Paradox of external finance in the Indian manufacturing sector

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Abstract

Purpose – This paper aims to examine how financial development affects the growth of industries that are more dependent on external finance, demystifying the roles played by the banks, stock and bond markets.

Design/methodology/approach – The authors apply panel fixed-effects and dynamic panel generalized methods of moments on disaggregated industry-level data of the Indian manufacturing sector for the period of 2001-2015 to examine the relationship between financial development, banking market structure and economic growth.

Findings – The study finds that financial development has a significant impact on the growth process by reducing cost of external finance. Among the three sources of finance, the study finds that while the banking sector has been the most preferred source of external finance, increasing concentration and selective disbursement of credit have continued to dent the prospects of the industry. This paradoxical result explains the dismal performance of the Indian manufacturing sector.

Originality/value – The effect of financial development (encompassing banking market structure) on economic growth has received sparing attention. Related literature is unclear regarding the impact of banking market structure on the growth process in the context of emerging economies. The authors attempt to fill this important gap in the literature. Moreover, they add novelty to the literature by calculating the external dependence at the firm level, diverging from using US industry as a proxy for calculation of external dependence.

Keywords Banks, Manufacturing sector, Economic development: Financial markets, Financial institutions and services, Market structure, Financial dependence, Industrial growth

Paper type Research paper

1. Introduction

Access to external finance acts as a serious deterrent to the growth of firms. Firms having potentially profitable investment opportunities but insufficient funds are adversely impacted by this. Well-developed financial system by alleviating problems related to *adverse selection* and *moral hazard* helps in reducing the cost of external finance and paving the way for investing in profitable ventures. Manganelli and Popov (2013) show that the effect of financial system is more pronounced on the growth of industries that are naturally dependent on external finance. In emerging economies like India, it has been observed that firms rely heavily on external finance for their investment needs (Singh and Hamid, 1992; Cobham and Subramaniam, 1998; Allen *et al.*, 2012). Hence, if the financial system in these economies is unable to impart the functions of allocating resources properly, then this could seriously impede the growth prospects. The important role played by the financial system in the growth process is well documented in the literature[1]. However, comparatively less attention has been paid to the mechanisms through which financial system affects real economy. This study is an endeavour in that direction.

In this paper, we examine how financial development affects the growth of industries that are more dependent on external finance, drawing from disaggregated

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industry-level data from the Indian manufacturing sector. To this end, the study investigates three related empirical questions on *financial development*, *banking market structure* and *economic growth*. First, we examine the impact of banking market structure on the growth of industries. Second, we determine whether age structure plays any role in the external finance needs of industries. Third, we inquire whether banking concentration leads to industry concentration.

Various related streams of literature have focussed on the relationship between external finance and growth (Rajan and Zingales, 1998; Fisman and Love, 2007; Manganelli and Popov, 2013) and between age structure of firms and external finance (Cetorelli and Gambera, 2001; Chavis *et al.*, 2011) and the role of banking market structure (Petersen and Rajan, 1995; Cetorelli and Gambera, 2001; Beck *et al.*, 2004; Liu *et al.*, 2014). While these diverse streams of literature are highly entwined in as much as one cannot be viewed in isolation with the others, there has been no methodical attempt in bridging them together so as to view the effect of financial development (encompassing banking market structure) on economic growth in totality.

For this purpose, it was necessary to introduce novel measures in capturing (a) external dependence and (b) financial development. First, with regards to external dependence, prior studies have used the external dependence of US industries as a proxy while exploring the relationship between financial dependence and economic growth. However, the external dependence happens to be "country-specific", which renders external dependence of US industries as a proxy untenable. The reasons are obvious, as the external dependence of industries is contingent upon the market conditions:

- the extent of monopoly power that firms have; and
- the nature of demand for a product that determines the cash flows of the that respective firms.

Hence, it would be unwise to generalize the financial dependence of US industries for industries located in other economies. Second, we have used firm-level financial development variable, unlike macroeconomic measures used in earlier studies, for capturing the extent of financial development. For capturing the extent of financial development, it was necessary to use firm-level sources of finance for estimating the actual level of resources that has been channelled to investment by the financial system. The macroeconomic measures, in contrast to being broader in scope, fail to provide micro foundations for capturing financial development.

Overall, both theoretical and empirical contributions on bank market structure and growth process yield contradictory conclusions. While the conventional argument suggests that concentration of market power generates inefficiencies that result in lower levels of credit, the opposing argument posits that banking market power augments valuable lending relationships. Prior studies on this issue are either based on cross-country (Cetorelli and Gambera, 2001; Beck *et al.*, 2004; Claessens and Laeven, 2005; Fisman and Love, 2007; Cole, 2009) or focussed on the developed economies (Petersen and Rajan, 1995; Jayaratne and Strahan, 1996; Cetorelli and Strahan, 2006). However, we are still unclear regarding the impact of banking market structure on the growth process in the context of emerging economies. This paper attempts to fill this important gap in the literature by drawing from disaggregated industry-level of data of the Indian manufacturing sector over the period of 2001-2015.

India, being one of the fastest-growing economies, presents a unique setting for exploring the relationship between financial development, banking market structure and growth. This uniqueness stems from:

- the virtual insulation of the banking sector from the recent global financial crisis; and
- Indian banking system that remains predominantly state-owned (Andrianova *et al.*, 2008), notwithstanding the initiation of reforms since the early 1990s.

In other words, the presence of a liberalized financial regime coupled with the dominance of the state-controlled banking sector (notwithstanding the issuance of banking licence to new banks in the private sector in recent times[2]) gives India an intriguing setting worth exploring.

Using industry-level data (two-digit NIC code, 1998 revision) over the period from 2001 to 2015, we demonstrate that financial development has a significant impact on the growth of the manufacturing sector by reducing the cost of external finance for industries. However, this external finance-led growth has yielded paradoxical results. While on one hand, the manufacturing sector continues to rely heavily on the banking sector for survival, the risk averse behaviour of the banks has continued to dent the prospects of the industry. This explains the dismal growth of the manufacturing sector amidst financial sector reforms.

