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DISSERTATION

Three Essays
on Entrepreneurship
in India and the U.S.

Policies, Social Ties and Mobility

Elizabeth D. Brown

This document was submitted as a dissertation in June 2012 in partial fulfillment of the requirements of the doctoral degree in public policy analysis at the Pardee RAND Graduate School. The faculty committee that supervised and approved the dissertation consisted of Krishna Kumar (Chair), Susan Gates, and Joanne Yoong.



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Three Essays on Entrepreneurship in India and the US: Policies, Social Ties and Mobility

Elizabeth D. Brown

Abstract

Across the globe, policymakers view entrepreneurship as a potential route out of poverty, even for the most disadvantaged. Many countries have developed policies to encourage business creation within this group. My dissertation papers explore the role entrepreneurship plays in the lives of the economically disadvantaged in both India and the US. The first paper examines how India's Micro, Small and Medium-sized Enterprise (MSME) policies affect low-income and female entrepreneurship. In addition to important policy effects, a key finding highlights that entrepreneurial social ties significantly correlate with early-stage entrepreneurship, regardless of income level. The second paper explores this result by instrumenting for the endogeneity of entrepreneurship and social ties using past vernacular newspaper circulation and population density. Instrumental variables regression substantiates the non-instrumented finding indicating social ties play a non-trivial role in increasing early-stage entrepreneurship in India. Finally, analysis of data from the US Panel Study of Income Dynamics in the third paper finds no evidence that self-employment provides any particular advantage in achieving upward mobility, or in reducing downward mobility. In contrast, family business ownership associates with more upward mobility and less downward mobility. We instrument for the endogeneity of family business ownership and mobility using tax schedule progressivity. Instrumental variables regression results substantiate the non-instrumented findings but should be interpreted with some caution.

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1 How India's MSME Policies Affect Early-stage Entrepreneurship: With Analysis of Female and Low-income Subgroups

Elizabeth Brown

Entrepreneurial choice is an individual decision affected by personal characteristics and embedded within a public policy context. This choice is explored in India, using sub-national variation in Micro, Small and Medium-sized Enterprise policies to predict early-stage entrepreneurship while controlling for individual characteristics. In addition to average effects, the level of low-income and female entrepreneurship is estimated. Results suggest that policies enabling foreign market access, capital access, and subsidizing firm-level human and technology capital investments encourage early-stage entrepreneurship. Policies targeting specialized industries, disadvantaged individuals, and speedier business permitting negatively correlate. The set of policies affecting low-income entrepreneurship overlaps with but differs from the main results, however self-reported entrepreneurial social ties are equally as important for both groups. Being female has a negative but not significant effect on entrepreneurship however, I find scant evidence that particular policies promote gender discrimination in female entrepreneurship.

1.1 Motivation

An incentivizing policy environment alone is insufficient to lead individuals down the path of recognizing and acting upon entrepreneurial opportunities, as other barriers may yet stand in the way. Personal income, gender, educational attainment, temperament, age, capital access, risk propensity and social connections to another entrepreneur, along with other characteristics affect the chances a person will enter entrepreneurship (*Shane, 2004*). At the same time, policies designed to improve the business environment, lower barriers to entry and make it easier for small businesses to innovate are now recognized methods of stimulating entrepreneurial opportunities (*Schramm, 2005*). In India, the individual decision to exploit a recognized entrepreneurial opportunity¹ is made within the context of state and national Micro, Small and Medium-sized Enterprise (MSME) policies, however no empirical research has studied their effects comprehensively, which leads to the first research question:

¹for a discussion of opportunity recognition and exploitation, see (*Eckhard and Shane, 2003*)

Controlling for individual and state attributes, how do state-level MSME policies impact individual entrepreneurial choice?

While the relationship between entrepreneurship and macroeconomic growth is reasonably well-established in the literature (*Wennekers and Thurik, 1999; van Stel et al., 2005; Audretsch et al., 2006; Acs, 2006*) the benefits of such growth are not necessarily widely shared (*Kanbur, 1982*). Fewer women in developing countries participate in entrepreneurship as compared with men (*Minniti and Naude, 2010a; Minniti, 2010; Minniti and Naude, 2010b*). Additionally, the pervasive market failures restricting access to credit in developing countries may particularly affect the growth prospects of very small enterprises (*Banerjee and Duflo, 2008; Banerjee and Newman, 1993*), which may in turn disincentivize low-income individuals from entering. But growth on its own is an insufficient outcome for a country with a large population of poor and disadvantaged individuals. India's MSME policies also seek to redress economic inequality and poverty through policies designed to increase the economic participation of disadvantaged individuals, leading to the second research question:

How do MSME policies affect the decisions of low-income and women entrepreneurs?

A particular advantage of conducting policy study in India is the ability to ascertain effects in the low-income group. Of the 1.14 billion people² living in India about 27% reside in poverty³ – which, for perspective is approximately equal to the entire US population⁴. This large population of poor and low-income people is of interest for two main reasons: 1) expected utility theory predicts a higher probability of entry into entrepreneurship as the agent's opportunity cost decreases. Therefore, low-income individuals should have an a priori higher chance of becoming entrepreneurial; 2) this population is a target of national MSME

²2008 World Bank estimates

³India's Planning Commission

⁴About 307 million poor in 2009 – however the poverty estimates of India's Planning Commission may be conservative. The World Bank estimates about 500 million in poverty in India.

policy. India's Planning Commission expects MSME's to play a vital role in re-balancing inequality, by making "growth regionally balanced, and in generating dispersed off-farm employment, some of it in rural areas" (Planning Commission, 2008).⁵ One of the means through which this could occur is through the entrepreneurship of low-income individuals and disadvantaged women.

In order to examine and measure India's MSME policy environment, we developed a novel quantitative sub-national policy data set comprised of the de jure policies in 15 states over the 1997-2006 period. The policy data set is merged with microdata from the Global Entrepreneurship Monitor's (GEM) adult population survey conducted in India in 2006. The resulting data set reveals that state policies and entrepreneurship levels vary across the states, which enables the estimation strategy.

After controlling for individual differences and state characteristics, I find that policies subsidizing fundamental investments in human capital and technology and those which make capital cheaper and more widely available are positively and significantly correlated with higher levels of early-stage entrepreneurship. In addition, policies promoting access to foreign markets by reducing trade barriers and promoting foreign direct investment are likewise positively correlated.

The benefits of policies designed to reduce the bureaucratic burden the state imposes on MSMEs are less clear. Single Window Clearance (SWC) policies, which are designed to reduce entry barriers for businesses, negatively impact early-stage entrepreneurship. In addition, policies designed to promote specific industries through economic clusters or by creating Special Economic Zones (SEZ), are associated with less early-stage entrepreneurial activity. States with policies intended to improve the state's business services to entrepreneurs have less entrepreneurial activity also.

Low-income individuals are either slightly less or just as likely to engage in early-stage entrepreneurship as everyone else in the sample. However, the combination of policies found to correlate with higher levels of low-income entrepreneurship is somewhat different. The presence of Human Capital and Technology policies—which subsidize MSME investment in worker training or technology improvement, are positive and significant in the low-income subgroup. Business Environment Policies, designed to improve state services to entrepreneurs, are significant for this group also. However, in contrast to the main results, Open-

⁵The Eleventh Plan of India's Planning Commission, 2007-08

ness policies, designed to open the state economy to foreign markets and trade, are associated with significantly less low-income entrepreneurship.

A somewhat counter-intuitive result is that Special Treatment policies—targeting the entrepreneurship of disadvantaged populations with capital subsidies and training—are associated with fewer low-income entrepreneurs, at the 5% level of significance. Without controlling for the possibility of policy endogeneity, however, an omitted variables bias cannot be ruled out. Either the sign is correct and the policy negatively affects the targeted group or the sign is wrong and states with a large proportion of disadvantaged individuals initiate demand-responsive policies to improve entrepreneurship levels.

The gender gap in early-stage entrepreneurial prevalence rates is relatively small in the GEM India sample. On average, being female is associated with a lower probability of early-stage entrepreneurship, however this estimate cannot be statistically differentiated from zero. Variation in the number of female entrepreneurs across states in the sample is sufficient to enable quantitative study of state policy effects. However, only one policy, Business Environment, was found to be significantly associated with lower levels of female entrepreneurship. Moreover, without a qualitative analysis of this policy, it is difficult to interpret the significance of this result. A counter-intuitive outcome of the policy analysis on women is that capital subsidies and individual special treatment policies fail to make a significant impact on the estimated levels of female entrepreneurship. We would expect otherwise given the number of microfinance programs specifically targeting women in India.

1.2 Literature Review

The following section reviews the factors found to correlate with the individual propensity to choose entrepreneurship and evidence regarding the effects of policies on entrepreneurial behavior.

Individual Characteristics

Factors affecting human capital, such as educational attainment, more career experience, a greater level of social status (*Van Praag and Cramer, 2001; Shane, 2004; Kim et al., 2006*) and the presence of entrepreneurial social connections

(*Davidsson and Honig, 2003; Ardagna and Lusardi, 2010; Shane, 2004*) positively correlate with entrepreneurial behavior. The effects of age are found to be non-linear. Although older individuals bring knowledge acquired from work and life experience to starting a business, their income also rises as they age, which leads to a lower probability of entering entrepreneurship. Other individual characteristics, such as extroversion, a desire to achieve, risk-taking and independence are all positively associated with entrepreneurship (*Van Praag and Cramer, 2001*) while agreeableness (the ability to go along with others) is not (*Shane, 2004*).

Entrepreneurial social ties have received a great deal of attention in the literature, see (*Brown, 2012b*) for more discussion. Cross national research of respondents in 37 countries using data from the Global Entrepreneurship Monitor (GEM) finds that knowing another entrepreneur significantly increases the chances of becoming one (*Ardagna and Lusardi, 2010*). Studies conducted in both developed and developing countries find that those with social ties to entrepreneurial family members, work colleagues, and friends are more likely to start a business (*Mueller, 2006; ?*). For example, in China, having ties to entrepreneurial friends and family positively impacts the choice to start a business (*Djankov et al., 2006*). A study conducted in Denmark uses detailed panel data from a matched employee-employer dataset to show that a one standard deviation increase in colleague's entrepreneurship experience raises the individual's chances of starting a business by 5% (*Nanda and Sorensen, 2009*). In Russia, *Djankov et al. (2005)* find that the proportion of entrepreneurial relatives and school friends is much higher among entrepreneurs (42% and 53% respectively) than it is among non-entrepreneurs (20% and 23% respectively).

Women

Significantly fewer women than men are found to own and manage businesses in cross-country analysis *Startiene and Remeikiene (2008); Minniti and Naude (2010a); Minniti (2010); Minniti and Naude (2010b)*, however India's rates of female entrepreneurship are among the lowest in the world (*Ghani et al., 2011*). This is somewhat surprising since levels of female entrepreneurship are usually higher in developing countries as compared to developed one (*Minniti and Naude, 2010a*). In addition, studies performed in the United States, the Dominican Republic, Malaysia, Malawi, Ghana, Mexico and South Africa, suggest

that when women do start businesses, they are less successful (*Fairlie and Robb, 2009; Espinal and Grasmuck, 1997; Karupiah, 2010; Chirwa, 2008; Bhasin, 2009; Cohen and Montiel-Ishino, 2009; Mahadea, 2001; Robb, 2002*)

Although a number of explanations for women’s entrance and performance differences have been explored in the literature, none of them uniquely explain why fewer women choose entrepreneurship and achieve less success once they do. Some studies have shown that women’s fewer years of work experience and less formal education play a role (*Chaganti and Parasuraman, 1996; Espinal and Grasmuck, 1997; Robb, 2002*); others show that women may have different preferences regarding their labor time (*Fairlie and Robb, 2009; Verheul et al., 2009*); may experience discrimination in gaining access to finance (*Kevane and Wydick, 2001; Bushell, 2008; Muravyev et al., 2009; Bellucci et al., 2010*); and may start their businesses in less profitable “pink collar” industries (*Espinal and Grasmuck, 1997; Hussein, 1997; de Mel et al., 2009a*).

A key poverty alleviation strategy used extensively in the developing world and particularly in India targets poor and ultrapoor women with microcredit, microenterprise and self-help group programs with the idea that they can use credit to start or expand a small businesses or smooth consumption expenditures. Through programs like BRAC’s⁶ Microfinance and Ultra Poor Programs these institutions have provided loans and training to millions women around the world (*Maes and Reed, 2012*). Indeed, women are about 80% of all microfinance recipients, worldwide.

Although compelling anecdotal evidence suggests microfinance borrowing can improve consumption and business outcomes for women, many reports overlook the possibility of a biased estimation arising from selection into the program. Positive effects will be overstated when households or individuals with a greater chance of success are chosen or choose to receive micro loans (*Morduch, 1999*).

The results of randomized controls trials (RCT) typically overcome these biases. Indeed, an RCT conducted in Hyderabad showed that making finance available to borrowers (who were almost exclusively women) stimulated new business creation. In the 15-18 months after the micro-lending program was initiated new business starts rose by one-third (*Banerjee et al., 2012*).

Even if microfinance programs work to stimulate entrepreneurship, the start

⁶BRAC is a large, global development organization dedicated to alleviating poverty which was founded in Bangladesh in 1972.

up, success and growth of women's small businesses in India may be further constrained by societal limits on women's movement and social interaction. For example, *Field et al.* (2010a) trained a randomly-selected sample of poor, self-employed Indian women in basic financial literacy and business skills and encouraged them to identify concrete financial goals. Training positively and significantly affected the probability of a woman taking a loan; had no discernible effect of reporting problems managing her credit; and had no effect on savings rates across treatment and control groups. The effects of training were found to vary according to a woman's caste. Among upper caste women training was highly significant and indicated a 25 percent increase in the probability of engaging in labor market activity. However, women with more extreme caste-restricted mobility and social interaction were found to have too little agency to easily change their aspirations or activities.

Although women's entrepreneurship has been a prime target of microfinance policy and activity in India, the effects of other MSME policies on women's early-stage entrepreneurship remain relatively unknown. Therefore in this study, I estimate the impact of MSME policies to ascertain what if any role other policies play in encouraging female entrepreneurship.

Income

Income is thought to affect the probability of engaging in early-stage entrepreneurship through two main channels, which work as opposing forces for the low-income entrepreneur. First, expected utility theory predicts that as the gap between current income and the opportunity cost of starting a business increases, all things equal, the probability of engaging in entrepreneurship also goes up (*Shane, 2004; Banerjee and Newman, 1993*). Low-income or poor potential-entrepreneurs should have a higher prior likelihood of starting a business relative to high-income individuals with similar characteristics (*Gifford, 1992*).

At the same time, low income individuals are much more likely to experience difficulty accessing finance since few banking and financial services extend to these populations in India. In addition, other constraints may correlate with low-income status. For example, (*Ardagna and Lusardi, 2010*) find that a lower level of individual income level diminishes one's chances of having a social connection to another entrepreneur. Of the more than 118,000 individuals in their sample of respondents to the GEM survey conducted in 37 countries, just 19%

of those with incomes in the lowest third of their country's income distribution have personal social ties to an entrepreneur compared to 44% of middle-income individuals, 32% of upper middle-income individuals and 35% of high-income individuals.

Lower levels of firm ownership have been documented among Scheduled Caste (SC) and Scheduled Tribe (ST) members⁷. Using data from the Economic Census, *Iyer et al.* (2011) find widespread and significant under-representation of SC and ST-members in (mainly) single-proprietor, private, non-agricultural businesses ownership. SC and ST-owned enterprises had fewer employees, were more likely to employ family labor, and belong to the informal and unorganized sectors. Despite very high levels of economic growth during the review period, firm ownership rates have only increased modestly in these subpopulations. There is some evidence of persistent discrimination, for example factors that would typically explain entrepreneurial behavior such as literacy rates, levels of secondary schooling, or the proportion of the population engaged in farming at the state level, negatively correlated with levels of SC and ST business-ownership.

SC and ST members are among the poorest and most disadvantaged members of Indian society who, in addition to their economic constraints, likely face significant social barriers as well. As will be discussed later, a few state MSME policies are specifically designed to address the special circumstances of these populations.

Other state policies in India affect entrepreneurial incentives through their impact on the cost of starting a business, of innovating, and the cost of running a business in future time periods.

1.3 State Policies

In the following section, I review what the cross-country, developing country, and India-focused academic literature knows already about the effects of state

⁷Prior to the 1949 Indian Constitution, Scheduled Caste members, at the bottom of the caste hierarchy, were historically denied property, business, education, civil, cultural, and religious rights. Scheduled Tribe members (comprised of social groups marginalized mainly by geographic and spatial isolation) have also faced poor economic and social prospects. Each group is explicitly recognized in the reservation policy of the 1949 Indian Constitution, which is intended to abolish all forms of discrimination, untouchability and social exclusion. The Constitution provides legal safeguards against discrimination; and promotes the welfare SC and ST members through "reservation policy". This includes reserving seats in Parliament, the State Legislative Assemblies, and Government and public sector jobs in both the Federal and State Governments, see *Thorat and Senapati* (2006).

MSME policies on growth and entrepreneurship. The discussion is organized around the three main policy goals identified during an extensive review of India’s state MSME policies conducted for this study. The state policy information collected from the Ministry of Micro, Small and Medium Enterprises (MMSME)⁸ was collected in 2008 for this and other studies of Indian Entrepreneurship (see *E. Brown and Yoong (2012)*).

As shown in Table 1.1, the main objectives of Indian state MSME policies are: 1) Lowering the cost of starting a business, 2) Stimulating innovation entrepreneurship, and 3) Reducing the cost of running a business. Column two of the table shows the range of policy tools used to achieve these objectives. Although there is a broader policy literature pertaining to MSMEs, the discussion is limited to the set of policies specifically used among the Indian states in this study.

Table 1.1 – Three Main Policy Objectives MSME Policies used Among the Indian States

Policy Objective	MSME Policies Used Among Indian States
Lower the Cost of Starting a Business	Capital Subsidies
	Capital Subsidies to Disadvantaged Populations Single Window Clearance (SWC)
Stimulate Innovation Entrepreneurship	Lower the Cost of Human Capital & Tech Investments
	Facilitate Access to International Markets
	Subsidize Start ups in Targeted, “Growth” Industries
	Promote Special Economic Zones
Reduce the Cost of Running a Business	Improve State Services to Entrepreneurs
	Lower Labor Costs
	Reduce Business Fees

First, I note that the quality of policy studies is variable but improving as new data and methods become available. The highest-quality studies of policy in India have estimated growth-impact using cross-state variation in policy amendments or timing to identify effects. A general result from these queries is that factor market liberalization and promotion of good institutions leads to higher growth levels. For example, *Kochhar et al. (2006)* found that states with weaker institutions and poorer infrastructure⁹ experienced lower GDP and

⁸The Ministry of Micro, Small & Medium Enterprises is a branch of the Indian Government responsible for forming and administering rules, regulations and laws pertaining to micro, small and medium-sized enterprises in India.

⁹Transmission and distribution losses (T&D losses) of state-level electricity boards (as a fraction of generating capacity) are used to jointly measure infrastructure capability and state policies affecting the quality of infrastructure and the business environment.

industrial growth. This was particularly so in the electricity and infrastructure-intensive sectors of the economy. In addition, amending state labor laws - to make them more favorable to workers - led to lowered growth in output, employment, investment, and productivity in the formal manufacturing sector and increased urban poverty (*Besley and Burgess, 2004; Aghion and Zilibotti, 2008*). In contrast, states where laws were changed to encourage land redistribution to laborers and amalgamate farms into viable units experienced higher investment, productivity, and output growth (*Besley and Burgess, 2000*).

Policies to Lower the Cost of Starting a Business

In general, Single Window Clearance (SWC) entry-regulation policies are intended to increase entrepreneurship by reducing the bureaucratic burden associated with formal business registration. Such policies have been widely embraced in both developed and developing countries.

Research conducted across western and eastern European countries, and in a range of other developed and developing countries, suggests that SWC mechanisms encourage MSME entry. Using a sample of five million privately-owned firms in 34 western and eastern European countries, *Klapper et al. (2006)* find a significant adverse effect of high entry regulations on firm entry; especially in industries with already-high entry rates. More entry regulation is also found to crowd-out smaller firms, and lead to a higher rate of larger firms entering.

In another study, heavier entry regulation—measured as official procedure, time and cost of legal entry—of firms in 85 countries is associated with higher corruption, larger unofficial economies, and public and private goods that are no better than those found in less regulated countries (*Djankov et al., 2002*). Countries using electronic registries experience both faster national economic growth and more formal sector expansion (*Klapper et al., 2008*).

In addition to bureaucratic burden, small and entrepreneurial firms often face substantial difficulty accessing credit. A possible credit market failure can arise when small firms present too much risk and too little reward for commercial investment to be tractable. Under these conditions, public capital subsidies have been justified and used to assist credit-constrained entrepreneurs in gaining market access. Recent developing country evidence suggests that small and medium-sized firms indeed lack access to credit (*Banerjee and Duflo, 2008; ?; de Mel et al., 2009a*). By relaxing the credit constraint, the state helps to

enable individuals and small firms to borrow and either finance a new business or expand an existing one. Our review of policies finds that capital subsidy policies are widespread in India with all but two states having implemented them.

Other capital subsidies used in India work to reduce economic disparity by targeting the entrepreneurship of disadvantaged populations. These policies (including micro-lending) involve making concessional loans and incentives available to women, SC and ST members, and individuals living in Backward Areas. Evidence from a randomized control-trial study conducted in Hyderabad showed that making finance available to borrowers (almost exclusively women) stimulated new business creation. After the micro-lending program was started, near term new business starts increased by one third (in the ensuing 15-18 months) (*Banerjee et al.*, 2012).

Although a positive association between states with capital subsidy policies and the number of early-stage entrepreneurs is expected, a possible confounding factor concerns correlated barriers that may still yet impede the probability of starting a business among disadvantaged individuals. Women, SC and ST members, and individuals living in Backward Areas may also face discrimination or have low levels of human and social capital to enable business start up success.

Innovation Policies

A substantial amount of policy attention focuses on stimulating innovation-entrepreneurship. Endogenous growth models predict increasing returns to human capital and technological investment (*Lucas*, 1988; *Romer*, 1986), a result supported by cross-country research (*Barro*, 1991; *Wennekers and Thurik*, 1999; *van Stel et al.*, 2005; *Wong et al.*, 2005; *Audretsch et al.*, 2006). While our outcome of interest, early-stage entrepreneurship, is not a direct outcome in these models, to some degree, growth implies the creation of new firms – which requires entrepreneurship.

Openness to international trade strongly predicts growth and poverty reduction in cross-country regressions and is found to help narrow the gap between rich and poor worldwide (*Dollar and Kraay*, 2004). Export promotion policies are found in many countries, however lowering trade barriers across the board can be problematic in developing country setting. A policy of protecting selected industries while enabling international trade in others, as was done in Taiwan,

South Korea and China (in combination with SEZs), is likely to be most successful (*Rodrik, 2008*).

