanatory Variables

Network Density

This variable measures the breadth of competition within a particular network. We calculate network density for each state in our sample in time t. Network density is often operationalized using the proportion of possible ties among alters actually present (Marsden, 1987). We follow Skilton and Bernandes (2014) in the conceptualization of competition network density and define it as the ratio of actual number of dyadic ties in the network to the theoretical number of dyadic ties possible. In our case, we code a competitive tie between two banks equal to one if they compete in at least one common market. Two banks are assumed to have a competitive tie if they have branches located in the same district in a given state. Thus, our conceptualization of a competitive tie based on observed data on where banks place their branches. We find it reasonable to assume that if two banks have branches in the same area, they will be competitors at least in that area because all banks in our sample are of the same type (commercial banks), and their branches essentially carry out similar operations (offer banking services to consumers). While running our regression models, we lag the values of network density and use logged values of density. In a particular state s, at time t, we calculate competition network density as:

$$\text{Competition Network Density}_{st} = \frac{\text{Total Number of dyadic competitive ties observed}_{st}}{(n_{st}) * (n_{st} - 1)/2}$$

where n_{st} is the total number of banks in state s in time t.

Average Tie Strength

This variable measures the depth of competition within a particular network. By depth we mean the extent to which firms embedded in the network compete with each other. Levels of competition between firms has a bearing on the competitive actions taken by them – high levels of multimarket competition may lead to mutual forbearance (Baum and Korn, 1999; Gimeno and Woo, 1996). We build on concepts of multimarket competition to define tie strength of a competition network in a given state ‘s’ at time ‘t’. We first create dyads of competitors in every state. We then calculate the number of districts that a dyad compete in. This gives us the measure of tie strength between two competitors. We then average the tie strength across all competitor dyads in a given state to arrive at average tie strength of dyads for the state in time t. We repeat this for all states in all years and consequently, we obtain average tie strength for all networks in every time period. In our regression models, we lag the values of average tie strength for every state and use the logged value of tie strength.

Network Size

This variable measures how large a network is by calculating the number of nodes in the network. Each bank occupies a node in the network. Therefore, network size is measured by the number of banks in the network. Network size is calculated for each state in every year and this value is lagged our regression models.

Control Variables

Chen (1996) describes how resource similarity between firms can have a bearing on competitive dynamics between them. Firms with greater resource similarity are less likely to initiate competitive action against each other, but are more likely to respond to competitive actions of each other. Since resource profiles of firms may change over time, the effects of resource similarities cannot be accounted for by the fixed effects models we run.

Consequently, it is important for us to control for effects of resource similarity between firms in a network. We do this by introducing two control variables Resource Dissimilarity and Resource Variance. Resource Dissimilarity is an averaged value while Resource Variance is a measure of the deviation. We introduce both these variables in order to take into account both the mean levels of resource similarity and the variation within a state. We feel that this is important because we want to minimise the risk of our results being skewed by any possible outliers in resource profile of banks. In order to calculate these variables, we first calculate the absolute value of the size differences for each observed dyad in a network. Size or more generally resource profile is measured by the number of branches that a bank owns within a network (Greve, 2000). Resource Dissimilarity is the mean value of size differences across all dyads in a network, while Resource Variance is measured by the standard deviation of size differences. Other control variables include year dummies and the total number of branches in a network. Total number of branches may affect both, network tie-strength and also the entry of newcomers in the network, and therefore we control for it. Year dummies are included in order to account for any year specific shocks that may bias the results of our regressions.

RESULTS

Table 1A and 1B show the summary statistics and correlations between key variables in our sample. The maximum number of newcomers entering a network in a particular year is five, and newcomers do not enter each state every year. Since the mean of our dependent variable is not very different from its standard deviation (0.89 versus 1.0), we can employ a Poisson regression model. The predicted number of zeros from a Poisson distribution with mean 0.89 is 42.6% of the total number of observations⁵. Our sample has 46.7% zero values for the

⁵ Calculated by generating a variable using the `rpoisson` command in Stata and then tabulating the variable.

dependent variable. In order to be more conservative, we choose to run both, a Poisson model as well as a Negative binomial model to check if our results hold across these models. In Table 1B, our key explanatory variables show low levels of correlation with each other.