The remainder of the paper is organized as follows. In Section 2, we describe the theoretical underpinnings. In Section 3, we describe the data and methodology. The empirical results are presented in Section 4. Section 5 underlines the policy implications and concludes.

2. Theoretical underpinnings
Financial development leads to economic growth by reducing the cost of external finance. In this context, the role of financial intermediaries assume prominence, as they can effectively reduce external cost of financing by exploiting their economies of scale while screening and monitoring of projects. The role of financial intermediaries in effectively reducing the cost of external finance has received adequate attention in the literature. Levine (1996) shows that the cost of monitoring decreases with the development of the financial system, as financial intermediaries apply enhanced techniques for gathering and processing information on potential borrowers and develop improved mechanisms for monitoring firm and manager performance. This allows more investment projects to be financed and, ex ante, increase the aggregate success probability (King and Levine, 1993; Blackburn and Hung, 1998). Wurgler (2000), using an industry-level data base, shows that financial development could affect growth by allocating capital efficiently. So, financial intermediation promotes growth by removing imperfections in the credit market, allocating capital efficiently and allowing a higher rate of return to be earned on capital. This reduces the cost of external finance for the firm, and the fostering growth in turn provides the means to implement costly financial structures (Greenwood and Jovanovic, 1990).

In a perfect capital market, a firm's investment decisions are independent of its financial condition. As all firms have equal access to capital markets, a firm's financial structure is irrelevant in financing firm growth, because external funds provide a perfect substitute for internal capital (Modigliani and Miller, 1958). In reality, however, firms have uneven access to capital markets, and internal and external funds are not perfect substitutes for reasons such as transaction costs, tax advantages, agency problems, costs of financial distress and asymmetric information (Stiglitz and Weiss, 1981; Myers and Majluf, 1984). With imperfect market, the external funds become more costly.

In a steady-state equilibrium, there will not be much need for external funds. Therefore, much of the demand for external funds is likely to arise as a result of technological shocks that raise an industry's investment opportunities beyond what internal funds can support. Bena and Ondko (2012) show that firms that operate in industries with positive growth shocks are better equipped to exploit new opportunities by increasing their external financing in countries with higher levels of financial market development. Rajan and Zingales (1998) argue that financial

development reduces the wedge between the cost of internal and external funds by providing better accounting and disclosure rules and better corporate governance through institutions, which enhances growth, especially for firms that are most reliant on external financing. They also show that well-developed financial system lowers the cost of capital, which helps capital-intensive firms to grow faster and facilitate growth process.

Love (2003) suggests that financial development could expand the availability of external finance, which would reduce financing constraints and thus increase the total amount of investment. Ayyagari *et al.* (2008) find that the underdeveloped financial institutions aggravate cost of borrowing for firms, which acts as the most robust obstacle to the growth process. Hence, financial development could reduce the cost of external finance for the firms and help in stimulating the growth process. Galindo *et al.* (2007), using firm-level panel data for 12 countries to create proxies for marginal product of capital and construct the efficiency index of capital allocation, show that efficiency increases in periods following the development of the financial system. Leuz *et al.* (2008) argue that financial development helps in alleviating corporate governance problems such as poor outsider protection, disclosure and expropriation, which in turn help the firm to raise external finance from outside investors and result in the growth process. Islam and Mozumdar (2007) examines the impact of financial market development on the extent to which firms have to rely on internal capital for making investments. The results show that financial development reduces the dependence on internal sources for undertaking a new investment opportunity. In a recent paper, Gochoco-Bautista *et al.* (2014) explore the mechanisms through which finance affects corporate investments and capital accumulation in five Asian emerging economies. They show that financial development affects firms' external financing constraints by reducing the cost of capital and absorbing shocks to the real economy, which helps in investment and capital accumulation. Oura (2008) examine firm-level data on corporate financing patterns in India and show that financial development lowers the external financing cost by reallocating resources and thus helps in capital accumulation.

Rajan and Zingales (1998) show that financial development reduces the cost of external finance to firms. Using the external dependence of manufacturing industries of USA as proxy for external dependence in other 42 countries, they argue that industries located in a well-developed financial system benefit disproportionately in comparison to industries located in a less developed financial system. Beck (2003), using industry-level data on firms' dependence on external finance for 56 countries and 36 industries, shows that countries with well-developed financial systems have higher export shares and trade balances in industries that use more external finance. In a related paper, Fisman and Love (2007) argue that financial development increases resource allocation to firms with good growth opportunities. However, recently, Manganelli and Popov (2013) find that financial development exerts a positive influence on the growth of sectors in need of external finance and of sectors facing good growth opportunities, albeit to a threshold.

Existing literature casts an ambiguous relationship between the banking market structure and external finance needs of firms. The traditional view suggests that departures from perfect competition in the credit market are detrimental for growth, as they are bound to generate inefficiency and harm firms' access to credit. Guzman (2000) shows that a banking monopoly is more likely to result in credit rationing than a competitive banking market and leads to a lower capital accumulation rate. Cetorelli and Gambera (2001) suggest that industries that depend more on external finance grow relatively faster in more concentrated banking sectors, while the overall effect of bank concentration on growth is negative. Based on cross-country data, Beck *et al.* (2004) document that higher bank concentration increases financing obstacles for firms, more so for small- and medium-sized

firms. Claessens and Laeven (2005) find no support for the view that market power is good for access to financing. They conclude that the higher the competition among banks, the faster the growth of finance-dependent industries, implying that higher financial development precedes economic growth.

Recent literature taking into account of information asymmetry and hold-up problems shows that the relationship between banking market structure and external finance may be positive or non-linear. Petersen and Rajan (1995) document that firms are less credit-constrained in a concentrated banking system. Young firms are charged low interest rates, as banks with market power can share in their future surpluses. Claessens and Laeven (2005) find that the higher the competition among banks, the faster the growth of finance-dependent industries, implying that higher financial development precedes economic growth. Cetorelli and Strahan (2006), examining the local US market, find that in markets with concentrated banking, potential entrants face greater difficulty in the growth of industrial output. Moreover, they document that in developing economics where the bank competition is not strong, the positive effect of bank concentration on growth is more pronounced. In a recent paper, Liu *et al.* (2014) find a positive effect of the bank concentration on the industrial output for developing economies. Their results support the view that the banking sector competition fosters the provision of growth-enhancing financial services. Similarly, Huang *et al.* (2014) observe that concentration in the banking system facilitates relationship lending, and as a consequence, industries more dependent on external liquidity enjoy a beneficial effect.