Careful screening of potential FDI is also important. Cross country comparisons using International Financial Statistics (IMF) and the World Bank's World Development Indicators for countries in Asia, Africa and Latin America over the 1970-1996 period shows that lowering FDI barriers in selected industries leads to higher growth in comparison to across-the-board FDI policies (*Agosin and Machado, 2000*). FDI can also stimulate innovation entrepreneurship by bringing new human and technology capital in the process of exchange. For example, ? demonstrates how Indian-born engineers who trained or worked in Silicon Valley accelerated Information Technology development in India. Although low-cost skilled labor was first exploited to win comparative advantage, returning entrepreneurship also helped to improve worker skills which eventually lead to home-grown innovation and entrepreneurship.

A number of policies work to develop target "thrust" industries and industry-clusters (geographically - concentrated firms in similar and related industries with possible buyer - supplier relationships). However, it is unclear if these efforts will yield positive results or how long it will take to observe them. The process of cluster development has occurred organically, or in response to exogenous shocks in the past (*Feldman and Francis, 2004*). For example, Silicon Valley's loss of the defense industry in the 1980s is thought to have precipitated the growth and commercialization of information and communication technologies, in part, through private entrepreneurship.

However Silicon Valley's agglomeration takes advantage of already-present workforce skills; infrastructure, such as research universities; and know-how, including marketing, venture capital and specialized knowledge of the relevant law to launch, develop, retain, and attract innovative new firms in similar and related industries (*Henton et al., 1997*). In addition to the special combination of factors leading to the Silicon Valley story, is time. A region's economic history affects its future development and the gains derived from industry-focused business attraction may take a considerable amount of time to realize (*Feldman and Francis, 2004*).

Special Economic Zones (SEZ), formally known as Export Processing Zones, are geographic areas designed to attract foreign investment and trade, promote industrialization and stimulate job growth. SEZs typically offer substantial tax

incentives (e.g. tax-free goods and services production within the zone); world-class infrastructure, (e.g. making electricity, information and communication technology, roads, buildings and water supplies both reliable and accessible to firms operating in the zone); and offering quick approval mechanisms to enable businesses to start up quickly and with little friction (*Reddy et al.*, 2009).

SEZ policies are criticized for a range of reasons: they have been known to distort business location decisions; disrupt local labor markets; and promote “land grabbing” which consumes cultivated farmland and puts self-employed farmers out of work. They are also thought to exacerbate inequality. However, recent research in India suggests SEZs actually generate direct and indirect employment of both skilled and unskilled labor in the places where they operate (*Aggarwal*, 2007). If true, this effect may dampen entrepreneurial activity by offering potential entrepreneurs the chance to join a firm rather than risk starting a business. Or, alternatively, a SEZ may stimulate entrepreneurship by attracting small and large businesses to operate under in its enabling environment while creating linkages to firms outside the SEZ—as it is designed to do.

Reducing the Cost of Running a Business

A third class of growth-stimulating policies is intended to reduce the cost of running a business. Efforts include: 1) improving state services to entrepreneurs through training field officers, making technology improvements to business development offices, easing the number of state inspections and making business registration easier to accomplish; 2) creating incrementally more flexible labor regulations, by allowing more hours in the working week, or removing minimum wage and worker compensation protections; and 3) reducing the fiscal and administrative running costs businesses face, for example by reducing the state’s cut of business transactions and the cost of business per se, through reductions in the value-added tax (VAT) for business and excise tax subsidies.

As was previously noted, cross-national evidence shows that reducing the bureaucratic burden of small businesses is associated with increased formal sector participation and growth (*Klapper et al.*, 2006, 2008; *Djankov et al.*, 2002). Changes making state-level labor regulations more favorable to Indian workers led to lower output, employment, investment, and productivity in the formal manufacturing sector and an increased in urban poverty (*Besley and Burgess*, 2004; *Aghion and Zilibotti*, 2008). Last, in a study of corporate tax rates in 85

countries, (*Djankov et al.*, 2010) report that higher effective tax rates impose robust, adverse impacts on aggregate investment, FDI, and entrepreneurial activity. However, their research indicates little if any significant impact of VAT tax on entrepreneurship rates. Therefore, the relationship between observed levels of early-stage entrepreneurship is likely to depend on the exact combination of taxes used in each state.

The following section describes the data used in the study. Data reflecting the responses of adult early-stage entrepreneurs from the Global Entrepreneurship Monitor's (GEM) is merged with data from a wide range of other sources.

1.4 Data

The data set matches state level demographic and policy information together with individual-level information including entrepreneurship experience for respondents in 15 Indian states. Micro-level entrepreneurship data comes from the GEM 2006 Adult Population Survey in India (*Global Entrepreneurship Monitor*, 2006); state demographic information from the Indian Census (*of India*, 2001); data on economic devolution from the Ministry of Panchayati Raj (*of Applied Economic Research*, 2009); and state policy information comes from a novel data set developed for several policy studies using information collected from the MMSME (*E. Brown and Yoong*, 2012)

A limited number of states were selected on the basis of their: 1) population size and economic activity; 2) whether they were included in the 2006 Global Entrepreneurship Monitor Survey; and 3) the availability of official state documentation on industrial policy. The fifteen states analyzed make up about 90% of India's population according to the 2001 Indian Census, including: 1) Andhra Pradesh, 2) Assam, 3) Bihar, 4) Gujarat, 5) Haryana, 6) Karnataka, 7) Kerala, 8) Madhya Pradesh, 9) Maharashtra, 10) Orissa, 11) Punjab, 12) Rajasthan, 13) Uttar Pradesh, 14) Tamil Nadu, and 15) West Bengal.¹⁰

Role of State-level MSME Policies in India

The Indian Constitution gives states considerable power to make laws pertaining to economic development. However, economic growth is a goal shared by

¹⁰2001 Census tables are available at http://www.censusindia.gov.in/Census_Data_2001/Census_data_finder/A_Series/Total_population.htm

both the Federal and State governments (*Government of India*, 2007-08; *Planning Commission, Government of India*, 2008). State-level MSME policies are offered in addition to incentives given at the Federal level. The 1949 Indian Constitution empowers states with legislative authority over the majority of domains relevant to the relationship between states and business, including the regulation of industries; the production, supply and distribution of goods; and the regulation of trade unions and industrial disputes. States relate to the private sector through their respective Investment Promotion Agencies (IPA) – organizations which have existed in all states since the mid-1960s, (with the exception of Bihar’s IPA which was founded in 2006) (*Cali et al.*, 2011; *Besley and Burgess*, 2000, 2002a, 2004).

The state policy data set was constructed to enable quantitative and comparative study of policy variation across 15 of India’s states. The content of 15 state-level policy documents available from the Office of the Development Commissioner, of the (MMSME) was extensively reviewed for the study.¹¹

Each of the state policy documents constitutes a five-year plan enacted at some point during the 1999-2007 period. Policies are typically updated about every five years—resulting in a series of five year plans for each state. Review of five-year plans before and after the focus period suggests most policies change marginally, rather than substantially from planning period to planning period.

The documents’ typically present an overview of MSME goals followed by succinct statements describing the policies. MSME goals may reflect a national, regional or global level of competition. For example, in Gujarat, the goal is “to be the Asian Leader in Industrial Growth and to transform Gujarat to be a major player in the Global Arena.” In Tamil Nadu, the mission is to accelerate development by maximizing investment, output, growth, employment and manufacturing competitiveness through infrastructure and human resources development in the MSME sector.

According to the MMSME, “while most of the institutional support services and some incentives are provided by the Central Government, others are offered by the state governments in varying degrees to attract investments and promote small industries with a view to enhance industrial production and to gener-

¹¹Available at <http://www.dcmsme.gov.in/policies/policies.htm> (formerly found at www.laghu-udyog.com/policies/state/spolicies.htm). Following links from the website, all state industrial policy information and documentation used in the analysis was downloaded on July 3, 2008.

ate employment in their respective States.”¹² The Central Government’s major reform initiatives began with removing compulsory licensing requirements for the vast majority of industries in 1991. Since that time, Central Government policy has evolved to promote foreign trade and foreign investment; investment by non-resident Indians; the development of backward areas and women’s entrepreneurship; quality standards, including a scheme subsidizing ISO 9000 certification; pollution and environmental controls; and tax and excise subsidies as well as making cheap credit widely available through the Small Industries Development Bank of India. ¹³ State policies give incentives on top of the national policies but their content overlaps with and enhances what is offered at the national level. The package of policies for each state is presented in Table 1.3. States vary in terms of the combination of MSME policies adopted.

Although it is unclear if states are required to file a policy statement with the MMSME¹⁴ a page on the MMSME website provides links to policy statements for all states. Omitted policy data could present a serious problem leading to bias. However, data are unlikely to be missing for several reasons. First, states stand to lose substantial business revenue if wide and effective policy dissemination prevents access to information that will help entrepreneurs start, formalize, and grow. Second, all states filed a policy document, suggesting a powerful norm of reporting, even if not required. Third, policy data was collected just prior to the enactment of new small business legislation (the Micro, Small and Medium Enterprises Development Act, 2006), after a review of all state policies was completed by the MMSME. These factors suggest a reasonable degree of accuracy in state reporting.

¹²Note, this quoted description of the relationship between Central Government and State policies is found on the MMSME website available at <http://dcmsme.gov.in/policies/policies.htm>, accessed in July 2008.

¹³For more discussion of this topic, see the Policies page on the Development Commissioner (MSME) website, available at <http://www.dcmsme.gov.in/policies/policies.htm>

¹⁴Although the website contains the URL for each state’s MSME policy, it is unclear if states are required to report their policy statements. An extensive search of Ministry documentation did not find rules explicitly stating the requirement that states submit policy documentation to the ministry, and efforts to contact Ministry officials continue to be unsuccessful.

Table 1.2 – India State Policy Groupings

Policy Group Description / Economic Development Goals	Policies aggregated into the group
Openness	FDI subsidies and export subsidies
Human Capital & Technology Assistance	Subsidies for ISO certification, R&D, marketing assistance, technical assistance and other human capital subsidies
Subsidy for Capital & Financing	State subsidies and concessional loans or other financing to MSME firms
Special Treatment of Individuals	Subsidies for women and Scheduled Caste and Scheduled Tribe entrepreneurs
Incentives for Special Economic Zones	Special Economic Zones are business-enabling environments where tax incentives, low-cost capital, fast-track policy approvals (single window clearance) and other incentives are used to spur the creation, expansion and competitiveness of specific businesses
Single Window Clearance Policy	Policies intended to reduce and streamline the bureaucratic burden of the state on new business start ups by locating all services in a single office
Policies to Improve Business Environment	Reduced stamp duty, flexible labor regulations, and business-friendly subsidies
Special Treatment of Industry	Tax subsidies, power, land, sick industries, and environmental impact, support for infrastructure, target industries, incentives for technology clusters

Each of the policy groups in Table 1.2, constitutes a unique factor characterizing a states' economic development goals. Policies such as Human Capital and Technology Assistance policies—including subsidies for businesses making investments in the knowledge and skills of workers or in making technology improvements; Openness policies—designed to open the state economy to foreign investment and trade; and SEZ policies—subsidizing or encouraging the development of special economic zones; and Business Environment policies—including incentives to reduce the business tax burden and enable a more business-friendly climate all reflect logical mechanisms for achieving MSME growth according to endogenous growth theory *Lucas (1988); Romer (1986)*.

The groupings also reflect national goals to improve the MSME sector as stated in the Central Government Policies and Schemes for the MSME sector – such as

improving finance opportunities for MSME's, making economic growth more equitable by assisting disadvantaged individuals, improving the start-up environment in specific sectors, and providing modernization and training opportunities for businesses.¹⁵

Table 1.2, documents how state policies were categorized for analysis. A total of eight policy groups, listed in rows, and 15 states given in the columns were analyzed. The numbers given in the cells reflect the number of policies each state held in the policy category. For example, Andhra Pradesh had two categories of Openness policies, one reflecting a FDI policy and the other reflecting a trade openness policy. Importantly, a diverse range of policies is distributed across the states and no single group or state dominates.

A cursory review of the policy by state matrix shown in Table 1.3 confirms that policy groups designed to generate innovation and growth, remove entry barriers or improve the business climate more generally dominate the environment. For example, thirteen of fifteen states have adopted policies to train staff and improve available technology at district offices responsible for economic development. Likewise, all but one state had adopted a SWC policy—designed to reduce the bureaucratic burden of starting a business by the end of 2006. Only a few policies specifically address the special treatment of disadvantaged populations, e.g. women and the members of scheduled castes and scheduled tribes.

Table 1.3 – State Policy Matrix

Policies	Andhra Pradesh	Assam	Bihar	Gujarat	Haryana	Karnataka	Kerala	Madhya Pradesh	Maharashtra	Orissa	Punjab	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal
Openness	2	1	0	0	1	0	1	2	2	1	1	2	0	1	0
SEZ	1	0	0	1	0	0	0	0	1	0	1	0	0	1	0
Human Capital/Tech	5	2	1	5	5	3	3	4	3	4	1	2	5	5	1
SWC	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1
Business Environment	2	1	2	0	0	1	3	2	3	1	2	1	2	3	2
Capital/Finance	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1
Individual Special Treatment	2	1	2	0	1	1	1	2	0	0	0	1	2	2	0
Industry Special Treatment	8	4	5	3	4	4	5	7	5	6	7	6	7	8	3

¹⁵For more discussion on national and state policies, see <http://www.dcmsme.gov.in/policies/cpolicy.htm>

GEM Adult Population Survey of India, 2006

The analysis uses cross-sectional GEM data collected in India in 2006. In sum, 1999 face-to-face surveys were conducted with adults aged at least 18 years using a sampling frame comprised of voter's records.¹⁶ The sample is designed to be representative at the country level and to adequately represent the urban and rural populations *Manimala* (2002). Data are not representative at the state level, which affects the empirical strategy in two ways: First, between-state comparisons are made invalid by the lack of information on selection probability at the state level; and the empirical strategy relies on between-state variation in both entrepreneurship and policies to identify effects.

Respondents to the GEM Adult Population Survey are first asked a generic battery of demographic questions and screened for entrepreneurial behavior. Only those found to be engaged in entrepreneurship (about 12% of the Indian sample) are asked the full set of survey questions. These additional questions ascertain the degree of innovativeness, competitiveness, and growth expectations of early-stage and established business owners, as well as the existence and characteristics of social environments conducive to entrepreneurship. Other questions assess the entrepreneur's motivation, how actively involved the respondent is in business creation (as an owner or manager), for what amount of time wages have been paid to labor, and other questions about cost, start-up time, financial sources, expected returns to investment over time, and job creation.

GEM's benchmark measure of entrepreneurial activity, the Total Entrepreneurial Activity (TEA) index is used to identify individuals actively involved in the initial stages of the entrepreneurial process (*Reynolds et al.*, 2005). TEA is constructed from a respondent's positive response to any of the three following questions:

Are you, alone or with others:

- currently trying to start a new business independently of your work?
- currently trying to start a new business as part of your work?
- currently the owner or manager of a business less than 42 months old?

¹⁶GEM APS were conducted in India in 2001, 2002, 2006, and 2007. The 2001 "pilot" survey data is not representative, and therefore is not used. The 2007 data lack state-level identifiers and are still in process by GEM India.

Any adult involved in the initial stages of starting a new business either independently or as part of his or her work is considered an entrepreneur; this includes those currently owning or managing a business less than 42 months old (a new business).

GEM Data Reliability Three studies comparing GEM data against results from other surveys reveal that GEM’s estimated levels of entrepreneurship are comparable but measure a qualitatively different kind of entrepreneurial behavior. *Reynolds et al. (2005)* compares GEM’s estimated entrepreneurship levels against the official national new firm registrations for 13 developed countries in various years between 2000 and 2003. Of the 13 countries reviewed, official new firm counts in six countries fall within GEM’s 95% confidence interval of entrepreneurship levels, four are “close” and three are “much higher”. The authors caution that even though the counts are similar, the GEM estimates measure an earlier stage of entrepreneurial behavior in comparison to official business registrations.

In a separate study, *Acs et al. (2008)* compare the results of the World Bank Group’s Entrepreneurship Survey (WBGES), measuring formal business registration of LLCs against two measures of early-stage entrepreneurship in GEM. Their comparison shows a 0.93 correlation between baby entrepreneurship rates (GEM) and incorporation (WBGES), and similar to the results described above, highlights GEM’s measurement of early stage entrepreneurial activity.

In another study, *Ardagna and Lusardi (2010)* compare GEM outcomes to the Flash Eurobarometer survey for individuals living in countries covered by both surveys in the 2000-2003 period. The studies report similar levels of entrepreneurship despite substantial sample size differences: 6.37% for GEM and 6.53% for the Flash Eurobarometer Surveys.

State-level Dataset

Census 2001 data¹⁷ is used to compile total population, demographic composition, literacy rate and poverty for each Indian state included in our analysis. These data are merged with the information from the GEM Adult Population Survey and with state level information on industrial policies for analysis.

¹⁷Data are available from the Indian Census tables: http://www.censusindia.gov.in/Census_Data_2001/Census_data_finder/Census_Data_Finder.aspx

Ministry of Panchayati Raj Dataset

State-level data from the Ministry of Panchayati Raj is also merged with the GEM data set. The Ministry of Panchayati Raj is a branch of the Government of India responsible for all matters pertaining to the Panchayati Raj and its system of local governance institutions. These state-level, democratic institutions are organized in three tiers (district, intermediate, and village-level). Despite having existed for years, they have lacked central financing and functional authority and their relevance and performance has been uneven across states. While Panchayats have been effective and strong in some states they have been weak in others. In 1993, under the 73rd amendment, the Union Government of India required states to devolve 29 functions to local governance institutions within the Panchayati Raj system. As a result, they were formally empowered to take responsibility for many aspects of local welfare including poverty alleviation, health and public distribution, the maintenance of community assets, as well as primary and secondary education, among others (*of Applied Economic Research*, 2009).

A total of 29 functions traditionally handled by the state were devolved to the Panchayats; 11 of these were officially designated “economic functions.” These functions include responsibility for small scale industry and craft industry development and land development – functions that could directly influence early-stage entrepreneurship. I develop a measure of the percentage of 11 economic functions states have officially devolved to the local, Panchayat level. These data are merged with the information from the GEM Adult Population Survey and with state level information on industrial policies for analysis.

1.5 Descriptive Statistics

After merging the GEM and state-level datasets our final dataset of 1386 observations¹⁸ includes individuals ages 18-64 who have been screened for participation in entrepreneurial activity. To focus the estimation on the decisions of early-stage entrepreneurs, 91 “ever entrepreneurs” (established business owners) were dropped from the sample.

¹⁸Some observations were dropped because of missing values. Adults from Delhi (UT) were dropped because there would be no corresponding state-level information on policies to match with individual-level data available for the capital region.

Unweighted (weighted) sample respondents have an average age of 35 (36) years and 40% (50%) are female. Note that Appendix Table 4.3 gives unweighted summary statistics for individual and policy data at the state level. In brief, 61% (59%) of sample respondents report having social ties to an entrepreneur and 51% (48%) report having the skills necessary to start a business. Just 8% of established business owners reported having social ties whereas 19% of early-stage entrepreneurs did, a key difference between the two groups. As shown in Table 1.4, approximately 66% (62%) of sample respondents report monthly household incomes in the lowest income category of Rs 5000 or less.¹⁹

Table 1.4 – Weighted Sample Distribution of Household Income

Household Income Level	Mean	Std. Dev.
Rs 5000 or less	0.66	0.013
Rs 5001-10000	0.19	0.011
Rs 10001-15000	0.07	0.007
Rs 15001-20000	0.03	0.005
More than Rs 20000	0.04	0.005

A monthly household income of Rs 5000 or less (roughly equivalent to an annual household income of Rs 60,000 in 2006) is roughly equivalent to the average monthly household income reported by female microfinance clients in a West Bengal program in 2007 (*Field et al.*, 2010b). And for comparison purposes, is well below the subsistence level of income (Rs. 90,000) given in a 2004 National Council of Applied Economic Research (NCAER) report (*Shukla et al.*, 2004).

India’s poverty statistics are a source of debate (*Deaton and Kozel*, Fall 2005). The percentage (66%) estimated at an income of Rs. 60,000 using GEM in 2006 reflects a lower level of income among a larger population as compared results reported elsewhere (*McKinsey Global Institute*, 2007). However, as has been widely documented in the literature, individuals tend to underreport income for various reasons ?. Indeed, authors of the 2002 GEM India report state that underreporting is consistent across the population; although reported incomes are probably too low, the percentage of respondents in the category are accurate (*Manimala*, 2002).

With respect to self-reported educational attainment, about 6% of respondents

¹⁹National-level statistics reported are weighted to be representative of the 18-64 labour force, adjusted using census data

report having no education, 42% achieved primary education, 19% completed a secondary education and 33% hold a college degree.²⁰

Entrepreneurial Behavior

Of the 1,386 valid observations used in the analysis, 185 individuals— 13.3% (12.7%) of all respondents—report currently participating in early-stage entrepreneurial activity. The percentage of entrepreneurs varies widely across states, as shown in Table 1.5, below, a fact we exploit in our empirical strategy.

In addition, this variation in the number of entrepreneurs also extends to their gender. In sum 63 of 185 early-stage entrepreneurs in the sample are women and about 14.7% of male respondents and 11.3% of female respondents were involved in early-stage entrepreneurial activity. The gender difference in early-stage entrepreneurial prevalence is relatively small, which is consistent with rates found in other low-income and middle-income countries using GEM data (*Allen et al.*, 2006).

Table 1.5 – Early-stage Entrepreneurship by State and by Gender

State	Observations			Entrepreneur			
	Total	Male	Female	Total	Male	Female	Percentage
Andhra Pradesh	58	34	92	7	2	9	10%
Assam	42	30	72	24	15	39	54%
Bihar	41	27	68	1	0	1	1%
Gujarat	44	40	84	9	14	23	27%
Haryana	57	30	87	5	4	9	10%
Karnataka	62	33	95	13	7	20	21%
Kerala	62	34	96	10	1	11	11%
Madhya Pradesh	23	16	39	1	1	2	5%
Maharashtra	86	53	139	12	4	16	12%
Orissa	54	39	93	11	8	19	20%
Punjab	21	19	40	0	0	0	0%
Rajasthan	29	37	66	1	0	1	2%
Tamil Nadu	110	64	174	7	5	12	7%
Uttar Pradesh	48	38	86	2	0	2	2%
West Bengal	92	63	155	19	2	21	14%
Total	829	557	1386	122	63	185	13%

Low-income entrepreneurs are defined as individuals whose monthly household income is Rs. 5,000 or less, and who are engaged in any early-stage en-

²⁰Statistics reported at the national level for India are weighted

entrepreneurial activity. Table 1.6 shows that about 66% (62.6%) of the sample is low-income and 11.7% of all individuals at this level of household income are engaged in entrepreneurship. Although there are a large number of low-income entrepreneurs in the sample (107 are low-income entrepreneurs out of a total of 185 entrepreneurs), the rate of low-income entrepreneurship no different from the rate in the other income categories.

