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Does Local Financial Development Matter for Firm Lifecycle in India?

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Abstract

The differences in financial development across Indian states, while seeming substantial, have a minor effect on firm lifecycle and growth. These results hold controlling for differences in labor regulations across states, capital intensity, and for firms born before and after the major reforms. There is no evidence that firms in financially dependent industries have different lifecycle profiles or grow faster in financially developed states than underdeveloped states. Overall, firms in the formal manufacturing sector grow as they age whereas in the informal sector, firms have a declining lifecycle, but in both cases little evidence is found that financial institutions matter for firm lifecycle. The findings of this paper suggest that size and depth differences in financial development across Indian states are likely dwarfed by overall inefficiencies that characterize state-dominated financial systems, with important implications for the reforms of the Indian financial system going forward.

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I Introduction

An influential body of research in finance has established the importance of life-cycle explanations for many fundamental corporate finance policies in the US.[1] Much less is known about lifecycle issues in developing countries. We do know that in the U.S., new businesses start small and, if they survive, grow fast as they age. [2] It is an open question as to whether firms in developing countries face a similar size-age profile as in the US given that they face entirely different business environments and operating conditions.

Furthermore, the role of institutions in determining how firm size and growth evolve over the lifecycle in developing countries is still largely a black-box. For instance, a large literature has shown the importance of financial development for firm growth (see Levine (2005) for a review). While most studies have focused on cross-country data (e.g. King and Levine, 1993; Levine and Zervos, 1998), or industry-level analyses (e.g. Rajan and Zingales, 1998), or firm-level studies (e.g. Demirguc-kunt and Maksimovic, 1998), there have been several country case studies showing that financial development across states within a country matter. Jayaratne and Strahan (1996) and Dehejia and Lleras-Muney (2007) show that differences in state-level bank regulation in the United States affects financial development which has an impact on economic growth; Guiso, Sapienza, and Zingales (2004) examine differences in financial development across regions in Italy, particularly on small firms and entrepreneurship and find that local financial development matters for economic success. Other studies such as Bertrand, Schoar, and Thesmar (2007) examine the impact of deregulation in France on the functioning of credit

[1]Research has shown the importance of life-cycle explanations for dividends (Fama and French (2001), Grullon et al. (2002), and DeAngelo, DeAngelo, and Stulz (2006), Denis and Osobov (2008)), financing (Berger and Udell, 1998), stock valuations (Pastor and Veronesi (2003)) and acquisitions (Maksimovic and Philips (2008), Arikan and Stulz (2013)).

[2] See, for example, Evans, 1987; Dunne, Roberts, and Samuelson, 1989; Davis, Haltiwanger, and Schuh, 1996; Caves, 1998; Hsieh and Klenow, 2012.

markets and their impact of the structure and dynamics of product markets. Still unanswered though is the impact of financial institutions on firm lifecycle in developing countries.

In this paper, we examine whether domestic financial development matters for explaining firm[3] lifecycles in a developing country like India. Specifically, we examine the relationship between plant size, age, and growth using detailed manufacturing census data from India and ask: how does local financial development influence the size-age relationship? Are there differences in the size-age relationship across different industry characteristics and between the formal and informal manufacturing sector and does this vary with the extent of local financial development? Does the role of local financial development on firm lifecycle vary with major regulation changes in India such as financial liberalization, changes in labor regulation, and industry de-licensing?

India offers an ideal laboratory for testing the role of institutions on firm lifecycle given the large persistent differences in institutions, business environment, and income across different regions in India (Ahluwalia, 2002). In an interesting comparison, the *Economist* magazine matches India's most populous state, Uttar Pradesh, to Brazil in terms of population, Qatar in terms of size of the economy, and Kenya in terms of its GDP/capita. Maharashtra, on the other hand is one of India's richest states and is equivalent to Mexico in terms of population, Singapore in terms of GDP, and Sri Lanka in terms of GDP/capita.[4] Importantly, there is substantial and well researched heterogeneity in financial and labor institutions across these states. Overall however, India ranks quite low on different indicators of financial development. For instance, the Global Findex database ranks India as 77 of 147 countries in terms of

[3] For brevity we use the terms firm and establishment interchangeably since the vast majority (over 72%) of firms in India are single establishment firms. We obtain similar results in other contexts when we restrict our analysis to firms with single establishments.

[4] All the comparisons are based on 2009 values. See "Comparing Indian states and territories with countries," *The Economist Magazine, June 21, 2011.*

percentage of adults with an account at a formal financial institution. At the same time, comprehensive and centrally collected Census data at the firm-level is available to researchers, thereby sidestepping many of the concerns arising from data comparability in cross-country studies. India is also an interesting case study because some recent studies (e.g. Hsieh and Klenow, 2012) suggest that India has a flat life-cycle where fo40-year-old plants are no larger than young plants. Our India sample comprises of repeated cross-section census data for the formal manufacturing sector at roughly five year intervals - 1983/84; 1989/90; 1994/95; 2000/01; and 2004/05[5] and census data on the informal sector for 1994/1995.

We have the following main findings: Despite considerable differences in financial depth across Indian states we find the role of financial development to be marginal in explaining lifecycles in the broad population of firms and in most of the sub-samples we analyze. These results are robust to a number of checks including looking at just the firms in the right tail of the size distributions, across states with flexible versus rigid labor market regulation, and using alternate indicators of financial development. We also find no differential impact of financial development on lifecycle when we look at firms born after India's financial liberalization in 1991 or looking at periods after industry de-licensing. We also find only marginal differences in the proportion of manufacturing employment in old and new firms across different levels of financial development.

Second, we find the extent of financial dependence of industries does not predict the life cycles of firms across states in India. We use the identification strategy introduced by Rajan and Zingales (1998) for classifying industries into financially dependent and financially independent depending on the extent to which firms can support their capital expenditures using cash flow

[5] Repeated cross-sections helps us look at life-cycle patterns over a longer period of time in addition to providing us more observations at each point in the life-cycle. It also allows us to examine if our results are consistent over different periods of institutional change in India such as financial liberalization and industry de-licensing.

from operations, based on the experiences of US firms in the same industries. We find that firms in financially dependent industries are larger at all stages of their life-cycle. Thus, there is no evidence that financial dependence affects growth rates of established Indian firms relative to firms in industries that are not financially dependent. [6] Furthermore we do not see that firms in financially dependent industries are larger or face different lifecycle effects in financially developed states than under-developed states. Using a similar difference-in-difference set-up we also find that firms in large-firm dominated industries are larger at each stage of the life-cycle, both in the case of capital intensive and labor intensive industries.[7]

Our findings contrast with the literature that finds significant effect of within-country institutional differences on firm performance. For example, Jayaratne and Strahan (1996) and Dehejia and Lleras-Muney (2007) show that differences in state-level bank regulation in the United States affects financial development. Similarly, Guiso et al. (2004) examine differences in financial development across regions in Italy, particularly on small firms and entrepreneurship and find a significant effect. The explanation for the differences in conclusions is most likely that the state-owned and controlled financial sector in India is not significantly contributing to firm growth. In such a system, the regional differences in financial development as measured by the financial depth of the banking system may be masked by other potentially more important institutional (e.g. infrastructure constraints) and firm-specific factors (e.g. organizational form). The finance literature also shows that in a large cross-section of countries, higher government ownership of banks is associated with slower subsequent financial development and lower

[6] Rajan and Zingales (1998) show that financially dependent industries grow *less fast* than financially independent industries using a sample of developed and developing countries.

[7] Following Beck et al. (2008), we classify industries into small firm dominated and large firm dominated categories using the US industry composition as an instrument. Beck et al. measure an industry's "technological" composition of small firms relative to large firms as the share of employment in firms with less than 20 employees in the United States (a country with a relatively frictionless financial system) in 1997. To classify industries into labor vs. capital intensive we follow Hasan and Jandoc (2012)

income per capita growth and productivity (La Porta et al, 2002; Barth et al. 2001), as well as poorer financial access by small firms (e.g. Beck, Demirguc-Kunt and Maksimovic, 2005). Our findings are also consistent with those of Boyreu-Debray (2003) and Boyreau-Debray and Wei (2005) who show that the depth of the financial sector does not promote growth of provinces in China, another country where the banking system is largely state owned and controlled. Hence, our findings on India provide additional evidence that state-ownership in banking hampers the impact of finance on growth.

The finding that differences in financial depth in a state-owned financial system do not affect the life-cycles of firms does not imply that there are no qualitative differences in financial access within those systems and that they do not benefit individual firms. For example, Cole (2009)'s Indian study uses a regression discontinuity design and finds that government ownership of banks adversely affects the development of small enterprises in villages in which these banks have branches. In another study of Chinese banks and enterprises, Ayyagari, Demirguc-Kunt and Makimovic (2010) find that controlling for local financial development, firms that receive bank financing outperform firms that do not. However, Ayyagari et. al. do not address the question of whether differences in financial depth at the province level materially affect the aggregate province level growth or the life-cycles of the firms comprising the whole of the manufacturing sector.

Overall, our analyses of firm lifecycle in India shows that the average 40 year old firm in the formal sector in India is 2 to 4 times the size of firms less than five years of age. Our results hold true when we take sampling weights into account and look at the entire population of firms. Thus, while firms in India may not be growing at the same rate as in developed countries such as

the US where the size-age ratio is eight times (Hsieh and Klenow, 2012), there is clear evidence that older firms in the formal manufacturing sector are larger than younger firms.

We do find stark differences in firm lifecycle in the formal and informal sectors: Older firms in the unorganized manufacturing sector in India employ fewer people than firms younger than 5 years old. This is consistent with recent findings in La Porta and Shleifer (2008) who show that informal firms look very different from formal firms in terms of size, productivity, and education level of managers and find little evidence that growth occurs by informal firms eventually becoming large formal firms.

Our results also contribute to the large literature on firm size and age (Dunne, Roberts, and Samuelson, 1989; Davis, Haltiwanger, and Schuh,1996; Cabral and Matta, 2003, Foster, Haltiwanger, and Syverson, 2012). Given the idiosyncratic distortions in the business environment, it is not clear what type of size-age gap to expect in developing countries. A recent paper by Hsieh and Klenow (2012) suggests that in India and Mexico, in contrast to the case of the U.S., the lifecycle of manufacturing plants is relatively flat - that in fact on average the surviving manufacturing plants in India shrink in size between ages of 5 and 35. The dual economy view in development economics (originally associated with Harris and Todaro, 1970) predicts that informal firms should look very different from formal firms in terms of size, productivity, wages paid, and the industries/markets they operate in. Recent studies such as La Porta and Shleifer (2008) also show that while informal firms account for a large portion of economic activity in developing countries, growth and development comes from the creation of highly productive formal firms. Strikingly, Hsieh and Klenow find that plants in both the formal and the informal sector share the same trajectories. Our results using data for the same year 1994/95 as in their paper stand in sharp contrast with their findings on the formal sector. Given

the heterogeneity in firm formation we study the formal sector and informal sectors separately in this paper and do find differing life-cycle patterns. Our findings are also consistent with Ayyagari, Demirguc-Kunt, and Maksimovic (2013) who find the upward sloping size-age profile to be pervasive across a vast majority of developing countries.

The remainder of the paper is organized as follows. In section II we describe the data. In section III we discuss in detail the relationship between firm size and age in India. In this section we also reconcile our findings on the financial sector in India with the broader finance and growth literature. Section IV concludes.

II Data

We use data on formal manufacturing plants in India from the Annual Survey of Industries (ASI), which is conducted by the Indian Ministry of Statistics and Program Implementation. The ASI sampling frame consists of all registered factories employing 10 or more workers using power or 20 or more workers without using power. The sampling frame consists of the "Census" sector which are surveyed every year and the "Sample" sector where plants are sampled randomly and unit multipliers are provided to take into account sampling probabilities. The definitions of the Census and Sample sectors have changed over the years as described in the table in Appendix A.[8] In robustness checks, we find all our results to hold when we just analyze the Census sample. We use data from five years: 1983/84; 1989/90; 1994/95; 2000/01, and 2004/05.

[8] The ASI also contains some establishments outside of manufacturing. Thus while the primary unit of enumeration in the survey is a factory in the case of manufacturing industries, it could also be a workshop (for repair services), an undertaking or a licensee (electricity, gas & water supply undertakings) or an establishment (bidi & cigar industries). According to the Ministry of Statistics, "the owner of two or more establishments located in the same State and pertaining to the same industry group and belonging to census scheme is, however, permitted to furnish a single consolidated return. Such consolidated returns are common feature mostly in the case of bidi and cigar establishments, electricity and certain public sector undertakings"

The specific ASI variables we use are described below: **Firm Age** is defined as the year of the census - year of initial production reported by the firms. We define 9 age bins as follows : <5, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, and 40+. **Firm Size** is the total number of workers which includes workers employed directly, workers employed through contractors, supervisory and managerial staff, other employees, working proprietors, unpaid family workers, and unpaid working members if cooperative factory. As a measure of growth rates, we construct **Firm Size Ratio** which is the ratio of each firm's firm size scaled by the average firm size of all firms in its birth cohort. Thus, we scale the employment of the each firm in youngest age bin (<5) in 2004 by the average size of that age bin in 2004, of the firms in the age bin (5-9) in 2004 by the average size in the youngest age bin (<5) in 1999, of the firms in the age bin (10-14) in 2004 by the average size in the youngest age bin (<5) in 1994, of the firms in the age bin (15-19) in 2004 by the average size in the youngest age bin (<5) in 1989, of the firms in the age bin (20-24) in 2004 by the average size in the youngest age bin (<5) in 1983, and so on. Since our sample period extends from 1983/84 to 2004/05 we are able to construct this ratio for only the following age bins - <5, 5-9, 10-14, 15-19, and 20-24.

To deal with outliers, we winsorize the bottom and top 1% of all plant-level variables and drop firms that stated initial year of production to be before 1800 and clear data errors where the year of initial production is given to be after the year of the survey. The data also provides National Industry Classification (NIC) codes that map onto different revisions of the International Standard Industry Classification (ISIC) codes.[9] Using this we construct three digit

[9] The census years 1983/84 uses NIC-70 which maps onto ISIC-Revision 2 at the 3-digit level. The 1989/90 and 1994/95 censuses use NIC-87 which maps onto ISIC-Revision 3 at the 3-digit level. The 1999/00 and 2000/01 censuses use NIC-98 which maps onto ISIC-Revision 3 at the 3-digit level. The 2004/05 census uses NIC-04 which maps onto ISIC-Revision 3.1 at the 3-digit level.

NIC industry dummies that are consistent across all census-years and restrict the data to only the manufacturing sector.[10]

To explore industry heterogeneity, we use three different classifications of industries. First, we follow the procedure in Rajan and Zingales (1998) and estimate an industry's dependence on external financing using data on US corporations (RZ index). The RZ index is based on the assumption that since U.S. financial markets are developed, sophisticated, have fewer market imperfections and relatively open they should allow US firms to achieve their desired financial structure. Thus assuming that there are technological reasons why some industries depend more on eternal finance than others, the RZ index offers an exogenous way to identify the extent of external dependence of an industry anywhere in the world. The methodology does not require that the US markets are perfect but rather that market imperfections in the US do not distort the ranking of industries in terms of the technological dependence on external financing.

We reconstruct the RZ index for the period 1980-2012 by computing external dependence as (Capital Expenditures-Operating Cash Flow)/Capital Expenditures for each domestic US firm in Compustat. The median value across firms in each industry is a measure of that industry's dependence on external finance. This index of external dependence is constructed at the SIC 2/3 digit level which is then manually matched to 3-digit ISIC codes that map onto the Indian NIC classification. Appendix C provides the concordance used in the paper. We construct **EFD,** a dummy variable that takes the value 1 if industry's dependence on external finance is ≥ median value of dependence on external finance across industries and 0 if it was < the median across industries.