3. Data, variables and estimation methods

3.1 Data

We obtain firm-level data from the Prowess database of the Centre for Monitoring Indian Economy. We use balance sheet and cash flow statement data of the COSPI manufacturing index [3] of Prowess over the period from 2001 to 2015. The data set contains information about 1,030 manufacturing firms. Firm-level data have been transformed into industry-level data by aggregation according to the two-digit NIC code[4] (1998 revision). This is done for each year over the chosen period, 2001-2015. There are, in total, representations for 12 industries[5] in the sample.

We use the growth rate of gross value added of the industries as the measures of growth, which is deflated by industry-specific wholesale price indices to obtain output in real terms. Data on manufacturing gross value added are obtained from various issues of Annual Survey of Industries published by the Ministry of Statistics and Programme Implementation, while the deflator is from the Office of the Economic Adviser, Ministry of Commerce and Industry, Government of India (http://eaindustry.nic.in/).

3.2 Measuring external dependence

For calculating external dependence of industries at the country level, we identify the firms in each industry group which are less constrained for external finance. We posit that the need or desired amount of external finance is different from the actual use of external finance. This difference is due to the constraints in supply of external finance, given the market imperfections. These conditions hinder a firm for achieving its desired level of external finance. Therefore, we model on unconstrained firms where supply is virtually equal to the demand of external finance. To identify the unconstrained firms, we use three alternative criteria of investment, real sales growth and export to sales. For the first criteria, we choose the firms in an industry whose investment is above the median value of investment in the industry group under consideration. Investment is defined as ($GFALR_t − GFALR_{t-1}$), where $GFALR$ is gross fixed asset less revaluation reserves. Firms with zero investment that are dropped as zero

investment hardly require any external finance[6]. Similarly, for the second criterion, firms whose real sales growth was above the median value of the growth in the industry are selected, and for the third criterion, we select the firms having export to sales[7] ratio above the median value of export to sales ratio of an industry.

After identifying the unconstrained firms by the above criteria, we calculate the external dependence of firms in each industry group by following steps given by Rajan and Zingales (1998). They define external dependence as the amount of desired investment that cannot be financed through internal cash flows generated by the same business. Therefore, a firm's dependence on external finance is defined as capital expenditure minus cash flow from operations divided by capital expenditure. Cash flow from operation is broadly defined as the sum of cash flow from operations plus decreases in receivables and increases in payables. Capital expenditure is denoted by change in the net fixed assets. After calculating the external dependence of unconstrained firms, the median value[8] of each industry is calculated for these firms.

3.3 Measuring financial development
Identifying a proxy for measuring financial development, which is central to our analysis, is indeed a daunting task given the dynamism of the sector and plethora of services on offer. Not surprisingly, despite all efforts made by researchers to refine and improve the existing measures, the financial proxies used so far are from satisfactory. In this paper, we consider external sources of finance for firms as proxy for financial development. We argue that financial development eases external finance needs of firms by ameliorating market frictions. Therefore, usage of external source of finance is an adept proxy for the actual level of financial development in an economy. We consider dependence of firms on banks, stock markets and bond markets as the sources of external finance. For banking sector, firm's borrowings from banks and financial institutions (including development financial institutions) are considered as proxy for banking sector development. Firm's issue of fresh capital, equity premium and share capital is considered as proxy for stock market development, while issue of bonds and debentures is used as proxy for bond market development. All the financial development indicators are expressed as ratio of net fixed assets. Bank finance, bond finance and equity finance are averages of financing from bank, stock market and bond market, respectively, in the respective industries. The indicators are computed from the prowess database. Banking sector concentration is calculated as the ratio between sums of market shares (measured in total assets) of the three largest banks to the share of assets of all commercial banks. The data on banking concentration have been extracted from the World Bank database.

3.4 Model specifications
Our basic model explores the relationship between financial development and economic growth by using the below-mentioned growth equation:

$$
\begin{aligned}
Growth_{i,t} = Constant + \beta_1.Industry \quad dummy_i + \\
\beta_2 \cdot Industry\ i's\ share\ of\ manufacturing_{i,t} + \\
\beta_3 \cdot External\ dependence\ of\ industry_{i,t} \cdot Financial\ development_t + \epsilon_{it}
\end{aligned}
$$

(1)

The notations are self-explanatory. The dependent variable is the average annual real growth rate of value added in industry i over the period 2001-2015. The explanatory

variables include industry i's share in total value added in manufacturing segment, and the primary variable of interest is the interaction between external dependence of industry i and financial development. The interaction variable tests how the sectors (that are in need of external finance) grow given the level of financial development. Therefore, β_3 is expected to have a positive sign if sectors grow disproportionately faster, a negative sign otherwise. The industry dummies correct for the industry-specific effects.

We extend the above model to include bank concentration. The model allows us to decompose the total effect of bank concentration into an economy-wide and sector-specific effect. The extended model specification is as follows:

$$
\begin{aligned}
Growth_{i,t} = Constant + {} & \beta_1.Industry \quad dummy_i + \\
& \beta_2 \cdot Industry\ i's\ share\ of\ manufacturing_{i,t} + \\
& \beta_3 \cdot External\ dependence\ of\ industry_{i,t} \cdot Financial\ development_t + \\
& \beta_4 \cdot External\ dependence\ of\ industry_{i,t} \cdot Bank\ concentration_t + \epsilon_{it}
\end{aligned}
\tag{2}
$$

In the extended specification, we include the interaction between external dependence and bank concentration. The interaction variable examines whether industries that are more dependent on external finance grow faster if the banking concentration is more.