Table 1.6 – Share of Early-stage Entrepreneurs by Household Income

Household Income Level	Entrepreneur Status						
	No	Yes	Obs.	Mean	Std. Dev.	Min	Max
Rs 5000 or less	107	770	877	0.122	0.3275	0	1
Rs 5001-10000	51	244	295	0.173	0.3788	0	1
Rs 10001-15000	12	100	112	0.107	0.3107	0	1
Rs 15001-20000	8	37	45	0.178	0.3866	0	1
More than Rs 20000	7	50	57	0.123	0.3311	0	1
Total	185	1201	1386	0.133	0.2402	0	1

However, low-income entrepreneurship does vary across states.²¹

1.6 Empirical Methods

The relationship between the state-level policy environment and individual choice to engage in entrepreneurship is estimated using a multivariate linear regression model. The baseline model controls for both state and individual-level characteristics shown to influence entrepreneurial choice in the empirical literature. The baseline analysis is extended to consider how specific policies affect the choice of low-income individuals to engage in entrepreneurship. A major finding from this analysis is the importance of individual social ties²². Regardless of income level, those with social ties to other entrepreneurs are much more likely to engage in entrepreneurship than individuals without them.

Our baseline regression model predicts entrepreneurship as a function of state policies, state controls and individual characteristics. This model is constructed as follows:

²¹Chi-square tests of independence validate that observed differences are statistically significant.

²²The endogeneity of social ties and early stage entrepreneurship is fully explored in (*Brown*, 2012b)

$$Y_{is} = \alpha + \beta X'_i + \phi P_s + \gamma C_s + \varepsilon_{is} \quad (1)$$

In Equation (1) Y_{is} is a binary indicator of entrepreneurial activity equal to 1 if individual i in state s reports starting, owning or managing a business either alone or in conjunction with others and 0 otherwise; X'_i is a vector of individual characteristics including gender, self-assessed entrepreneurship skills (hasskill) and an indicator of whether the respondent has personally known another entrepreneur within the last two years (knowent); P'_s is a vector of indicator variables for the grouped policies as shown in Table 1.3; and C'_s , a vector of state-level variables controlling for population size and income levels and the percentage of state economic functions devolved to the local Panchayats. Since the outcome variable is binary, the coefficients express the marginal probability of a change in $Y = 1$ associated with a unit change in X'_i or any of the other regressors specified in the model.

The GEM data set offers a static, cross-sectional view of entrepreneurship across 15 of India's states in 2006. Between-state differences in the level of entrepreneurship could arise from unobserved state characteristics or historical factors not captured with available data. For example, a state with a long-established seaport may have more entrepreneurship because of its historical access to international markets through trade; or in another state, a strong-willed politician may have enacted policies favoring entrepreneurship, leading to a predominance of entrepreneurs. A fixed-effects specification controls for both the historically-rooted and omitted variables that could lead to different levels of entrepreneurship across states. Equation (2) estimates this relationship using a linear probability model with individual-level characteristics and state-level dummies;

$$Y_{is} = \alpha + \beta X'_i + \delta F'_s + \varepsilon_{is} \quad (2)$$

where Y_{is} indicates participation in early-stage entrepreneurship, X'_i is a vector of individual characteristics, F'_s is a vector of state dummies, and ε_{is} the error term.

Since India's poverty rate is high (an estimated 27% of the population live below the poverty line), Equation(1) is extended to test the impact of low-income status on early-stage entrepreneurship with the addition of a simple

binary indicator of low-income status (LI) in Equation (3) as shown, below:

$$Y_{is} = \alpha + \beta X'_i + \chi LI'_i + \phi P_s + \gamma C_s + \varepsilon_{is} \quad (3)$$

Next, to examine the effect of policies on low-income entrepreneurial activity, Equation (3) is extended to include a set of terms interacting LI (low-income) with each of the policy groupings, as shown in Equation (4) below. Coefficients derived from the interactions should be interpreted as the marginal effect of the policy on the early-stage entrepreneurial behavior of low-income individuals:

$$Y_{is} = \alpha + \beta X'_i + \chi LI'_i + \phi P_s + (\phi LI'_i \cdot P_s) + \gamma C_s + \varepsilon_{is} \quad (4)$$

Taking another look at the specific effects of the right hand side variables on low-income entrepreneurship, the sample is divided in half, retaining only those whose incomes are Rs. 5,000 or less. The same regression specification is run on this sample of 782 low-income individuals, as shown in Equation (5).

$$Y_{is} = \alpha + \beta X'_i + \phi P_s + \gamma C_s + \varepsilon_{is} \quad (5)$$

To further explore how polices affect the entrepreneurial behavior of Indian women, a final model interacts being female with each of the policy groupings as shown in Equation (6) below.

$$Y_{is} = \alpha + \beta X'_i + \eta F_i + \phi P_s + (\phi F'_i \cdot P_s) + \gamma C_s + \varepsilon_{is} \quad (6)$$

1.7 Results

Policies and Early-stage Entrepreneurship

The estimated coefficients and their associated t-statistics from the benchmark regression are reported in Table 1.7. All specifications include robust standard errors. Since the outcome is binary, coefficients should be interpreted as the marginal effect of the regressor on levels of early-stage entrepreneurship. Policies with a similar objective but that may use different mechanisms are grouped together to facilitate the ensuing results discussion. The policy discussion is

followed by a discussion of individual characteristics affecting early-stage entrepreneurial behavior.

Table 1.7 – Baseline Regression Results

Early-stage entrepreneurship	b	t
Female	-.022	-1.21
Social Ties	0.095***	5.17
Self-reported Skills	0.108***	5.10
Age	0.001	0.23
Age ²	0	-0.29
Openness	0.028*	2.03
SEZ	-0.109*	-2.30
Human Capital / Technology	0.031***	3.49
Single Window Clearance	-0.085*	-2.09
Business Environment	-0.043**	-2.65
Capital / Finance	0.253***	5.08
Individual Special Treatment	-0.022	-0.68
Industry Special Treatment	-0.066***	-5.81
Economic Devolution	-0.286***	-3.36
Log 2005 Income	-0.209***	-5.49
Log Population 2001	0.008	0.18
Cons	2.308*	2.56
N	1254	
R ²	0.158	

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust z statistics in brackets. Results from multivariate regression with the individual choice to engage in entrepreneurship as the dependent variable, and with the individual as the unit of observation. Logit and probit specifications yield similar results in terms of coefficient magnitude, sign, and significance.

By a wide margin, policies making capital and finance more readily available to MSME entrepreneurs—through state subsidies, concessional loans and other financing—increase the amount of observed early-stage entrepreneurial activity after controlling for individual and state demographics. Such policies are positively associated with elevated levels of early-stage entrepreneurship by a 0.25 margin—with significance at the 1% level.

When capital subsidy policies are targeted towards disadvantaged individuals, however, I find little or no associated effect on levels of early-stage entrepreneurship. In addition, the coefficient on Individual Special Treatment policies is negative but cannot be statistically differentiated from zero.

The set of states that have adopted Single Window Clearance policies exhibit sig-

nificantly less (-.085) early-stage entrepreneurship as compared with the states that have not adopted such policies (with significance at the 10% level).

Openness policies, including policies to increase foreign direct investment are associated with 0.028 more early-stage entrepreneurship in the states that have adopted them – a positive and significant impact across India.

At the same time, policies assisting small firms to make foundational investments in people and their skills, and policies providing firms with subsidies to make technological developments or outreach to new customers through marketing assistance are positively and significantly (at the 1% level) associated with higher levels of early-stage entrepreneurship. The presence of human capital and technological assistance policies correlates with .031 more early-stage entrepreneurship. This finding is broadly consistent with the literature linking human capital and technological investment to economic growth (*Lucas, 1988; Barro, 1991*).

But the presence of a Special Economic Zone - a specialized duty free zone within a state where business is enabled by duty exemption, tax incentives, the availability of low-cost capital, the availability of higher-quality infrastructure, and fast-tracked policy approvals is negatively and significantly (at the 10% level) associated with early-stage entrepreneurial activity. A SEZ within state bounds is associated (-0.109) less early-stage entrepreneurship in comparison to the states without a SEZ policy.

Last, policies targeting specific industries and industry-clusters reduce early-stage entrepreneurial activity by a statistically significant margin of about (-0.066).

Finally, when looking across all 15 Indian states, the impact of policies intended to improve the state's business environment is negative (-0.43) and significant at the 5% level. Our finding contrasts with research showing that improving state governance²³ is strongly and significantly related to new firm entry rates (*Klapper et al., 2008*). However, both the policies and outcomes measured differ in the two studies. Klapper et. al. estimate effects on firm registration and formalization, while our study examines early-stage entrepreneurship. In addition, the policies measured are not directly comparable in the two studies.

²³As measured using six dimensions development by Kaufmann, et al. (2006), including voice and accountability, political stability, government effectiveness, regulatory quality and the rule of law and corruption control.

In addition to the state policies, the model also controls for the number of economic functions the state has devolved to Panchayats – including policies that would make them responsible for land and small scale industry-development. Devolving a larger percentage of economic policies to the local level is negatively associated with less early-stage entrepreneurial activity. The coefficient (-0.286) is significant at the 1% level.

Individual Characteristics

Table 1.7 reports several important individual variables affecting early-stage entrepreneurship. I find a positive and significant association of having social ties to another entrepreneur—individuals reporting having social ties to another entrepreneur are 0.095 more likely to be engaged in early-stage entrepreneurship. Additionally, self-assessed entrepreneurial skills also stands out as having a strong and significant impact on engaging in early-stage entrepreneurial behavior – and is associated with 0.108 higher probability of engaging in early-stage entrepreneurship.

In line with other empirical studies, being female is negatively (but in our case not significantly) associated with entrepreneurship and the effects of age are found to be nonlinear.

A range of other variables were tested and excluded in the process determining model fit. Theoretically relevant variables were excluded for reasons of multicollinearity or because they offered little additional explanatory power. For example, self-assessed entrepreneurial skills correlates with personal income, educational attainment and fear of failure, yet it alone explains more of the variance in early-stage entrepreneurship than each of the other variables alone or combined and is therefore best used on its own. As has been well-documented in the literature, confidence and over-confidence in one’s abilities is highly associated with entrepreneurial behavior (*Shane, 2004*). Although the individual’s perception of social receptivity to entrepreneurship as a career choice has been found important in the empirical literature, the addition of perceptions contributes little explanatory power to the model.

Although the GEM APS survey questionnaire asks many excellent questions, there is little information collected regarding the respondent’s family. Factors such as a spouse’s income, the number of dependent children in the household, and family land ownership is missing from the questionnaire. As a result, we

cannot control for these factors in this study despite their importance in the literature (*Banerjee et al.*, 2012).

Controlling for State Differences

Table 5 reports the results of estimating Equation (2) showing coefficients on the state dummy variables, $\delta F'_s$ while controlling for individual characteristics. State dummies are jointly significant across the outcome (early-stage entrepreneurship) which suggests that the variation in individual attributes is insufficient to explain differences in the levels of entrepreneurship observed across states.

The relative magnitude of the coefficients, (state dummy variables) indicates how states differ in terms of their entrepreneurship levels while controlling for respondent's individual differences. Note that the omitted state is Madhya Pradesh—and all statements are therefore relative to that baseline. The fixed effect is largest in Assam, Orissa, Gujarat, and West Bengal which suggests that something in these states affects the propensity of the individuals in this sample to report more frequent involvement in early-stage entrepreneurship.

Table 1.8 – OLS with State Dummies

Early-stage entrepreneurship	b	t
Female	-0.019	-1.03
Social Ties	0.081***	4.46
Self-reported Skills	0.117***	5.55
Age	0.002	0.29
Age ²	0.000	-0.47
Andhra Pradesh	0.080	1.50
Assam	0.549***	7.99
Bihar	-0.061	-1.40
Gujarat	0.199**	3.24
Haryana	0.039	0.77
Karnataka	0.110	1.93
Kerala	0.014	0.27
Madhya Pradesh	0.000	(.)
Maharashtra	0.072	1.41
Orissa	0.201***	3.36
Punjab	-0.114**	-2.78
Rajasthan	0.035	0.75
Tamil Nadu	0.014	0.32
Uttar Pradesh	0.008	(-0.19)
West Bengal	0.115*	2.36
Cons	-0.060	-0.55
N	1254	
R ²	0.192	

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust t-statistics in brackets. OLS regressions results with early-stage entrepreneurship as the dependent variable, and the individual as the unit of observation. Model 2 presents fixed-effect results run with state dummy variables. All fixed effects should be interpreted relative to the omitted state's baseline (Madhya Pradesh).

Low-income Entrepreneurs

This section discusses the results of estimating Equations (3), (4), and (5) which each studies a dimension of how low-income status effects early-stage entrepreneurship.

Table 1.9 – Low-income Estimations

Entrepreneurship	[3] OLS		[4] OLS		[5] OLS	
	b	t	b	t	b	t
Low-Income [LI]	-0.024	-1.12	-0.105	-0.32		
Age	0.001	-0.09	-0.003	-0.22	0.003	0.53
Age*LI			0.006	0.42		
Age Squared	0	0.17	0	0.32	0	-0.66
Age Squared*LI			0	-0.57		
Female	-0.02	-1.08	-0.018	-0.55	-0.022	-0.96
Female*LI			-0.003	-0.08		
Social Ties	0.094***	5.06	0.099**	2.90	0.090***	4.05
Social Ties*LI			-0.007	-0.18		
Self-Reported Skills	0.107***	5.07	0.134***	3.84	0.089**	3.18
Self-reported Skills*LI			-0.043	-0.98		
Openness	0.029*	2.11	0.101**	(2.7)	0.005	0.36
Openness*LI			-0.097*	-2.40		
SEZ	-0.112*	-2.37	-0.133	-1.81	-0.128*	-2.05
SEZ*LI			-0.008	-0.12		
Human Capital / Technology	0.031***	3.48	0.005	0.27	0.047***	4.46
Human Capital / Technology*LI			0.040*	2.22		
Single Window Clearance	-0.086*	-2.12	-0.098	-1.24	-0.06	-1.24
Single Window Clearance*LI			0.037	0.40		
Business Environment	-0.046**	-2.79	-0.112***	-4.13	0.002	0.07
Business Environment*LI			0.106**	3.10		
Capital / Finance	0.246***	4.96	0.365***	4.11	0.188**	3.08
Capital / Finance*LI			-0.185	-1.92		
Individual Special Treatment	-0.027	-0.84	0.054	1.10	-0.07	-1.67
Individual Special Treatment*LI			-0.128**	-2.62		
Industry Special Treatment	-0.065***	-5.66	-0.075***	-3.71	-0.064***	-4.03
Industry Special Treatment*LI			0.015	0.62		
Economic Devolution	-0.296***	-3.47	-0.290**	-2.65	-0.321**	-2.80
Economic Devolution*LI			-0.044	-0.41		
Log 2005 Income	-0.212***	-5.59	-0.215***	-5.50	-0.234***	-4.80
Log Population 2001	0.015	0.33	0.023	0.43	0	-0.01
Cons	2.259*	2.49	2.211*	2.11	2.679*	2.04
N	1254		1254		782	
R ²	0.159		0.174		0.163	

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust t statistics in brackets. Model (3) results from multivariate regression with the individual choice to engage in entrepreneurship as the dependent variable, and with the individual as the unit of observation. Model (3) modifies model (1) by adding a low-income status indicator. Model (4) includes terms interacting low-income status with other variables and policies; Model (5) is estimated using the sample of 819 low-income respondents. Logit and probit specifications yield similar results in terms of coefficient magnitude, sign, and significance.

The coefficient on the low-income term (LI) in Equation (3) represents the marginal effect of low-income status on early-stage entrepreneurship. As shown in Table 1.9, this effect is negative, but cannot be statistically differentiated from zero. When the other individual and state-level factors are controlled, low-income individuals are slightly less or just as likely to engage in early-stage entrepreneurship as everyone else in the sample. A review of the magnitude, sign, and significance of the other model coefficients suggests that adding low-income status to the model has a negligible impact on the model's fit.

Table 1.9 also presents the results of the (low-income * policy) interaction coefficients estimated in Equation (4). The interaction-term coefficients should be interpreted as the marginal probability of a low-income agent engaging in early-stage entrepreneurship in the presence of the specified policy. A statistically significant result provides evidence of a policy's heterogeneous effect and implies non-trivial dependence upon the respondents' low-income status. As shown in Table 1.9, several of these terms are significant.

A very interesting result of estimating Equation (4) is the lower level of low-income entrepreneurship observed in states with policies promoting the Special Treatment of disadvantaged individuals. While the main effect of the Individual Special Treatment policies cannot be differentiated from zero, the marginal effect on the targeted group of disadvantaged individuals is negative and significant at the 5% level. This is a somewhat counterintuitive finding since Individual Special Treatment policies are specifically designed to encourage the entrepreneurship of disadvantaged and presumably, low-income individuals. The results could suggest these policies are ineffective, however, the possibility of a biased coefficient resulting from policy endogeneity cannot be ruled out. This could occur if states with Individual Special Treatment policies were each responding to the exceptional need or exceptional demand of low-income entrepreneurs within their borders.

A second interesting result is the positive effect of Human Capital/Technology policies on low-income entrepreneurship. Once variation by the respondent's income status is allowed, it becomes evident that the majority of the policy's positive effect results from its impact on the low-income group. Once these two groups are analyzed separately, the coefficient on the low-income interaction term is shown to be positive and significant at the 10% level, while the main effect is positive but cannot be differentiated from zero.

The effects of Openness policies and Business Environment Policies on low-income entrepreneurs are each in the opposite direction of their main effects. While the main effect of Openness policies is positive and significant, they are negatively correlated with the entrepreneurship of low-income agents at the 10% level of significance. The main effect of Business Environment Policies is negative but for the low-income population, a positive and significant correlation is noted.

Interaction coefficients on the remaining policies are not significant; indicating that the policies are either equally as effective or ineffective for both groups. This is likewise true for the individual regressors in the model; entrepreneurial social ties are equally as important for low-income individuals as they are for higher income individuals and individuals reporting they have the skills and knowledge to start a business are equally likely to do so regardless of income status.

Finally, the results of our split sample equation indicate that having social ties to another entrepreneur has an equally large effect regardless of low-income status. The coefficients on social ties in Equations (3) and (5) are similar (0.094 and 0.090, respectively). In comparison to the results of Equation (3), a substantial difference in the relative impact of self-reported skills is noted. Individuals in the general sample who self-report having the skills necessary to start a business experience 0.107 more entrepreneurship than those without these skills. In comparison, the impact of self-reported skills for respondents in the split sample (containing only low-income individuals) is lower but still positive, with an estimated 0.089 more entrepreneurship. Secondly, the results show that although the sign on the Individual Special Treatment policy is negative, the estimated impact is not significant. This finding does not conflict with the interactions resulting from Equation (4), although the result is weaker because of information loss resulting from dropping more than 500 observations (40% of the sample) to run the split sample regression.

According to the results of estimating Equation (5), Human Capital /Technology Policies and Capital/Finance Policies are positively associated with entrepreneurship in the subgroup of low-income respondents. Early-stage entrepreneurship is negatively affected by Industry Special Treatment and SEZ policies and Economic Devolution is associated with less entrepreneurship in this group.

Women Entrepreneurs

In addition to the low-income subgroup, gender-policy interactions were also explored, with regression results shown in Table 1.10, below. The results of estimating Equation (6) indicate that all but one of the coefficients on the female interaction terms were non-significant; a majority of policies affect early-stage entrepreneurship among women no differently than for men. In addition, women's self-reported skills and social ties do not appear to differentially affect female entrepreneurship—women reporting these attributes are just as likely to choose entrepreneurship as men, all things equal.

The negative and significant coefficient on the estimated interaction of Business Environment Policies and being female suggests that women residing in states with active Business Environment Policies participated less in early-stage entrepreneurship. Business Environment policies are designed to improve the state's business services to entrepreneurs and small businesses; make labor regulations more flexible for MSMEs and reduce and simplify the number of fees related to business start up and early-stage running costs. It is possible that female entrepreneurs fail to benefit from these policies, however, without more detailed analysis or greater insight through existing literature (none has been identified) it is difficult to draw a strong inference from this solitary result.

Since millions of women have been reached with microfinance and other capital instruments in India (*Banerjee et al.*, 2012; *Halder and Mosley*, 2004), the positive but not significant coefficient resulting from the interaction of female status with Capital/Finance policies, is striking, as is the result that Individual Special treatment policies are not significantly correlated with female entrepreneurship in this sample. Without detailed historical microdata, it is difficult to distinguish if the levels of female entrepreneurship currently observed were achieved through state or national policy mechanisms. In addition, it is hard to know what effect capital/finance and individual special treatment policies have had on changing historical levels of women's entrepreneurship. A possible area for further research entails examining the evolution and spread of policies targeting women's entrepreneurship to ascertain if they have indeed helped women achieve close parity in entrepreneurship rates - although with the caveat that the gender gap in women's entrepreneurship prevalence is lowest among low and middle income countries (*Allen et al.*, 2006), suggesting other factors - such as individual opportunity cost, social expectations of women or macroeconomic

growth could play a large role in the observed result.

Table 1.10 – Female Interaction Terms

Entrepreneurship	[F] OLS	
	b	(t)
Female	-0.033	-0.12
Low-income	-0.014	-0.51
Low-income*Female	-0.032	-0.74
Age	-0.002	-0.21
Age*Female	0.006	0.58
Age-squared	0	0.21
Age-squared*Female	0	-0.70
Social Ties	0.092***	3.90
Social Ties*Female	-0.001	-0.03
Self-reported Skills	0.118***	4.74
Self-reported Skills*Female	-0.037	-0.84
Openness	0.041*	2.25
Openness*Female	-0.036	-1.30
SEZ	-0.121*	-2.25
SEZ*Female	0.024	0.39
Human Capital / Technology	0.024*	2.20
Human Capital / Technology*Female	0.013	0.92
Single Window Clearance	-0.041	-0.75
Single Window Clearance*Female	-0.122	-1.53
Business Environment	-0.018	-0.76
Business Environment*Female	-0.077*	-2.51
Capital / Finance	0.224***	3.81
Capital / Finance*Female	0.052	0.60
Individual Special Treatment	-0.022	-0.59
Individual Special Treatment*Female	-0.01	-0.23
Industry Special Treatment	-0.073***	-4.95
Industry Special Treatment*Female	0.027	1.24
Economic Devolution	-0.287**	-3.04
Economic Devolution*Female	-0.013	-0.12
Log 2005 Income	-0.206***	-5.34
Log Population 2001	0.011	0.24
Cons	2.274*	2.49
N	1254	
r2	0.168	

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust t statistics in brackets. OLS regressions results with any entrepreneurship as the dependent variable, and the individual as the unit of observation. Model [F] includes terms interacting female status with other variables and policies.

1.8 Conclusion

The results suggest that the state policy environment does play a role in impacting early-stage entrepreneurial behavior. The findings pertaining to the general population of early-stage entrepreneurship are broadly consistent with the predictions of endogenous growth theory; MSME policies subsidizing fundamental investments in human capital and technology and those which make capital cheaper and more available are significantly correlated with higher levels of early-stage entrepreneurship. In addition, policies promoting access to foreign markets by reducing trade barriers and promoting foreign direct investment are likewise positively correlated with early stage entrepreneurship.