[10] We drop recycling from the manufacturing sector since it is not included under manufacturing in the ISIC classification.

Second, we create **Small Firm Industry** which is a dummy variable that takes the value 1 if the industry's share of employment in firms with less than 20 employees is ≥ median value of the Index of small firm domination from Beck, Demirguc-Kunt, Laeven, and Levine (2008) and takes the value 0 if it is < the median index value. Beck et. al. (2008) use the methodology in Rajan and Zingales (1998) described above to argue that each industry has a technological firm size that depends on that industry's particular production process and that these technological differences should persist across countries. They construct each industry's share of employment in firms with less than 20 employees in the US using data from the 1997 US Census. [11]

Finally, we follow Hasan and Jandoc (2012) in constructing **Labor Intensive Industries** which is a dummy variable that takes the value 1 for labor intensive industries and 0 for capital intensive industries.[12]

We use data on informal firms from the Unorganized Manufacturing sector for 1994/95 that is collected by the National Sample Survey (NSS) Office of the Ministry of Statistics. The survey uses a stratified two-stage sampling design where the first-stage units are the villages in the rural areas and urban blocks in the urban areas and the second-stage units are the enterprises. The allocation of sample first stage units between rural and urban areas is in proportion to population as per 1991 census with double weightage to the urban sector. As seen in Appendix B, the informal sector in India is very large and dwarfs the formal sector in terms of the number of firms. Firm Size and Age variables are calculated similar to the formal manufacturing census described above.

[11] Beck et. al. present alternate indices including using 100 employees as the cut-off and using 1992 census to construct the index. Our results are robust to these alternate classifications.

[12] Hasan and Jandoc (2012) classify the following industries in India to be capital intensive industries: Machinery, Electrical Machinery, Transport, Metals and Alloys, Rubber/Plastic/Petroleum/Coal and Paper/Paper Products. The labor-intensive industries are: Beverages and Tobacco, Textile Products, Wood/Wood Products, Leather/Leather Products and Non-Metallic Products. The remaining industries are not as clearly distinguishable and include: Food Products, Textiles, Basic Chemicals, Metal Products and Other Manufacturing

A.1. Finance and Labor Market Institutions in India

To take into account institutional differences that may affect firm life-cycle, we focus on the level of financial development and the stringency of labor regulations across different states of India. We first describe India's banking sector and the measures we construct followed by the stringency of labor regulation in India and the associated measures.

India has a rich and mature banking history with the first banks being established by the British East India Company towards the end of the 18th century. India's largest bank today, the State Bank of India originated in 1806 as the Bank of Calcutta. Following India's independence, in 1949, the Banking Regulation Act vested the Reserve Bank of India (RBI), India's Central Bank, with extensive powers for supervision of banking in India. In two waves of nationalization in 1969 and 1980, the Indian government nationalized the major private banks running them as profit-making public sector undertakings that were allowed to compete and operate as commercial banks.[13] This increased the public sector banks' share of deposits to 92% (Hanson, 2001). The Government also experimented with a social banking program during this period to improve access to banking services for the poor leading to a huge expansion in the number of bank branches (Burgess and Pande, 2005).

In response to a fiscal and balance of payments crisis in 1991, India went through a large-scale financial liberalization. Following the recommendations of the Narasimhan Committee Report that suggested reforms in the Indian banking sector, the Government allowed for the entry of new private sector banks (including foreign banks) in 1993. Despite the massive growth

[13] In 1969, 14 banks with deposits over Rs 50 crores were nationalized. In 1980, 6 private sector banks were nationalized. A few of the private sector banks were not nationalized because of their small size and regional focus.

of private sector banks, India's banking system is still largely state dominated. As of 2012, India's state owned banks have 73% of market share of assets and 83% of branches.[14]

Even within this government dominated banking sector, there is a large variation across India's states in level of financial development. Bajpai and Sachs (1999) note that there has been a wide variation in the adoption of economic reforms with states like Maharashtra being very reform oriented while others, especially the poorest BIMARU[15] states (Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh) being laggards. Aghion et al. (2005) also note the reforms in the 1990s to be associated with increasing cross-state inequality in industrial performance.

Insert Table 1 here

Our measure of financial development is the ratio of total Commercial Bank Credit outstanding to the Net State Domestic Product (SDP) in each census year and gauges the depth of financial development. The data is sourced from Burgess and Pande (2005) with updates from the Reserve Bank of India (http://dbie.rbi.org.in). According to statistics by the Reserve Bank of India, in March 2006, there were about 217 commercial banks in operation, with 161 of them state owned (includes nationalized banks and regional rural banks), 27 private sector banks and the rest 29 foreign banks.[16] Despite the entry of private banks, state controlled banks still account for three-quarters of all loans in India. India's largest commercial bank, the State Bank of India, is over two hundred years old and is government owned. Banerjee, Cole, and Duflo (2004) state that 83% of banking business in India is through government owned banks and even the private banks are subject to extensive regulations on who they can lend to.

[14] Speech by Dr Duvvuri Subbarao, Governor of the Reserve Bank of India, at the FICCI–IBA (Federation of Indian Chambers of Commerce & Industry – Indian Banks' Association) Annual Banking Conference, Mumbai, 13 August 2013. http://www.bis.org/review/r130813b.pdf?frames=0.
[15] BIMARU resembles the Hindi word "Bimar" meaning sick.
[16] http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/78903.pdf

We only have data on financial development across 15 Indian states but these are the major states of India with the highest SDP, accounting for 95% of India's population and 90% of India's GDP in 2004/05. Table 1 shows a wide variation in Credit/SDP across the states ranging from 0.073 in 1983 in Assam, one of India's poorest states to 0.477 in Maharashtra, one of the richest Indian states with a median value of 0.19 (Gujarat) in 1983. These differences persist over our sample period and the values in 2004/05, the last year in our sample, are 0.171 in Assam and 1.148 in Maharashtra. Based on Credit/SDP, we construct a dummy variable, **FD**, which takes the value 1 for a particular state in a particular year if that state is at the median or above the median value of financial development in that year across states and 0 for states that are below the median value of financial development. Across the years, we find six states to always be classified as financially developed – Punjab, Andhra Pradesh, Kerala, Karnataka, Tamil Nadu, and Maharashtra. Only two of the states, Rajasthan and Madhya Pradesh, switch from being classified as being financially under-developed to developed in 2004/05 while Gujarat and West Bengal are classified as under-developed in the last year.

India's labor regulations have been known to be among the most stringent in the world and responsible for the stagnant share of manufacturing outputs in India's GDP (Dougherty, 2009). Under the Indian Constitution, both central and state governments have joint jurisdiction over labor market regulation. One of the most important set of labor regulations governing Indian industry is the centrally legislated Industrial Disputes Act of 1947 which lays out the arbitration and adjudication procedures in industrial disputes, and which has been extensively amended by state governments. A large literature has evolved quantifying labor market regulations across different states of India, the most well-known being Besley and Burgess (2004), that code the legislative state-level amendments to IDA to classify states as pro-worker

(score of +1) or pro-employer (-1) or neutral (0) over the period 1958 to 1992. Given the limited time-series variation within states, Hasan, Mitra, and Ramaswamy (2007) build on the Besley-Burgess dataset to cumulate the coded scores in net years into a time-invariant index of the general direction in labor regulations, classifying states with anti-employee amendments as those with flexible labor markets and the others as inflexible labor markets. They argue that the scores on cumulative amendments between 1980 and 1997 do not vary much over time within states, with eight of the states showing no amendment activity since 1980. Dougherty (2009) further reports that only 8 amendments (in 3 states) have been recorded since 1990, and only one amendment passed in 2004 appears to be of material importance to labor market outcomes. Gupta et al. (2008) build a composite index based on a simple majority rule across the indicators proposed in Besley and Burgess (2004), Bhattacharjea (2006), and Dougherty (2009), and classify five states to have flexible labor regulations, (Andhra Pradesh, Karnataka, Rajasthan, Tamil Nadu, and Uttar Pradesh), three states to have inflexible labor market regulations (Maharashtra, Orissa, and West Bengal and the remaining seven to be neutral (Assam, Bihar, Gujarat, Haryana, Kerala, Madhya Pradesh, and Punjab). [17]

Following Gupta et al. (2008)'s composite classification, we create a **Flexible State** dummy that takes the value 1 for states with flexible labor regulation and 0 for states with rigid or neutral labor regulations as shown in panel B of Table 1. We make one change to the Gupta et al. classification of using the pre-2000 state boundaries in classifying states. So our flexible states classification includes Uttaranchal (which split from Uttar Pradesh in 2000) and inflexible states classification includes Jharkhand and Chattisgarh that were formerly part of Bihar and Madhya Pradesh respectively).

[17] The labor market regulation index is not available for the following states and union territories: Jammu & Kashmir, Chandigarh, Nagaland, Manipur, Tripura, Meghalaya, Daman & Diu, Dadra & Nagar Haveli, Pondicherry, Lakshadweep, and Andaman & Nicobar Islands.

Insert Table 2 here

Table 2 presents summary statistics and correlations for our main variables from the formal manufacturing Census. Table 2 shows that after winsorizing, Firm Size ranges from 1 to 1616 employees with a mean of 121 employees. The mean Firm Size Ratio is 1.38 suggesting that the average firm in our sample is 1.38 times the size of its birth cohort. 62% of the firm-year observations are classified as small firm industries, 23% are classified as labor intensive and 42% are classified as being in industries that are highly dependent on external finance. 69% of the firms are in states with flexible labor regulations and 73% are in financially developed states.

Panel B presents the correlation matrix between these variables. The sample correlations with age dummies show that older firms are larger and growing faster. When we look at the industry classifications we find that none of the correlations between the industry categories are larger than 0.19 suggesting that the three measures – Small Firm Industry, Labor Intensive, and EFD – are capturing three different aspects of industry technology. Overall we find that small firm industries are positively correlated with labor intensive industry and negatively correlated with external finance dependence. The correlations with Firm Size and Firm Size Ratio show that firms are larger and grow faster in large firm dominated industries, in capital intensive industries and in industries that are not highly dependent on external finance. The raw correlations also show that firms in financially developed states are larger and grow faster. On the other hand, while firms in states with flexible labor regulations are smaller, they are growing faster.

III Firm Size and Age in India

A. Lifecycle in the Formal Manufacturing Sector

To examine the relationship between firm size and age, we pool repeated cross-section data from the Indian census. We begin with some descriptive statistics of our data. For each census year separately, we first compute the mean employment in each age bin reported by that census. We then compute an index for each year of data where the index takes the value 1 for firms less than five years old. For all other age bins, the index is the ratio of the mean employment in that age bin to the mean employment for firms under five years of age reported in the same census. Figure 1 plots the mean index for each age bin using data for five repeated cross-sections – 1983/84, 1989/90, 1994/95, 2000/01, and 2004/05. The figure shows that the average 40+ year old plant is 3 to 5 times the size of the plants under five years of age. The firms in the 40+ age bin are typically large firms (mean size is 291 employees compared to sample mean of 121 employees). Many of these firms (62%) were born during the colonial era before India achieved independence from Britain in 1947, so the early growth opportunities of the latter subsample will have occurred in a distinct business and regulatory environment. Khanna and Palepu (2005) detail how British merchants set up large trading houses in India which were transferred to Indian owners in the 1950s.

Figure 2 presents data using weighted employment and shows that for the average 40+ year old plant, the ratio varies from 4.8 times in 1983 to 2.2 in 1994. We also see that in recent years, the average 30 year old plant is not that much larger than plants younger than five years old but after that, older plants are larger than the young plants.

To mitigate concerns about sampling issues we present data only using the census sector in Figure 3 and find that even the 20 year old plant in most years is twice as large as plants

younger than five years of age. Figure 3 also shows that over time the size-age gap for the 40+ year old plant has shrunk starting from 4.91 in 1983/84 to 2.62 in 2004/05. In unreported figures we find similar results when we use a weighted average across all industries in each age bin with the weights being the value added shares of each industry.

The graphs show a much faster growth rate for Indian plants than found by Hsieh and Klenow (2012) who document a flat plant lifecycle in Indian manufacturing, including in just the formal sector, using only data form the 1994/95 Census. The differences are particularly stark later in the lifecycle where we find older plants to be much larger while they find older plants to be declining in size.

Insert Table 3 here

In Table 3, we use pooled OLS regressions to explore the age effects in detail. In col. 1, we regress Firm Size on age dummies and find all the age coefficients to be positive and significant suggesting that older firms are larger than younger firms. For ease of comparison with youngest firms, we add the constant (which presents the average mean size for firms younger than 5 years old) to each of the age coefficients and divide the sum by the constant. These ratios are reported in bold in square brackets below the coefficient and standard errors. Thus we see that the average 40+ year old firm is 3.775 times the size of the average firm that is younger than five years old. In col. 2, we repeat the analysis in Col. 1 using 3-digit NIC industry dummies and state dummies. While we are not allowing for time varying changes across states and industries, the dummies help us control for any time-invariant unobserved heterogeneity across states and industries. Once again we find that all the age coefficients are positive and significant. Figure 4 plots the coefficients for the age dummies and the 95% confidence bands and shows that even

after controlling for period effects, location, and industry, older firms are larger than firms younger than five years old (reference sample).

In columns 1 and 2, we are comparing the mean size of firms that are 40+ years old in the pooled sample with the mean size of firms that are younger than 5 years old. However, young firms could be varying in size across years due to different macroeconomic factors, entry regulations, capital market openness, etc. Figure 5 plots the mean employment and the confidence intervals for firms younger than five years old in each census year and shows that the average size of the youngest firms almost doubles between 1983 and 1995[18] and then reduces.

In order to obtain true lifecycle effects and to see if firms indeed grow as they age over their lifecycle, we would want to compare the size of older firms at any given point in time with their size when they were born. In the absence of panel data we are unable to look at the employment of the exact firm when it was born and hence rely on the mean employment in its birth cohort. Thus we construct Firm Size Ratio, which is the size of firms in a particular age bin scaled by the mean size of the firms in their birth cohort. Since our sample period extends from 1983 to 2005, the oldest firms in our sample for which we can obtain this comparison are firms that are 20-24 years old in 2005 with their birth cohort being firms that were <5 years old in 1983. Columns 3 and 4 in Table 3 present regressions with the Firm Size Ratio. Col. 3 shows that firms that are 20-24 years old are 1.419 times the size of average firms in their birth cohort. The constant in col. 3 is again the reference category of firms younger than five years old and since we are scaling each firms employment by the mean employment of their birth cohort (firms younger than 5 years old when the firms was born) and using OLS we would expect it to be 1 as it is. Col. 4 shows that after controlling for industry, location, and year dummies, firms that are

[18] Hsieh and Klenow (2012) use data from 1995 for their main analysis thus scaling the employment of all firms with that of the youngest firms in 1995, which is also the year when the youngest firms were the largest in our sample period.

20-24 years old are 1.86 times the size when they were born. Col. 4 also shows that there must be heterogeneity across industries (e.g. labor vs. capital intensive), states (e.g. regulation), and firm types (e.g. organization structure) in the size of the firms younger than 5 years old since the constant is no longer 1.

Overall Table 3 shows that manufacturing plants in India grow as they age.