We estimate our model by using panel data regression methods. We estimate both the fixed-effects and the random-effects model. Hausman specification test is carried out to choose the appropriate model. There is industry-specific effect in our model, and the unobserved effect may be correlated with our regressors. Hence, the fixed-effects model serves our purpose quite well, which is also validated by the Hausman test. The robustness of the results from the fixed-effects model is checked with the estimates of generalized method of moments (GMM).

4. Results

Table I presents the external dependence of industries calculated on the basis of three criteria of investment, real sales growth and export to sales at the country level. The ranks for external dependence differ from industry to industry depending on the criteria used. We consider the average of the external dependence arrived under the above-mentioned three criteria as the measure of external dependence to test our hypothesis. Then, we compare our external dependence measure with the measures given by Rajan and Zingales (1998). To compare our measure of external dependence with that given by Rajan and Zingales (1998), we need to associate each industry classification in their study with our industry classification. In few cases, such an association could not be done reliably on account of differential classification schemes adopted by the respective economies. But for the industry group, for which we could match our results with that of Rajan and Zingales (1998), we observe differences in ranking for the same industry. This signifies that country-specific factors assume prominence in determining external dependence of industries. However, this important aspect has been overlooked in earlier studies, probably because of unequivocal reliance on the Rajan and Zingales (1998) measure.

Table II presents the summary statistics of the main regression variables. The average real growth rate of manufacturing sector is 18.3 per cent. The average sector requires some 76 per cent of external financing for its investment. The growth in average size of firms is 13 per cent. Average dependence on bank finance is higher in comparison to equity and bond finance.

Table III is a correlation matrix and shows significant correlation among some variables. Growth in value added is positively correlated with share in value added. The indicators of financial development are positively related with the growth in value added, which is consistent with previous findings. Noteworthy for our analysis is the negative correlation

Industry group	Sample size	External dependence based on investment	External dependence based on real sales growth	External dependence based on export to sales	Average external dependence	Rank
Textiles	100	0.874	1.182	0.894	0.983	1
Paper	31	0.855	0.961	1.106	0.974	2
Rubber and plastic products	75	0.822	0.898	1.025	0.915	3
Basic metals	116	0.804	0.927	0.967	0.899	4
Chemical and pharmaceutical	269	0.801	0.742	0.993	0.845	5
Food and beverages	98	0.791	0.918	0.807	0.839	6
Other non-metallic minerals	62	0.765	0.864	0.842	0.824	7
Other transport equipment	80	0.750	0.958	0.709	0.806	8
Electrical equipment	64	0.744	0.792	0.784	0.773	9
Computer and electronics	39	0.726	0.761	0.807	0.765	10
Fabricated metal	32	0.719	0.732	0.744	0.732	11
Machinery equipment	64	0.619	0.746	0.739	0.701	12

Table I.
External dependence of industries in India

Variable	Mean	SD	Minimum	Maximum	No. of observations
Industry's real growth	0.183	0.714	−0.268	7.289	168
Industry's share of total value added	0.061	0.049	0.004	0.204	168
Industry's growth in number of firms	0.072	0.521	−1.501	4.028	168
Industry's growth in average firm size	0.135	0.432	−1.824	2.852	168
External finance dependence (all firms)	0.766	0.104	0.291	0.981	168
External finance dependence (young firms)	0.803	0.199	−0.028	1.493	154
External finance dependence (mature firms)	0.758	0.108	0.224	0.981	168
Bank finance	6.017	0.838	4.286	7.864	168
Bond finance	5.680	1.861	0	9.366	168
Equity finance	4.734	0.359	3.730	5.703	168
Bank concentration	0.338	0.006	0.329	0.350	168

Table II.
Summary statistics

between banking sector concentration and growth in value added. This suggests that more concentrated systems are less conducive to growth in parlance with the conventional wisdom.

Next, we examine the effects of industry growth, financial development and banking market structure by using fixed-effects estimator. There will be cross-industry effects in our model, and the unobserved effect may be correlated with our regressors. The results of the fixed-effects estimators are presented in Table IV. The dependent variable is the average annual growth in value added for each industry segment. The industry's share in manufacturing value added has a positive sign in all regressions (Columns 1-6). This suggests that industries with a large share in value added have more growth potential than industries with smaller shares. In effect, our results contradict the industry-specific convergence effect shown by Rajan and Zingales (1998) and Claessens and Laeven (2005) in cross-country studies. The lack of industry-specific convergence effect can be attributed to

	Growth	Share in value added	External dependence (all firms)	External dependence (young firms)	External dependence (mature firms)	Bank finance	Bond finance	Equity finance	Bank concentration
Growth	1								
Share in value added	0.048** (0.018)	1							
External dependence (all firms)	0.458*** (0.000)	0.105 (0.277)	1						
External dependence (young firms)	0.073 (0.473)	0.138 (0.173)	0.239** (0.017)	1					
External dependence (mature firms)	0.485*** (0.000)	0.063 (0.516)	0.879*** (0.000)	0.204** (0.042)	1				
Bank finance	0.384*** (0.005)	0.243** (0.011)	0.391*** (0.000)	0.269*** (0.007)	0.355*** (0.000)	1			
Bond finance	0.308*** (0.001)	0.265*** (0.005)	0.264*** (0.005)	0.19* (0.05)	0.247*** (0.009)	0.573*** (0.000)	1		
Equity finance	0.205* (0.070)	0.389*** (0.000)	0.069 (0.477)	0.262*** (0.008)	0.008 (0.927)	0.729*** (0.000)	0.517*** (0.000)	1	
Bank concentration	−0.012 (0.896)	0.031 (0.744)	−0.062 (0.520)	−0.030 (0.764)	−0.041 (0.667)	−0.056 (0.558)	0.092 (0.341)	0.093 (0.337)	1

Notes: This table reports the correlation matrix of the main regression variables; p-values of significance tests are reported in parentheses below the correlation coefficients; ***, ** and * imply statistical significance at 1%, 5% and 10% levels, respectively

Table III.
Correlation matrix

industrial policies and industrial structure of India. Industrial and trade policy reforms in the past two decades have ushered in economies of scale and scope in the Indian manufacturing sector (Nagaraj, 2005) manifested in rising industry concentration witnessed in the post-liberalization era (Athreye and Kapur, 2006).