The benefits of policies designed to reduce the bureaucratic burden the state imposes on MSMEs are less clear. Single Window Clearance and fast track policies (designed to reduce entry barriers for businesses) negatively impact early-stage entrepreneurship. In addition, policies designed to perform industry-targeting through cluster initiatives or by creating Special Economic Zones are associated with less early-stage entrepreneurial activity. And states with policies intended to improve business services to entrepreneurs have less entrepreneurial activity.

Evidence shows that low-income individuals are either slightly less or just as likely to engage in early-stage entrepreneurship as everyone else in the sample. However, the combination of policies found to correlate with higher levels of low-income entrepreneurship is somewhat different. The presence of Human Capital and Technology policies is positive and statistically significant for the low-income subgroup; as are Business Environment Policies—designed to improve state services to entrepreneurs. However, in contrast to the main results, I find that Openness policies (designed to open the state economy to foreign markets and trade) are associated with significantly less low-income entrepreneurship.

The policy mechanism designed to assist low-income entrepreneurs, Special Treatment policies—which target the entrepreneurship of disadvantaged populations with capital subsidies and training—is associated with fewer low-income entrepreneurs, at the 5% level of significance. This policy category is mainly designed to assist women and scheduled caste and tribe members; two groups traditionally marginalized in Indian society. In the absence of policy endogeneity controls, however, it is difficult to infer any robust conclusions from this result. If the estimated coefficient is unbiased, the policy negatively effect en-

entrepreneurship levels in the targeted group. On the other hand, if the result is biased, this conclusion would be entirely misleading.

Areas for Further Research

This result does suggest these policies deserve further scrutiny, presenting an area for additional and more targeted policy research. While the research makes a clear case that state policies play a role in affecting early-stage entrepreneurial choice, the analysis does not identify the mechanisms through which these policies work, nor does it specifically control for bias that can arise from policy endogeneity. To address identification concerns, additional study could focus on a single policy mechanism. A possible case suggested by this research is the set of Individual Special Treatment policies found to negatively correlate with the entrepreneurship of low-income entrepreneurs; a sub population that should ostensibly benefit from them. The clear challenge is to find ways of identifying the policy effect. This requires exogenous variation, through experimentation or natural mechanisms. An alternative means of exploring how policies work use qualitative methods is to identify the role state-level economic development officers play in facilitating linkages between state policies, new businesses and potential entrepreneurs.

Additional research could work to improve the state policy data set. A more nuanced account of state policy variation might involve comparing specific rates and levels of taxation and subsidy offered by the states. The timing of policy “notification” (roughly the equivalent of policy enactment) could also be used to develop an empirical strategy. This has already been done in a study of Single Window Clearance policies across Indian states, see (Yoong et. al.) but could be similarly performed with other state policies.

Last, measures of policy intensity could be developed by collecting new policy data as it becomes available (states issue new five-years plans every five years or so) and tracking incremental policy change within each state over time. New learning regarding state policy effectiveness could come to bear if this information is analyzed in conjunction with newly-released data available from the GEM Consortium on early-stage and nascent entrepreneurship.

2 The Effects of Social Ties on Early-Stage Entrepreneurship in India

Elizabeth Brown

Empirical research has demonstrated the importance of entrepreneurial social ties in explaining entrepreneurial behavior. However, because most studies neither recognize nor control for the endogeneity of this relationship, estimates may be biased. I model and test the impact of social ties on early-stage entrepreneurship in India using microdata. After instrumentation in which the effects of state-level micro, small and medium-enterprise (MSME) policies and individual characteristics are also controlled, I find that individuals reporting social ties are 1.7 times more likely to engage in early stage entrepreneurship in comparison to those who lack such ties. I discuss these results within the context of India's MSME policies and entrepreneurial networking organizations, each of which promotes entrepreneurial social networks in direct and indirect ways.

2.1 Motivation

The benefits of networking relationships among entrepreneurs are found to extend into all phases of the entrepreneurial process from opportunity recognition to business formation, long-term survival and growth. However, most empirical research does not account for the possibility that observed network effects may result from the strategic behavior of entrepreneurs.

If in truth it is not the networks but instead self-selection into entrepreneurship that we observe in our studies, it is very difficult to know if a public policy of networking entrepreneurs – designed to increase the welfare of all society members, rather than a select few – will be an effective way of increasing entrepreneurship in India.

Although India does not currently have an explicit public policy of networking entrepreneurs, this study provides evidence and a rationale in support of developing one. Using past vernacular newspaper circulation during a respondent's formative years in their state of residence and population density as excluded instruments yields a positive and significant instrumented coefficient on social ties, where the outcome is early-stage entrepreneurship.²⁴ Instrumented results

²⁴Results pass overidentification tests indicating exclusion restrictions are satisfied, but instrument strength may not be great enough in many cases for such tests to have good power to reject the null. As a result of these limitations, instrumental variable results should be interpreted with some caution.

indicate the baseline probability of engaging in early-stage entrepreneurship increases by 1.7 times among those reporting entrepreneurial social ties as compared to those lacking such ties.

By controlling for selection, the study identifies the beneficial effects of social ties on the choice to engage in early-stage entrepreneurship in India. This analysis sets the stage for future study of the costs involved in subsidizing the technology of entrepreneurial social ties, and places the study among the few that control for the endogeneity of social ties and entrepreneurship in any setting.

Cross-national research conducted using microdata finds individuals with entrepreneurial social ties have a much higher likelihood of engaging in nascent entrepreneurship (*Ardagna and Lusardi, 2010*) as compared to individuals without such ties. This finding has been repeatedly demonstrated in other countries and contexts (*Davidsson and Honig, 2003; Morales-Gualdrón and Roig, 2005; De Clercq and Arenius, 2006; Mueller, 2006*). However, with some notable exceptions (*Davidsson and Honig, 2003; Lerner and Malmendier, 2011*) few studies address or control for the possibility of omitted variables bias (*Stuart and Sorenson, 2007*).

Although few studies acknowledge the problem, a clear mechanism for bias resulting from reverse causality exists. Individuals could form social connections with entrepreneurs more easily because they are proximal to entrepreneurs. Social ties are less costly and easier to form in places with high entrepreneurial density, clusters of entrepreneurs, or high social acceptance of entrepreneurship (*Minniti, 2005*). In an alternative scenario, individuals with a propensity to start a business seek out like-minded others, for example by forming entrepreneurial social ties as preparation to start a business (*Stuart and Sorenson, 2007*). Without controlling for these factors or other omitted variables affecting the behavior of entrepreneurs, standard empirical methods will generate a biased estimate of the social networking effect in addition to biased coefficients of all regressors.

India's dense, highly pluralistic and longstanding systems of social relations leave a legacy in which social ties or "village capital" (*Kumar and Matsusaka, 2008*) remain a key conduit of economic transaction. Exceptionally low geographic mobility (*Munshi and Rosenzweig, 2009*), a wide array of sub-national vernacular languages and speakers with distinct identities (*Jeffrey, 2000; Singh, 2008*), highly structured social stratification based on caste membership with little intermarriage between groups (*Ambedkar, 1979; Sridhar, 1909*), and a

more challenging entry and labor market regulatory environment (*Ardagna and Lusardi*, 2010) provide a unique context in which social resources can be marshaled to start businesses, and sometimes in new and uprising ways (*Munshi*, 2011). These unique features of the Indian experience provide the context for developing the instruments used to control for the endogeneity in the study.

Encouraging MSME growth and rebalancing growth inequalities is a goal of Indian public policy (*Goswami et al.*, 2008; *Government of India*, 2007-08; *Planning Commission, Government of India*, 2008). Consequently, I explore whether existing social ties may have a useful role to play through three related research questions:

- How could personal social ties to an entrepreneur work to increase the likelihood of entry?
- Within the context of India, what is the causal effect of having social ties to another entrepreneur on entrepreneurial choice after controlling for individual, state and policy differences?
- In what ways do existing state policies promote entrepreneurial social ties or promote entrepreneurial success?

The effects of social ties on occupational choice are first presented in a theoretical framework. The model helps to clarify that any minimal investment in social ties is utility-improving and therefore increasing in the probability of entering entrepreneurship. However, the amount of time and number of connections in which the prospective entrepreneur can productively invest is finite. Investments beyond this level are utility-reducing and result in a higher probability of seeking paid work instead.

Second, the causal effect of social ties on entrepreneurship is estimated using an instrumental variable specification as described previously.

Last, I discuss each of the MSME policy groupings extensively reviewed for the study and evaluate their anticipated impact on entrepreneurial social ties and business success, citing empirical evidence where it is available.

Before introducing the model, I describe concepts and results from the sociological, organizational behavior, and entrepreneurship literature relevant to a key assumption of the model. This discussion is partly motivated by a limitation of the empirical data set used in this analysis. While microdata from the

Global Entrepreneurship Monitor (GEM) documents self-reported social ties for all survey respondents, the information is limited. We know that social ties are: 1) personal 2) entrepreneurial and 3) current (to within two years).²⁵

The research literature suggests social ties play a vital role in economic relationships. Characteristics of social ties affect the quality and flow of information available to the nascent entrepreneur, underscore social norms through both reward and punishment, and impact the confidence the individual has that another network member will 'do the right thing' *Granovetter* (2005).

In general, social ties can perform a bridging or a bonding function. Bridging ties, linking individuals through weak but diverse social networks, (through so-called "structural holes" in the social network) are likely to deliver more novel information (*Burt*, 1999) that may help with innovation. Bonding ties, formed within a tight social network, tend to yield trusted but more consensual and less novel information (*Granovetter*, 2005).

Entrepreneurship is a risky endeavor, solid evidence supports that those with personal ties to another entrepreneur are more likely to enter (*Morales-Gualdron and Roig*, 2005; *Davidsson and Honig*, 2003; *De Clercq and Arenius*, 2006; *Klyver et al.*, 2008). In the process of starting up, nascent entrepreneurs are known to rely on all manner of friends, family, business groups, colleagues and others (*Davidsson and Honig*, 2003).

However, business survival rates are low and many entrepreneurial ventures fail before even their first birthdays (*Aldrich et al.*, 1989). Thus the individual to which the nascent entrepreneur is tied may be just as likely to detect early entrepreneurial failure and assist in minimizing loss, filing bankruptcy, and winding down operations with the least damage possible to personal finances as they are to advise on markets, capital, opportunities, and growth opportunities. Therefore having personal social ties to another entrepreneur may lower the early-stage entrepreneur's risk of loss, relative to those who lack such ties.

The evidence of social ties' effects on firm success, e.g. survival, reaching profits and sustaining growth, suggests that social ties embedded in business networks are important. For example, time spent maintaining personal contacts with

²⁵Note that the measure of social ties to another entrepreneur is binary and dependent on the GEM survey question; whether "you know someone personally who started a business in the past 2 years"

business group members and the density of business-group social networks increased the likelihood of observing a profit among a longitudinal sample of US nascent businesses three years old and younger (*Aldrich et al.*, 1987).

Business network memberships were significantly associated with first sale and profitability while other types of ties had no such effect in a study conducted in Sweden. Having parents in business; being encouraged by family or friends; having close friends or neighbors in business; having contact with an assistance agency and being a member of a business start-up team, or being married; were found to have no relationship to nascent firm's success (*Davidsson and Honig*, 2003).

Last, despite the high visibility of wildly successful entrepreneurial firms, only a tiny minority of companies experience exceptionally high growth – and more often than not, these were selected, vetted and advised by venture capitalists (*Shane*, 2009, 2008), through a subset of highly-specialized entrepreneurial networks (*Shane and Cable*, 2002)

Instead, the average firm begins with few resources and seeks to create a wage-substitution rather than high-growth business. With data from the Global Entrepreneurship Monitor covering entrepreneurs in 34 countries, *Shane* (2009) estimates that the typical start-up required only about \$11,400 in capital during the 1998 to 2003 period. Therefore, for the average entrepreneur, an individual, personal tie to another entrepreneur is an unlikely predictor of exceptional returns.

The next section introduces logic to explain how an investment in social ties affects the choice to engage in entrepreneurship. It is followed with the literature review, data, methodology, and results sections of the paper.

2.2 How Entrepreneurial Social Ties Impact Expected Utility

The purpose of this model is to explore how the aspiring entrepreneur's investment in social ties interacts with their decision to either enter into entrepreneurship or remain a worker within a two-period expected utility framework. Prior to the start of the first period, each individual learns his or her exogenously-given level of access to social ties technology. A high level of technology enables easy

access to valuable entrepreneurial social ties. However, a low endowment—which may arise from geographic or social distance—that makes access difficult.

With knowledge of their own technology endowment, the individual must choose either to prioritize future consumption by strategically investing in developing social ties to another entrepreneur or else to consume all her wage earnings. The endogenous variable θ_i is the amount of time the agent chooses to invest in developing social ties. The heterogeneity of θ_i ²⁶ is in terms of the choice of time investment in forming or improving social ties. Any investment costs the agent the opportunity to earn wages, leading to a lower level of consumption in the first period due to a budget constraint. Aspiring entrepreneurs with a low technology endowment are discouraged from making any investment.

In the second period, the agent chooses whether to remain a wage-earner or to become an entrepreneur; risking the certainty of her wages for the possibility of either earning profits or going bankrupt. Should the agent choose entrepreneurship, any first-period investment acts as insurance by reducing the risk-spread associated with expected entrepreneurial profits. For example, experienced entrepreneurs can advise aspiring entrepreneurs during the start-up period by encouraging self-protective behavior in the event of loss and resource conservation and investment in the face of success. Thus a key assumption of the model is that the presence of social ties to another entrepreneur insures against some of the volatility expected in period two entrepreneurial profits.

The individual’s lifetime utility depends on present (c_1) and future consumption (c_2), and an exogenously-given rate of time preference, (d). All wealth is consumed in each period, with the exception of wealth invested in social ties. Utility is modeled over two periods where the $U(c) = \ln(c)$ represents the risk averse agent’s preferences. Thus for the risk-averse agent, lifetime expected utility is as follows:

$$EU = [u(c_1) + dE[u(c_2)]] \quad (2.1)$$

All agents earn a labor market wage (w_1) in the first period. And each determines how much of that wage to consume (c_1) and how much to invest in strengthening social ties to one or more entrepreneurs, θ . Current consumption

²⁶To simplify notation, I drop the subscript i in all subsequent instances where θ appears. The heterogeneity of θ as described here, remains.

is therefore the amount labor income (w_1) remaining after an investment in social ties is made:

$$w_1 = c_1 + \theta \quad (2.2)$$

The agent's second period decision revolves around the occupational choice between wage employment and entrepreneurship. Should the agent choose wage employment, she earns and consumes the wage (w_2) in the second period. If on the other hand, the agent chooses entrepreneurship, she faces one of two possible outcomes: success (π_s) with a probability p and bankruptcy (π_b) with a probability $1 - p$. Where the payoffs to each outcome are ranked as follows $\pi_b < w_2 < \pi_s$.

While the possibility of entrepreneurial returns carries more risk relative to wages, the entrepreneur gains a premium for assuming this additional uncertainty. Expected entrepreneurial profits yield a higher value in comparison to second-period wages: $E\pi = w_2 < p\pi_s + (1 - p)\pi_b$.

Under the condition that an investment in social ties is made, the agent's expected entrepreneurial profit is as follows: $E(\pi|\theta) = p[\pi_s - (1 - p)\theta] + (1 - p)[\pi_b + p\theta]$ where the investment in social ties preserves the expected value of profits but at the same time reduces the risk spread associated with entrepreneurial profits in period two. The full expression for the payoff in the successful entrepreneurial state entails that $\pi_b + \theta < \pi_s$.

Two conditions in the first and second period limit the size and extent of the entrepreneur's investment in social ties. In the first period, since agents cannot consume more than they earn:

$$\theta \leq w_1 \quad (2.3)$$

Second, the entrepreneur makes a social ties investment that's equal to or greater than zero but that's no greater than the difference in entrepreneurial profits under success and bankruptcy conditions. These boundaries are given by:

$$0 \leq \theta \leq \pi_b - \pi_s \quad (2.4)$$

Entrepreneur's and Worker's Expected Utility

The agent will maximize utility subject to the first and second-period budget constraints by solving two maximization problems and comparing her utility across the expected utility of entrepreneurship $[EU_e]$ and wage employment $[EU_w]$. She chooses the occupation offering the highest possible level of utility for the investment made in social ties.

By substituting the entrepreneur's first- and second-period budget constraint into the expected utility function (2.1), the risk-averse entrepreneur's maximization problem:

$$\max_{\theta} EU_e = [\ln(w_1 - \theta)] + d[(p) \ln(\pi_s - (1-p)\theta) + (1-p) \ln(\pi_b + p\theta)] \quad (2.5)$$

The first order conditions for a maximum, entrepreneur:

$$\frac{\partial EU_e}{\partial \theta} = d \left[\frac{p(1-p)}{\pi_s - (1-p)\theta} + \frac{p(1-p)}{\pi_b + p\theta} \right] - \frac{1}{w_1 - \theta} = 0 \quad (2.6)$$

yield the result;

$$d \left[\frac{p(1-p)}{\pi_s - (1-p)\theta^*} + \frac{p(1-p)}{\pi_b + p\theta^*} \right] = \frac{1}{w_1 - \theta^*} \quad (2.7)$$

at the optimum, the entrepreneur chooses a non-zero level of investment in social ties to equilibrate the discounted marginal benefit of her expected profits with the marginal investment cost made in the first-period and $\pi_s - \pi_b \geq \theta > 0$. With any positive investment in social ties, both sides of (2.8) is positive and some positive level of investment θ^* can be found to satisfy the interior conditions for a maximum.

The worker's maximization problem is as follows:

$$\max_{\theta} EU_w = [\ln(w_1 - \theta)] + d[\ln w_2] \quad (2.8)$$

The first order conditions for a maximum, for the worker:

$$\frac{\partial EU_w}{\partial \theta} = -\frac{1}{w_1 - \theta^*} = 0 \quad (2.9)$$

In this instance, the boundary condition prevails and the worker's optimal strategy is to make no investment in social ties. Therefore, for the worker, the $\theta^* = 0$

Condition Necessary to Choose Entrepreneurship

Equation (2.10) is used to evaluate how the agent makes a choice between entrepreneurship and performing paid work in the labor market at the optimal level of social ties investment, θ^* . Equation (2.10) states the condition $[EU_e \geq EU_w]$ required for the individual choose entrepreneurship. If the condition is not true, the agent will achieve more utility from remaining a worker.

$$[\ln(w_1 - \theta^*)] + d[(p) \ln(\pi_s - (1-p)\theta^*) + (1-p) \ln(\pi_b + p\theta^*)] \geq \ln(w_1) + d \ln(w_2) \quad (2.10)$$

The agent will choose entrepreneurship when the expected utility of entrepreneurial profits in the presence of θ^* is equal to or exceeds the value of wage income across the two periods.

Comparative Statics

The optimal choice of theta is a function of the exogenous variables (p, w_1, w_2 , and d) and the agent will adjust θ investment in response to small changes in them. In this section, I evaluate whether small increases in the exogenous factors increase or decrease the probability of the conditions required for the agent to choose entrepreneurship being met.

Exogenous Factors Increasing in the Probability of Choosing Entrepreneurship

Small changes in the probability of success p ; and in first period wages, w_1 are increasing in the probability of choosing entrepreneurship by making the conditions stated in (2.10) more likely. To explore these, we first take the derivative of (2.10), with respect to the probability of success for the entrepreneur. Since p does not enter into the worker's utility function at all, a small change in p will have no effect on the worker's decision process.

$$\frac{\partial EU_e}{\partial p} = -\frac{1}{w_1 - \theta^*[p]} + d(\text{Log}[S] - \text{Log}[B]) + d\left(\frac{p(\theta^*[p] + (-1 + p))}{S} - \frac{(-1 + p)(\theta^*[p] + p)}{B}\right) \quad (2.11)$$

where $S = \pi_s - (1 - p)\theta^*$ and $B = \pi_b + p\theta^*$

and, applying log rules, we can rewrite (2.11) and evaluate the sign on the first term using the payoff structure, $\pi_b < w_2 < \pi_s$.

$$d\left(\ln\left[\frac{S}{B}\right] + \frac{p(\theta^*[p] + (-1 + p))}{S} - \frac{(-1 + p)(\theta^*[p] + p)}{B}\right) \quad (2.12)$$

Since the payoffs in the profit state always exceed the payoffs in a bankruptcy state, the first term is larger than one and its log will be positive. The other two terms are positive and therefore all three terms are positive. According to (2.12) a small increase in the probability of success increases the agent's utility in entrepreneurship but has no effect on the worker's utility payoff. As the probability of success rises, the chances of the conditions stated in (2.10) are more likely to be met and with that, the choice to enter entrepreneurship goes up. The second derivative of (2.10) with respect to the probability of success yields a negative term, indicating the probability of success increases at a decreasing rate to the maximum level of benefit for the investment in social ties.

Taking the derivative of (2.10) with respect first-period wages gives the following result:

$$\frac{\partial EU_e}{\partial w_1} = \frac{1}{w_1} \quad (2.13)$$

$$\frac{\partial EU_w}{\partial w_1} = \frac{1}{w_1 - \theta^*} \quad (2.14)$$

In (2.13) and (2.14), both terms are positive indicating that the individual's expected utility increases in both entrepreneurship and work with any positive change in period one wages. However, the denominator $(w_1 - \theta^*) < w_1$ so any small increase in w_1 makes the entrepreneur's expected utility rise relatively

faster than the worker's. Since the worker's optimal level of social ties investment is zero as shown in (2.9), the worker's first period wage will be larger than the entrepreneur's. A lower first period wage increases the chances of selecting entrepreneurship by increasing the probability that the conditions stated in (2.10) are met.

Exogenous Factors Decreasing in the Probability of Choosing Entrepreneurship

A small increase in second period wages w_2 and in the discount rate (rate of time preference), d will alter the conditions required to make the utility-maximizing occupational choice.

$$\frac{\partial EU_w}{\partial w_2} = \frac{d}{w_2} \quad (2.15)$$

$$\frac{\partial EU_e}{\partial w_2} = 0 \quad (2.16)$$

Since $\frac{\partial EU_e}{\partial w_2} \frac{1}{-w_1 + \theta^*[w_2]} + \left(\frac{d(-1+p)p(\pi_b - \pi_s + \theta^*[w_2])}{\pi_s + (-1+p)\theta^*[w_2]} \right) \theta'[w_2] = 0$

Since $d > 0$, (2.16) is positive, the worker's expected utility rises as the second period wages increase. Since second period wages carry no uncertainty, a positive change increases expected utility without adding any additional risk. This decreases the chances that the conditions in (2.10) are met and increases the chances that the agent chooses to remain a worker.

$$\frac{\partial EU_e}{\partial d} = p \ln [\pi_s (-1+p) \theta^*[p]] + (-1+p) \ln [p\theta^* + \pi_b] \quad (2.17)$$

In (2.17) note that a small increase in the discount rate makes the agent value second period consumption less than she does first period consumption. A rise in the discount rate decreases the agent's chances of choosing entrepreneurship, because she's more willing to forgo first period consumption for an investment in social ties and realize a higher level of utility from her in gains in period two.