B. Heterogeneity across Industries in Firm lifecycle

In this section we explore if there are technological differences across industries that must be taken into account when considering lifecycle effects. In the regression tables in this section and the following section, we first show the regression results and then show the corresponding margin plots of the interaction coefficients for ease of interpretation. While these margin plots give an idea of the initial starting points of plants in different industries and give an idea of relative size across different age groups, we also present results taking the ratio of the predicted margin of each age group with that of the youngest firms to give an estimate of growth rates.

In column 1 of Table 4 we interact Age Dummies with Small Firm Industry dummy. The main age effects are positive and significant suggesting that the average older firm is larger and the main effect of Small Firm Industry is negative and significant suggesting that average firm size in small firm dominated industries is smaller than that in large firm dominated industries. The interaction coefficients are all negative and significant. To better interpret the interaction effects, we plot the predictive margins of the interaction coefficients in col. 1 along with the 95% confidence intervals in Figure 6. The first panel in Figure 6 shows that the average size of firms in large firm dominated industries is higher than that in small firm dominated industries across

all age groups. Large firm dominated industries are also growing faster than small firm dominated industries. In Panel B of Table 4 we present the ratio of the predictive margins of each age bin to that of the reference group to obtain an estimate of growth rates. Cols 1 and 2 of Panel B show that the average 40+ year old firm is 5.11 times the size of firms that are younger than five years old in large firm dominated industries while that ratio is only 2.74 in small firm dominated industries.

Insert Table 4 here

In col. 2 of panel A we look at the interaction of labor intensive industry and age. The age effects are again positive and significant while the labor intensive industry dummy is positive and significant suggesting that on average employment levels are higher in labor intensive industries. The second panel in Figure 6 plots the margin plots of the interaction coefficients and shows that while firms in capital intensive industries start out smaller than those in labor intensive industries they grow faster and are larger than firms in labor intensive industries as they age. Cols. 3 and 4 of Panel B show that the average 40+ year old firm is 4.08 times the size of firms that are younger than five years old in capital intensive industries while that ratio is only 2.38 in labor intensive industries.

The correlation coefficient of the Small Firm Industry dummy and Labor Intensity Dummy is only 6.3% (see panel B of Table 2). However to investigate if the difference in age effects in Small firm versus Large firm dominated industries varies by labor intensity in col. 3 of panel A of Table 4, we explore the triple interaction of age dummies with Small Firm Industry dummy and Labor Intensity dummy. The interaction of labor intensity and small firm dominated industry is positive and significant. Figure 7 plots the predictive margins of the triple interaction coefficients and shows that the average size is the biggest in Capital Intensive and Large Firm

dominated industries while in the Small Firm dominated Labor Intensive industries growth over the firm's life-cycle is the lowest. The figure also shows that older firms in Capital Intensive and Large Firm Dominated industries are particularly large while the differences between the other industry classifications are not as stark.

In cols. 5-8 of panel B, we take the ratio of the predictive margins in each age group in each industry category with the predictive margin of the youngest firms in that industry category. We find that the average 40+ year old firm is 5.69 times larger than firms younger than 5 years old in large firm dominated and capital intensive industries where as that ratio is 2.71, 3.02, and 2.12 in large firm and labor intensive industries, small firm dominated and capital intensive industries, and small firm dominated and labor intensive industries respectively.

To explore the role of external financing in the firm lifecycle and firm growth we divide the sample into industries that are dependent on external finance and those that are not dependent on external finance using the index of external finance dependence (EFD). In col.4 of Table 4 we interact the age dummies with EFD. The age dummy coefficients are all positive and significant suggesting that on average older firms are larger. The EFD dummy is positive but not significant whereas the interaction of EFD with age dummies is positive and significant. To better interpret the interaction terms we plot the predictive margins along with the 95% confidence intervals in Figure 8. The figure shows that while firms in industries that are dependent on external finance start out the same size as firms in industries that are not highly dependent on external finance, they grow faster and are larger as they age. Cols. 9 and 10 of Panel B show that the average 40+ year old firms in industries that are not highly dependent on external finance is 2.93 times the size of firms younger than five years old in those industries whereas that number is 4.89 times in industries that are highly dependent on external finance.

Overall, Table 4 and figures 6-8 show that the initial starting point of firms and their growth rates are different depending on their industries' technological size, production technology, and dependence on external finance. Firms grow more over their life-cycles in industries predicted to be large-firm-dominated based on US data and in capital-intensive industries and in industries more dependent on external finance.

C. Financial Development and Firm Life-cycle

In this section, we examine variations in firm lifecycle across different levels of financial development of the states they are located in and across different industry characteristics. In these regressions, we don't include state fixed effects but instead control for net State Domestic Product (SDP)/capita (in logs). In col.1 of Table 5, we investigate the role of financial development on firm life-cycle by interacting age dummies with FD, a dummy variable that takes the value 1 for financially developed states and 0 for financially under-developed states. The financial development dummy is by itself positive and significant suggesting that plants in more financially developed states are larger and so are plants in states with higher SDP/capita. Most of the interaction terms are insignificant. This can also be seen in Figure 9 where we plot the predictive margins of the interaction coefficients and find that financial development does not make a material difference to plant lifecycles in India. In col. 1 of Panel B, we take the ratios of the predicted margins in each age bin to that of the youngest firms (< 5), and find that plants in developed versus under-developed states are growing at very similar rates. In unreported tests we find similar results when we look at just the top 3 and bottom 3 states in terms of financial development. We also do not find evidence supporting the role of financial development for firm

lifecycle when we use a continuous measure of financial development, Credit/SDP, interacted with age dummies either.

Insert Table 5 here

In cols. 2-7 we investigate if the financial development of the state is more critical for firm lifecycle in some industries versus others. We look at large-firm dominated and labor intensive industries in col.2, large-firm dominated capital intensive industries in col. 3, small-firm dominated and labor intensive industries in col.4, small-firm dominated capital intensive industries in col. 5, industries not dependent on external finance in col.6 and industries dependent on external finance in col. 7.

The financial development dummy is positive and significant in all specifications except in the case of small firm dominated, capital intensive industries. The predictive margins of the interaction coefficients in all the 6 columns are shown in Figure 10 where we see that firms in large-firm dominated labor intensive industries are larger at all ages in financially developed states versus underdeveloped states. In small-firm dominated labor intensive industries, plants start out larger in the financially developed states but for older plants we find that those in financially under-developed states are larger. In all other industry samples, we do not find striking differences between the financially developed and under-developed states. In cols. 2 -7 of panel B we show the ratio of the predictive margins in each age bin to that of the youngest firms (< 5 years old). We find that plants are growing fastest in large firm dominated capital intensive industries and slowest in small-firm dominated labor intensive industries. Plants in industries that are dependent on external finance grow faster compared to plants in industries less dependent on external finance. However when we look at the differences across financial development, surprisingly we find that the older plants in financially under-developed states are

larger than youngest firms in those states compared to the size difference between old and young plants in financially developed states.

Together Table 5 and figures 9-10 show that there are no significant differences in the lifecycle of Indian firms across financially developed and under-developed states and any key differences in size and growth rates that exist are at the industry level.

C.1. Robustness

In this section we undertake a number of robustness tests to see if there is a differential effect of financial development on firm lifecycle. First, in col. 1 of Table 6, we explore whether the effect of financial development is larger for firms in the right tail of the size distribution by looking at firms at or above the 90^{th} percentile in terms of size distribution. Most of the interaction terms are insignificant suggesting only marginal differences in growth rates of these plants in financially developed versus under-developed states.

Insert Table 6 here

In cols. 2 and 3 we use alternate measures of our financial development indicator – in col. 2 we use Commercial Bank Deposits/SDP as an alternate measure of financial depth and in col. 3 we use Total number of bank branches/1000 persons as a measure of financial outreach. We once again split states each year into financially developed versus under-developed depending on the median value of these indicators across states. Cols. 2 and 3 show that the main effect of financial development is negative while the interaction effects with age are mostly insignificant. This is also seen in Figure 11 where we don't find material differences between developed and under-developed states using these alternate indicators.

India has been known to have one of the most stringent formal labor laws in the world, and substantially more protective than the British labor laws along which it was originally modeled as discussed by Dougherty, Robles, and Krishna (2011). Several studies have shown that stringent labor regulations have been associated with lower levels of manufacturing output, employment, and labor productivity (e.g. Besley and Burgess, 2004; Aghion et al., 2008; Ahsan and Pages, 2009). In cols. 4 and 5 of Table 6, we examine if the effect of financial development on plant lifecycle is different in states with flexible labor regulations versus states with stringent labor regulations following the classification in Gupta, Hasan, and Kumar (2008). While the main effect of financial development is positive and significant in flexible states it is negative and significant in the inflexible states. However, all the interaction coefficients of age with financial development are positive and significant in states with rigid labor regulations. To better interpret the interaction coefficients, we look at the predictive margins with the 95% confidence bands for the interaction coefficients in Figure 12. We find that among the plants in states with rigid labor regulations, those in financially developed states are larger than those in financially under-developed states. The differences across financial development are less stark in states with flexible labor regulations.

In cols. 6 and 7 of Table 6, we next investigate if the role of financial development differs across differing periods of industrial policy. Following India's independence in 1947, the 1951 Industries Development and Regulation Act introduced a system of industrial licensing that came to be known as the "license raj", which regulated and restricted the entry of new firms and expansion of existing firms. With the Indian economy being stagnant over several decades, a series of liberalization reforms were introduced by the Government starting in the 80s which included de-licensing of industries. A third of the industries were de-licensed during the period

1985-1987 and most of the others in 1991. Aghion et al. (2008) provide information on each three-digit industry that was de-licensed over the period 1980-1997. We extend their data to the end of our sample period till 2005 to identify firms that were born after their industry was de-licensed. In col. 6 of Table 6 we look at the interaction of FD and age for firms born after the period of de-licensing. Since the earliest de-licensing year in our sample starts in 1985, we only have the first19 years of firm life-cycle and hence use interactions of FD with each year of age. The predictive margins of the interaction coefficients are in Figure 13. We find that while the age coefficients are mostly positive and significant, the FD dummy is not significant and neither are the interaction terms. Figure 13 also shows that there does not seem to be much difference in the early lifecycle of firms born after de-licensing in financially developed versus under-developed states. While firms in financially developed states seem to be born larger, the difference is not maintained over time.

In col. 7 of Table 6 we examine if there is a differential effect of state-level financial development on plants born after India's financial liberalization in 1991. Since the last year of data in our sample is 2005, we have 14 years of firms' lifecycle for the firms born after liberalization. Once again most of the interaction terms are not significant. Figure 14 plots the predictive margins of the interaction coefficients along with the 95% confidence intervals. We find that while firms in financially developed states start out larger than firms in financially under-developed states in the period before liberalization, these differences do not persist over time. We do not find any material difference in the lifecycle of plants born after liberalization in financially developed versus under-developed states.

In unreported tests we do not find significant differences in early plant lifecycle between states with high versus low levels of financial development even before industry de-licensing or liberalization.

C.2. Intensive vs. Extensive Margins

The above section shows that despite great variation within the country, financial institutions have limited explanatory power for plant lifecycle in India. In this section we examine if the financial institutions have a differential effect on the *extensive margin* (Number of Plants) versus *intensive margin* (Avg Employment/Plant).

In Figure 15, we plot the proportion of employment in financially developed states in each bin (EM-developed) and the proportion of employment in financially under-developed states in each bin (EM-Underdeveloped). We find marginal differences between financially developed versus under-developed states. Across both categories of states, the 5-9 aged firms have the highest proportion of employment after which it declines. So older plants have smaller employment shares though the oldest age group of 40+ have higher employment shares than middle-aged plants between 20-39 years of age Next, for each age bin in financially developed states we take the ratio of total number of employees to total number of firms to give us the intensive margin (IM-developed) and repeat the same for the under-developed states to obtain IM-Underdeveloped. While older firms have higher employment/ firm ratio, we don't find significant differences across financially developed versus under-developed states. All our results hold if we were to take sampling weights into account and examine the intensive and extensive margin in the population.

D. Informal Manufacturing Sector

In this section we study the size-age gap in the informal manufacturing sector in India. In a recent paper using World Bank Enterprise survey data for the informal sector, La Porta and Shleifer (2008) show that informal firms look very different from formal firms in terms of size, productivity, and education level of managers and find little evidence that growth occurs by informal firms eventually becoming large formal firms. They interpret their findings as being consistent with the *dual economy* view (e.g. Harris and Todaro, 1970) which predicts that in developing countries, in addition to the formal sector, there is an informal sector that employs a large section of the labor force.

Figure 16 presents the sample statistics for firm size across different age bins, combining the data for both the rural and urban sectors. We see that older firms in the unorganized manufacturing sector employ fewer people than firms younger than 5 years old. Thus firms in the informal manufacturing sector in India have a very different lifecycle than the firms in the formal manufacturing sector. The downward sloping age size profile in the informal sector is consistent with the description of the informal sector in La Porta and Shleifer (2008).

In unreported statistics, we examine if financial development has an impact on lifecycles in the informal manufacturing sector. Again we find no evidence that informal manufacturing plants in financially developed states are growing at a faster rate than informal plants in financially under-developed states.

E. Reconciling our results with the Finance and Growth Literature

The analysis above shows that firms in the formal manufacturing sector in India grow as they age and the quality of financial institutions at the state level does not seem have to an

differential impact on the growth rates of firms across different states. In this section we try to provide additional insight into why we are finding seemingly different results from the vast finance and growth literature that has established a causal impact of finance on firm growth.

First, our results may be reflecting the low level of financial development of the country overall. On the one hand, states within India exhibit large differences in income and quality of institutions. On the other hand, India does not rank very high in terms of financial development in the global economy along a number of different indicators. According to the Global Financial Inclusion (2011) database, only 35% of adults in India have an account at a formal financial institution and only 11% of adults save at a financial institution giving India a rank above 75 along both dimensions in a sample of 147 countries. In terms of private credit provided by deposit money banks as a share of GDP, India ranked 52 out of 103 economies in 1983 at the beginning of our sample period and 69 out of 171 economies in 2005, the end of our sample period. Thus it may be the case that the Indian banking system seems to be uncompetitive and inefficient according to global rankings making within country differences marginal. If lending decisions are politicized, financial development as captured by bank credit to state domestic product is not likely to be very meaningful. Indeed, Rajan and Prasad (2008) also emphasize that the Indian financial sector if "unleashed from government strictures" can have an "enormous multiplier effect on economic growth."

Second, it could be that there are other exacerbating factors in the economy such as corruption or infrastructure weaknesses that are greater in magnitude than the differences in financial sector development across states which we are not focusing on in this paper.

Finally it could be that firm idiosyncratic factors such as managerial skill (e.g. Bloom, Eifert, Mahajan, Mckenzie, and Roberts, 2013) or firm characteristics at birth (e.g. Ayyagari,

Demirguc-Kunt, and Maksimovic, 2013) may be more important than the institutional environment in influencing firm lifecycles in developing countries. More research is needed to understand the role of institutions versus firm specific characteristics in determining the lifecycles of firms in developing countries.

IV Conclusion

An understanding of the relationship between size and age or lifecycle effects is crucial to both fundamental corporate finance policies at the level of the firm as well as productivity differences across firms and countries. In this paper we examine the role of financial institutions in influencing firm life-cycle in a developing country, India, which shows substantial variation in regional financial development according to standard measures used in the literature.