The results of our baseline model are presented in Columns 1-3, wherein we add one measure of financial development at a time. The baseline model investigates how industrial growth relates to the interaction between financial development and external dependence of an industry. We find that the industrial sector, which relies more on external finance (be it bank or equity finance), grows faster, as evident from the sign and significance of the interaction variable (Columns 1 and 2). However, we find little impact of bond market on the growth prospects of firms. The results are on the expected lines, given the depth of the corporate debt market in India (Banerji *et al.*, 2012). When we consider all the three sources of external finance concurrently in our model (Column 4), we find that industrial sectors that rely more on bank finance for their external finance needs tend to grow faster. This implies that the financial structure in India is still bank-based, wherein the banking sector retains its undisputed leadership in facilitating external finance.

With regards to the effect of banking concentration, we find negative effect of bank concentration on the growth in value added of external dependent industries (Column 5). Our findings are in parlance with the conventional wisdom that departure from perfect competition in the credit market introduces inefficiencies that reduce firm's access to credit. Hence, high bank concentration results in lower credit availability. Our results also corroborate the findings of Cetorelli and Gambera (2001), who find a depressing effect of banking concentration on growth.

Corporate finance theory suggests that most of the demand for external funds is observed in the formative years of companies. For fairly obvious reasons, it is legitimate to expect that external finance needs of young firms are a better measure to capture an industry's financial needs. Moreover, *ceteris paribus*, young firms have less of free reserves for investment as compared to their older counterparts. A firm is considered a young firm if its incorporation year [9] is less than 20 years from the study period. In our sample, very few young firms are

	(1)	(2)	(3)	(4)	(5)
Share in value added	15.143* (7.36)	14.920* (7.51)	14.301* (7.45)	14.639* (6.65)	14.090* (6.72)
External dependence × bank finance	0.255** (0.05)	——	——	0.495** (0.22)	0.424** (0.19)
External dependence × equity finance	——	0.315* (0.15)	——	−0.387 (0.37)	0.450 (0.28)
External dependence × bond finance	——	——	0.032 (0.08)	−0.030 (0.07)	−0.050 (0.08)
External dependence × bank concentration	——	——	——	——	−13.02*** (2.34)
Industry dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Number of observations	168	168	168	168	168
R^2	0.36	0.27	0.17	0.16	0.56

Table IV.
Industry growth, financial development and banking sector concentration

Notes: The dependent variable is real growth in sectoral value added over the period of 2001-2015. Regressions are estimated using fixed-effects with industry and year dummies (coefficient estimates not reported). Heteroskedasticity robust standard errors are reported in parenthesis; ***, ** and * imply statistical significance at 1%, 5% and 10% levels, respectively

dependent on bond finance for their external finance needs. Hence, we are left with no other option but to focus on the bank and stock markets as sources of external finance for young firms. In Table V, we check the robustness of the results of our baseline models by using external dependence measured for the sample of young firms. Regardless of how we measure financial development, industry's share in manufacturing value added is positive and significant (Columns 1-4). We find young firms that rely more on banks for their external finance tend to grow faster. Further, we also observe negative effect of banking sector concentration on the growth of value added. These inferences reinforce the findings of our base line model.

In Table VI, we carry out further robustness checks to account for the possibility of heterogeneity and contemporaneous correlation in our specification using by system GMM estimator[10]. We apply the one-step system GMM with robust standard error for the complete sample and to the sample of young firms. Results from the estimation are in consonance with the findings of Table IV. Columns 1 and 2 show the result of external dependence of the whole set of firms, and Columns 3 and 4 focus on external dependence of young firms. In all the estimations (Columns 1-4), industry's share in manufacturing value added has a positive and significant effect on the growth of value added, which is consistent with our previous findings. In both the samples, industries relying more on bank finance for their external finance tend to grow faster. We find evidence of negative effect of banking concentration on the growth of value added. The negative effect of bank concentration on growth of value added suggests that banks in India prefer relationship-based lending, wherein they support the profitability of already established borrowers over new borrowers. Under relationship-based lending, banks become risk-averse, and depending on the degree of bank competition, some firms may benefit while others may lose. This risk-averse nature of Indian banks have been well documented in the literature (Banerjee and Duflo, 2001, Bhaumik and Piesse, 2008). Risk averseness of banks has a detrimental effect on the growth process, as risk averse banks will wary of giving credit to highly profitable but risky projects, thereby stifling innovation and growth.

The consistency of the GMM estimator depends on the validity of the assumption that there is no serial correlation of the error terms. We examine whether the differenced error terms are serially correlated with respect to the first and second order. The Arellano–Bond serial correlation tests (AR [1] and AR [2]) in all columns do not reject the null hypothesis of non-existence of serial correlation, validating our instrument.

	(1)	(2)	(3)	(4)
Share in value added	12.278** (5.51)	12.870* (6.50)	11.795** (5.15)	11.195* (5.19)
External dependence × bank finance	0.183** (0.05)	–	0.313** (0.11)	0.312** (0.11)
External dependence × equity finance	–	0.201** (0.54)	−0.199 (0.12)	0.138 (0.140)
External dependence × bank concentration	–	–	–	−5.31*** (0.94)
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Number of observations	154	154	154	154
R^2	0.43	0.32	0.21	0.56

Notes: The dependent variable is real growth in sectoral value added over the period of 2001-2015. Regressions are estimated using industry and year fixed-effects (coefficient estimates not reported). Heteroskedasticity robust standard errors are reported in parenthesis; ***, ** and * imply statistical significance at 1%, 5% and 10% levels, respectively

Table V.
Industry growth, financial development and banking sector concentration (young firms)