2.3 Discussion

The model helps to clarify three important aspects of the role social ties and public policy can play in promoting entrepreneurship. First, the model predicts that a non-zero investment in social ties is the utility-maximizing decision for the aspiring entrepreneur. Any minimal investment in social ties is utility-improving, however, the amount of time and number of connections in which the entrepreneur can productively invest is finite. Investments beyond this level are utility-reducing and increase the chance of selecting paid labor instead.

Second, aspiring entrepreneurs consider their exogenously-given access to the technology of forming social ties before choosing how much they will invest (θ) in forming or improving social ties to other entrepreneurs. Because access is heterogeneously distributed across the population, some aspiring entrepreneurs without access will choose to make no investment. This will lower their probability of choosing entrepreneurship. A public policy of subsidizing the cost of social ties technology among aspiring entrepreneurs may be the optimal strategy in a society that wants to promote entrepreneurship.

Third, small changes in first period wages and the probability of entrepreneurial success increase the expected utility in entrepreneurship and therefore the chances of entry. A positive change in period two wages has the opposite effect, reducing the expected utility in entrepreneurship and increasing the chances of remaining a worker. Last, an increase in the discount rate favors the choice to remain a worker.

Last, the model is constructed with social ties as an endogenous choice variable because the literature supports the idea that the choice to invest in social ties is anticipatory (*Stuart and Sorenson, 2007*) and evidence from the sample of Indian entrepreneurs in the GEM data set is suggestive. Just 8% of established business owners reported having social ties whereas 19% of early-stage entrepreneurs did, a statistically significant difference at the 1% level. Indeed when business ownership is substituted as a binary outcome in our benchmark regression framework, the reported coefficient on social ties is .002 and non-significant.

2.4 Social Ties and Nascent Entrepreneurship

As noted previously, entrepreneurial social ties have received a great deal of attention in the literature. Studies conducted in both developed and developing countries generally find that those with social ties to entrepreneurial family members, work colleagues, and friends are more likely to start a business. For example, in China, having ties to entrepreneurial friends and family positively impacts the choice to start a business (*Djankov et al.*, 2006). A colleague's entrepreneurship experience raises the individual's chances of starting a business by 5% (*Nanda and Sorensen*, 2009) in Denmark. The proportion of entrepreneurial relatives and school friends is much higher among entrepreneurs (42% and 53% respectively) than it is among non-entrepreneurs (20% and 23% respectively) in Russia (*Djankov et al.*, 2005). And knowing another entrepreneur significantly increases the chances of becoming one when data from 37 developing and developed countries in the Global Entrepreneurship Monitor (GEM) is analyzed (*Ardagna and Lusardi*, 2010).

In terms of effect size, according to *Mueller* (2006) a self-employed parent increases a child's chances of being self-employed by an estimated factor of 1.5, using data from the German Socioeconomic Panel (SOEP) in combination with data from the German Social Insurance Statistics of nascent entrepreneurship. In Sweden, entrepreneurial parents increase the odds of being a nascent entrepreneur by a factor of 1.4; encouraging friends increases nascent odds by a factor of 1.9; and ties to close entrepreneurial friends or neighbors increases nascent entrepreneurship odds by two times *Davidsson and Honig* (2003).²⁷

However, new evidence suggests that social context matters and that not all entrepreneurial ties increase entrepreneurship. For example among graduates of Harvard Business School, an individual's exposure to a higher proportion of experienced entrepreneurs (randomly assigned to the same class section) reduced the likelihood of starting a business in the ten years after graduation. And although it was found that those who did start businesses were more likely to succeed, the result was not statistically significant (*Lerner and Malmendier*, 2011).

Moreover, there is some suggestive evidence that entrepreneurial motivation

²⁷The results of this study are particularly interesting because it is one of the few studies to overcome bias arising from self-selection into entrepreneurship, an issue common to many other studies. This was accomplished by establishing treatment (engaged in nascent activity) and control groups after screening 30,000 randomly-selected Swedes at the study's outset.

affects the prevalence of ties. Individuals who report pursuing a business opportunity have a higher prevalence of social ties (3%) as compared with those pursuing entrepreneurship out of necessity (0.5%) *Ardagna and Lusardi* (2010).

And last, a lower level of income is associated with fewer entrepreneurial social ties. Of the more than 118,000 individuals in their sample, just 19% of those with incomes in the lowest 33rd of their country's income distribution have personal social ties to an entrepreneur compared to a 44% of middle-income individuals, 32% of upper middle-income individuals and a 35% of high-income individuals (*Ardagna and Lusardi*, 2010).

2.5 Data

For a complete description of the data set, please see *Brown* (2012a). Briefly, the data set used in this analysis matches state level demographic and MSME policy information together with microdata from the Global Entrepreneurship Monitor's (GEM) 2006 Adult Population Survey in India (Global Entrepreneurship Monitor (2006)). State demographic information is from the Indian Census (*of India*, 2001); data on economic devolution from the Ministry of Panchayati Raj (National Council of Applied Economic Research(2009)); state policy data were collected from the Ministry of Micro, Small and Medium Enterprises.

The instrumental variables were developed using historic state variation in vernacular language newspaper circulation and population density from the Economic Organization and Public Policy Programme's (EOPP) Indian States Data Base (*Besley and Burgess*, 2002b).

EOPP Indian States Data Base

The Economic Organization and Public Policy Programme (EOPP) Indian States Data Base has been used in several papers coauthored by T. Besley and R. Burgess (see for example *Besley and Burgess* (2002a))²⁸. The Media and Socioeconomic data files summarizing newspaper circulation data by language (including vernacular, English and Hindi-language papers) across 16 states between the years 1954 – 1998 are used in the present study. All media data originate from the Press in India annual reports of the Registrar of Newspapers

²⁸ Available at <http://sticerd.lse.ac.uk/eopp/research/indian.asp>

for India; Ministry of Information and Broadcasting. Annual state population figures over the 1958 – 1998 period come from the Socioeconomic data files (*Besley and Burgess, 2004*) based on the Database on Poverty and Growth in India²⁹. The Socioeconomic files also contain a measure of state land area, in sq. kms (LAREA) from the Registrar of General, Ministry of Home Affairs, India³⁰. These data are merged with the master data set to perform an instrumental variables estimation procedure which is described in detail in a later section of the paper.

2.6 Descriptive Statistics

After merging the GEM and state-level datasets our final dataset of 1386 observations³¹ includes individuals ages 18-64 who have been screened for participation in entrepreneurial activity. To focus the estimation on the decisions of early-stage entrepreneurs, 91 established business owners were dropped from the sample. Appendix Table 4.4 reports weighted sample statistics for individuals in the sample.

On average, unweighted (weighted) sample respondents have an average age of 35 (36) years and 40% (50%) are female. Of the 1,386 valid observations used in the analysis, 185 individuals—13.3% (12.7%) of all respondents—report currently participating in early-stage entrepreneurial activity. About 61% (59%) of sample respondents report having social ties to an entrepreneur and 51% (48%) report having the skills necessary to start a business. Just 8% of established business owners reported having social ties whereas 19% of early-stage entrepreneurs did, a key difference between the two groups.

Approximately 66% (62%) of sample respondents report monthly household incomes in the lowest income category of Rs 5000 or less.³² A monthly household income at the lowest level of 5000 Rs or less was roughly equivalent to an annual household income of Rs 60,000 in 2006, which is “deprived”, well below subsistence level of Rs 90,000 (*Shukla et al., 2004*). However, under reporting of

²⁹World Bank data set prepared by Ozler, Datt and Ravallion (1996) as part of the research project on ‘Poverty in India 1950-1990’ as the ultimate source.

³⁰Land area data come from the Statistical Abstract, published by the Central Statistical Organization, Department of Statistics, Ministry of Planning, India.

³¹Some observations were dropped because of missing values. Adults from Delhi (UT) were dropped because there would be no corresponding state-level individuals

³²National-level statistics reported are weighted to be representative of the 18-64 labour force, adjusted using census data

household income may be as much an issue in the GEM sample as it is elsewhere (*de Mel et al.*, 2009b). First, GEM results are inconsistent with other estimates. For example, the McKinsey Global Institute (2007) reports that about 45% of India’s population lives at Rs 90,000 which compares to an estimated 66% at Rs 60,000 estimated using in GEM 2006. The 2002 GEM India report acknowledges that reported incomes are probably too low, but underexposing is consistent and the percentage of respondents in the category accurate according to the GEM report (*Manimala*, 2002).

With respect to self-reported educational attainment, nearly 6% of respondents report having no education, 41% achieved primary education, 19% completed a secondary education and 34% hold a college degree.³³

2.7 Empirical Methods

The relationship between social ties and the individual choice to engage in entrepreneurship is estimated using a multivariate linear regression model. The baseline model controls for both state and individual-level characteristics shown to influence entrepreneurial choice in the empirical literature as well as state MSME policies as follows:

$$Y_{is} = \alpha + \theta K'_i + \beta X'_i + \phi P_s + \gamma C_s + \varepsilon_{is} \quad (1)$$

In equation (1) Y_{is} is a binary indicator of entrepreneurial activity equal to 1 if individual i in state s reports starting, owning or managing a business either alone or in conjunction with others and 0 otherwise. K'_i is the key parameter of interest, indicating whether the respondent has personally known another entrepreneur within the last two years (social ties); X'_i is a vector of individual characteristics including gender, self-assessed entrepreneurship skills (self-reported skills). P'_s is a vector of indicator variables for the grouped policies as shown in Table ??; and C'_s , a vector of state-level variables controlling for population size and income levels, and the percentage of state economic functions devolved to the local Panchayats. Since the outcome variable is binary, the coefficients express the marginal probability of a change in $Y = 1$ associated with a unit change in T'_i or any of the other regressors specified in the model.

³³Statistics reported at the national level for India are weighted

The GEM data set offers a static, cross-sectional view of entrepreneurship across 15 of India’s states in 2006. Between-state differences in the level of entrepreneurship could arise from unobserved state characteristics or historical factors not captured with available data. For example, a state with a long-established seaport may have agglomerations of entrepreneurs taking advantage of international linkages; or in another state, a strong-willed politician may have enacted policies favoring the entrepreneurship of specific social groups, leading to a predominance of entrepreneurs. A fixed-effects specification controls for both the historically-rooted and omitted variables that could lead to different levels of entrepreneurship across states. Equation (2), estimates this relationship using a linear probability model with individual-level characteristics and state-level dummies;

$$Y_{is} = \alpha + \theta K'_i + \beta X'_i + \delta F'_s + \varepsilon_{is} \quad (2)$$

where Y_{is} indicates participation in early-stage entrepreneurship, K'_i indicates a personal tie to another entrepreneur within the last two years; X'_i is a vector of individual characteristics, F'_s is a vector of state dummies, and ε_{is} the error term.

2.8 Results

The estimated coefficients and their associated t-statistics from the benchmark regression are reported in Table 2.1. All specifications use robust standard errors. Weights are not used in regression specifications.³⁴ Since the outcome is binary, coefficients should be interpreted as the marginal effect the regressor on levels of early-stage entrepreneurship. The missing household income category is the highest level, which is monthly household income > Rs 20001 and all income results should be interpreted relative to that baseline.

After controlling for individual characteristics and MSME policy differences across states, results presented in Table 2.1 show a positive association of social

³⁴Note that all regressions have been performed with and without weights. Applying of population-representative weights in the regression specification makes little difference in the estimated effect of social ties. However, weighted estimation does reduce statistical power, as measured by small increases in standard errors. For example, the weighted coefficient on social ties was .09508 with a Standard Error of .0193945 while the unweighted coefficient using the same specification was .0941279 with a Standard Error of .018491. Weighted regression results are available upon request.

ties to another entrepreneur at the 1% level of significance. Social ties are found to marginally increase the probability of early-stage entrepreneurship by 0.092 percentage points. Additionally, self-assessed entrepreneurial skills also stands out as having a strong and significant impact on engaging in early-stage entrepreneurial behavior – and is associated with an estimated 0.095 higher probability of engaging in early-stage entrepreneurship.

Table 2.1 – Baseline Regression Results

Early-stage entrepreneurship	b	z
Social Ties	.092***	4.69
Self-reported Skills	.095***	4.69
Female	-.019	-1.10
Age	.000	0.11
Age ²	-.000	-0.29
Hhold Income: Rs 5000 or less	.017	0.41
Hhold Income: Rs 5001-10000	.062	1.25
Hhold Income: Rs 10001-15000	-.003	-0.06
Hhold Income: Rs 15001-20000	.092	1.23
Openness	.042*	2.94
SEZ	-.089*	-2.17
Human Capital / Technology	.027***	3.25
Single Window Clearance	-.069	-1.26
Business Environment	-.037*	-2.31
Capital / Finance	.116***	4.35
Individual Special Treatment	-.023	-0.80
Industry Special Treatment	-.049***	-5.31
Economic Devolution	-.136*	-2.09
Log 2005 Income	-.114**	-3.20
Log Population 2001	.010	0.26
N	1254	
Pseudo R^2	0.1922	

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust z statistics in brackets. Results are marginal effects reported after estimating unweighted multivariate probit regression with the individual choice to engage in entrepreneurship as the dependent variable, and with the individual as the unit of observation. Logit and OLS specifications yield similar results in terms of coefficient magnitude, sign, and significance.

Controlling for State Differences

Table 2.2 reports the results of estimating equation (2) showing coefficients on the state dummy variables, $\delta F'_s$ while controlling for individual character-

istics. State dummies are jointly significant across the outcome (early-stage entrepreneurship) which suggests that the variation in individual attributes is insufficient to explain differences in the levels of entrepreneurship observed across states. After controlling for state differences, we find that social ties remains a significant (at the 1% level) and positive factor affecting entrepreneurial behavior. The marginal effect of social ties is to increase early-stage entrepreneurial behavior by an estimated 0.083 in comparison to those who do not report entrepreneurial social ties.

Table 2.2 – Fixed Effects Regression

Early-stage entrepreneurship	b	z
Social Ties	.083***	4.16
Self-reported Skills	.101***	4.93
Female	-.018	-1.02
Age	.001	0.10
Age ²	-.000	-0.34
Hhold Income: Rs 5000 or less	.027	0.64
Hhold Income: Rs 5001-10000	.060	1.20
Hhold Income: Rs 10001-15000	.003	0.06
Hhold Income: Rs 15001-20000	.121	1.51
N	1215	
Pseudo R ²	0.2133	

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust t-statistics in brackets. Probit regressions results with early-stage entrepreneurship as the dependent variable, and the individual as the unit of observation. Model 2 presents fixed-effect results run with state dummy variables (coefficients not shown).

However, despite this finding, we can not rule out the possibility of a bias arising from omitted variables. Steps are taken to control for this bias using an instrumental variables procedure, as described in the following section.

2.9 Instrumental Variable Results and Validation

The endogeneity of social ties and early-stage entrepreneurship is addressed using an instrumental variables estimation procedure, which is valid under two conditions. First, the instrument must strongly correlate with the regressor of interest—having social ties to another entrepreneur—and second, the instrument must meet the exclusion restriction. The first condition is met when the Cragg-Donald Wald F-statistic of excluded instruments in the first stage regression exceeds the Stock-Yogo weak ID test critical values (*Baum et al.*, 2007;

Stock and Yogo, 2005). The exclusion restriction requires that the instrument explain the respondent’s general level of social capital without simultaneously correlating with factors that predict entrepreneurship (*Wooldridge, 2002*). A discussion of the instruments— population density and past vernacular newspaper circulation—follows.

Instruments

The instruments consist of two factors—one at the state and the other at the combined state and individual level—that facilitate agent’s developing general social ties by lowering the cost of doing so in the state of residence.

Research shows that the spatial proximity of individuals facilitates social connections by reducing the agent’s cost of forming new ties; (*Festinger, 1950; Glaeser and Sacerdote, 2000; Glaeser et al., 2002*) residing in a more densely populated state increases an agent’s chances of forming within-state social ties just by having a higher concentration of citizens in physical space.

The first instrument—the log of population density for each state—provides a rough measure of cross-state variation in the simple likelihood of meeting another person:

$$D_s = \ln \frac{\sum_{i=1}^n N}{\sum_{i=1}^s sqkm} \quad (6)$$

Where N is the number of individuals residing in the state and $sqkm$ is state land area given in square miles.

The second instrument—a moving average of vernacular newspaper circulation per capita in the respondent’s state of residence during his formative years (ages 8-16)—measures the individual’s potential exposure to a stock of traditional sub-national social capital in his state of residence.

It is assumed that most agents between 8-16 years are independently capable of consuming and processing available media information, either by reading, discussing or being in the presence of those discussing media content in vernacular language. A primary task of the adolescent life stage is to form a self-identity vis a vis family, society and peers (*Erikson, 1956*). In the process of doing so, I argue that agents become more attuned to social, political and cultural events around them and thus are likely to be influenced by the presence of a community

of vernacular newspaper consumers. In addition, despite vast differences in the circumstantial experience of adolescence, the agent would be at least aware of the common-language communities within social reach.

A common-language community is a geographically bounded group of individuals sharing language. The 1981 Indian Census recognized 18 official languages which vary widely across Indian states (*Jeffrey, 2000*). The data set compiled by (*Besley and Burgess, 2002b*) tracks 19 vernacular-language newspapers. Other studies have used language newspaper circulation to measure the flow of policy information to citizens (*Besley and Burgess, 2002a*) and more recently as one component (print-capitalism) of sub-national identity or “we-feeling” within Indian states (*Singh, 2008*).

In this study, vernacular newspaper circulation as a percentage of state population during the agent’s adolescent period is used to indicate presence of state-level communities of identity whose social transaction cost is lower as a result of three shared characteristics; a) common language, b) unified content, and c) and collective experience: “a mass ceremony. . . a substitute for morning prayers” – a reassuring daily morning ritual of consuming news media in a familiar language shared among readers and those who interact with them. The newspaper reflects the community of readers and – through its mere existence—validates that community’s existence in the public imagination (*Anderson, 1991*). These factors: collective experience; content; and language decrease social distance and lower the cost of engaging in face-to-face dialogue among subgroup speakers.

I am agnostic about whether individual exposure to past vernacular newspaper circulation (as a percentage of state population during their adolescent period) has a positive or negative effect on 2006 social ties to another entrepreneur. A positive and significant coefficient suggests the cost of forming social relations is lowered for everyone, regardless of their personal literacy, language spoken at home, caste or social status. On the other hand, a negative and significant coefficient suggests that social ties are more easily formed within groups, but not across the general population. This would lower social transaction costs within the group, but not more generally. A pattern of high social capital within subgroups is consistent with a largely immobile, traditionally caste-based society and suggests that without intervention, social networking may be highly dependent on historical context.

Each agent’s “formative period” is the range of calendar years over which he

or she was between the ages of eight and 16. Note the selection of the 8-16 range maximizes use of the available newspaper data. Shifting the range forward, for example to the 17-25 age span reduces the number of observations to 686 because no newspaper data will be available for anyone under the age of 33. Using the 8-16 range, the formative period of exposure for an individual who was 50 years old when the 2006 GEM survey was administered is $[2006 - (50 - 8), 2006 - (50 - 16)]$ or the period of eight years from [1964, 1972]. To generalize the notation, summing over the range of formative years [8, 16] for each individual as follows:

The agent's formative period $\in \{s, e\}$

Where the start of the period s for an individual of age a_i at the time of the GEM survey is defined as the year in which the agent was 8 years old

$$s = 2006 - (a_i - 8)$$

and the end period, e is defined as the year in which the agent was 16 years old

$$e = 2006 - (a_i - 16)$$

To calculate the moving average, v_j (state-level vernacular newspaper circulation over the agent's formative period for the state in which he resided) is first calculated for each individual, i and then divided by the state's population over the same period.

$$V_{is} = \ln \left(\frac{1}{n} \sum_{j=s}^e v_j \right) \quad (7)$$

There are at least two conditions under which past vernacular newspaper circulation would fail to be a valid instrument. First, instruments would be invalid if they directly stimulated entrepreneurship and second, if the historic and geographically-based social ties were disrupted by mass in or out-migration.

In the first instance, the nearly 500% growth in vernacular newspaper circulation over twenty years starting in the late 1970s (*Jeffrey, 2000*) could directly stimulate entrepreneurship in related industries: printing, writing, paper manufacturing, advertising and ancillary activities pertaining to the expanding newspaper business. A direct impact entails that an individual in our sample started a business during adolescence and continued to operate it until 2006 (the present).

This is highly unlikely for several reasons: first, just 4% of those in the 2006 GEM India sample who owned and managed a business for more than 3 years recorded having profits before 1998 (the last year of newspaper circulation data). Without showing profits, a business started prior to 1998 is unlikely to have survived to the present. Second, of those entrepreneurs reporting industry specialization, only seven were involved in business services (where newspaper printing and publishing is categorized) and none of these had profits (business start year is not included in GEM) prior to 1998. Thus no evidence supporting a direct link of newspaper growth to business creation is found in the data set.

The second potential point of failure is geographic mobility: if an agent moves to a different state at any point after he or she was 16 years of age her past exposure would have occurred in a state other than her 2006 state of residence. Available data does not allow us to verify the migration patterns of our sample elements. This presents a potential problem because research shows that social capital declines with spatial distance and likewise organizational membership declines with predicted mobility (*Glaeser and Sacerdote, 2000*). However, this an unlikely problem in India where present and historical spatial mobility (rural-to-urban, rural-to-rural), occupational mobility, and social mobility (longstanding social rules confine marriage to within the sub-caste, a narrow pool) remain exceptionally low (*Munshi and Rosenzweig, 2009*).

Having addressed two key issues with the potential to challenge the validity of the instrument’s exclusion restriction, an appropriate estimating procedure is sought by conducting OLS heteroskedasticity tests-using levels of IVs only. The results support a rejection of the null hypothesis that errors are homoskedastic, [141.202 Chi-sq(17) P-value = 0.0000]. This validates generalized method of moments (GMM) as a methodological approach to IV estimation since GMM is efficient in the presence of heteroskedastic error.

The following equations are estimated:

$$K_{is} = \alpha + \lambda I_{is} + \chi LI_i + \beta X_i' + \phi P_s + C_s' \gamma + \hat{u}_{is} \quad (8)$$

$$Y_{is} = \alpha + \theta \hat{K}_{is} + \chi LI_i + \beta X_i' + \phi P_s + C_s' \gamma + \hat{u}_{is} \quad (9)$$

Equation (8) is the first stage equation, where K_{is} , the dependent variable, is reported social ties to another entrepreneur. The instruments, $I_{is} = (V_i, D_s)$ are

the log of past vernacular language newspaper circulation and log of 2001 population density; LI_i indicates income status; X_i is a vector of individual characteristics including age, age-squared, gender, and self-assessed entrepreneurship skills; P_s is a vector of grouped policies; C'_s , a vector of state-level variables including log population and log of 2005 per capita income; and \hat{u}_{is} is the predicted value of the error term from the first stage regression. Equation (9) is the second stage equation where early-stage entrepreneurship, is the outcome of interest, and $\theta\hat{K}_{is}$ is the predicted value of social ties resulting from equation (8).