While Indian firms grow as they age and older firms are important contributors to employment, we find that the differences in financial development across Indian states only modestly affect the life-cycles of established firms in most industries. The one exception is firms in large-firm dominated labor intensive industries, which are larger in financially developed states versus underdeveloped states. We also find that plants in financially developed states that have rigid labor market regulations are larger than plants in financially under-developed states with rigid labor market regulations. We do not find financial development to have a big impact on either the intensive (employment/firm) or extensive margin (number of firms). Our results are consistent with the hypothesis that majority government-owned banking systems like the one India has, is not an effective way of employing the financial system to support economic growth. Our results may also suggest that in India, other institutional factors or firm idiosyncratic factors may be playing a more dominant role than differences in financial institutions in explaining firm

life-cycle. Given that we find the size-age ratio of Indian firms is not as large as that of the developed countries such as the US, more research is needed to understand the underlying factors that may play a role in determining the life-cycle of firms.

Our findings have important policy implications for financial sector reforms. Using standard measures of size and depth, we find an insignificant role for financial development in influencing firm life-cycle across different regions in India. This may be because size and depth differences in financial development across Indian states are likely dwarfed by overall inefficiencies that generally characterize state-dominated financial systems. This suggests the need for increasing competition and the private sector share of the banking system through further liberalization and reducing state control, which may help improve efficiency of credit allocation by reducing political interference.

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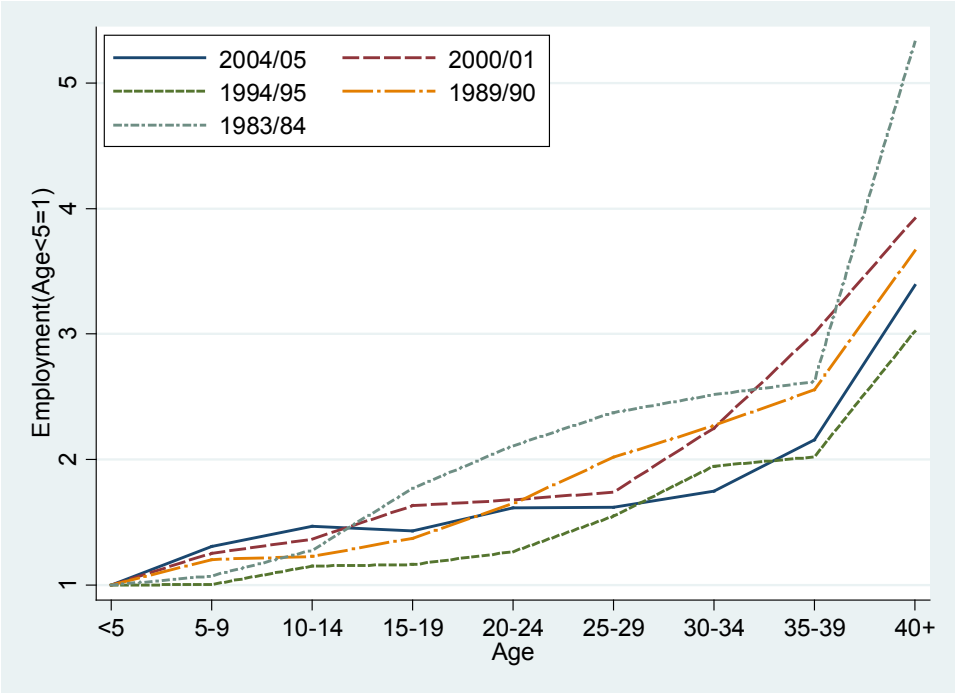
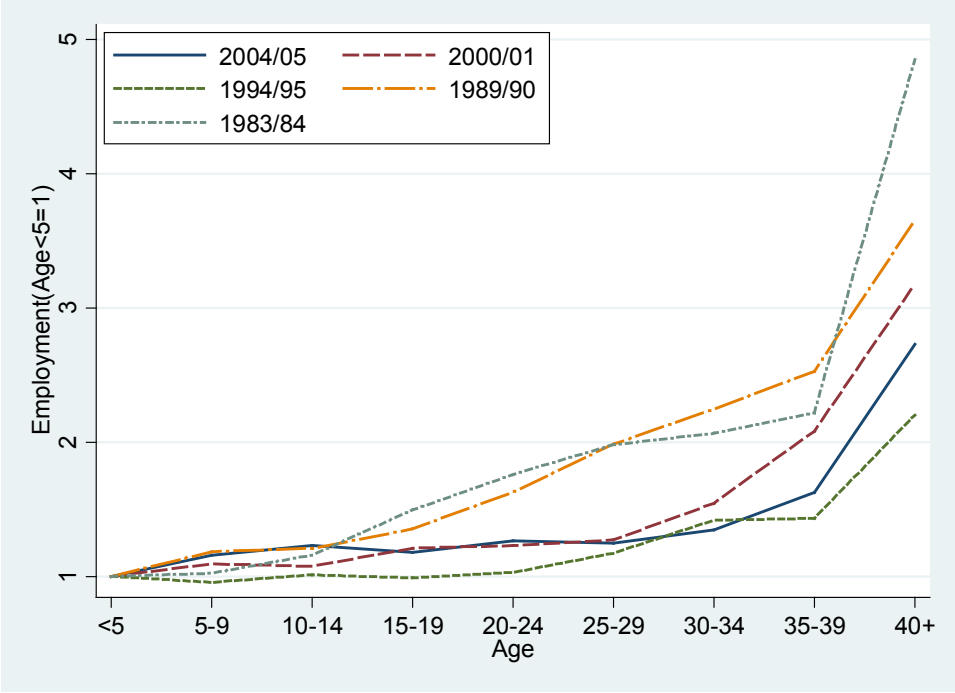
Figure 1: Firm Size and Age – Sample Estimates



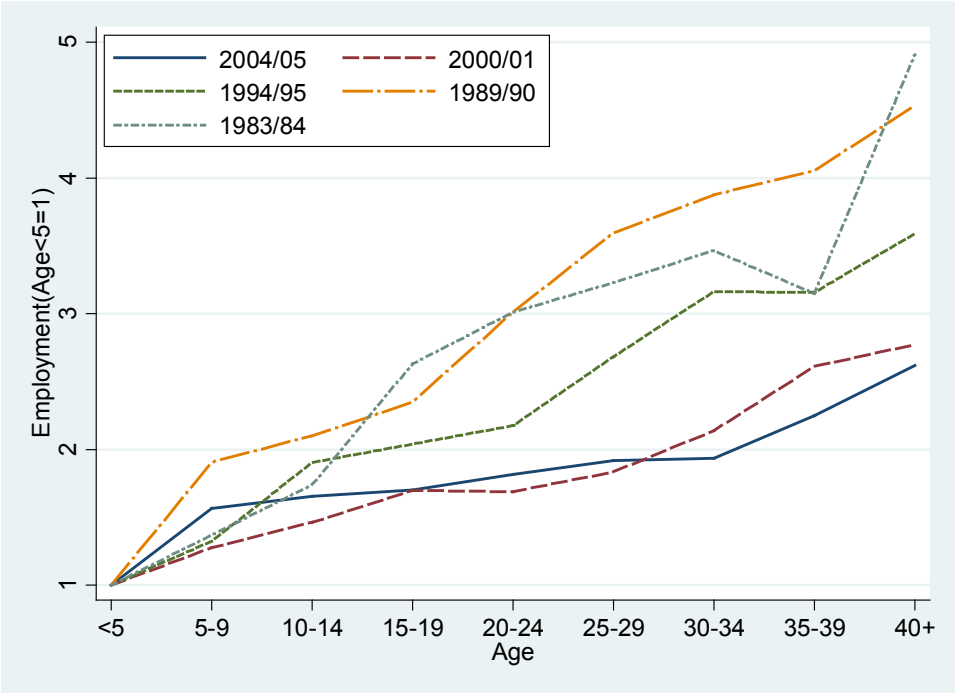
Source: ASI Data for following individual census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/05

Figure 2: Firm Size and Age – Population Estimates



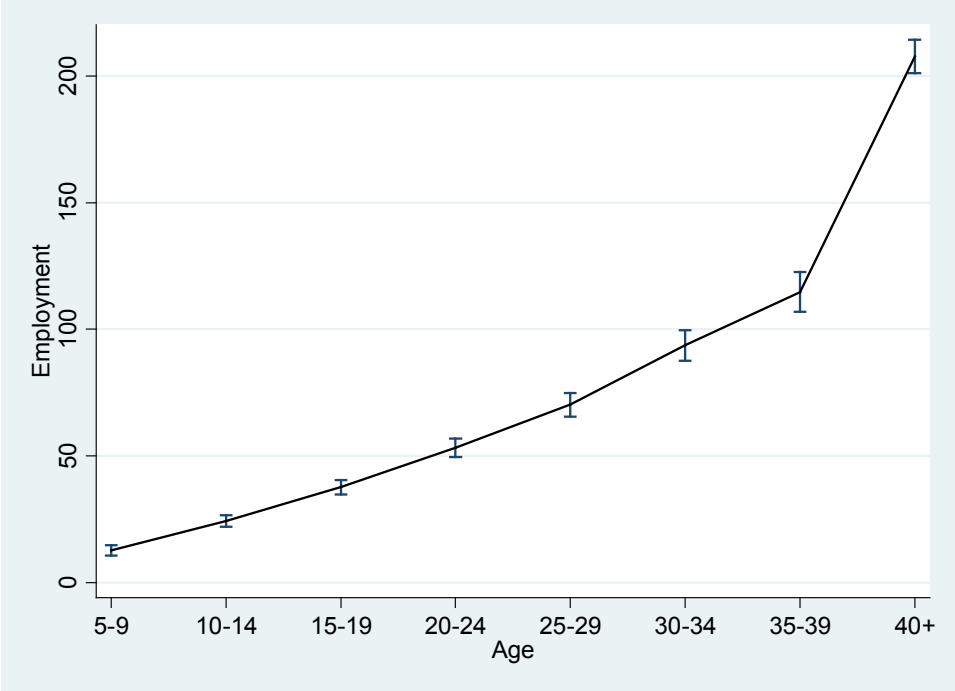
Source: ASI Data for following individual census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/05

Figure 3: Firm Size and Age – Census Sample



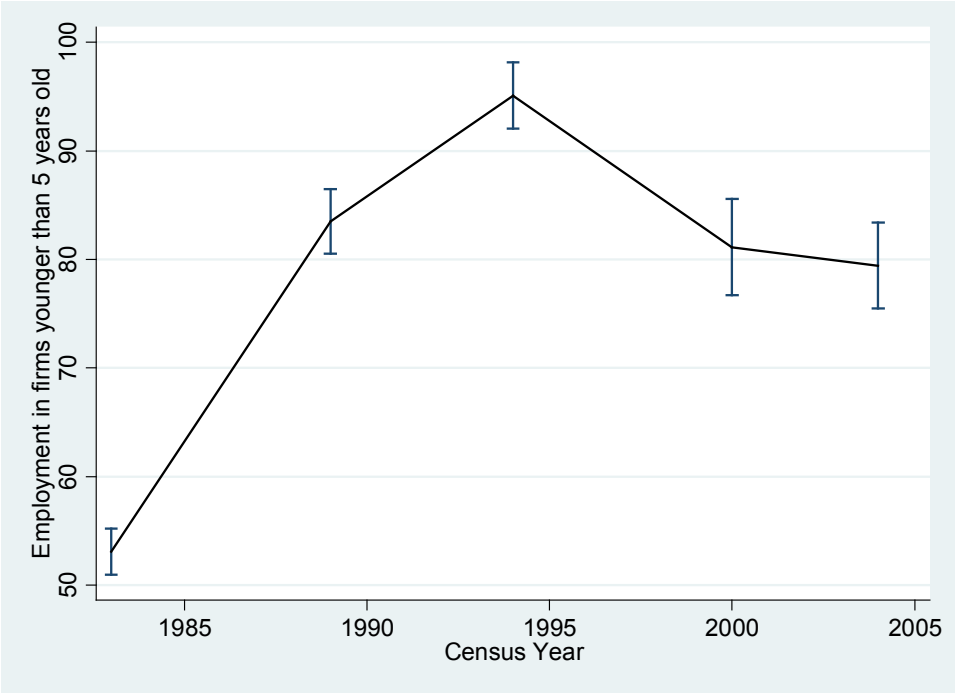
Source: ASI Data for following individual census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/05

Figure 4: Firm Size and Age – Pooled Regression Sample



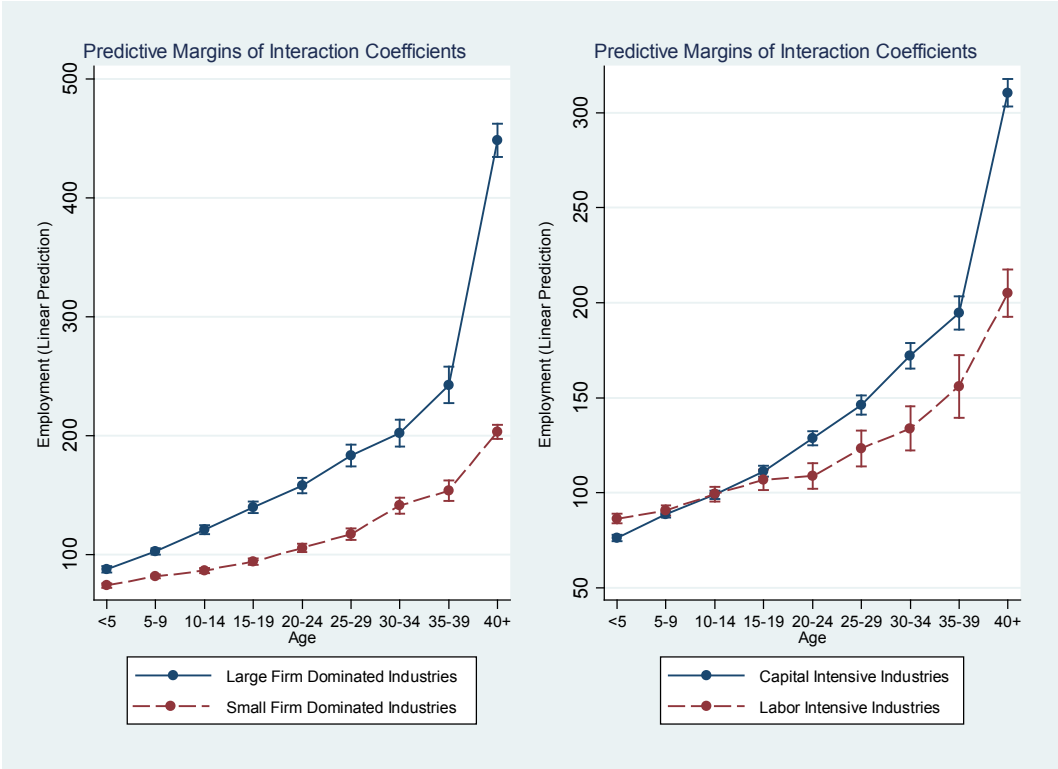
Source: ASI Data pooled from the following census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/05