[INSERT TABLES 1A & 1B ABOUT HERE]

Table 2 shows results of negative binomial regressions run as a fixed-effects panel model. Model 1 includes only network density as the main effect, while model 2 includes the interaction of density with network size. The main effect for network density is positive and significant in both the models confirming Hypothesis 1. Furthermore, the interaction of density and size is negative and significant confirming Hypothesis 3. Model 3 tests the main effect of tie strength without including network density, and confirms Hypothesis 2. Model 4 includes an interaction term between tie strength and network size. Models 5 and 6 tests the effects of network density and tie strength in joint models. The difference between model 5 and model 6 is the inclusion of the interaction terms with network size in model 6. We observe that the direct effect of network density is positive and significant across all models. Tie-strength has a direct negative effect which is significant across all models. The negative interaction effect of density and network size too, holds across partial and full models. Therefore, these results indicate support for all our three hypotheses.

[INSERT TABLES 2 & 3 ABOUT HERE]

We now turn to the Poisson model regressions in Table 3. These regressions too, are run using a state-fixed effects panel model and by including year dummies. The models are estimated using robust standard errors. We observe that our results hold across all models. The only exception is a reduced significance level for the direct effect of network density in model 1. Because all the results are consistent with the estimations using the negative binomial model, we interpret these as additional support for our hypotheses and conclude that our results are supportive of our hypotheses.

DISCUSSION AND LIMITATIONS

Our aim in this paper was to understand the effect of competition networks on the entry of newcomer firms. We characterised competition based on the actual patterns of head-to-head competition, and thus constructed networks arising out of direct competition between firms. Competition networks were then described in terms of structural parameters like network density, average tie strength and network size. The entry of newcomers was then analysed across different networks across time. In order to do this, we constructed a panel dataset comprising commercial banks in India. We proposed that competition networks have a constraining effect on incumbent firms and this may prevent them from taking competitive action against newcomers. The amount of competitive constraints on incumbents could thus influence the entry of newcomers. Constraint within a particular network was modelled on basis of the density of a network and the average strength of competitive ties. We argued that increasing density of a competition network constrains incumbents because incumbents risk affecting large parts of a network and escalating competitive tensions if they undertake unilateral competitive actions against newcomers. On the other hand, increasing average tie strength in a network may increase the chances of collusion between firms, and in turn, this may increase the prospects of coordinated action against newcomers. Thus, increasing average tie strength would lead to decrease in the number of newcomers entering a network. Finally, we argue that network size moderates the relationship between network density and entry of newcomers. Specifically, increasing network size would most likely reduce the chances of newcomer entry because increasing size in a particular may mean that markets served by the network are increasingly saturated, which reduces the incentives for newcomers to enter such networks.

We find support for our hypotheses in our empirical setting of commercial banks. In order to be more robust in our results, we choose to run both, a negative binomial

specification as well as a Poisson specification with robust standard errors, and we find consistent results across both models. In our model specification, we have used lagged values for our explanatory variables as well have used conservative fixed effect models. We feel that this minimizes any potential concerns of endogeneity that network studies are normally confronted with.

Even though we obtain strong results for our hypotheses, there are a few limitations in this paper. Firstly, we study the effect of competition networks within a specific industry i.e. commercial banking. Competition within this industry may be of a specific nature – for example, there is generally no scientific innovation that firms undertake. Moreover, the industry is subject to higher regulatory scrutiny than other industries⁶. Our conceptualization of competition is firms operating within the same product-markets where not much differentiation exists. Hence, generalization of these results could be made to similar settings – for example, telecom service providers or transportation. On the other hand, these results may not be as generalizable to other industries which are more dynamic and innovation oriented like the consumer electronics industry. Secondly, we study networks with fixed effects across time only concentrating on their structural parameters. There may be other institutional influences on networks; however studying these influences is out of the scope of this paper. We believe that a first attempt at unravelling the influence of networks should be more focussed, while subsequent studies can consider institutional contingencies.

CONTRIBUTION

This paper contributes to literature on entry and competition in three ways. First, we contribute to the literature on new firm entry by moving beyond performance implications and addressing issues related to factors influencing entry. This area has been understudied in

⁶ However, many studies of competition are conducted in regulated settings like banking and airlines. Therefore, in itself this may not be a big limitation of this study, but it is worth noting.

the past. We also contribute to extending the boundaries of competitive dynamics theory by focussing on the decisions of newcomers rather than industry incumbents. Existing theory and empirical studies generally focus on patterns of competitive behaviour between existing firms. Our study extends the purview of competitive dynamics theory to analyse the behaviour of newcomers.