	All firms (1)	All firms (2)	Young firms (3)	Young firms (4)
Lagged real growth	0.882*** (0.06)	0.756*** (0.08)	0.776*** (0.11)	0.676*** (0.12)
Share in value added	3.799*** (0.79)	3.942*** (0.61)	5.536** (2.29)	6.163** (2.48)
External dependence × bank finance	0.242* (0.13)	0.204** (0.10)	0.146** (0.06)	0.193** (0.15)
External dependence × equity finance	−0.504 (0.36)	0.185 (0.23)	−0.164 (0.17)	0.005 (0.10)
External dependence × bond finance	−0.016 (0.01)	−0.052* (0.03)	–	–
External dependence × bank concentration	–	−8.717*** (1.20)	–	−3.304** (1.64)
Constant	1.193 (0.77)	1.797*** (0.45)	0.753* (0.44)	1.115** (0.45)
Year dummies	Yes	Yes	Yes	Yes
Number of observations	156	156	143	143
AR(1)	0.108	0.112	0.206	0.203
AR(2)	0.241	0.334	0.279	0.315

Notes: The dependent variable is real growth in sectoral value added over the period of 2001-2015. Regressions are estimated using system GMM and year dummies (coefficient estimates not reported). Heteroskedasticity robust standard errors are reported in parenthesis; p-values represent first- and second-order autocorrelation; ***, ** and * imply statistical significance at 1%, 5% and 10% levels, respectively

Finally, we decompose the growth into number of new establishments and growth in size of new establishments. The growth in number of establishments is the log of the number of establishments in present period minus the log of number of establishments in previous period. The average size of establishments is obtained by dividing the value added in the industry by number of establishments, and the growth is obtained again as a difference in logs. The growth in number of establishments is essentially the creation of new establishments, which is more likely to require external funds. Hence, the effect of financial development is more pronounced in younger firms. We start our estimation by taking growth in number and growth in average size as dependent variable. For the sake of brevity, we only report the coefficients of interaction variable between bank finance and bank concentration.

As Table VII indicates, the interaction variable between external dependence and financial development is significant while explaining both the growth in number of firms and growth in average size. This implies that external finance significantly influences the formation of new firms or expansion of existing firms. As argued by Rajan and Zingales (1998), the requirement for external funds is likely to be more in the case of creation of new establishments as compared to expansion of existing establishments (which can also use internal funds). Thus, the effect of financial development should be more pronounced for the former as compared to the latter. Moreover, the growth in the number of establishments is more likely to be generated by new firms in comparison to the growth in the size of the existing ones. Thus, the growth in the number of establishments should be more sensitive to external dependence (measured using young firms). Our results quite well reflect that as the growth in number of establishments for mature firms is less significant in comparison to the younger firms. Hence, we can argue that financial markets are able to identify firms with potential growth opportunities and channelize the funds in accordance. This reduces the cost of external finance for the firms and increases the aggregate success probability (King and Levine, 1993, Blackburn and Hung, 1998). In other words, financial development by reducing cost of external finance fosters growth of industries. Our results corroborates the findings of Rajan and Zingales (1998), Fisman and Love (2007) and Bena and Ondko (2012). Bank finance is the preferred mode of external finance across all age groups, reinforcing the fact that India's financial structure is still bank-based. Our findings are similar to the findings of Allen *et al.* (2012) and Chakraborty (2010), who observe that banks are the most preferred source of external finance in India. Between growth in average size and growth in

	All firms		Young firms		Mature firms	
	Growth no. (1)	Growth average size (2)	Growth no. (3)	Growth average size (4)	Growth no. (5)	Growth average size (6)
Share in value added	6.398*** (2.33)	20.326 (17.76)	5.687** (2.28)	6.716 (18.77)	6.410** (2.36)	23.443 (30.68)
External dependence × bank finance	0.164*** (0.06)	2.175*** (0.46)	0.152** (0.04)	1.613*** (0.34)	0.114* (0.06)	2.201*** (0.64)
External dependence × bank concentration	−4.06** (1.64)	−31.247** (12.52)	−1.180 (0.85)	−23.215*** (7.02)	−3.58** (1.60)	−31.134** (10.98)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	168	168	154	154	168	168
R^2	0.15	0.22	0.25	0.21	0.12	0.21

Notes: Regressions are estimated using industry and year fixed-effects (coefficient estimates not reported); heteroskedasticity robust standard errors are reported in parenthesis; ***, **and *implies statistical significance at 1%, 5% and 10% levels, respectively

Table VII.
Growth in average
size and number of
establishments

number, the former assumes higher significance than the latter, as evident from the coefficients. Our findings are in conformity with Cestone and White (2003) and Da Rin and Hellmann (2002), who find that existing lending relationships affect behaviour of lenders *vis-à-vis* potential new borrowers. This may lead to fewer firms with a larger average firm size, which has important ramifications both on the banking market structure and on the manufacturing sector. While the banks continue to wield greater market power, given the number and size of the borrowers, on the industrial front, it has led to higher concentration. In other words, the reliance on bank financing explains the higher concentration in the Indian manufacturing sector.

5. Conclusion

This paper examines how financial development affects the growth of industries that are more dependent on external finance while controlling for banking market structure. Disaggregated industry-level data from the Indian manufacturing sector have been used to explore the relationship. Results suggest that financial development has a significant effect on the economic growth process by reducing the cost of external finance for industries that are heavily dependent on external finance. We also find evidence in support of the argument that country-specific factors are important in determining external dependence of industries. Further, we observe that banking sector development, in particular, assumes higher significance, as industries dependent on banking sector for their external financing tend to grow faster across all age group of firms. We also find evidence of young firms being more dependent on external finance for their growth. However, we find negative effect of bank concentration on the growth of value added in manufacturing industries.

The results of the paper should be of particular interest to policymakers. Study results reinforce that India continues to be a bank-based economy, notwithstanding the initiation of reforms to strengthen the equity and debt markets. The reliance on bank financing testifies that liberalization measures were inimical to competition, as it has failed to remove the financial constraints in the manufacturing sector (Bhattacharjee and Chakrabarti, 2013). Further, the failure of stock market as a source of finance can be attributed to the deterioration of the quality of trading on account of increasing concentration manifested in selective participation. The concomitant ramification has been higher volatility, without a corresponding return to the investors (Biswas, 2006). Hence, new reform measures should be aimed at removing the market imperfections, paving way for competition in the financial system for a sustainable long-term growth of the Indian economy.