Causal Effect of Social Ties

After merging the master GEM file with the instrument data (*Besley and Burgess, 2002b*), the total number of observations falls from 1254 to 1101. More than 150 observations are lost because anyone under the age of 24 was outside the range of available data (the data set covers the 1954 to 1998 period). Additional observations are lost as a result of missing responses in GEM.

Using feasible two-step GMM with robust standard errors, the first stage results instrumenting with I_{is} —log of past vernacular language newspaper circulation is a negative and significant effect on having personal social ties to another entrepreneur, whereas log population density is positively correlated. Instrument coefficients in the first stage are each significant at the 1% level, with a t-statistic of (-2.58) for log vernacular newspaper circulation and 2.96 for the log of population density. The regression F-statistic of 14.96 in the first stage indicates overall regression significance.

However, the Cragg-Donald Wald F-statistic of excluded instruments in the first stage regression is 4.56, and although the F-test of excluded instruments is significant at the 1% level, this value fails to exceed the Stock-Yogo maximal IV size, indicating the instruments are weak. To correct for this, I use a Continuously updated estimator (CUE estimator), which gives robust estimates in the presence of weak instruments and is indicated for non-linear outcome variables (*Baum et al., 2007; Stock and Yogo, 2002*). Results of the first stage regression are presented in Table 2.3.

Table 2.3 – First Stage Instrumental Variables Estimation

Entrepreneurial Social Ties	Stage I	
	Variable	b
Self-reported Skills	0.40***	13.88
Female	-0.01	-0.25
Age	0.00	0.35
Age ²	-0.00	-0.40
Hhold Income: Rs 5000 or less	-0.15*	-2.45
Hhold Income: Rs 5001-10000	-0.11	-1.72
Hhold Income: Rs 10001-15000	-0.10	-1.45
Hhold Income: Rs 15001-20000	-0.06	-0.79
Openness	0.05	1.11
SEZ	0.18	1.89
Human Capital / Technology	0.02	1.44
Single Window Clearance	-0.63**	-2.64
Business Environment	-0.18	-1.88
Capital / Finance	1.15***	3.40
Individual Special Treatment	0.20*	2.42
Industry Special Treatment	0.03	1.44
Economic Devolution	0.58**	2.90
Log 2005 Income	0.06	1.04
Log Population 2001	-0.49***	-3.64
Log Vernacular Newspaper Circulation	-0.09*	-2.49
Log population density	0.53**	2.83
Cons	5.149**	3.23
N	1101	

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001

An interesting result of the first-stage regression is that a higher level of past exposure to vernacular newspaper circulation is negatively correlated with present entrepreneurial social ties. This result suggests that vernacular language groups may not help to facilitate social ties to entrepreneurs later in life and may be consistent with other empirical research conducted in India which shows that pre-existing sub-caste social networks can inhibit the occupational and geographic mobility of members (*Munshi and Rosenzweig, 2009*). However, despite this general finding, strong within-group ties do not automatically result in less access to the growth economy. Such ties have lead to exceptional occupational mobility in some groups (*Munshi, 2011*).

A second possible factor to explain the negative effect of past vernacular newspaper circulation is literacy. Here, language newspaper exposure may lower the cost of making social connections only among the subset of literate agents

while those unable to read the newspaper in their own language miss the social benefits of participating. To explore this, I interacted state literacy rates with past vernacular newspaper exposure and entered the interaction term into the benchmark regression.

Results indicate that past vernacular newspaper exposure negatively correlates with nascent entrepreneurship, while state literacy rates negatively and significantly correlate. However the coefficient on the interaction terms is positive and significant at the 10% level, which indicates that past exposure to vernacular newspapers in combination with the literacy rate has a small (0.006) but significant effect on early-stage entrepreneurship. This test would be even more robust should we have information on individual literacy – however in the absence of this data, we can conclude that literacy does indeed play a small role in concentrating the benefits of past social capital.

Instrumental Variable Regression Results

As shown in Table 2.4, the instrumented coefficient on social ties is 1.73, which is positive and significant at the 5% level, after estimating equations (8) and (9) with robust standard errors. Results pass overidentification tests at the 10% level of significance, indicating that exclusion restrictions are satisfied. Since instrument strength may be insufficient for such tests to have good power to reject the null, these instrumental variable results should be interpreted with some caution.

Results indicate that individuals in this sample reporting social ties to an entrepreneur should be expected to engage in early-stage entrepreneurship at a rate that is about 1.7 times more than those without such ties. This result is well within the effect size range estimated by *Davidsson and Honig (2003)* in a study of Swedish nascent entrepreneurs where conditions for a natural experiment were also met. The Davidsson and Honig estimates range from 1.5 to 1.9, depending on social tie type.

Table 2.4 – Second Stage Instrumental Variables Estimation Results

Any Entrepreneurship Variable	Instrumented Results		Uninstrumented Results	
	b	z	b	z
Social Ties	1.73**	2.82	.092***	4.69
Self-reported Skills	-0.54*	-2.15	.095***	4.69
Female	0.01	0.13	-.019	-1.10
Age	-0.02	-0.74	.000	0.11
Age ²	0.00	0.62	-.000	-0.29
Hhold Income: Rs 5000 or less	0.32*	2.11	.017	0.41
Hhold Income: Rs 5001-10000	0.29*	2.13	.062	1.25
Hhold Income: Rs 10001-15000	0.23	1.57	-.003	-0.06
Hhold Income: Rs 15001-20000	0.28	1.61	.092	1.23
Openness	0.06	1.32	.042*	2.94
SEZ	-0.07	-0.58	-.089*	-2.17
Human Capital / Technology	0.01	0.23	.027***	3.25
Single Window Clearance	-0.18	-1.53	-.069	-1.26
Business Environment	-0.17**	-2.85	-.037*	-2.31
Capital / Finance	0.04	0.25	.116***	4.35
Individual Special Treatment	0.01	0.03	-.023	-0.80
Industry Special Treatment	-0.07*	-2.34	-.049***	-5.31
Economic Devolution	-0.41*	-2.17	-.136*	-2.09
Log 2005 Income	-0.26**	-2.74	-.114**	-3.20
Log Population 2001	0.24	1.65	.010	0.26
Cons	-1.33	-0.49		
N	1101		1254	

IV estimation using robust standard errors, z statistics given in column two, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Estimation strategy uses continuously-updated (CUE) GMM estimation. Similar reports are reported using LIML and Condivreg.

Robustness Checks All specifications have been estimated both with and without compensatory weights designed to make the sample representative of the labor force at the national level. IV results are sensitive to the weighted estimates - and past vernacular exposure is frequently not significant in the first stage when regressions are weighted. In examining this issue further, I find that the estimated effects of social ties with and without weights in the benchmark regression specification gives similar point estimates (.09411 without weights and .09508 with weights), but weighted regressions result in higher standard errors. This loss of statistical power gives little added benefit. Additionally, as described in the data section, the sample has been modified in several ways. Most significantly, it excludes observations from four states and in the process

of cleaning and merging data the IV is estimated on a sample of 1100 (from from 1999). As a result I have concluded that weights introduce more bias, reduce power and add little additional information to the analysis and therefore I do not use them.

To check the robustness of instrumented results, the same estimation procedure is performed over multiple age ranges and tested over multiple time-exposures (e.g. 4, 6, 8, and 10 year-spells) and results are found to be similar in the first and second stages for all regressions. A limitation of the data set is that observations dropped as the age-range is increased. For example, changing the formative vernacular newspaper language exposure years to the four years over the 20-24 range cuts the number of observations from 1100 to 675. As the sample size shrinks, the log of past vernacular language newspaper circulation is consistently found to be negative, although in some instances, the estimated relationship is not significant. The log of population density remains positive and significant at the 1% level. F-statistics indicate weak instruments leading to re-estimation using LIML and CUE estimators. The resulting instrumented social ties coefficient is consistent with the direction of previous results. However, the estimated magnitude of the effect diminishes with decreasing sample size and later age-ranges.

Since self-reported entrepreneurial skills may correlate with early-stage entrepreneurship, I estimate the instrumented regressions both with and without self-reported skills. After removing self-reported skills, the instrumented coefficient on social ties remains positive and significant, and increases from 1.73 to 3.06. The results pass overidentification tests indicating exclusion restrictions are satisfied, but instrument strength may not be great enough in many cases for such tests to have good power to reject the null. The instrumented regressions results without self-reported social ties appear to validate the previous results.

2.10 Results in the Context of MSME Policies

Given the importance of entrepreneurial social ties, I consider India's existing state MSME policy environment and reflect on whether policies are likely to promote entrepreneurial social connections and/or promote entrepreneurial business success.³⁵ The specific policy groupings used in the data analysis–

³⁵For a complete discussion of India's MSME policies, please refer to Essay 1

developed pursuant to an extensive review of MSME policy documentation in 15 Indian states—are shown in Table 1.2 and each is discussed below.

Openness Policies

India’s state and district Investment Promotion Agencies (IPA) provide information on business opportunities, prevailing laws and regulations, factor costs, and bureaucratic procedures in order to reduce the transaction costs of foreign investors and entrepreneurs. Dedicated resources connect foreign investors with the local business community; bankers; government agencies responsible for economic and workforce development; as well as business leaders, entrepreneurs and investors and other potential partners and assist them with obtaining necessary businesses permits and clearances.

These activities are found to be particularly effective in countries where the bureaucratic burden is high and information asymmetries are likely to be acute (*Harding and Javorcik, 2011*). Investment promotion efforts that form and promote such connections should work to help entrepreneurs recognize opportunities and facilitate their success, especially in instances where a human and technology investment is also transferred in addition to capital (?).

Human Capital and Technology Assistance

In pursuit of innovation-led economic growth, Indian states have sought ways of making investment in human, technology and knowledge capital more affordable for MSMEs. Policies have helped firms acquire technology and increase the skills-capacity of their workforce through subsidies for ISO 9000 and 14000 training and certification (or for other recognized training and certification programs); cash subsidies for firm R&D expenditures and collaboration; or helping entrepreneurs connect with markets by subsidizing their cost of participating in regional, national and overseas marketing fairs and trade delegations. Other policies include assisting with technology transfer; engaging in venture and business angel funding or building and staffing incubator facilities.

Any opportunity to reduce the cost of bridging structural holes through establishing a social link to another individual with non-redundant information is likely to increase the potential entrepreneur’s social capital (*Burt, 1992*), and

possibly impact the likelihood he or she starts a business. Therefore, human capital development and training may increase the opportunity for entrepreneurial-minded individuals to meet other potential entrepreneurs within their own organizations, or if such training occurs outside the workplace, to socialize even further afield. Likewise, participation in marketing fairs and industry and trade delegations is likely to increase an individual's social capital by introducing linkages to new social networks, as is participation in R&D through state-sponsored centers of excellence.

Since human capital investment policies are more likely to affect existing, rather than forming MSMEs, the possibility of intrapreneurial ventures and spinouts is another way in which education and training investments could increase nascent entrepreneurship. Individuals that form ventures from within existing organizations may be more likely to achieve success in entrepreneurship due to learning derived from social ties and in depth industry knowledge (*Shane, 2004; Rowley et al., 2000; Uzzi and Lancaster, 2003*); and while realizing the gains from a human capital investment (*Acs et al., 2005; Kim et al., 2006*). Individuals with industry work experience are more likely to form ventures (*Shane, 2004*), possibly leveraging the social networks of firm founders (*Aldrich et al., 1987; Kristiansen, 2004; Stuart and Sorenson, 2007*) and that of founding team-members (*Stam, 2008*) to achieve success.

Subsidy for Capital & Financing

Capital subsidies and financing policies offer tax credits, interest waivers or concessional financing/working capital loans for investment, infrastructure, and business expansion activities. These policies and activities may help entrepreneurs form institutional linkages to financing and financiers and may directly stimulate entrepreneurial social ties. Microfinance programs usage is even more direct in that the obligations of bonding social ties are exploited as collateral to ensure individual and group loan repayment (*Halder and Mosley, 2004*).

There is evidence to suggest that those with strong ties to bank loan managers can negotiate more favorable rates (*Uzzi and Lancaster, 2003*). Therefore increasing access to capital and finance is likely to play a very important role in stimulating nascent entrepreneurial activity and may help to increase the likelihood of firm success. This is particularly so in developing countries where capital constraints will be even more binding for nascent entrepreneurs (*Banerjee and Newman,*

1993; *Ardagna and Lusardi, 2010; Hurst and Lusardi, 2004*) than elsewhere. Indeed, a policy change that resulted in credit becoming suddenly available to a set of firms in India provides evidence of substantial credit constraints. Firms with new credit access through the policy change financed more production and accelerated their rates of growth, sales and profits (*Banerjee and Duflo, 2008*).

Special Treatment of Individuals

Even more credit constrained than the average nascent entrepreneur are disadvantaged members of society. Despite substantial political gains since the 1990s, Indian SC and ST-members have not made concurrent progress in business-ownership. Using data from the 1990, 1998 and 2005 waves of the Economic Census, (*Iyer et al., 2011*) report that fewer SC and ST-members owned private, non-agricultural businesses, non-SC and ST members, relative to their proportion in the population. Moreover, SC and ST-owned firms are smaller and more likely to be single-proprietorships, as compared with firms owned by others.

To address these inequalities, states offer special incentives to women; Scheduled Caste and Scheduled Tribe members; and to Micro, Small and Medium Manufacturing Enterprises operating in Backward areas. These include capital subsidies and concessionary loans (above what is already being offered by the state to MSMEs); incentives to create agricultural businesses in backward areas; and land allotments in industrial areas at a discounted rate. In addition, some states have also offered loans for larger firms employing a larger percentage (50% or more) or number (500 or more) of women.

As described earlier, there is some evidence to suggest these incentives have the effect of stimulating new business creation (*Banerjee et al., 2012*), and helping businesses to achieve success (*Banerjee and Duflo, 2008*). On the other hand, there is little evidence in the description of the MSME policies reviewed in this study that they would play a direct role in facilitating critical bridging social ties for these disadvantaged groups, unless carried out through micro-finance programs.

Incentives for Special Economic Zones (SEZs)

Special Economic Zones offer more liberal infrastructure, capital, trade and tax benefits within a single geographic area (on average about 200 acres in size).

To date, there are about eight such zones in India, and eight other Export Processing Zones (EPZs) which have been converted to fully functioning SEZs. Over and above national incentives, states provide capital subsidies, fast-track approvals, and a commitment to delivering services or enabling infrastructure (roads, electricity) to businesses within the state’s Special Economic Zones.

SEZ policies are criticized for a range of reasons: they can distort business location decisions; disrupt local labor markets; and promote “land grabbing” which consumes cultivated farm land and puts self-employed farmers out of work. They are also thought to exacerbate inequality. However, recent research suggests Indian SEZs actually generate direct and indirect employment of both skilled and unskilled labor in the places where they operate (*Aggarwal*, 2007). If true, potential entrepreneurs may seek wage employment rather than risk starting a business. Alternately, a SEZ may stimulate entrepreneurship by attracting small and large businesses while creating linkages to firms outside the SEZ—as it is designed to do. Since the opportunity for additional social interaction rises with proximity (*Glaeser et al.*, 2002; *Glaeser and Sacerdote*, 2000) the co-location of firms may increase the probability of nascent entrepreneurship through the social ties channel.

Single Window Clearance (SWC) policy

India’s single window clearance (SWC) policies are thought to increase entrepreneurship by reducing the bureaucratic burden of formal business registration. Studies of entry regulation across a range of countries suggest new firm registrations negatively correlate with more restrictive entry regulations (*Klapper et al.*, 2006; *Djankov et al.*, 2002). Efforts to facilitate entry, for example by using electronic business registries is associated with both faster national economic growth and more formal sector expansion (*Klapper et al.*, 2008).

Single window clearance policies were implemented in all but one of the 15 states by the close of 2006. While these policies are unlikely to affect the development of entrepreneurial social ties, they may affect the probability that an entering business chooses to formalize – as opposed to remain in the informal economy. However, there is no evidence to suggest their presence would deter (or enhance) nascent entrepreneurship in India’s informal sector. However, reducing the regulatory burden may improve the effectiveness of social ties since evidence suggests more tightly-regulated policy environments dampen their effects (*Ardagna and*

Lusardi, 2010).

Policies to Improve Business Environment

Some MSME policies involve training field officers in the IPAs³⁶ and making technology improvements to business development offices. Assisting IPA officers to perform their role could grow entrepreneurship through social networking, a needed improvement. Sixty-one percent of entrepreneurs interviewed as part of the National Knowledge Commission's study of entrepreneurship in 2008 indicated they were extremely or somewhat unsatisfied with the government's ability to facilitate entrepreneurship (*Goswami et al., 2008*). Corruption, red-tape, poor policy implementation, and a lack of publicity were some of the reasons entrepreneurs cited to explain the ways in which government policies failed to assist them.

Other MSME policies to improve the business environment include efforts to create incrementally more flexible labor regulations (working against the interest of labor, e.g. by allowing workers to work longer hours) which should improve business productivity (*Besley and Burgess, 2004*); and reducing the fiscal and administrative running costs businesses face. While these policies are unlikely to improve entrepreneurial social networks, they are likely to increase the entrepreneurs probability of success by reducing business startup and running costs.

Special Treatment of Industry

State policies targeting specific industries and industry-clusters (geographically-concentrated firms in similar and related industries with possible buyer-supplier relationships) have been implemented in a range of Indian states. These policies can subsidize specific business startups in desirable "growth" industries or clusters of high-technology industries in geographic proximity. Their intention is to build proximal networks of similar and related firms enabling them to benefit from sharing infrastructural costs, economies of scale and more concentrated "talent" pools. Although these economic development policies have become popular in recent years, research suggests that the process of cluster development is

³⁶The role of state Investment Promotion Agencies (IPA) is to provide information on business opportunities, prevailing laws and regulations, factor costs, and bureaucratic procedures in order to reduce the transaction costs of foreign investors and entrepreneurs.

non-linear and unpredictable (*Feldman and Francis, 2004*) which implies that centralizing them is risky policy.

In other regions around the world, clustering has often occurred organically, or in response to exogenous shocks – such as in response to Silicon Valley’s loss of the defense industry in the 1980s. Successful clustering takes advantage of already-present skills, infrastructure and know-how to develop, attract, and retain innovative new firms in similar and related industries (*Henton et al., 1997*). A second issue is the lagged result of clustering. A region’s economic history affects its future development and the gains derived from industry-focused business attraction may take a considerable amount of time to realize (*Feldman and Francis, 2004*).

In theory, efforts to attract specific businesses should fail if selection is imposed by bureaucrats rather arising organically from opportunities in the market. Nevertheless, the presence of similar and related firms should help to promote entrepreneurship through the social channel - certainly by affecting the prevalence of favorable attitudes towards entrepreneurship (*Minniti, 2005*), and potentially through concentrating people with similar talents and skills. Well-established economic agglomerations have performed well economically, however there is still substantial business churning despite this. It is not clear if clusters are likely to improve the business success of start-up firms, or if they present more competitive challenges instead.

2.11 Entrepreneurial Networking Organizations

A number of entrepreneurial network organizations and business groups operate in India and work to help existing and potential entrepreneurs connect. The largest and best-known is the Indus Entrepreneurs (TiE), a global entrepreneurship network with 17 local chapters in India. TiE’s worldwide membership exceeds 13,000, including 2500 charter members – VCs, private equity, angels, law firms and thought leaders—with entrepreneurial expertise to share. TiE organizes programs and events including TiEcon, the largest professional and networking conference for entrepreneurs; business-plan competitions such as the All-Asia Business Plan Competition (AABPC) for Asia based Graduate-level university students and TiEQuest Business Venture Competition, which offers over \$150,000 in prizes and an opportunity to win up to \$1,000,000 investment

from sponsoring funds as well as mentorship and advice from charter members to all participants.³⁷

TiE connects women entrepreneurs through TiE Stree Shakti (TSS), a pan-India initiative connecting and enabling enterprising women founded in 2009. TSS chapters have organized a monthly “chat over chai” series – an interactive meeting of Women Entrepreneurs with an iconic thought leader / successful entrepreneur around key social and business issues. The “Can I Dream Big” workshop organized by TSS focuses on scaling female enterprises, in addition to providing network and mentorship access to successful female entrepreneurs.³⁸

Also at the national level, the nonprofit National Entrepreneurship Network, established in 2003 by the Wadwhani Foundation, focuses on supporting high-growth Indian entrepreneurship and job creation. To do so, NEN partners with over 470 top-tier academic institutes to help them build an effective and a vibrant on-campus entrepreneurship ecosystem. NEN also provides critical support to start-ups and early-stage entrepreneurs through high-impact entrepreneurship education; access to mentors and experts; fast-track access to incubation and funding; and learning tools and materials. In addition, it runs Entrepreneurship Week India, the country’s largest entrepreneurship-awareness campaign. In 2009, E Week India featured over 3500 events with more than 350,000 participants.³⁹

A new national organization to promote Dalit entrepreneurs is the Dalit Chamber of Commerce and Industry (DICCI), founded in New Delhi in 2005. DICCI is actively involved in creating business opportunities for Dalit entrepreneurs and empowering them through information and knowledge exchange. DICCI offers seminars, workshops, personality development programs and access to industry and Government experts, to help to educate members on the latest trends, developments and opportunities. It currently has more than 1000 entrepreneurial and professional members among its seven chapters in Mumbai, Pune, Nagpur, Delhi, Chennai, Bangalore and Chattisgarh. DICCI held its second annual trade fair in Mumbai (the Mumbai Dalit Trade Fair) in December 2011. The three-day event featured over 170 Dalit entrepreneurial businesses.⁴⁰

³⁷Information about TiE was accessed from <http://www.tie.org/> on April 4, 2012

³⁸Information about TiE Stree Shakti was accessed from <http://www.tiestreeshakti.org/> on April 4, 2012

³⁹Information about the National Entrepreneurs Network was accessed from <http://www.nenonline.org/> on April 4, 2012

⁴⁰Information about the Dalit Chamber of Commerce and Industry (DICCI) was accessed from <http://www.dicci.org/> on April 4, 2012

Cluster-based initiatives also perform a networking function. The United Nations Industrial Development Organization finances the Foundation for MSME Clusters (FMC), founded in 2005 in New Delhi. FMC is a non-governmental organization that works collaboratively with international agencies, government institutions, financial institutions, academic organizations, technical bodies, industry associations, non-government organizations and corporate entities, to advocate and pursue cluster-based economic development⁴¹. For example, it helped create the Network of ICT Entrepreneurs and Enterprises (NITEE), in 2009. NITEE is an NGO forum comprised of more than 100 Information and Communication Technology MSMEs in the Delhi region. It works on issues of collective representation and advocacy, communication, and collaborative actions, including acquiring a group health insurance policy; finding common working spaces for small CIT businesses; and creating a Cluster Innovation Center.⁴²

Even more informal groups, such as the Indian Women Entrepreneur Network (IWEN), founded in 2009 in Bangalore also exist. IWEN reports about 50 aspiring and practicing women entrepreneurs and members. It is organized through the online professional network, LinkedIn and its purpose is to support women by encouraging entrepreneurship and helping them getting access to resources.⁴³

Most of the initiatives described here rely extensively on information and communication technologies to organize and network their members, and all are based in the urban regions of India. Efforts to network rural entrepreneurs are far more difficult to identify, indeed I have identified none to date. Access to technology and dense networks of entrepreneurs is a much more serious challenge in rural areas – and yet the individuals residing in such areas may have much to gain from such relationships.