Second, we contribute to the emerging stream of research that takes a network perspective of competition. Existing empirical work focuses on ego-level networks of firms, while we study competition networks at the market-level. By adopting such a lens of analysis, we are able to study market-level network patterns and their effects. To our knowledge, this is first study that conducts a large-sample empirical analysis on such a macro-level.

Third, we contribute to the discussion of incumbent inertia and incumbent response to new entrants. We feel that discussion on incumbent responses to newcomers has not adequately considered the effect of existing competition on constraining incumbents. By adding the dimension of competitive constraints to this discussion, we contribute to understanding the reasons because of which some incumbents may not respond to the actions of newcomers. Our results indicate that at least in some settings, competitive constraints may operate on incumbents in addition to constraints imposed by their large customers.

These results have significance for regulators in their policy decisions, as well as for practicing managers. Regulators generally want to make industries competitive by levelling the playing field in order to aid newcomer entry. The results give regulators an analytical tool by which they can classify the prospects of competitive backlash and therefore, propensity of newcomers to enter existing competition networks. For managers too, characterising existing industry competition in terms of networks may inform them about the possibilities of

competitive retaliation should they choose to enter existing competitive networks. Thus, these results have both academic as well as managerial implications.

CONCLUSION

Competition within an industry changes over time as newcomers enter. However, the entry of newcomers also depends on the expected competitive retaliation from incumbents. Studying existing competition in the form of network structures can be a useful method of analysis because it relies on studying actual patterns of direct competition rather than characterising competition on basis on overall aggregate measures like total number of firms operating in the market. We show that density and average tie-strength of networks has a bearing on the entry of newcomers in competition networks while controlling for number of competitors. These results extend the boundaries of competitive dynamics theory as well as contribute to the discussion on incumbent responses to newcomers. Future research can build on these results by considering the effects of institutional variation on competitive networks or conducting cross-industry studies.

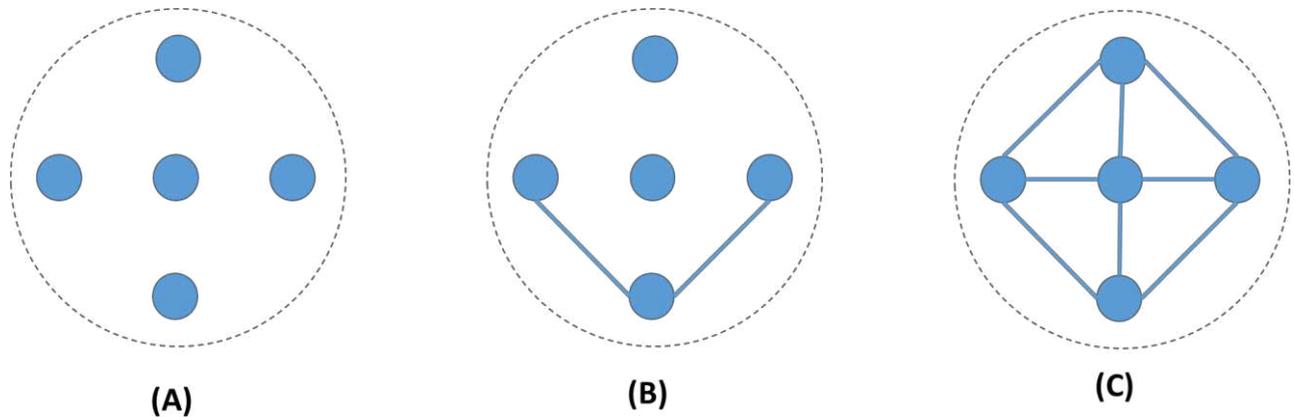
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APPENDIX

Figure 1: Illustration of Competition Networks



- i. (A), (B) and (C) illustrate three possible configurations of competition networks within a market.
- ii. Market boundary is represented by the dotted line.
- iii. Solid circles represent firms i.e. nodes of the network.
- iv. Solid lines depict competitive ties between firms. Two firms have a competitive tie between them if they engage in direct competition.

In this illustration, the number of firms are constant in the three scenarios. This is done in order to demonstrate the utility of analyzing competition using a network approach. Traditional approaches to market competition focusing on only the number of firms in the market predict equal rivalry across the three scenarios. On the other hand, a network approach predicts rivalry based on actual patterns of competition, which differ across the three scenarios.

Competitive networks constrain incumbent firms. Scenario (A) contains only unconstrained firms, scenario (B) contains both constrained and unconstrained firms, while scenario (C) contains only constrained firms.