Figure 5: Size of young firms over the years



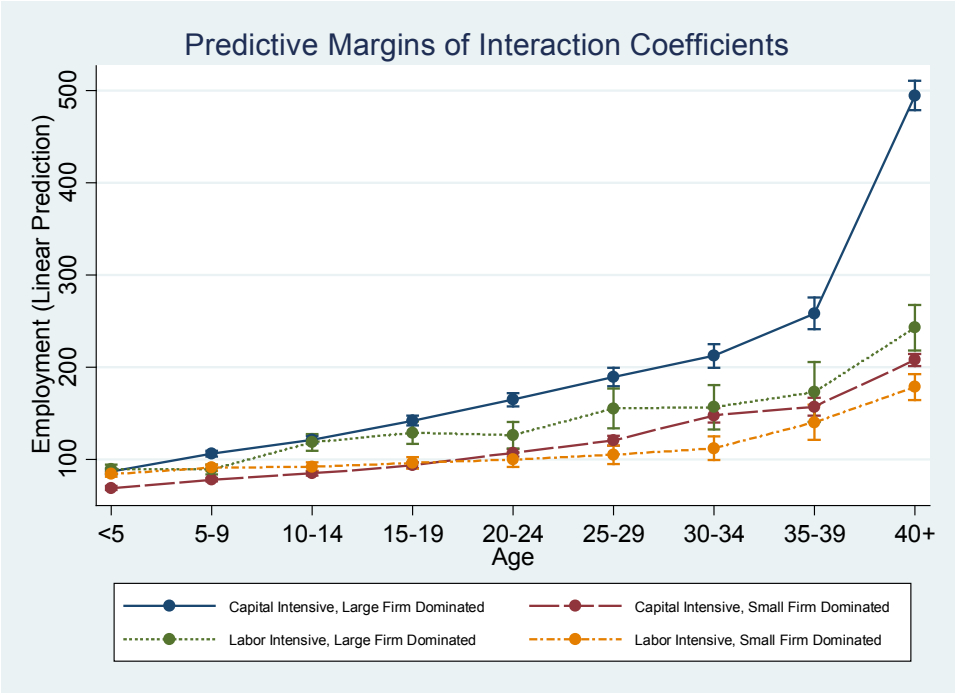
Source: ASI Data pooled from the following census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/05

Figure 6: Firm Size and Age: Industry Heterogeneity



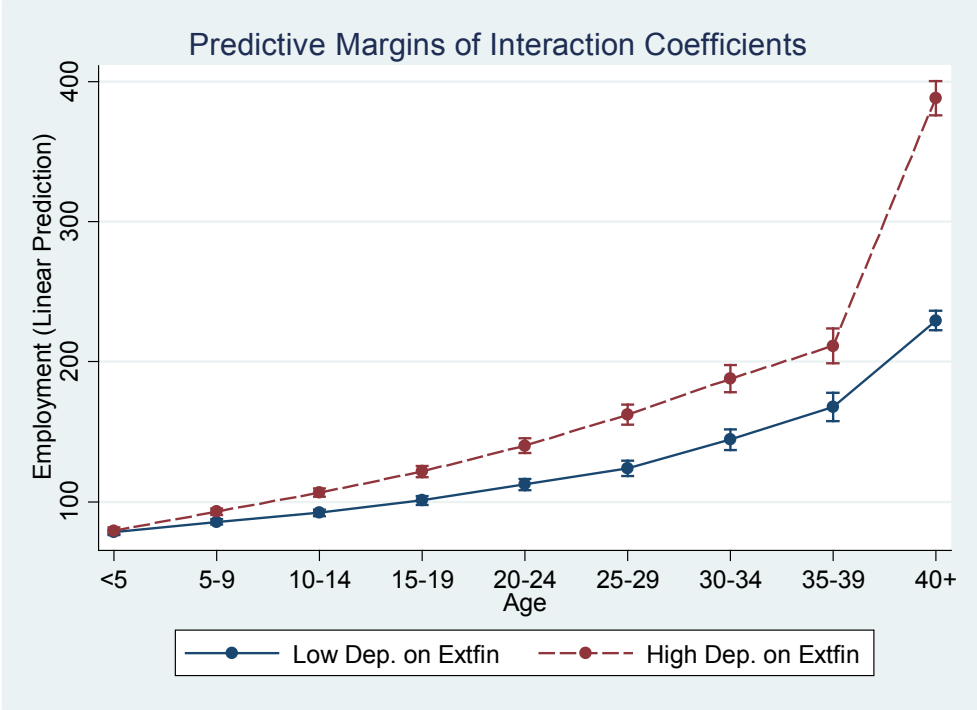
Source: ASI Data pooled from the following census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/05

Figure 7: Firm Size and Age: Small/Large Firm and Labor/Capital Intensive



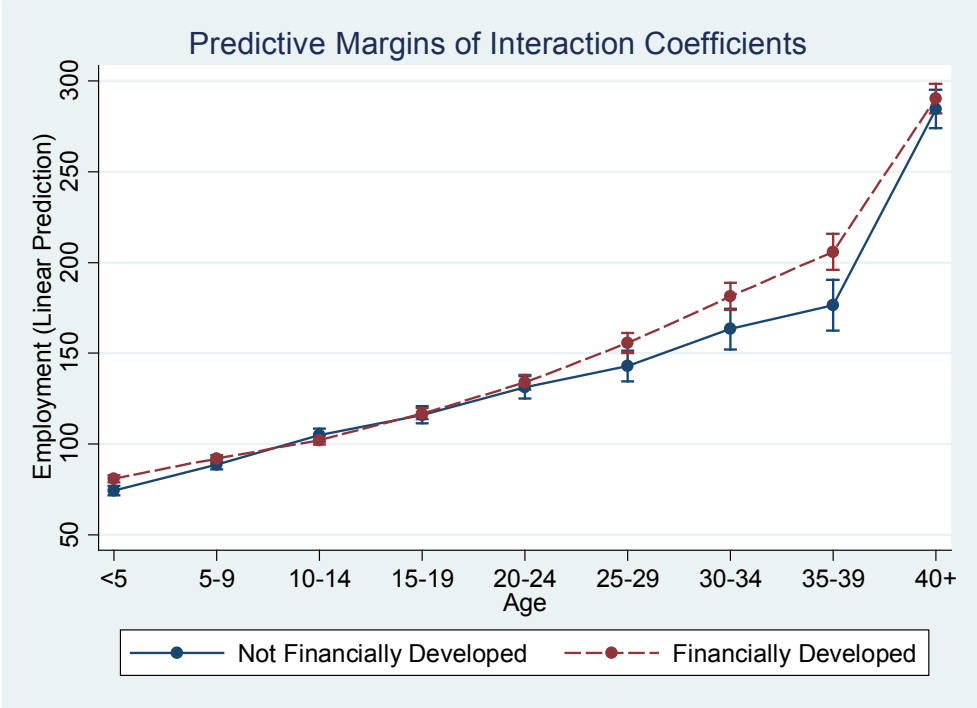
Source: ASI Data pooled from the following census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/05

Figure 8: Firm Size and Age: External Finance Dependence



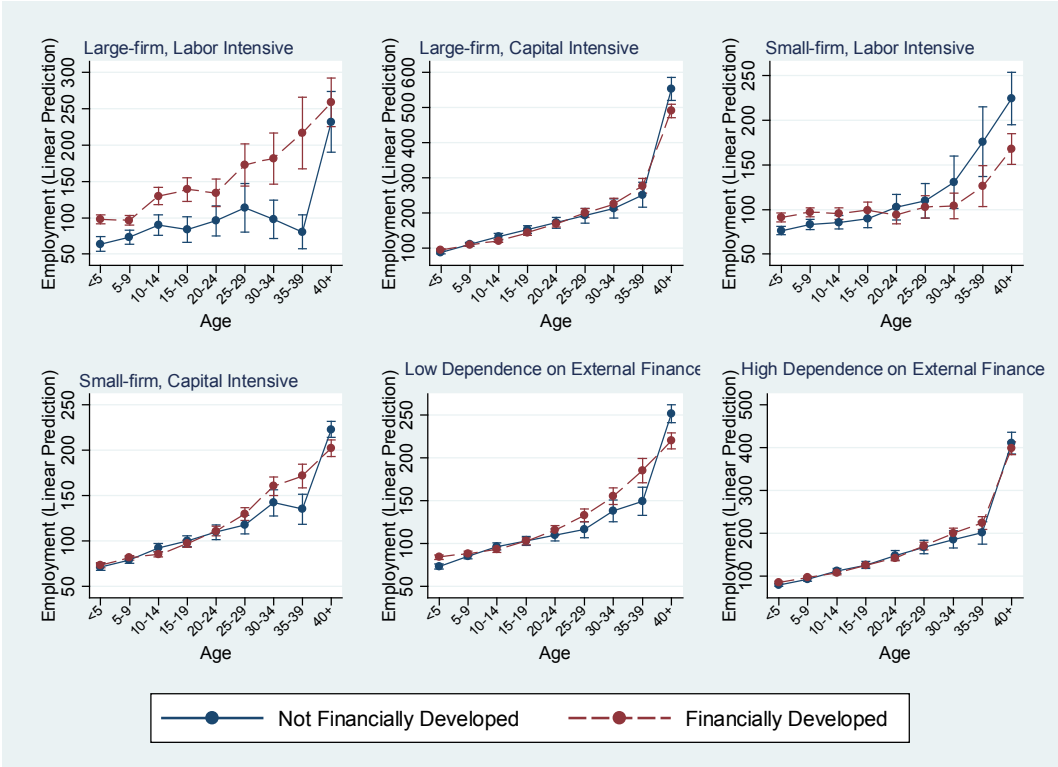
Source: ASI Data pooled from the following census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/05

Figure 9: Firm Size and Age: Role of Financial Development



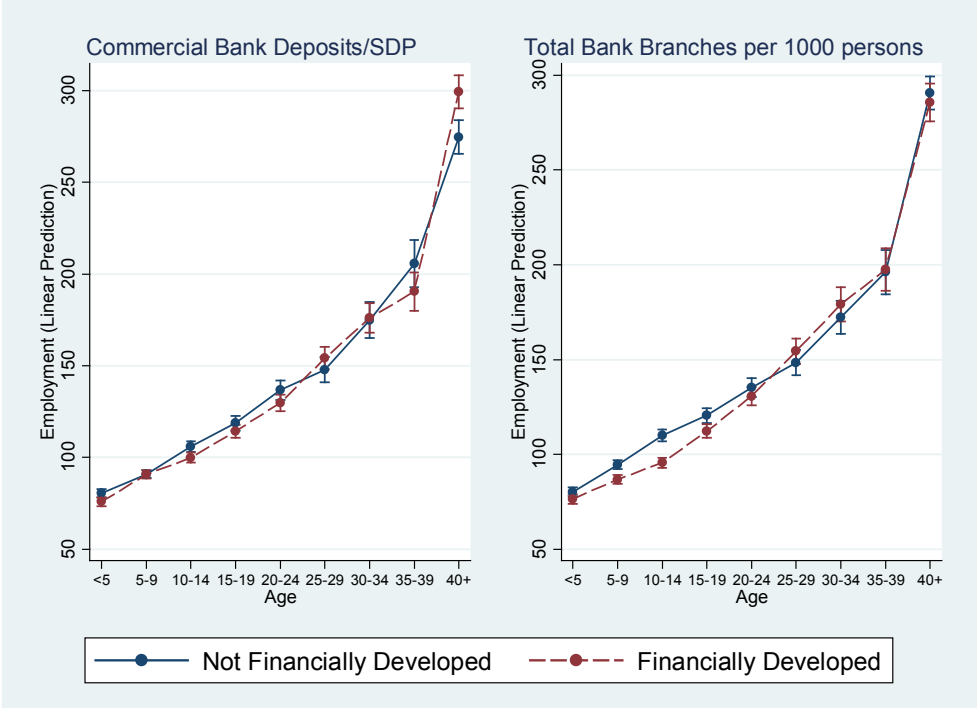
Source: ASI Data pooled from the following census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/05

Figure 10: Firm Size and Age: Role of Financial Development across Industries



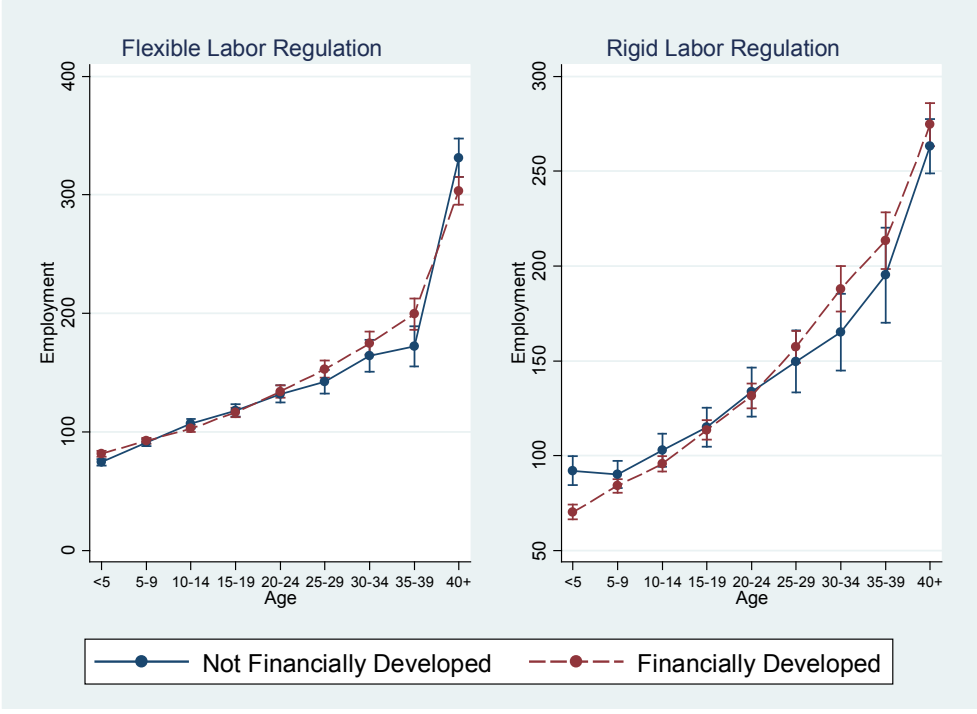
Source: ASI Data pooled from the following census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/05

Figure 11: Firm Size and Age: Alternate Indicators of Financial Development



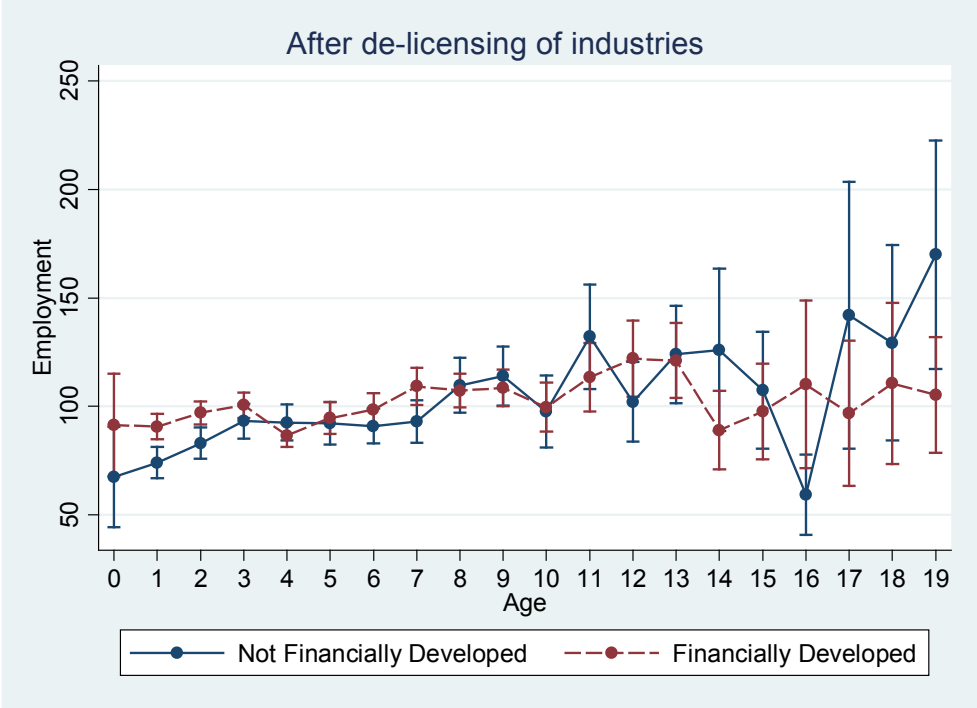
Source: ASI Data pooled from the following census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/05