Our results shed light on the debate on the effect of banking market structure on the growth process. Our finding is consistent with the theoretical underpinnings that higher banking concentration results in a lower amount of credit available to the firms. Higher concentration in the banking sector induces relationship-based lending and makes the banks risk-averse. Risk averseness impedes the growth process as banks refrain from financing high risk but profitable investment opportunities. This risk-averse behaviour of the banks has resulted in in the dismal growth of the manufacturing sector.

At this juncture, it is worth noting the paradox of external finance in Indian manufacturing sector. While on one hand, the sector continues to rely heavily on the baking sector for survival, the risk-averse behaviour of the banks has continued to dent the prospects of the industry. High government intervention in the banking sector and a higher share of nationalized banks have not helped the cause either. In view of this, the need of the hour is to instil competition in the banking sector. This can be done either by encouraging participation of more private and foreign banks or by privatizing state-owned banks. This would widen the avenues of accessing external finance and augment the growth momentum.

Notes

1. For a detailed review, see Levine (2005), Ang (2008).

2. The Union Finance Minister, Government of India, in his budget speech for the year 2010-2011 had announced the need to extend the geographic coverage of banks and improve access to banking services. Subsequently, on 2 April 2014, Reserve Bank of India (RBI) granted in-principal approval to IDFC and Bandhan Financial Services to setup banks.

3. COSPI manufacturing index serves our purpose quite well, as it constitutes of companies that are listed and whose trading frequency is greater than 90 per cent in the past 30 trading days.

4. NIC is the acronym for National Industrial Classification (All economic activities) compiled by the Central Statistical Organization (CSO), Ministry of Statistics and Programme Implementation, Government of India. After release of the United Nations International Standard Industrial Classification (ISIC) 2002 Rev. 3.1, NIC-1998 was updated keeping consistent with ISIC Rev 3.1.

5. We are forced to drop few industries, as the number of firms in some industries (e.g. tobacco and wood products) is very less for making any meaningful interpretation.

6. We have removed the outer 1 per cent of observations to avoid the effect of outliers in all the regressions. The results, however, do not change even if 5 per cent of the observations are deleted.

7. Recent literature, such as that by Ganesh-Kumar *et al.* (2001), has suggested that in developing countries such as India, firms with higher outward orientation (measured in terms of export to sales ratio) are less constrained in financial markets.

8. We use the industry median to prevent large firms from swamping the information from the small firms.

9. In the Indian context, we are hard-pressed to find the date of listing for all firms. Choudhury (2010) has used incorporation year for calculating age in the Indian context.

10. System GMM estimator alleviates the problem of endogeneity and omitted variable and is able to exploit the time series properties of the data. This estimator uses appropriate lags of variables in level form as instruments for equations in first difference form and conversely for equations in level form, all of which are combined into a system of equations with options to treat any of the variables in the system as endogenous.

References

Allen, F., Chakrabarti, R., De, S., Qian, J. and Qian, M. (2012), "Financing firms in India", *Journal of Financial Intermediation*, Vol. 21 No. 3, pp. 409-445.

Andrianova, S., Demetriades, P. and Shortland, A. (2008), "Government ownership of banks, institutions, and financial development", *Journal of Development Economics*, Vol. 85 Nos 1/2, pp. 218-252.

Ang, J.B. (2008), "A survey of recent developments in the literature of finance and growth", *Journal of Economic Surveys*, Vol. 22 No. 3, pp. 536-576.

Athreye, S. and Kapur, S. (2006), "Industrial concentration in a liberalising economy: a study of Indian manufacturing", *Journal of Development Studies*, Vol. 42 No. 6, pp. 981-999.

Ayyagari, M., Demirgüç-Kunt, A. and Maksimovic, V. (2008), "How important are financing constraints? The role of finance in the business environment", *The World Bank Economic Review*, Vol. 22 No. 3, pp. 483-516.

Banerjee, A. and Duflo, E. (2001), "The nature of credit constraints: evidence from an Indian banked", *Manuscript, MIT*, available at: www.chicagobooth.edu/research/workshops/AppliedEcon/archive/WebArchive20012002/duflo.pdf

Banerji, S., Gangopadhyay, K., Patnaik, I. and Shah, A. (2012), "New thinking on corporate bond market in India", *National Institute of Public Finance and Policy*, Working Papers No. 2012-106.

Beck, T. (2003), "Financial dependence and international trade", *Review of International Economics*, Vol. 11 No. 2, pp. 296-316.

Beck, T., Demirgüç-Kunt, A. and Maksimovic, V. (2004), "Bank competition and access to finance: international evidence", *Journal of Money, Credit and Banking*, Vol. 36 No. 3b, pp. 627-648.

Bena, J. and Ondko, P. (2012), "Financial development and the allocation of external finance", *Journal of Empirical Finance*, Vol. 19 No. 1, pp. 1-25.

Bhattacharjee, S. and Chakrabarti, D. (2013), "Financial liberalisation, financing constraint and India's manufacturing sector", *Economic & Political Weekly*, Vol. XLVIII.

Bhaumik, S.K. and Piesse, J. (2008), "Does lending behaviour of banks in emerging economies vary by ownership? Evidence from the Indian banking sector", *Economic Systems*, Vol. 32 No. 2, pp. 177-196.

Biswas, J. (2006), "Indian stock market in comparison", *Economic and Political Weekly*, pp. 1747-1752.

Blackburn, K. and Hung, V.T. (1998), "A theory of growth, financial development and trade", *Economica*, Vol. 65 No. 257, pp. 107-124.

Cestone, G. and White, L. (2003), "Anticompetitive financial contracting: the design of financial claims", *The Journal of Finance*, Vol. 58 No. 5, pp. 2109-2142.

Cetorelli, N. and Gambera, M. (2001), "Banking market structure, financial dependence and growth: international evidence from industry data", *The Journal of Finance*, Vol. 56 No. 2, pp. 617-648.