2.12 Conclusion

The results of the theoretical model taken together with our empirical findings suggest that entrepreneurial social ties play a significant role in promoting entrepreneurial behavior. The model suggests that any time invested in developing

⁴¹<http://www.msme.foundation.org/>

⁴²<http://nitee.org/>

⁴³<http://www.startupdunia.com/entrepreneurship/indian-women-entrepreneur-network-iben-to-promote-entrepreneurship-in-indian-women-2073>

social ties to another entrepreneur is utility-increasing for the entrepreneur, up to the point of maximum efficiency, after which over investment increases the utility of choosing paid work. After controlling for variation in state policies and individual characteristics, the empirical evidence demonstrates that the chances of early stage entrepreneurship rise by 1.7 times for those reporting social ties.

The absence of explicit attention to forming entrepreneurial social ties in the state MSME policy literature suggests policy makers have yet to realize the possibility of using social ties as a means of promoting entrepreneurship. A range of non-profit and private organizations has stepped in to fill this void, advancing the social networking function through the use of information and communication technologies and media.

A policy recommendation in light of this evidence is for policy makers to consider the ways in which networking mechanisms can be used to forward policy goals. Since a goal of MSME policy is to generate off-farm, rural employment and to balanced growth inequalities, a real challenge to design social networking mechanisms that are both economically efficient and that help to directly address inequality at the same time.

2.13 Areas for Additional Research

A limitation of the GEM data set is that it provides no additional information about the entrepreneurial social ties of respondents. As a result, the information herein does not particularly inform the design of a social ties policy mechanism. An area in which to carry out additional research in India is in ascertaining the design and effectiveness of public policies promoting entrepreneurial social networks - and particularly if they can be used to overcome the social constraints a prospective entrepreneur may face.

Although private and non-profit entrepreneurial social networks seem to have evolved organically, there is no evidence to suggest these private networks can overcome social inequalities – or particularly that they seek to do so. Thus a role for a public policy may exist. A second area of additional research concerns designing social-networking policy mechanisms that could specifically address inequalities arising from constrained or “not entrepreneurially useful” social networks – and whether there is a need for public invention to balance network access for marginalized groups in the first place.

The cost of implementing a public policy to promote entrepreneurial social networks is an unknown. And the process of deriving estimates will be challenging. However, without this information, it is difficult to know if it is cost-effective for states to engage in a direct policy of supporting entrepreneurial social networks.

Last, researchers are starting to focus more on more nuanced concepts of social networks and the effects of income, education, race and ethnicity on the quality of individual and group ties. As this research sheds more light on differences, it will be important to ascertain the ways it can affect efforts to re-balance economic growth in India.

3 Long Term and Intergenerational Effects of Self-Employment and Family-Business Ownership on Income Mobility in the US

Elizabeth Brown · Austin Nichols

We test the notion that entrepreneurship is a path to economic advancement by comparing the relative income mobility of US self-employed and family-business owning entrepreneurs to that of workers using data from the Panel Study of Income Dynamics. The mobility experience of each group is heterogeneous over the 1968-2007 period. We find no evidence that self-employment provides any particular advantage in achieving upward mobility, or in reducing downward mobility. In contrast, family business ownership associates with more upward mobility and less downward mobility. We instrument for the endogeneity of family business ownership and mobility using tax schedule progressivity. Instrumental variables regression substantiates the non-instrumented findings but should be interpreted with some caution. Further analysis of intergenerational correlations suggests the children of self-employed fathers experience more upward income mobility, relative to the children of wage-and-salary workers. This effect is even more pronounced among self-employed fathers with lower initial income, so self-employment may play an equalizing role.

3.1 Motivation

The entrepreneurial risk-reward trade-off is reasonably well-known: a higher level of average income in exchange for the risk of business failure and uncertainty associated with more volatile business income. But does entrepreneurship actually lead to more economic advancement relative to paid work?

A substantial number of federal, state, and local government-sponsored programs in addition to hundreds of NGO and foundation programs are betting it does. Many such programs promote self-employment and small business ownership as a possible substitute for unemployment or as a means to exit the welfare rolls (*Fairlie and Meyer, 2000; Fairlie et al., 2012*).

In this paper, we compare the relative income mobility of US self-employed and family-business owning entrepreneurs to that of workers using data from the Panel Study of Income Dynamics over the 1968-2007 period. We focus on

whether entrepreneurship versus working in the labor market causes upward income mobility—and whether these differences are carried over to the next generation. The research explores the following three questions:

1. Controlling for initial income level, what is the income mobility of business-owning, and working families over time?
2. Do self-employment and family-business ownership play a causal role in family income mobility? What is the magnitude of this effect?
3. What is the long-term, intergenerational effect? Are the children of self-employed and family-business-owning parents better off than those of wage earners?

We find no evidence in support of self-employment providing any particular advantage in achieving upward mobility. Worse, self-employment offers no protection against downward income mobility, suggesting substantial risk to those assuming it offers a means of social advancement. On average, the self-employed were positioned (-0.19) percentage points lower in the income distribution in relation to workers in the 1980-2007 period in the US. During this time, self-employment was associated with a 16 percent decline in the odds of upward mobility and a 48 percent increase in the odds of moving down the income distribution, relative to workers.

We find some suggestive evidence that self-employment offers an intergenerational benefit. In particular, the children of more income-constrained self-employed fathers experience even greater levels of upward mobility as compared to the children of richer self-employed dads and in comparison to the children of father's who were paid a wage or salary. This implies self-employment may play an equalizing role over the course of a generation. These long run, intergenerational differentials are small, however the evidence is merely suggestive.

Family business ownership is associated with faster upward mobility than observed in paid work. In contrast to the regressions assuming exogeneity of business ownership, using state tax progressivity as an excluded instrument yields a positive and significant instrumental variables coefficient on family business ownership, where the outcome is upward income mobility over the 1980-1999 period. In separate tests of downward mobility, the instrumental variables coefficient is negative and significant, indicating that family business ownership improved mobility prospects in both directions, after controlling for selection.

Taken together, the instrumental variables regressions suggest that family business ownership led to a higher level of economic advancement relative to working for someone else in the 1980s and 1990s. Owning or having a management stake in a small business had an unambiguously positive effect on incremental upward income mobility during the 1980s and 1990s after controlling for resources in the 1970s.

None of the evidence in this paper suggests that either form of entrepreneurship improves the upward mobility of those starting from the bottom of the income distribution, although results should be interpreted with some caution since the sample sizes are relatively small (about 9000 observations over the 1980-2007 period).

3.2 Background and Literature Review

The general question of whether entrepreneurship increases upward mobility is complicated by the selection mechanism discussed above. Systematic differences in the characteristics and behavior of entrepreneurs—for example their higher achievement motivation and propensity to take risk—may better explain their higher average incomes than business ownership does on its own. Ignoring selection leads to omitted variables bias using standard regression which a number of papers have recognized (*Holtz-Eakin et al.*, 2000; *Fairlie and Meyer*, 2000) and sought to overcome through analysis of long term trends. A good instrumental variable is difficult to find, however because many factors in addition to entrepreneurship explain income mobility. As a result of the standard difficulties involved in finding a good instrumental variable, we interpret our instrumental variable regression results using tax progressivity with some caution.

Most evidence suggests that the inability to access capital constrains self-employment. Self-employment entry rates increase with wealth once involuntary job loss is controlled (*Fairlie and Krashinsky*, 2012), however a disproportionate share of entrepreneurs enters from within the top 5% of the wealth distribution and more than 60% of households in the top 1% of the US wealth distribution are entrepreneurial *Cagetti and De Nardi* (2008). Even so, those families starting from the lowest wealth class experience a greater chance of upward mobility relative to working families (*Quadrini*, 1999).

A business loss or failure in a vulnerable family could precipitate a poverty spell. Although the chances of any family remaining in poverty for a long time are relatively low (*Stevens, 1999; Bane and Ellwood, 1986*), it is not clear what if any affect entrepreneurship would have on increasing or decreasing time below the poverty line. If a family can endure a temporary setback, perhaps because of access to other family resources or means, a business held over time may enable savings and asset accumulation, leading to upward mobility (*Quadrini, 1999; Gentry and Hubbard, 2004*). If on the other hand losses are too substantial, a family may spend years recovering from business loss and bankruptcy.

We don't have much information about the intergenerational mobility of self-employed and business-owning families, relative to working families (*McKernan and Salzman, 2008*). Most intergenerational research has focused on high intergenerational occupational correlations (*Fairlie and Robb, 2008; Dunn and Holtz-Eakin, 2000*) and skills transfer, which are found to increase the chances of entrepreneurial persistence and re-entry over time *Quadrini (1999)*. Thus the question of whether the children of entrepreneurs are better off in comparison to workers is ripe for research.

Many studies track the income mobility of US families (*Bradbury, 2011; Brenner, 2007; Lee and Solon, 2009; Solon, 1992*), however very few directly examine the role entrepreneurship or self-employment might play in generating it (*McKernan and Salzman, 2008*). Important longitudinal research has parsed mobility patterns by race, gender and income for those at the lowest income levels (*Fairlie, 2004a; Fairlie and Meyer, 2000; Fairlie, 2005*). And the mobility of young entrepreneurs from disadvantaged families shows mixed results for men and women, as compared with their working counterparts. While men's earnings rise relatively faster, than those of male workers, women's self-employment earnings actually fall in relative terms (*Fairlie, 2005*).

The studies that do examine the effects of entrepreneurship and self-employment on income mobility find mixed results. Using data from the PSID over the 1969 to 1990 period, *Holtz-Eakin et al. (2000)* characterize the income mobility of self-employed individuals over one, two and five-year intervals. Their analysis shows a greater likelihood of new entrepreneurs to move both up and down the income distribution, relative to working individuals. Once change over the initial income quintile is taken into account, individuals starting from the bottom of the income distribution were more likely to experience upward mobility-whereas those starting at the top of the income distribution lost ground relative to wage

earners.

Using data from the National Longitudinal Survey of Youth (NLSY), *Fairlie* (2004a) finds that young, less-educated self-employed individuals experience faster earnings growth in comparison to wage and salary workers. A subsequent paper reports mixed results by gender (*Fairlie*, 2005). When male and female self-employed business owners from disadvantaged families were compared to their working counterparts, males earned more than wage/salary workers, and females earned less. Among young, self-employed black and Hispanic men, *Fairlie* (2004b) finds that earnings exceed those of their wage and salary counterparts after slower initial growth.

Examining the causal effect of self-employment and family business ownership on income mobility is an unmet challenge. The most comprehensive research to date focuses on a causal explanation of variation in self-employment rates over time. Using 1910-1990 period using Census data, (*Fairlie and Meyer*, 2000) suggest that structural economic changes consistent with increased global competition, technology changes, and changes in consumer demand underlie dynamics in self-employment levels. In particular, the decline of low-self-employment industries (manufacturing) explains falling self-employment rates to the 1970s and the shift to high self-employment industries (e.g. construction, business, professional and repair services) explains its subsequent rise after the 1970s. The study rules out several plausible explanation for self-employment trends, including: long term tax rate patterns, social security retirement incentives, immigrant self-employment rates, and the labor/self-employment wage differential.

A great deal of entrepreneurship research has instead focused on the unique personality characteristics of the entrepreneur, noting differences with non-entrepreneurs in terms of locus of control, future orientation, achievement motivation, risk avoidance among other characteristics *Shane* (2004). Underlying these self-reported and observed characteristics are factors that the research may not observe, but which are likewise associated with being entrepreneurial. When entrepreneurial status is included in the right hand side of an OLS regression, the presence of these omitted variables therefore correlates with the error term, biasing all estimated coefficients. Indeed, if omitted factors are positively correlated with entrepreneurship, OLS will overestimate the role entrepreneurship plays in affecting family income changes.

To date, no papers have developed an IV method to address bias arising from omitted variables, a gap we attempt to remedy here.

A second overlooked area concerns the intergenerational correlation in the earnings of working and entrepreneurial families. A microeconomic theory of intergenerational income transmission was first proposed by *Becker and Tomes* (1979) and presented in a utility-maximization framework. Parents maximize lifetime utility by allocating income between own consumption and investment in children. A parent's investment decision is affected by: 1) how much they value children's future wealth, and 2) their perception of each child's investment return.

A result derived from the model is that a son's permanent income is a linear function of his father's. A primary empirical approach to ascertain this effect uses the correlation or elasticity in parent's and children's long-run income to estimate intergenerational transmission. An advantage of using the elasticity is that it accounts for the percentage income variation in both cohorts – and expresses how consequential a parent's income is for children's income *Solon* (1999). However, valid estimates of intergenerational elasticity must address two key methodological issues: 1) attenuation bias arising from the inability to measure permanent (lifetime) income using available data and 2) life-cycle bias emanating from level differences and earnings changes over the course of an individual's career. Early calculations generated unreliable and divergent long-run estimates, see *Hertz* (2007); *Solon* (1999, 1992); *Lee and Solon* (2009), reporting coefficients near 0.2-0.25 while subsequent studies hit the 0.5-0.6 range (*Stokey*, 1998). There is a general consensus that *Lee and Solon* (2009) are about right with an intergenerational correlation of .44 and .43, respectively for sons and daughters born during the 1952 to 1975 period estimated using PSID data (*Mayer and Lopoo*, 2008).

Self-employment and family business ownership could affect investment in children in a number of ways 1) a busy entrepreneur has less time and there may be less time to devote to child-rearing as a result. Alternatively, the children of business owners and the self-employed may have less time but more learning about things consequential to the family's well-being. Last, if there is a genetic component to entrepreneurship, then the children of entrepreneurs stand a greater chance of acquiring these characteristics.

The proposed empirical strategy seeks to determine if entrepreneurial and work-

ing families display different intergenerational income elasticities. A limitation of this approach is that it provides no insight on possible mechanisms should significant differences be observed. Explaining any observed differences would need to be taken up in another paper as there is limited evidence in this area of research. *Stokey (1998)* finds that a family’s position in the income distribution affects the role inheritance plays in income persistence. While inheritance is important at the upper end of the income distribution, it plays a modest role in the middle and a negligible role at the lower end. More important are variables related to parental investment e.g. through the dedication of time, parent’s education, and other factors.

3.3 Data

The data for this study come from the 1968 through 2007 interview years of the Panel Study of Income Dynamics *Panel Study of Income Dynamics (2011)*.⁴⁴ The PSID is a nationally-representative longitudinal study that collects a wide range of demographic, economic, psychological and sociological information pertaining to individuals and the families in which they reside. At its inception, 4,802 family units were interviewed and subsequently followed to the present if they did not leave the sample (*Gouskova et al., 2008*). By the 2009 wave, the number of participating families rose to 8690.⁴⁵ Interviews were conducted on an annual basis from 1968 – 1997 and thereafter on a biennial basis. Families are primarily interviewed by phone with about 3% of all surveys conducted in person.

The sample used in this study includes all individuals originating within PSID families as well as members of the Immigrant sample. It excludes members of the Latino sample and those individuals who joined a PSID family after 1967 through marriage or other movements into existing households. Individuals originating in a non-sample families are considered “non-followable” according to PSID sample rules and no compensatory weights are provided.

⁴⁴Corresponding to 1967 through 2008 calendar years

⁴⁵Families selected into the PSID were drawn from either the Survey of Economic Opportunity (SEO) or the Survey Research Sample (SRS). The SEO oversampled families with incomes twice below the 1967 federal poverty line while the SRS sample was a nationally representative sample of adults. Weights compensate for the unequal probability of entering the combined SEO and SRS samples. Samples added in the 1990s include a selection of post-1968 immigrants in 1990 (the Latino sample) which was dropped in 1995 for non-representativeness. Later in 1997 and 1999, a representative sample of 511 post-1968 US immigrant families was added and followed to the present.

Although the PSID is affected by differential attrition rates based on the observed characteristics of respondents, rules guiding following status and efforts to recontact and add non respondents back into the survey in the 1990s have ensured the PSID’s representativeness over time (*Gouskova et al.*, 2008). As a result, its representativeness has not been significantly affected by differential attrition (*Lillard and Panis*, 1998; *Fitzgerald et al.*, 1998; *Zabel*, 1998; *Duncan and Hill*, 1989).

The individual is the unit of observation in the PSID, however individuals are nested within families. Although ideally, we would track families over time, family composition changes from year to year make it difficult to identify “the same” family without creating a “balanced sample” of household heads and dropping a large number of observations.⁴⁶ Therefore we have constructed an unbalanced sample of individuals based on the following criteria:

- individual is present in the sample and assigned an individual PSID longitudinal weight
- the individual is between the ages of 25 and 65
- family income data are not missing

This unbalanced panel allows individuals to move in and out of families and in and out of the PSID, however the result is that the number of reporting units changes in each year, ranging from a low of 5,983 to a high of 7,529 observations.

The definition of entrepreneurship – particularly whether self-employment constitutes entrepreneurial behavior – is contested in the field. Similar to previous research using the PSID, (*Quadrini*, 1999; *Hurst and Lusardi*, 2004) we use two indicators of entrepreneurship.

Self-employment is an indicator of the household head’s self-employment status. It is generated in response to the following question: “(Are/Were) you (HEAD)

⁴⁶PSID documentation provides two options for identifying the same family; the first is to count those families with no composition changes and the second allows family composition change but requires that the household head remain unchanged. One method for tracking “the same” family is to drop any families whose household head changed during the analysis period. Creating a balanced sample in this manner leads to a large number of observations being dropped and results in systematic differences on key observables with significantly greater wealth, income, and education. This approach was tested and deemed not feasible.

self-employed, (are/were) you employed by someone else, or what?” It should be noted that self-employment in this definition includes individuals who report being self-employed exclusively and those who report both working for someone else and being self-employed. However, individuals who report they do not currently work for money have been removed from the sample of self-employed individuals— about 20% of those responding to the question were in this last category. As a result, the number of self-employment observations is smaller relative to family business ownership.

Family business ownership is an indicator variable generated from the question: “Did you (or anyone else in the family there) own a business at any time in 2006 or have a financial interest in any business enterprise?” This could include a side businesses owned by a wage and salary worker. In contrast, self-employed business owners are defined by their main job activity rather than by the activities of others in the household. Table 4.8 summarizes the unweighted sample frequencies by self-employment and family business ownership.

The key outcome of interest is needs-adjusted family income mobility; which is inflation adjusted⁴⁷ family income divided by the family-size and family composition-adjusted poverty threshold. The continuous Census poverty threshold calculated by *Grieger et al.* (2009) was used in the analysis.

Family income reports the sum of all family member’s pre-tax and post-transfer income including social security, pension, wage, salary, rent, interest, dividend, farm, business, welfare, alimony, child support, and other forms of income including support from family. Prior to 1994, family income was bottom-coded at \$1, inclusive of zero amounts. However, after the 1994 survey wave, family income was coded to allow negative values, to indicate a net business or farm loss.

In the process of data cleaning, these negative values were set to zero for consistency with the data for 1969-1994 period. Family income values at or above the top 1% of the income distribution were trimmed in each year to remove outliers. The bottom 1% of the income distribution was kept intact, following *Bradbury* (2011). Zero family income values at the bottom of the distribution are a small percentage of families whose incomes would be zero in the absence of government transfers. More than 1% of the sample reports zero income in

⁴⁷Family income and poverty thresholds are inflation-adjusted and reported in 2007 dollars. Inflation adjustment is performed using the CPI-U (all items using current methods, series CUUR0000SA0) available at: <http://data.bls.gov/cgi-bin/surveymost?cu>.

some years, making it impossible to trim only the lowest 1%, and removing more than the lowest income values would bias the sample, for more discussion, see (*Bradbury, 2011*).

Age is constructed from birth year, if reported and otherwise calculated using the modal age.

3.4 Descriptive Statistics

The sample contains about 6,600 respondents in each year in the 1968-2009 period, for a total of 237,163 observation-years. The number of observations ranged from a low of 5,225 in 1997 to a high of 7,494 observations in 1994. Size and inflation-adjusted family income averaged \$28,840. The sample was 53% female and 16% of respondents were non-white.⁴⁸ The average respondent was about 43 years old. About 27% of respondents were unmarried,⁴⁹ and roughly half of all respondents had no children. Approximately 19% had a level of education below high school; 38% had attained a high school degree; about 20% had attended some college; and over 23% had attained a college degree or above. On average across all years, a majority of households (77%) experienced no family composition change; 16% experienced changes among individuals other than the household head and about 7% experienced changes in the status of a household head or wife. Table 4.7 in the Appendix presents a summary of the variables used in the analysis.

The percentage of individuals reporting self-employment or family business ownership varies from year to year. Weighted and unweighted annual sample statistics, broken down by self-employment and family business ownership after data cleaning are presented in the Appendix, (see Table 4.8). On average about 14% of the sample respondents reported self-employment; the lowest estimated fraction of self-employed was 12.5% in 1999 and the reported peak was 15.5% in 1983. On average, 15% of individuals reported family business ownership, with a low of 10.6% in 1968 and a high of 18.3% in 1997.

Self-employment and family business ownership are positively correlated, with a coefficient of .59, however there are small and significant differences. In par-

⁴⁸All statistics and estimates are weighted using the PSID core individual weight

⁴⁹Individuals reporting they are married or separated are coded 'married'. Respondents indicating they are single, divorced, or widowed are coded 'unmarried'.

ticular, the average family business owner is significantly more educated and reports a higher size-adjusted mean family income. The inflation and family-size-adjusted average income was \$33,015 in families with self-employed household heads, as compared with \$35,912 in families with business-owning household heads. Fourteen percent of self-employed respondents indicated they had not achieved a high school degree; whereas 9% of family-business owners did. High school and “some college” levels of attainment are about the same in the two groups. Twenty-nine percent of self-employed reported attainment at the college level or above, as compared with 32% of family business owners. The families of self-employed and family business-owners are similar along other observed dimensions such as gender, family composition change, race, age, marital status, and numbers of children.

Table 3.1 – Characteristics of Self-employed and Family Business-Owners

	Self-employed		Family Bus. Owner	
	mean	sd	mean	sd
Size-adjusted Family Income (\$2007)	33,015	31,447	35,912	31,486
Female	0.49	0.50	0.49	0.50
Non-White	0.07	0.26	0.07	0.25
Below High School	0.14	0.34	0.09	0.29
High School	0.37	0.48	0.35	0.48
Some College	0.21	0.41	0.23	0.42
College	0.29	0.45	0.32	0.47
Change: Other	0.17	0.37	0.17	0.37
Change: Head	0.06	0.23	0.06	0.24
Change: No	0.78	0.42	0.77	0.42
Age	44	11	44	11
Unmarried	0.16	0.37	0.15	0.36
No Children	0.47	0.50	0.48	0.50
One Child	0.19	0.39	0.19	0.39
Two Children	0.20	0.40	0.21	0.41
More than Two Children	0.14	0.34	0.13	0.33

Statistics are weighted using the PSID core individual weight and pertain to individuals between the ages of 25 and 65.