Figure 12: Firm Size and Age: Role of Financial Development in Flexible vs Inflexible States



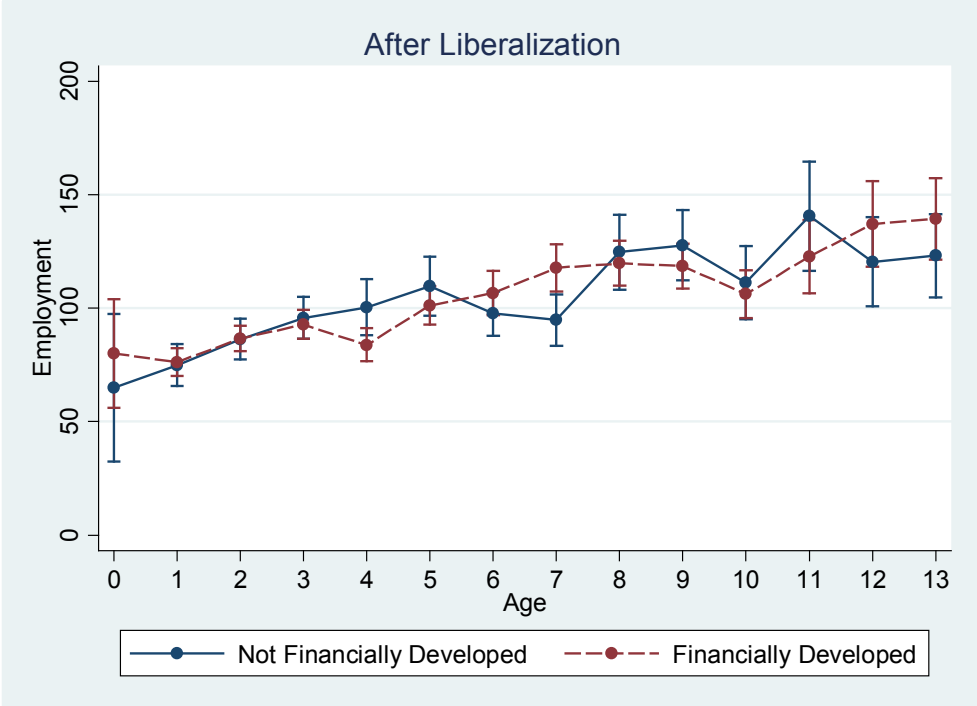
Source: ASI Data pooled from the following census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/05

Figure 13: Firm Size and Age: Role of Financial Development after De-licensing



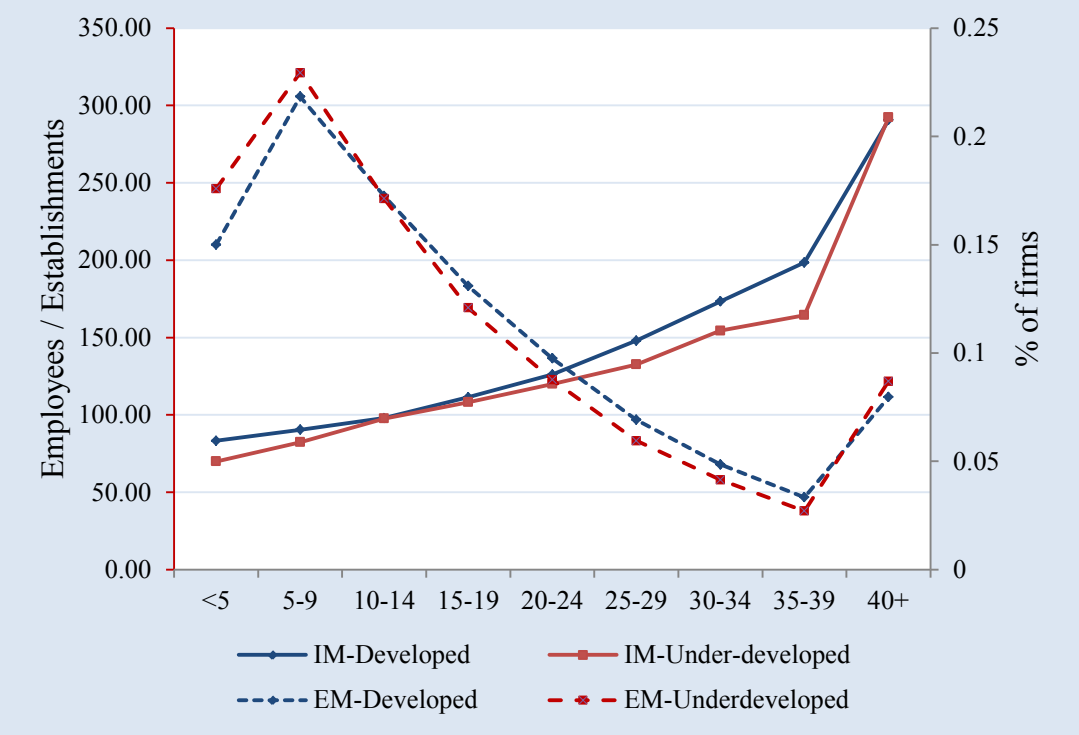
Source: ASI Data pooled from the following census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/05

Figure 14: Firm Size and Age: Role of Financial Development after Liberalization



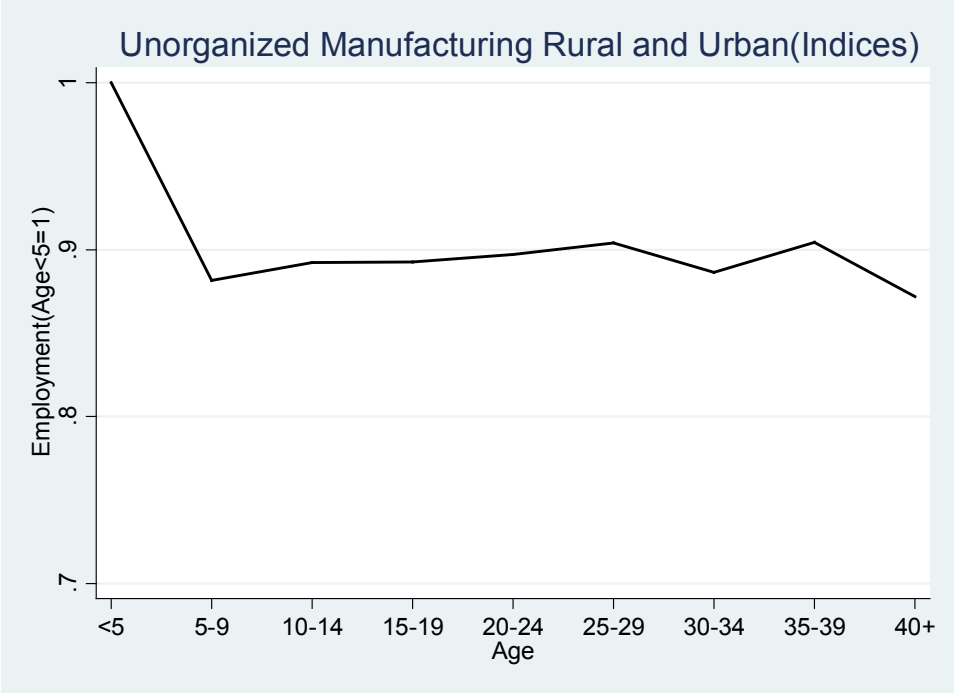
Source: ASI Data pooled from the following census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/05

Figure 15: Financial Institutions and Intensive (IM) versus Extensive Margin (EM)



Source: ASI Data pooled from the following census years: 1983/84, 1989/90, 1994/95, 2000/01, 2004/0

Figure 16: Firm Employment by Age – Informal Sector in India



Source: NSS 1994/95

Table 1: Institutional Variation across Indian States

Panel A presents data on financial development across different states of India for each of the census years in our sample. Credit/SDP is the ratio of Total Bank Credit to Net State Domestic Product. FD is a dummy variable that takes the value 1 for state-years that are at or higher than the median value of Credit/SDP across states in a given census year. Panel B classifies states based on the stringency of labor regulations and is from Gupta, Hasan, and Kumar (2008). Flexible is a dummy variable that takes 1 for states with flexible labor regulations and 0 for states with rigid labor market regulations.

Panel A: Financial Development across States

Year	1983		1989		1994		2000		2004	
State	**Credit/SDP**	**FD**	**Credit/SDP**	**FD**	**Credit/SDP**	**FD**	**Credit/SDP**	**FD**	**Credit/SDP**	**FD**
Assam	0.073	0	0.118	0	0.102	0	0.119	0	0.171	0
Bihar	0.120	0	0.145	0	0.144	0	0.166	0	0.259	0
Uttar Pradesh	0.149	0	0.169	0	0.156	0	0.172	0	0.267	0
Haryana	0.187	0	0.184	0	0.155	0	0.181	0	0.273	0
Gujarat	0.190	1	0.245	1	0.210	1	0.296	1	0.322	0
West Bengal	0.273	1	0.287	1	0.283	1	0.238	1	0.342	0
Orissa	0.115	0	0.168	0	0.155	0	0.172	0	0.357	0
Punjab	0.229	1	0.221	1	0.231	1	0.286	1	0.364	1
Rajasthan	0.150	0	0.176	0	0.145	0	0.206	0	0.374	1
Madhya Pradesh	0.122	0	0.180	0	0.166	0	0.197	0	0.418	1
Andhra Pradesh	0.222	1	0.272	1	0.262	1	0.316	1	0.438	1
Kerala	0.293	1	0.345	1	0.330	1	0.366	1	0.555	1
Karnataka	0.291	1	0.385	1	0.330	1	0.383	1	0.666	1
Tamil Nadu	0.351	1	0.396	1	0.424	1	0.522	1	0.733	1
Maharashtra	0.477	1	0.417	1	0.497	1	0.659	1	1.148	1

Panel B: Stringency of Labor Regulations across States

State name	Flexible State
Andhra Pradesh	1
Delhi	1
Gujarat	1
Haryana	1
Himachal Pradesh	1
Karnataka	1
Madhya Pradesh	1
Maharashtra	1
Punjab	1
Rajasthan	1
Uttar Pradesh	1
Assam	0
Bihar	0
Chhattisgarh	0
Goa	0
Jharkhand	0
Kerala	0
Orissa	0
Tamil Nadu	0
Uttaranchal	0
West Bengal	0

Table 2: Summary Statistics and Correlations

The variables are defined as follows: Firm Size is the total number of workers which includes workers employed directly, workers employed through contractors, supervisory and managerial staff, other employees, working proprietors, unpaid family workers, and unpaid working members if cooperative factory. Firm Size Ratio is the ratio of each firm's firm size scaled by the average firm size of all firms in its birth cohort year. Age Dummies consists of dummy variables for the following 9 age bins - <5, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, and 40+ - and is defined as the year of the survey - year of initial production reported by the firms. Small Firm Industry takes the value 1 if industry's share of employment in firms with less than 20 employees is ≥ median value of the Index of small firm domination from Beck, Demirguc-Kunt, Laeven, and Levine (2008) and takes the value 0 if it is < the median index value. EFD is a dummy variable that takes the value 1 if industry's dependence on external finance is ≥ median value of the Index of External Finance Dependence and takes the value 0 if it is < the median of the Index of External Finance Dependence. The Index of External Finance Dependence is computed for US industries over the period 1980-2005following the procedure in Rajan and Zingales (1998). Labor Intensive Industries is a dummy variable that takes the value 1 for labor intensive industries and 0 for capital intensive industries and is from Hasan and Jandoc (2012). FD is dummy variable that takes value 1 for financially developed states and 0 otherwise. Flexible state is a dummy variable that takes the value 1 for states with flexible labor regulations and 0 for states with stringent labor regulations and is from Gupta, Hasan, and Kumar (2008).

Panel A: Summary Statistics

Variable	N	Mean	Std. Dev.	Min	Max
Firm Size	221029	121.51	238.36	1	1616
Firm Size Ratio	106362	1.38	2.64	0.01	30.44
Age Dummies	228904	3.78	2.40	1	9
Small Firm Industry	217596	0.62	0.48	0	1
Labor Intensive	228904	0.23	0.42	0	1
EFD	227123	0.42	0.49	0	1
FD	208963	0.73	0.44	0	1
Flexible State	220811	0.69	0.46	0	1

[a] and [b] represent significance at 1% and 5% levels respectively.

Panel B: Correlation Matrix

	Firm Size	Firm Size Ratio	Age Dummies	Small Firm Industry	Labor Intensive	EFD	FD
Firm Size Ratio	0.962***						
Age Dummies	0.221***	0.132***					
Small Firm Industry	-0.101***	-0.085***	0.025***				
Labor Intensive	-0.04***	-0.004	-0.085***	0.063***			
EFD	-0.066***	-0.053***	-0.007***	-0.019***	-0.163***		
FD	0.024***	0.012***	-0.022***	-0.01***	-0.050***	0.001	
Flexible State	-0.021***	0.014***	-0.107***	-0.054***	-0.051***	0.073***	0.073***

*, **, and *** represent significance at 10%, 5%, and 1% levels respectively.

Table 3: Firm Size and Age

This table shows results from the following regression: Firm Size/Size Ratio = $\alpha + \beta_1$ Age Dummies + β_2 State Dummies + β_3Year Dummies + β_4Industry Dummies + e. Firm Size is the total number of workers which includes workers employed directly, workers employed through contractors, supervisory and managerial staff, other employees, working proprietors, unpaid family workers, and unpaid working members if cooperative factory. Firm Size Ratio is the ratio of each firm's firm size scaled by the average firm size of all firms in its birth cohort year. Age Dummies consist of 9 age dummies for the following age bins: <5(reference category), 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, and 40+. Year Dummies consist of dummies for each of the years in which the census is conducted. State Dummies are 32 dummies for states in which the firms are located. Industry dummies are 3 digit NIC dummies for manufacturing industries. All regressions are estimated by ordinary least squares. Robust standard errors are reported in parentheses. The square brackets in cols. 1 and 2 contain a ratio of the mean size of the particular age bin to the mean size in the age bin with youngest (<5) firms.

	(1)	(2)	(3)	(4)
	Firm Size	Firm Size	Firm Size Ratio	Firm Size Ratio
5-9	11.531***	12.777***	0.377***	0.421***
	(1.026)	(1.026)	(0.016)	(0.016)
	[1.149]	**[1.258]**		
10-14	21.942***	24.367***	0.636***	0.833***
	(1.189)	(1.195)	(0.023)	(0.024)
	[1.284]	**[1.493]**		
15-19	34.544***	37.649***	0.884***	1.200***
	(1.452)	(1.465)	(0.040)	(0.042)
	[1.447]	**[1.762]**		
20-24	48.060***	53.217***	1.419***	1.862***
	(1.816)	(1.814)	(0.075)	(0.076)
	[1.622]	**[2.076]**		
25-29	66.018***	70.194***		
	(2.370)	(2.351)		
	[1.855]	**[2.420]**		
30-34	89.781***	93.613***		
	(3.142)	(3.101)		
	[2.163]	**[2.894]**		
35-39	110.703***	114.692***		
	(4.068)	(3.985)		
	[2.434]	**[3.320]**		
40+	214.261***	207.637***		
	(3.335)	(3.349)		
	[3.775]	**[5.200]**		
Constant	77.205***	49.436**	1.000***	0.282
	(0.717)	(25.092)	(0.009)	(0.385)
State Fixed Effects	NO	YES	NO	YES
Year Fixed Effects	NO	YES	NO	YES
Industry Fixed Effects	NO	YES	NO	YES
N	221029	221020	106362	106362
Adjusted R-square	0.057	0.107	0.018	0.063

*, **, and *** represent significance at 10%, 5%, and 1% levels respectively.