New firms face a greater threat of competitive response from firms in scenario (A) as compared to the other two scenarios. As density of the network increases, the threat of competitive response from incumbents reduces. New firms face the least threat of competitive response from firms in scenario (C) because incumbent firms are highly constrained by the competition network.

Table 1 A: Summary Statistics

	Mean	Std. Dev.	Min	Max
Number of newcomers	0.891	1.072	0.00	5.000
Network Density (Logged)	-0.025	0.049	-0.31	0.000
Network Tie Strength (Logged)	1.142	0.657	-0.10	2.509
Resource Dissimilarity	12.896	8.482	1.29	44.866
Resource Variance	15.167	9.948	1.39	47.776
Network Size	32.374	16.185	3.00	83.000
Total Branches (Logged)	5.403	1.252	2.64	7.745

Table 1 B: Correlation Matrix

	1	2	3	4	5	6	7
1 Number of newcomers	1						
2 Network Density	0.117**	1					
3 Network Tie Strength	0.0973*	0.0917*	1				
4 Resource Dissimilarity	0.0553	0.0221	0.685***	1			
5 Resource Variance	0.0758	0.0430	0.637***	0.975***	1		
6 Network Size	0.154***	0.0739	0.652***	0.773***	0.816***	1	
7 Total Branches	0.118**	0.143***	0.781***	0.887***	0.901***	0.915***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2: Fixed Effect Negative Binomial Panel Models

Dependent Variable: Number of newcomers

	(1)	(2)	(3)	(4)	(5)	(6)
Network Density	3.75*	9.01**			4.12*	9.30**
	(1.79)	(3.30)			(1.80)	(3.13)
Network Tie Strength			-1.29**	-1.98**	-1.37**	-2.22***
			(0.46)	(0.64)	(0.46)	(0.65)
Network Density x Network Size		-0.31*				-0.30*
		(0.13)				(0.12)
Resource Dissimilarity	-0.18***	-0.21***	-0.13*	-0.15**	-0.12*	-0.18**
	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)	(0.06)
Resource Variance	0.09*	0.07	0.04	0.03	0.06	0.04
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Network Size	-0.23***	-0.26***	-0.26***	-0.29***	-0.25***	-0.33***
	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)	(0.04)
Total Branches	0.89	1.30 ⁺	1.03	1.35 ⁺	0.85	1.72*
	(0.67)	(0.69)	(0.67)	(0.69)	(0.67)	(0.73)
Network Tie Strength x Network Size				0.02		0.03*
				(0.01)		(0.01)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	13.99***	13.83**	17.25***	17.42***	17.42***	17.16***
	(4.20)	(4.22)	(4.41)	(4.36)	(4.39)	(4.35)
Observations	644	644	644	644	644	644

Standard errors in parentheses

⁺ p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 3: Fixed Effect Poisson Panel Models

Dependent Variable: Number of newcomers

	(1)	(2)	(3)	(4)	(5)	(6)
Network Density	3.70 ⁺ (1.97)	9.18 ^{**} (2.98)			4.06 [*] (1.93)	9.39 ^{***} (2.72)
Network Tie Strength			-1.35 [*] (0.53)	-2.06 [*] (0.84)	-1.42 ^{**} (0.54)	-2.29 ^{**} (0.78)
Network Density x Network Size		-0.31 [*] (0.13)				-0.30 ^{**} (0.11)
Resource Dissimilarity	-0.18 ^{**} (0.06)	-0.21 ^{***} (0.06)	-0.12 [*] (0.06)	-0.15 [*] (0.06)	-0.11 ⁺ (0.06)	-0.18 ^{**} (0.06)
Resource Variance	0.09 ⁺ (0.05)	0.08 ⁺ (0.04)	0.04 (0.05)	0.03 (0.04)	0.06 (0.05)	0.04 (0.04)
Network Size	-0.23 ^{***} (0.04)	-0.26 ^{***} (0.04)	-0.25 ^{***} (0.04)	-0.29 ^{***} (0.04)	-0.24 ^{***} (0.04)	-0.33 ^{***} (0.05)
Total Branches	0.78 (1.00)	1.27 (0.98)	0.94 (0.99)	1.28 (0.97)	0.76 (0.96)	1.71 ⁺ (0.99)
Network Tie Strength x Network Size				0.02 (0.02)		0.03 (0.02)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	644	644	644	644	644	644

Note: Robust Standard errors in parentheses
⁺ p < 0.10, ^{*} p < 0.05, ^{**} p < 0.01, ^{***} p < 0.001