Cetorelli, N. and Strahan, P. (2006), "Finance as a barrier to entry: bank competition and industry structure in local US markets", *The Journal of Finance*, Vol. 61, pp. 437-461.

Chakraborty, I. (2010), "Financial development and economic growth in India an analysis of the post-reform period", *South Asia Economic Journal*, Vol. 11 No. 2, pp. 287-308.

Chavis, L.W., Klapper, L.F. and Love, I. (2011), "The impact of the business environment on young firm financing", *The World Bank Economic Review*, Vol. 25 No. 3, pp. 486-507.

Choudhury, M. (2010), "Bank funding and firm investment in underdeveloped financial markets: evidence from India", *Macroeconomics and Finance in Emerging Market Economies*, Vol. 3 No. 2, pp. 227-244.

Claessens, S. and Laeven, L. (2005), "Financial dependence, banking sector competition, and economic growth", *Journal of the European Economic Association*, Vol. 3 No. 1, pp. 179-207.

Cobham, D. and Subramaniam, R. (1998), "Corporate finance in developing countries: new evidence for India", *World Development*, Vol. 26 No. 6, pp. 1033-1047.

Cole, S. (2009), "Financial development, bank ownership, and growth: or, does quantity imply quality?", *The Review of Economics and Statistics*, Vol. 91 No. 1, pp. 33-51.

Da Rin, M. and Hellmann, T. (2002), "Banks as catalysts for industrialization", *Journal of Financial Intermediation*, Vol. 11 No. 4, pp. 366-397.

Fisman, R. and Love, I. (2007), "Financial dependence and growth revisited", *Journal of the European Economic Association*, Vol. 5 Nos 2/3, pp. 470-479.

Galindo, A., Schiantarelli, F. and Weiss, A. (2007), "Does financial liberalisation improve the allocation of investment?: Micro-evidence from developing countries", *Journal of Development Economics*, Vol. 83, pp. 562-587.

Ganesh-Kumar, A., Sen, K. and Vaidya, R. (2001), "Outward orientation, investment and finance constraints: a study of indian firms", *Journal of Development Studies*, Vol. 37 No. 4, pp. 133-149.

Gochoco-Bautista, M.S., Sotocinal, N.R. and Wang, J. (2014), "Corporate investments in Asian markets: financial conditions, financial development, and financial constraints", *World Development*, Vol. 57, pp. 63-78.

Greenwood, J. and Jovanovic, B. (1990), "Financial development, growth, and the distribution of income", *Journal of Political Economy*, Vol. 98 No. 5 Part 1, pp. 1076-1107.

Guzman, M.G. (2000), "Bank structure, Capital accumulation and growth: a simple macroeconomic model", *Economic Theory*, Vol. 16 No. 2, pp. 421-455.

Huang, H.-C.R., Fang, W. and Miller, S.M. (2014), "Banking market structure, liquidity needs, and industrial growth volatility", *Journal of Empirical Finance*, Vol. 26, pp. 1-12.

Islam, S.S. and Mozumdar, A. (2007), "Financial market development and the importance of internal cash: evidence from international data", *Journal of Banking & Finance*, Vol. 31 No. 3, pp. 641-658.

Jayaratne, J. and Strahan, P.E. (1996), "The finance-growth nexus: evidence from bank branch deregulation", *The Quarterly Journal of Economics*, Vol. 111 No. 3, pp. 639-670.

King, R.G. and Levine, R. (1993), "Finance and growth: Schumpeter might be right", *The Quarterly Journal of Economics*, Vol. 108 No. 3, pp. 717-737.

Leuz, C., Lins, K.V. and Warnock, F.E. (2008), "Do foreigners invest less in poorly governed firms?", *The Review of Financial Studies*, Vol. 22, pp. 3245-3285.

Levine, R. (Ed.) (1996), *Foreign Banks, Financial Development, and Economic Growth*, American Enterprise Institute Press, Washington, DC.

Levine, R. (2005), "Finance and growth: theory and evidence", *Handbook of Economic Growth*, Vol. 1, pp. 865-934.

Liu, G., Mirzaei, A. and Vandoros, S. (2014), "The impact of bank competition and concentration on industrial growth", *Economics Letters*, Vol. 124 No. 1, pp. 60-63.

Love, I. (2003), "Financial development and financing constraints: international evidence from the structural investment model", *Review of Financial Studies*, Vol. 16 No. 3, pp. 765-791.

Manganelli, S. and Popov, A. (2013), "Financial dependence, global growth opportunities, and growth revisited", *Economics Letters*, Vol. 120 No. 1, pp. 123-125.

Modigliani, F. and Miller, M.H. (1958), "The cost of Capital, corporation finance and the theory of investment", *The American Economic Review*, pp. 261-297.

Myers, S.C. and Majluf, N.S. (1984), "Corporate financing and investment decisions when firms have information that investors do not have", *Journal of Financial Economics*, Vol. 13 No. 2, pp. 187-221.

Nagaraj, R. (2005), "Industrial growth in China and India", *Economic and Political Weekly*, pp. 2163-2171.

Oura, H. (2008), *Financial Development and Growth in India: A Growing Tiger in a Cage*, Washington, DC.

Petersen, M.A. and Rajan, R.G. (1995), "The effect of credit market competition on lending relationships", *The Quarterly Journal of Economics*, Vol. 110 No. 2, pp. 407-443.

Rajan, R.G. and Zingales, L. (1998), "Financial dependence and growth", *The American Economic Review*, Vol. 88, pp. 559-586.

Singh, A. & Hamid, J., 1992. Corporate financial structure in developing countries. *World Bank-International Finance Corporation Papers*.

Stiglitz, J.E. and Weiss, A. (1981), "Credit rationing in markets with imperfect information", *The American Economic Review*, Vol. 71, pp. 393-410.

Wurgler, J. (2000), "Financial markets and the allocation of Capital", *Journal of Financial Economics*, Vol. 58 Nos 1/2, pp. 187-214.

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