Table 4: Technological differences across industries

Panel A shows results from the following regression: Firm Size = $\alpha + \beta_1$ Age Dummies + β_2 Labor Intensive Dummy+ β_3 Small Firm Dominated Dummy + β_4 EFD + β_5 Age Dummies x Labor Intensive Dummy + β_6 Age Dummies x Small Firm Dominated + β_7 Age Dummies x EFD + β_8 Age Dummies x Labor Intensive Dummy x Small Firm Dominated Dummy + β_9Year Dummies + β_{10} State Dummies + e. In Panel B, we present ratios of the predicted margins of the interaction coefficients (from the regressions in panel A) of each age bin with that of the youngest firms (<5) as an estimate of growth rates. Firm Size is the total number of workers which includes workers employed directly, workers employed through contractors, supervisory and managerial staff, other employees, working proprietors, unpaid family workers, and unpaid working members if cooperative factory. Age Dummies consist of 9 age dummies for the following age bins: <5(reference category), 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, and 40+. Year Dummies consist of dummies for each of the years in which the census is conducted. Labor Intensive Dummy takes the value 1 for labor intensive industries and 0 for capital intensive industries and is from Hasan and Jandoc (2012). Small Firm Dominated Industry is from Beck et al. (2008) and takes the value 1 for small firm (≤20 employees) dominated industries and 0 otherwise. EFD takes the value 1 for industries that are highly dependent on external finance and 0 for industries that are not highly dependent on external finance. State Dummies are 32 dummies for states in which the firms are located. All regressions are estimated by ordinary least squares. Robust standard errors are reported in parentheses.

Panel A:

	(1)	(2)	(3)	(4)
	Firm Size	Firm Size	Firm Size	Firm Size
5-9	15.213***	12.532***	19.265***	7.398***
	(1.884)	(1.216)	(2.177)	(1.322)
10-14	33.317***	22.839***	34.450***	13.887***
	(2.281)	(1.385)	(2.539)	(1.510)
15-19	52.117***	35.269***	55.066***	22.635***
	(2.877)	(1.681)	(3.173)	(1.814)
20-24	70.595***	52.684***	77.838***	34.073***
	(3.573)	(2.107)	(3.993)	(2.291)
25-29	95.773***	70.069***	102.336***	45.453***
	(4.803)	(2.713)	(5.282)	(2.921)
30-34	114.397***	95.959***	125.371***	66.157***
	(5.997)	(3.610)	(6.751)	(3.880)
35-39	154.768***	118.498***	171.340***	89.405***
	(7.919)	(4.590)	(8.886)	(5.231)
40+	360.350***	234.465***	407.587***	151.009***
	(7.258)	(3.885)	(8.273)	(3.710)
Small Firm Industry	-13.650***		-18.131***	
	(1.572)		(1.840)	
5-9 x Small Firm Industry	-7.588***		-10.143***	
	(2.252)		(2.615)	
10-14 x Small Firm Industry	-20.697***		-18.396***	
	(2.664)		(2.993)	
15-19 x Small Firm Industry	-32.065***		-30.378***	
	(3.308)		(3.684)	
20-24 x Small Firm Industry	-38.986***		-39.601***	
	(4.110)		(4.625)	
25-29 x Small Firm Industry	-52.444***		-50.693***	
	(5.448)		(6.050)	
30-34 x Small Firm Industry	-47.235***		-46.413***	
	(6.997)		(7.928)	
35-39 x Small Firm Industry	-74.887***		-83.104***	
	(9.099)		(10.212)	
40+ x Small Firm Industry	-231.268***		-268.560***	
	(7.958)		(9.032)	
Labor Intensive Industry		10.239***	2.527	
		(1.555)	(2.995)	

	(1)	(2)	(3)	(4)
	Firm Size	Firm Size	Firm Size	Firm Size
5-9 x Labor Intensive Industry		-8.146***	-19.618***	
		(2.244)	(4.245)	
10-14 x Labor Intensive Industry		-9.875***	-5.310	
		(2.743)	(5.853)	
15-19 x Labor Intensive Industry		-14.820***	-15.620**	
		(3.440)	(7.523)	
20-24 x Labor Intensive Industry		-30.227***	-40.982***	
		(4.178)	(8.740)	
25-29 x Labor Intensive Industry		-33.089***	-36.561***	
		(5.612)	(12.611)	
30-34 x Labor Intensive Industry		-48.415***	-58.239***	
		(7.096)	(14.313)	
35-39 x Labor Intensive Industry		-48.894***	-87.864***	
		(9.646)	(19.055)	
40+ x Labor Intensive Industry		-115.782***	-254.272***	
		(7.610)	(15.383)	
Labor Intensive Industry x Small Firm Industry			12.701***	
			(3.558)	
5-9 x Labor Intensive Industry x Small Firm Industry			17.484***	
			(5.070)	
10-14 x Labor Intensive Industry x Small Firm Industry			-2.761	
			(6.692)	
15-19 x Labor Intensive Industry x Small Firm Industry			3.060	
			(8.495)	
20-24 x Labor Intensive Industry x Small Firm Industry			18.496*	
			(9.999)	
25-29 x Labor Intensive Industry x Small Firm Industry			5.958	
			(14.001)	
30-34 x Labor Intensive Industry x Small Firm Industry			7.321	
			(16.370)	
35-39 x Labor Intensive Industry x Small Firm Industry			55.759**	
			(22.035)	
40+ x Labor Intensive Industry x Small Firm Industry			209.643***	
			(17.456)	
EFD				1.086
				(1.469)
5-9 x EFD				6.190***
				(2.067)
10-14 x EFD				13.199***
				(2.403)
15-19 x EFD				19.643***
				(2.954)
20-24 x EFD				26.549***
				(3.698)
25-29 x EFD				37.353***
				(4.822)
30-34 x EFD				42.218***
				(6.385)

	(1)	(2)	(3)	(4)
	Firm Size	Firm Size	Firm Size	Firm Size
35-39 x EFD				42.497***
				(8.220)
40+ x EFD				157.612***
				(7.345)
Constant	67.859***	48.003*	68.821***	58.993**
	(24.826)	(24.729)	(25.189)	(24.353)
State Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Industry Fixed Effects	NO	NO	NO	NO
N	210044	221020	210044	219282
Adjusted R-Square	0.093	0.070	0.099	0.077

*, **, and *** represent significance at 10%, 5%, and 1% levels respectively.

Panel B: Ratio of Predictive Margins of each age bin to the reference group (<5 firms)

	1	2	3	4	5	6	7	8	9	10
Age	Large-Firm	Small Firm	Capital	Labor	Large-Firm, Capital Intensive	Small-Firm, Capital Intensive	Large-Firm, Labor Intensive	Small-Firm, Labor Intensive	Low Dependence on External Finance	High Dependence on External Finance
<5	1	1	1	1	1	1	1	1	1	1
5-9	1.17	1.10	1.16	1.05	1.22	1.13	1.00	1.08	1.09	1.17
10-14	1.38	1.17	1.30	1.15	1.40	1.23	1.33	1.09	1.18	1.34
15-19	1.59	1.27	1.46	1.24	1.63	1.36	1.44	1.14	1.29	1.53
20-24	1.80	1.43	1.69	1.26	1.89	1.56	1.41	1.19	1.43	1.76
25-29	2.09	1.59	1.92	1.43	2.18	1.75	1.73	1.25	1.58	2.04
30-34	2.30	1.91	2.26	1.55	2.44	2.15	1.75	1.33	1.84	2.36
35-39	2.76	2.08	2.56	1.81	2.97	2.28	1.93	1.67	2.14	2.66
40+	5.11	2.74	4.08	2.38	5.69	3.02	2.71	2.12	2.93	4.89

Table 5: Role of Financial Development

The regression equation estimated in Panel A is Firm Size $= \alpha + \beta_1$ Age Dummies $+ \beta_2$FD $+ \beta_3$ FD x Age Dummies $+ \beta_4$ Year Dummies $+ \beta_5$ Industry Dummies $+ \beta_6$ Log SDP/Capita + e. In Panel B, we present ratios of the predicted margins of the interaction coefficients (from the regressions in panel A) of each age bin with that of the youngest firms (<5) as an estimate of growth rates. Firm Size is the total number of workers which includes workers employed directly, workers employed through contractors, supervisory and managerial staff, other employees, working proprietors, unpaid family workers, and unpaid working members if cooperative factory. Age Dummies consist of 9 age dummies for the following age bins: <5(reference category), 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, and 40+. FD is dummy variable that takes value 1 for financially developed states and 0 otherwise. Year Dummies consist of dummies for each of the years in which the census is conducted. Industry dummies are 3 digit NIC dummies for manufacturing industries. All regressions are estimated by ordinary least squares. Robust standard errors are reported in parentheses.

Panel A:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size
		Large Firm Dominated, Labor Intensive	Small Firm Dominated, Labor Intensive	Large Firm Dominated, Capital Intensive	Small Firm Dominated, Capital Intensive	Not Dependent on External Finance	Dependent on External Finance
5-9	14.331***	15.889**	5.316	24.638***	8.513***	11.700***	14.200***
	(1.823)	(7.263)	(3.687)	(4.062)	(2.604)	(2.135)	(3.049)
10-14	30.379***	33.735***	8.990**	47.782***	21.930***	23.330***	34.817***
	(2.197)	(8.894)	(4.533)	(5.106)	(2.955)	(2.490)	(3.780)
15-19	41.611***	22.287**	12.440**	65.657***	28.207***	28.903***	47.337***
	(2.703)	(10.490)	(5.507)	(6.354)	(3.622)	(3.039)	(4.748)
20-24	56.823***	35.436***	26.174***	86.911***	39.571***	37.154***	70.568***
	(3.443)	(11.974)	(7.775)	(8.265)	(4.552)	(3.945)	(6.147)
25-29	68.594***	49.792***	30.665***	105.893***	46.905***	42.034***	88.580***
	(4.488)	(17.946)	(10.150)	(11.049)	(5.610)	(4.905)	(8.245)
30-34	88.962***	37.314***	52.918***	126.531***	71.326***	64.148***	107.396***
	(5.882)	(14.458)	(15.155)	(14.266)	(7.589)	(6.665)	(10.619)
35-39	102.120***	24.865*	96.669***	166.647***	65.038***	75.633***	123.904***
	(7.319)	(12.891)	(19.919)	(18.463)	(8.560)	(8.396)	(13.250)
40+	210.194***	166.776***	144.789***	467.598***	151.684***	176.468***	332.947***
	(5.565)	(21.469)	(15.116)	(17.174)	(5.028)	(5.398)	(12.991)
FD	6.439***	58.656***	18.656***	11.155***	3.492	13.047***	9.382***
	(1.694)	(6.378)	(3.594)	(3.533)	(2.533)	(2.049)	(2.750)
5-9 x FD	-3.168	-17.247**	0.249	-10.257**	-0.993	-7.743***	-2.620
	(2.286)	(8.463)	(5.140)	(4.968)	(3.287)	(2.844)	(3.706)
10-14 x FD	-9.143***	-3.477	-4.803	-20.888***	-10.945***	-15.101***	-12.742***
	(2.686)	(11.160)	(6.167)	(6.000)	(3.650)	(3.273)	(4.446)
15-19 x FD	-5.745*	16.050	-4.692	-16.293**	-5.709	-11.049***	-7.385
	(3.277)	(13.587)	(7.531)	(7.477)	(4.391)	(3.936)	(5.561)
20-24 x FD	-3.739	-3.805	-22.296**	-10.747	-1.917	-5.904	-11.727*
	(4.127)	(15.791)	(9.580)	(9.616)	(5.478)	(5.004)	(7.105)
25-29 x FD	6.109	24.540	-18.736	0.444	8.547	5.667	-3.214
	(5.375)	(23.588)	(12.286)	(12.834)	(6.815)	(6.308)	(9.493)
30-34 x FD	11.472	47.720**	-40.640**	4.708	14.481	5.865	6.771
	(7.079)	(23.270)	(17.018)	(16.453)	(9.375)	(8.478)	(12.315)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size
		Large Firm Dominated, Labor Intensive	Small Firm Dominated, Labor Intensive	Large Firm Dominated, Capital Intensive	Small Firm Dominated, Capital Intensive	Not Dependent on External Finance	Dependent on External Finance
35-39 x FD	22.965**	97.683***	-61.149***	17.203	33.776***	25.683**	15.948
	(8.932)	(28.157)	(23.278)	(21.439)	(10.893)	(11.084)	(15.347)
40+ x FD	-0.685	-5.424	-69.092***	-70.629***	-23.561***	-41.980***	-19.764
	(6.974)	(27.594)	(17.674)	(19.779)	(7.005)	(7.358)	(15.090)
Log SDP/Capita	3.325*	-38.255***	-4.200	-6.697*	4.516**	6.395***	-7.087**
	(1.795)	(7.329)	(3.319)	(4.063)	(2.304)	(2.126)	(2.935)
Constant	-15.480	288.294***	78.652***	110.535***	10.728	-7.156	109.595***
	(13.822)	(55.267)	(25.320)	(31.338)	(17.561)	(16.116)	(22.576)
State Fixed Effects	NO	NO	NO	NO	NO	NO	NO
Industry Fixed Effects	YES	NO	NO	NO	NO	NO	NO
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES
N	201796	14121	27662	58965	90974	108303	91801
Adjusted R-square	0.105	0.067	0.026	0.131	0.045	0.049	0.091

*, **, and *** represent significance at 10%, 5%, and 1% levels respectively.

Panel B: Ratio of Predictive Margins of each age bin to the reference group (<5 firms)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Age	FD	Full Sample	Large-Firm Dominated, Labor Intensive	Small-Firm Dominated, Labor Intensive	Large-Firm Dominated, Capital Intensive	Small-Firm Dominated, Capital Intensive	Low Dependence on External Finance	High Dependence on External Finance
<5	0	1	1	1	1	1	1	1
5-9	0	1.19	1.15	1.09	1.26	1.11	1.16	1.16
10-14	0	1.41	1.41	1.12	1.51	1.29	1.32	1.40
15-19	0	1.56	1.32	1.17	1.74	1.40	1.41	1.57
20-24	0	1.76	1.50	1.35	1.96	1.53	1.50	1.84
25-29	0	1.92	1.78	1.44	2.20	1.65	1.59	2.09
30-34	0	2.20	1.54	1.71	2.43	1.99	1.89	2.31
35-39	0	2.37	1.27	2.30	2.87	1.89	2.04	2.50
40+	0	3.83	3.64	2.94	6.32	3.11	3.43	5.10
<5	1	1	1	1	1	1	1	1
5-9	1	1.14	0.98	1.06	1.16	1.11	1.05	1.14
10-14	1	1.26	1.32	1.05	1.28	1.16	1.10	1.25
15-19	1	1.44	1.41	1.09	1.53	1.32	1.22	1.47
20-24	1	1.66	1.37	1.03	1.79	1.51	1.37	1.67
25-29	1	1.92	1.76	1.13	2.14	1.76	1.58	2.00
30-34	1	2.24	1.85	1.14	2.40	2.18	1.84	2.34
35-39	1	2.55	2.20	1.38	2.96	2.33	2.20	2.62
40+	1	3.59	2.63	1.83	5.25	2.75	2.61	4.65

Table 6: Role of Financial Development –Robustness

The regression equation estimated in this table is Firm Size $= \alpha + \beta_1$ Age Dummies $+ \beta_2$FD $+ \beta_3$ FD x Age Dummies $+ \beta_4$ Year Dummies $+ \beta_5$ Industry Dummies $+ \beta_6$ Log SDP/Capita + e. Firm Size is the total number of workers which includes workers employed directly, workers employed through contractors, supervisory and managerial staff, other employees, working proprietors, unpaid family workers, and unpaid working members if cooperative factory. Age Dummies consist of 9 age dummies for the following age bins: <5(reference category), 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, and 40+. In cols. 6 and 7 we use dummies for each year of age. FD is dummy variable that takes value 1 for financially developed states and 0 otherwise and is defined by Total Bank Credit/SDP in cols. 1, 4-9. In Cols. 2 and 3 we use alternate measures of financial development namely Bank Deposits/SDP and Branches/1000 persons respectively. In cols. 4 and 5 we split the sample into states with states with flexible (pro-employer) labor regulation and states with rigid labor regulations respectively. In cols. 6 and 7 we focus on early life-cycle by looking at firms born after de-licensing of industries (col.6) and after liberalization in 1991 (col.7). The de-licensing of industries varies by industry-year. Year Dummies consist of dummies for each of the years in which the census is conducted. Industry dummies are 3 digit NIC dummies for manufacturing industries. All regressions are estimated by ordinary least squares. Robust standard errors are reported in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size
	Above 90th percentile of size distribution	*Alternate Measure of FD:* Deposits/ SDP	*Alternate Measure of FD:* Branches/ 1000 per	Flexible States	Inflexible States	Firms born after de-licensing	Firms born after Liberalization
5-9	44.421**	10.512***	14.297***	16.760***	-1.962		
	(18.046)	(1.502)	(1.575)	(2.020)	(4.232)		
10-14	78.741***	25.548***	29.738***	32.465***	10.783**		
	(18.952)	(1.785)	(1.872)	(2.454)	(5.017)		
15-19	112.084***	38.209***	40.179***	43.732***	22.989***		
	(19.963)	(2.244)	(2.266)	(3.059)	(5.846)		
20-24	143.166***	56.284***	54.926***	57.591***	41.469***		
	(21.191)	(2.885)	(2.767)	(3.943)	(7.175)		
25-29	213.063***	67.442***	68.158***	67.917***	57.572***		
	(24.056)	(3.732)	(3.530)	(5.223)	(8.902)		
30-34	245.911***	94.524***	92.119***	90.014***	73.105***		
	(26.879)	(5.096)	(4.547)	(6.995)	(10.953)		
35-39	199.345***	125.308***	115.839***	97.663***	103.137***		
	(29.328)	(6.655)	(6.078)	(8.782)	(13.270)		
40+	284.614***	194.276***	210.234***	256.951***	171.069***		
	(18.084)	(4.836)	(4.538)	(8.451)	(7.970)		
FD	-46.502***	-4.516***	-3.839**	7.049***	-21.824***	23.852	14.996
	(17.177)	(1.698)	(1.885)	(1.945)	(4.689)	(16.910)	(20.575)
5-9 x FD	-8.142	4.243*	-3.988*	-5.741**	15.755***		

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size
	Above 90th percentile of size distribution	*Alternate Measure of FD:* Deposits/ SDP	*Alternate Measure of FD:* Branches/ 1000 per	Flexible States	Inflexible States	Firms born after de-licensing	Firms born after Liberalization
	(21.429)	(2.210)	(2.195)	(2.636)	(4.877)		
10-14 x FD	-24.319	-1.578	-10.588***	-11.090***	14.600**		
	(22.360)	(2.537)	(2.525)	(3.115)	(5.680)		
15-19 x FD	-21.482	0.226	-4.348	-8.680**	20.307***		
	(23.587)	(3.085)	(3.069)	(3.863)	(6.587)		
20-24 x FD	-16.547	-2.342	-0.729	-5.020	19.844**		
	(25.083)	(3.853)	(3.818)	(4.892)	(8.094)		
25-29 x FD	-60.795**	10.857**	9.780**	3.573	29.529***		
	(27.924)	(5.005)	(4.967)	(6.490)	(10.027)		
30-34 x FD	-30.693	5.584	10.499	3.347	44.583***		
	(31.155)	(6.663)	(6.573)	(8.630)	(12.660)		
35-39 x FD	25.928	-10.728	5.143	20.275*	40.031***		
	(34.000)	(8.584)	(8.426)	(11.099)	(15.380)		
40+ x FD	55.745**	29.195***	-1.033	-35.073***	33.266***		
	(22.028)	(6.744)	(6.919)	(10.420)	(9.637)		
1 year						6.585	9.971
						(12.186)	(17.144)
2 years						15.490	21.404
						(12.194)	(17.100)
3 years						25.653**	30.796*
						(12.359)	(17.154)
4 years						25.079**	35.437**
						(12.416)	(17.687)
5 years						24.661*	44.715**
						(12.736)	(17.843)
6 years						23.386*	32.721*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size
	Above 90th percentile of size distribution	*Alternate Measure of FD:* Deposits/ SDP	*Alternate Measure of FD:* Branches/ 1000 per	Flexible States	Inflexible States	Firms born after de-licensing	Firms born after Liberalization
						(12.443)	(17.279)
7 years						25.538**	29.796*
						(12.768)	(17.520)
8 years						42.140***	59.748***
						(13.417)	(18.592)
9 years						46.552***	62.719***
						(13.632)	(18.317)
10 year						30.092**	46.310**
						(14.511)	(18.467)
11 years						64.580***	75.627***
						(16.976)	(20.585)
12 years						34.580**	55.468***
						(15.058)	(19.381)
13 years						56.401***	58.154***
						(16.476)	(19.060)
14 years						58.519***	
						(22.397)	
15 years						39.881**	
						(18.112)	
16 years						-8.188	
						(15.044)	
17 years						74.473**	
						(33.531)	
18 years						61.745**	
						(25.785)	
19 years						102.363***	

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size
	Above 90th percentile of size distribution	*Alternate Measure of FD:* Deposits/ SDP	*Alternate Measure of FD:* Branches/ 1000 per	Flexible States	Inflexible States	Firms born after de-licensing	Firms born after Liberalization
						(29.397)	
1 year x FD						-7.333	-13.751
						(17.455)	(21.238)
2 years x FD						-9.831	-14.822
						(17.405)	(21.158)
3 years x FD						-16.507	-17.973
						(17.548)	(21.242)
4 years x FD						-29.842*	-31.605
						(17.561)	(21.776)
5 years x FD						-21.415	-23.449
						(17.957)	(22.005)
6 years x FD						-16.269	-6.011
						(17.765)	(21.675)
7 years x FD						-7.698	8.038
						(18.130)	(21.967)
8 years x FD						-26.276	-19.989
						(18.480)	(22.742)
9 years x FD						-29.345	-24.090
						(18.730)	(22.541)
10 years x FD						-21.840	-20.060
						(19.715)	(22.728)
11 years x FD						-42.661*	-32.858
						(22.311)	(25.233)
12 years x FD						-3.930	1.660
						(21.283)	(24.820)
13 years x FD						-26.654	1.197

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size	Firm Size
	Above 90th percentile of size distribution	*Alternate Measure of FD:* Deposits/ SDP	*Alternate Measure of FD:* Branches/ 1000 per	Flexible States	Inflexible States	Firms born after de-licensing	Firms born after Liberalization
						(22.208)	(24.327)
14 years x FD						-60.840**	
						(27.057)	
15 years x FD						-33.606	
						(24.493)	
16 years x FD						26.937	
						(27.568)	
17 years x FD						-69.032*	
						(39.521)	
18 years x FD						-42.525	
						(34.115)	
19 years x FD						-88.526**	
						(34.508)	
Log(SDP/Capita)	16.608*	6.812***	11.195***	6.795***	22.466***	13.529***	7.594**
	(9.555)	(1.841)	(2.051)	(2.092)	(5.530)	(2.897)	(3.144)
State Fixed Effects	NO	NO	NO	NO	NO	NO	NO
Industry Fixed Effects	YES	YES	YES	YES	YES	NO	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES
Constant	333.851***	-36.349**	-70.096***	-43.029***	-152.354***	-63.601**	-15.537
	(75.096)	(14.216)	(15.628)	(16.237)	(40.376)	(30.189)	(34.821)
N	21114	201796	201796	140100	61696	41055	30844
Adjusted R-square	0.137	0.105	0.105	0.103	0.127	0.007	0.077

*, **, and *** represent significance at 10%, 5%, and 1% levels respectively

Appendix A: ASI Sampling Design

Year	Census Sector	Sample Sector (Definition borrowed verbatim from the Ministry of Statistics)
1983-84	• All units with ≥ 50 workers and using power or ≥ 100 workers without using power • All electricity undertakings • All industrial units in 12 less industrially developed States/Union Territories*	The rest of the universe was covered on sampling design adopting *State x 3 digit industry group* as stratum so as to cover all the units in a span of two consecutive years (50% samples in alternate years).
1989-90	• All units with ≥ 100 workers with/without power • All electricity undertakings • All industrial units in 12 less industrially developed States/Union Territories*	The rest of the universe was covered on sampling design adopting *State X 3 digit industry group* as stratum so as to cover all the units in a span of three years. In any stratum, if the number of units was less than 20, then the entire stratum was enumerated completely along with census factories. In any stratum if no. of unit is between 21 & 60, a minimum sample of size 20 was selected by Circular Systematic Sampling. For all other units a uniform sampling fraction of 1/3 was adopted.
1994-95	• All units with ≥ 100 workers with/without power • All electricity undertakings • All industrial units in 12 less industrially developed States/Union Territories*	The rest of the universe was covered on sampling design adopting *State X 3 digit industry group* as stratum so as to cover all the units in a span of three years. In any stratum, if the number of units was less than 20, then the entire stratum was enumerated completely along with census factories. In any stratum if no. of unit is between 21 & 60, a minimum sample of size 20 was selected by Circular Systematic Sampling. For all other units a uniform sampling fraction of 1/3 was adopted.
1998-99	• All industrial units in 5 less industrially developed States/Union Territories ** • Units having ≥200 workers and all factories covered under Joint Returns	After identifying Census sector factories, rest of the factories were arranged in ascending order of States, NIC-98 (4 digit), number of workers and district and properly numbered. The Sampling was taken within each stratum (State X Sector X 4-digit NIC) with a minimum of 8 samples in each stratum in the form of 2 sub-samples. For the first time, all electricity undertakings other than captive units, Government Departmental undertakings such as Railway Workshops, P & T workshops etc. were kept out of coverage of ASI.
2000-01	• All industrial units in 5 less industrially developed States/Union Territories ** • Units having ≥100 workers and all factories covered under Joint Returns	After identifying Census sector factories, rest of the factories were arranged in ascending order of States, NIC-98 (4 digit), number of workers and district and properly numbered. The Sampling fraction was taken as 12% within each stratum (State X Sector X 4-digit NIC) with a minimum of 8 samples except for the State of Gujarat where 9.5% sampling fraction was used. For the States of Jammu & Kashmir, Himachal Pradesh, Daman & Diu, Dadra & Nagar Haveli, Goa and Pondicherry, a minimum of 4 samples per stratum was selected. For the States of Bihar and Jharkhand, a minimum of 6 samples per stratum was selected. The entire sample was selected in the form of two independent sub-sample using Circular Systematic Sampling method.
2004-05	• All industrial units in 6 less industrially developed States/Union Territories *** • Units having ≥100 workers and all factories covered under Joint Returns • All units belonging to the strata (*State x 4-digit of NIC-04*) having less than or equal to 4 units are also considered as Census Sector units.	Remaining units are arranged in order of their number of workers and samples are then drawn circular systematically considering sampling fraction of 20% within each stratum (*State x Sector x 4-digit NIC*) for all the states. An even number of units with a minimum of 4 are selected and evenly distributed in two sub-samples. The sectors considered here are Biri, Manufacturing and Electricity.

* Goa, Himachal Pradesh, Jammu & Kashmir, Chandigarh, Manipur, Meghalaya, Nagaland, Tripura, Daman & Diu, Pondicherry Dadra & Nagar Haveli, and Andaman & Nicobar Islands

** Manipur, Meghalaya, Nagaland, Tripura, and Andaman & Nicobar Islands.

*** Manipur, Meghalaya, Nagaland, Tripura, Sikkim, and Andaman & Nicobar Islands.

Appendix B: Sample and Population Sizes in the ASI/NSS

Survey	Sample	Population
ASI 1983/84	59000	95,133
ASI 1989/90	49485	49,485
ASI 1994/95	57933	117,290
ASI 1999/00	33515	174,263
ASI 2004/05	49340	164,265
NSS 1994/95 (Informal)	120609	10,497,371

Appendix C: Concordance between US-SIC and ISIC-Revision 2

ISIC Rev. 2	ISIC Industry Description	SIC
311-312	Food products	201,202,203,204,205,206, 207, 209
313	Beverages	208
314	Tobacco	21
321	Textiles	22
322	Wearing apparel, except footwear	23, 315
323	Leather products	311,316,317,319
324	Footwear, except rubber or plastic	313, 314
331	Wood products, except furniture	24
332	Furniture, except metal	25 except 2514
341	Paper and products	26
342	Printing and publishing	27
351	Industrial chemicals	281,286,287,282
352	Other chemicals	283,284,284, 285, 289
353	Petroleum refineries	291
354	Miscellaneous petroleum and coal products	295,299
355	Rubber products	301,302,305,306
356	Plastic products	308
361	Pottery, china, earthenware	326
362	Glass and products	321,322,323,
369	Other non-metallic mineral products	325,327,324,328,329
371	Iron and steel	331,332
372	Non-ferrous metals	333, 334, 335, 336
381	Fabricated metal products	34, 2514
382	Machinery, except electrical	35
383	Machinery, electric	36
384	Transport equipment	37
385	Professional and scientific equipment	38
390	Other manufactured products	39

Appendix D: Employment Categories in ASI 1994/95 and NSS 1994/95 Surveys

Panel A: ASI Data

Sl. No.	Item		Average number of persons worked
1	Workers Employed directly	Men	
2		Women	
3		Children	
4	Sub-total (1+2+3)		
5	Employed through contractors		
6	Total Workers (4+5)		
7	Supervisory & managerial staff		
8	Other employees		
9	Total (6 to 8)		
10	Working proprietors		
11	Unpaid family members		
12	If cooperative factory unpaid working members		
13	Total (9 to 12)		

Panel B: NSS Data

Sl. No.	Item				Average number (modal value) of persons per working day during the reference month
1	Hired workers (other than household workers)	Men			
2		Women			
3		Children	Boys		
4			Girls		
5	House-hold workers	Paid	Men		
6			Women		
7			Children	Boys	
8				Girls	
9		Unpaid	Men		
10			Women		
11			Children	Boys	
12				Girls	
13	All workers				
14	Supervisory & managerial staff	Men			
15		Women			
16	Other employees	Men			
17		Women			
18	Working proprietors	Men			
19		Women			
20	If co-operative society unpaid working members	Men			
21		Women			
22	All employees (13 to 21)				