The research literature has demonstrated that entrepreneurs differ from workers in some fundamental ways. To explore “genetic” differences, we tabulate observed differences between “ever” entrepreneurs—those who ever reported self-employment or family business ownership at any point during the observation period—and “never” entrepreneurs or workers, who always reported working for

someone else and never reported owning a family business.⁵⁰

First, a substantial percentage of sample respondents (57%) report “any” entrepreneurial experience; which includes having participated in either self-employment or family business ownership for as little as one year at any point during the 1968-2009 period. Second, ever entrepreneurs differ from never entrepreneurs in a number of ways. Ever entrepreneur incomes are significantly higher, \$31,115 in comparison to those who never entered entrepreneurship of any kind \$25,715.⁵¹ In comparison to the never entrepreneurs, fewer entrepreneurs were female (51%). On average, ever entrepreneurs are statistically less likely to be non-white and unmarried; and statistically more likely to be college-educated and to report having no children. A Table of results is presented in the Appendix, (see Table 4.6).

Controlling for both these observed differences and other omitted factors that may induce self-selection into entrepreneurship is an important underlying motivation for the IV strategy applied later in the analysis.

Income Trends

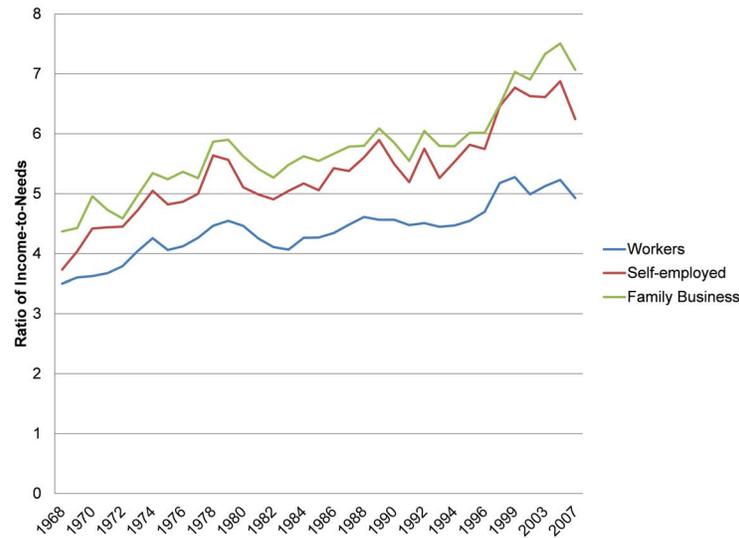
Figure 3.1 compares the income-to-needs ratio of working, self-employed and business-owning families over time. On average, family business owners reported the highest income-to-needs ratio, followed by the self-employed and then workers.

The average working family’s income-to-needs ratio was 82% of the self-employed and 77% of the business-owning family’s ratio. This gap widened over the observation period from 80% in 1968 to 70% of family incomes in 2007. A similar trend is observed in self-employed incomes, where the gap widened from 94% of self-employed incomes in 1968 to 79% in 2007.

⁵⁰Individuals between the ages of 25-65 who neither reported self-employment nor reported family-business ownership over the observation period (1968-2007) are never-entrepreneurs and those reporting any entrepreneurship at any point are ever-entrepreneurs.

⁵¹Note that average incomes are size-adjusted for the number of family members and presented in presented in 2007 dollars after inflation-adjustment using the CPI.

Figure 3.1 – Mean Income-to-Needs Ratio of Family Business Owners, Self-employed, and Workers Over Time



Note: Average family income to needs ratios are weighted using core individual weights.

As the estimated mean income-to-needs ratio rises, so does income volatility, as measured by the variance and standard deviation of the mean over the 1968-2007 period. Table 3.2, shows that mean income-to-needs was highest among business owners and the self-employed, and lowest among workers. Self-employed individuals experienced more income volatility in comparison to family business owners, even though their mean incomes were lower overall.

Table 3.2 – Summary Statistics for Income-to-Needs Ratio

Occupational Status	mean	sd	variance	min	max
Worker	4.48	3.21	10.33	0	62.76
All	4.63	3.40	11.59	0	63.08
Self-employed	5.49	4.40	19.32	0	63.08
Family Business Owner	5.96	4.38	19.15	0	63.08

Income-to-needs ratio by occupational status over the 1968-2007 period. Statistics are weighted using the core individual weight and inflation-adjusted to 2007 dollars.

Time Steps

In addition to experiencing both upward and downward income mobility, individuals also switch between entrepreneurship and working for someone else. To examine the combined effects of these changes, we generated five-year transition probability matrices for the 1975-1979, 1980-1984, 1985-1989, 1990-1994, 1995-1999, and 2003-2007 periods. We show a single table here to illustrate the trends observed over the set of five-year periods.

Table 3.3 presents a transition matrix showing income and occupational mobility over the 1980-1984 period (please contact the authors for a full set of transition matrices). This table was developed using data for family business owners, however tables were also developed for the self-employed, showing comparable but not identical trends.

Individuals are first classified according to their start-period and end-period occupation and position in the 1980 income distribution:

Staying Worker: Start and end-period occupation is Worker

Staying Entrepreneur: Start and end-period occupation is Entrepreneur

Switching Worker: Start period occupation is Entrepreneur and end-period occupation is Worker

Switching Entrepreneur: Start period occupation is Worker and end-period occupation is Entrepreneur

Those whose start and end-period occupations remain the same are deemed “staying worker” or “staying entrepreneur.” Individuals who switched are categorized according to the occupation they held at the end of the period. For example, “switching workers” began as entrepreneurs in the first period and switched to worker status in the second. Transition probabilities are then calculated over the ensuing five years.

The cell percentages represent the proportion of individuals transitioning between different levels of the income distribution over the five-year time step. For example, in Table 3.3, 75% of Staying Workers remained at the bottom of the distribution; 22% moved from the bottom to the middle, and 4% transitioned from the bottom to the top of the distribution.

Table 3.3 – Five-Year Transition Matrix for Business-Owning and Working Families: 1980-1984

Staying Worker					Switching Worker				
1984					1984				
	<i>Bottom</i>	0.75	0.22	0.04		<i>Bottom</i>	0.56	0.31	0.14
1980	<i>Middle</i>	0.21	0.57	0.22	1980	<i>Middle</i>	0.25	0.43	0.32
	<i>Top</i>	0.06	0.22	0.72		<i>Top</i>	0.04	0.22	0.73
Switching Entrepreneur					Staying Entrepreneur				
1984					1984				

Note: Sample period 1980-1984 for business-owning and working families, transition in needs-adjusted family income tercile

The transition matrices estimated for the 1980-1984 period illustrates empirical regularities common across transition matrices estimated for other periods. First, Switching Entrepreneurs experienced the highest probability of upward mobility and the lowest probability of remaining at the bottom of the income distribution. For example, 45% of Switching Entrepreneurs moved from the bottom in 1980 to the middle in 1984; and 16% moved up to the top from the bottom level. In addition, only 40% of Switching Entrepreneurs who started at the bottom remained there five years later – which compares to 75% of Staying Workers, 61% of Staying Entrepreneurs and 56% of Switching Workers.

Second, Staying Workers are the most likely to remain in the same income class after five years. For example in the 1980-1984 period, 75% remained at the bottom, 57% remained in the middle and 72% remained at the top of the distribution.

Third, Staying Workers and Switching Workers experienced more downward mobility, as compared to Switching and Staying Entrepreneurs. For example in the 1980-1984 period, the probability of moving down from the Top to the Middle of the distribution was .22 for both Staying and Switching Workers, which compares to .15 and .17 for Staying and Switching Entrepreneurs, respectively.

One caveat to the first trend is that it does not hold when using the self-

employment definition of entrepreneurship. When examining trends for the self-employed across all time periods, Switching Entrepreneurs had the highest levels of downward mobility. Staying (self-employed) Entrepreneurs and Switching (from self-employment) Workers experienced the highest levels of upward mobility.

In sum, simple trends with few controls suggest that the self-employed experience no greater chance of upward mobility than their working counterparts. In addition, those switching from work to self-employment experienced some of the highest levels of downward mobility over the five-year period.

Poverty Transitions

In total, 17,330 individuals in the sample ever entered poverty and a fraction of these experienced multiple “spells” in poverty. About half of those who ever entered poverty endured a single poverty spell.⁵² Twenty-five percent experienced two spells and about 10% experienced three or more spells of poverty.

In comparison to workers, self-employed and business-owning families are more likely to experience a poverty spell lasting no more than one year. Whereas 28% of all worker’s poverty spells lasted one year, 48% of self-employed and 52% of family business owners’ spells were year-long episodes. On average, 16% of worker poverty spells were two years long, but were 20% of all spells among the self-employed and 21% among family business owners.

Table 3.4 shows survivor function estimates, while accounting for multiple family poverty exits as well as delayed entry, re-entry and exit from the PSID sample.⁵³ Values given in the table should be interpreted as the probability of remaining below the poverty line in year $t + 1$ after surviving t years in poverty.⁵⁴

⁵²A poverty spell begins when family income falls below the poverty threshold and ends when when income exceeds the poverty threshold. The duration of a spell is the number of years spent in poverty from the time of entry to the time of exit.

⁵³Survival rates are estimated using compensatory core individual longitudinal weights. To perform the analysis, these weights must be held constant for each individual and therefore the first-observed individual longitudinal weight is used, representing the inverse probability of selection into the sample.

⁵⁴The analysis does not account for changes in family composition, but does take into effect family size when estimating poverty rates. Poverty estimates are generated by dividing inflation-adjusted family income by the corresponding poverty threshold values for each family. Poverty thresholds are consistent with Current Population Survey (CPS) poverty estimates for the duration of the PSID. For more discussion, see (*Grieger et al.*, 2009).

In the absence of any controls, estimates indicate a lower probability of staying in poverty for entrepreneurs in comparison to workers after the first year in poverty. Among family business owners, the probability of remaining in poverty after the first year was the lowest at 0.35. The equivalent probability was 0.48 among the self-employed and 0.66 among workers.

Table 3.4 – Kaplan-Meier Survival Estimates

Time	Worker	Self-employed	Fam. Bus. Owner
1	0.66	0.48	0.35
2	0.46	0.33	0.27
3	0.37	0.24	0.18
4	0.29	0.18	0.13
5	0.24	0.14	0.11
6	0.21	0.12	0.09
7	0.19	0.10	0.08
8	0.16	0.09	0.07
9	0.15	0.07	0.06
10	0.13	0.07	0.05

Probabilities given in the cells express the chance of remaining poor in year $t+1$ after surviving in poverty to year t , accounting for multiple poverty entries and exits.

A Cox regression-based test for the equality of survival curves indicates the curves are significantly different when family business owners and the self-employed are compared to their working counterparts *Cox and Oakes* (1984).

Income Mobility Across all Income Levels

While descriptive patterns provide some useful insights into the data, they fail to explain the effect of self-employment and family-business ownership on income mobility. This next section describes panel regression methods used to control for serial correlation and heteroskedasticity when estimating the income mobility of business-owning and working families over time. In addition, we introduce a vector of covariates used as regression controls.

3.5 Methods

Effect of Self-employment and Family Business Ownership on Income Mobility

We separately estimate the effects of self-employment and family business own-

ership on various outcome measures of income mobility using multivariable non-linear panel data regression. The key outcome measures are family rank in the income distribution and position-relative mobility indicators for the family income distribution divided into deciles.

The outcome, $rank_{it}$ (0,1) indexes the individual's relative position in the annual distribution of family incomes, scaled to (0,1). Where i indexes individuals and t indexes years.

Mobility outcomes, $Outcomes_{it} = (up_{it}, down_{it}, farup_{it}, fardown_{it}, up_{it}^l)$ include binary indicators of up and down income mobility, as follows:

$$up_{it} = \begin{cases} 1 & \text{if } (d_{i(t-10)} < d_{it}) \\ 0 & \text{otherwise} \end{cases}$$

$$down_{it} = \begin{cases} 1 & \text{if } (d_{i(t-10)} > d_{it}) \\ 0 & \text{otherwise} \end{cases}$$

Where d_{it} is the decile assigned to each individual in each year, according to where their family income-to-needs ratio, yn_{it} , falls relative to the family incomes of all individuals in the annual distribution. Note that $d_{it} = (1, \dots, 10)$ is ranked from lowest income-to-needs ratio to highest. d_{it} is calculated using:

- y_{it} = trimmed family income for individual i in year t .
- p_{it} = family-size adjusted Census poverty threshold for individual i in year t .
- $yp_{it} = \frac{y_{it}}{p_{it}}$ family income-to-needs ratio for individual i in year t .

In addition, we estimate the upward mobility of those starting from the bottom of the distribution, using up_{it}^l , a position-relative origin-specific measure of mobility. For initial incomes in the lowest two deciles, up_{it}^l is equal to one for a positive change in the income decile over the measurement period.

$$up_{it}^l = \begin{cases} 1 & \text{if } (d_{i(t-10)} \leq 2; d_t < 2,); d_{t-1} + d_{t-10} < d_t \\ 0 & \text{otherwise} \end{cases}$$

Finally, to examine upward and downward mobility in excess of two deciles, we develop two additional mobility outcomes:

$$farup_{it} = \begin{cases} 1 & \text{if } (d_{i(t-10)} + 2 < d_{it}) \text{ and } d_{i(t-10)} < 10 \\ 0 & \text{otherwise} \end{cases}$$

$$fardown_{it} = \begin{cases} 1 & \text{if } (d_{i(t-10)} - 2 \geq d_t) \\ 0 & \text{otherwise} \end{cases}$$

Estimating Equations

Each of the outcomes is regressed on a vector of individual controls including self-employment, family business and worker status. Equation (5.1) specifies a generalized linear model with a logit link which is used with $rank_{it}$, as shown below:

$$rank_{it} = F(a + \gamma entrep_{is}^{type} + \delta rank_{it_0} + \beta x'_{is}) + u_{is} \quad (3.1)$$

$$E(rank) = \mu = a + \gamma entrep_{is}^{type} + \delta rank_{it_0} + \beta x'_{is} + u_{is}$$

$$\eta = g(\mu) = \log \{ \mu / (1 - \mu) \}$$

and where the error structure is decomposed into an individual and state-level component as follows: $u_{is} = a_s + v_{ig}$.

The primary relationship of interest pertains to the two measures of entrepreneurship $entrep_{is}^{type}$ where type = self-employment, or family business ownership; and $rank_{it_0}$ is the individual's initial income-to-needs rank. The vector of individual characteristics x'_{is} includes gender, age, squared-age, past-mean family income (averaged over three year and lagged 10-years), the individual's highest level of educational attainment, household head's marital status, household head's race, and an indicator of whether the family's composition has changed

over the prior year. Family composition changes when a family member left, moved, or died, in the previous period or if a change in the household head’s designation occurred. Family composition change contains three categories: no change in family composition; change in family members other than the head or “wife”; and family composition change affecting the household head or wife. Last, the number of dependents is included as a regressor and recoded to include a category for no dependents, one dependent, two dependents and more than two dependents.

In regressions where $rank_{it}$ is the outcome, coefficients estimated for self-employment and family-business ownership should be interpreted as the percentage point difference in the mean income-to-needs ratio of self-employed individuals in comparison to those who are working. This regression specification provides a simple estimate of the average partial effects for the sample of entrepreneurs and workers. The result of estimating Equation (1) is shown in Table 3.5.

The remaining $Outcomes_{it} = (up_{it}, down_{it}, farup_{it}, fardown_{it}, up_{it}^l)$ are each separately estimated using equation (2). Outcomes up_{it} and $down_{it}$ outcome measures to estimate the effect of self-employment and entrepreneurship on mobility using logit regression with cluster robust standard errors at the state level. We add the term λd_{it_0} which controls for the individual’s initial position in the income distribution.

$$Outcomes_{it} = F(a + \gamma entrep_{is}^{type} + \beta x'_{is} + \lambda d_{it_0}) + u_{is} \quad (3.2)$$

The results of estimating Equation (5.2) using a logit specification for each of the $Outcomes_{it} = (up_{it}, down_{it}, farup_{it}, fardown_{it}, up_{it}^l)$ are presented in separate tables, please see Tables 3.6, 3.7, 3.8, 3.9, and 3.10 in the results section. Since each of the $Outcomes_{it}$ is binary, a negative coefficient reflects the odds of moving down the income distribution and a positive coefficient is the estimated odds of upward mobility.

Instrumental Variables Specification

As *Domar and Musgrave* (1944) famously pointed out, higher tax rates may discourage economic activity more broadly, but they also increase the government’s participation in risky ventures, and therefore encourage more risk-taking, indicating that higher tax rates may encourage entrepreneurship, relative to wage

and salary jobs.⁵⁵

More progressive taxes, however, tend to discourage risk-taking. A progressive tax schedule implies mean lower expected returns for riskier ventures, discouraging entry (*Gentry and Hubbard, 2005*). Businesses, however, can more easily shift income from labor to capital income tax schedules, and when capital income is taxed more favorably, there is greater incentive to be an entrepreneur, in a variety of forms. Entrepreneurship is also encouraged by the option to incorporate (*Cullen and Gordon, 2007; Gordon and Slemrod, 2000*), essentially choosing to shift income between personal and corporate tax schedules. Or, to realize other flexibilities for example by reinvesting retained earnings in expensible investments and deferring taxes, including international tax avoidance strategies.

We take state marginal tax rates on earnings at average real wages in 2000, and the difference between state marginal tax rates on labor and capital income of that amount, as two indicators of the policies affecting entrepreneurship, namely tax rates and the gap between labor and capital income taxes. We take measures of progressivity due to (*Kakwani, 1977; Domar and Musgrave, 1944*) based on state taxes applied to the 1996 distribution of family-size-adjusted income as measured in the 1997 March CPS, inflated using the CPI to reflect changes over time due to inflation only, thereby holding income and population shifts constant over time, and looking only at shifts in state tax policy (noting that measures of progressivity are sensitive to the distribution of pretax income).

Income tax policies may also have general equilibrium effects that result in violations of the exclusion restrictions justifying instrumental variables. Our results pass overidentification tests indicating exclusion restrictions are satisfied, but instrument strength may not be great enough in many cases for such tests to have good power to reject the null. As a result of these limitations, instrumental variable results should be interpreted with some caution.

We use these measures as instruments predicting participation in self-employment and the operation of a family business during the 1980s and 1990s, controlling for family resources in the 1970s. This linear instrumental variable strategy makes very few assumptions about the error structure, aside from imposing that the effect of excluded instruments on outcomes operates only through the influence

⁵⁵See also Atkinson and Stiglitz (1980), Bulow and Summers (1984), Feldstein (1969), Gordon (1985) Kaplow (1995), Mossin (1968), Sandmo (1977), Stiglitz (1969), Tobin (1958); Bankman and Fried (1998), Gentry and Hubbard (1997).

on entrepreneurship. Since tax rates and progressivity could have effects on individuals and state economies aside from their impact on entrepreneurship, we try several alternative specifications using different excluded instruments to assess the quality of identification.

The following equations are estimated:

$$E_{it} = \alpha + \lambda I_{ist} + \beta X'_{it} + \hat{u}_{is} \quad (3.3)$$

$$up_{it} = \alpha + \theta \hat{K}_{is} + \beta X'_{it} + \hat{u}_{is} \quad (3.4)$$

Equation (5.3) is the first stage equation, where E_{ist} , the dependent variable, is reported family business ownership or self-employment (estimated separately). The instrument $I_{ist} = (P_{st}, T_{ist})$ P_{st} is a measure of tax schedule progressivity and T_{ist} measures the difference in the marginal tax rate of business and non-business income; X_{it} is the same vector of individual characteristics described previously; and \hat{u}_{is} is the predicted value of the error term from the first stage regression. Equation (5.4) is the second stage equation where individual upward income mobility, is the outcome of interest, and $\theta \hat{K}_{is}$ is the predicted value of family business ownership resulting from equation (5.4).

Intergenerational Transmission of Income

A comparison of intergenerational income mobility is made using separate regressions estimating the correlation between parents' and childrens' earnings for working and entrepreneurial parents. The basic approach follows that used in (*Cooper and Luengo-Prado, 2011; Solon, 1992*), as shown below:

$$y_{ic} = \alpha_0 + \alpha_1 y_{ip} + u_i \quad (3.5)$$

Where y_{ic} is a child's (log) family income and y_{ip} is a parent's (log) family income; the constant term α_0 captures how a generation's average income evolves over time; and the parameter of interest is α_1 which is the estimate of intergenerational income elasticity between parents and children. To minimize attenuation bias, which has been shown to lead to the underestimation of the elasticity (*Solon, 1992; Mazumder, 2001; Lee and Solon, 2009*), we take log family income over a five-year average.

Equation (5.5) is extended to estimate effects for entrepreneurial and working families by including controls for father's entrepreneurship (estimated separately

for family business ownership and self-employment) as well as a term interacting father’s income and self-employment status as shown below in (5.6)

$$y_{ic} = \alpha_0 + \alpha_1 y_{ip} + e_{ip} + (e_{ip} * \alpha_1 y_{ip}) + u_i \quad (3.6)$$

Since life-cycle bias has been shown to cause a downward inconsistency in measures of inter-generational elasticity (*Hertz, 2007; Grawe, 2006; Lee and Solon, 2009*), we take a rolling average of income over a five-year period. The means of parent and child incomes are compared at the same age point, when each was between the ages of 25-40 years. To control for income shocks that may persist over time, we use a robust covariance matrix to correct for serial correlation and heteroskedasticity, following (*Solon, 1992*).

3.6 Results

Cluster robust standard errors are applied in all regressions and the PSID individual longitudinal panel weight is applied in all specifications. As only $k - 1$ of the categorical variables can be included in the regression, the reference category for all regressions is a white male with a college degree and no dependents whose family experienced no composition change over the prior year. Results should be interpreted relative to the reference case.

Benchmark Results of Rank Difference

Table 3.5 reports the results of estimating Equation (1). The primary coefficients of interest report the mean difference in the relative position of self-employed and family business owners in comparison to workers in the income distribution over the measurement period. Note that individuals who reported that they are not currently working for money were excluded from the sample of self-employed individuals and therefore sample counts are lower in specifications containing self-employment. Control variables included in the regression are discussed below and reported in Appendix Table 4.9. The coefficients on each regressor reflects its marginal impact on individual rank in the income distribution (as measured in deciles) over the estimated time period.

On average, self-employed individuals were positioned (-0.19) percentage points lower in the income distribution in relation to workers during the 1980-2007

period. The trend is also negative and significant income differences persisted in each of the observed ten-year periods. However, there was some evidence that the gap in self-employed and worker incomes reduced somewhat in the 1996-2005 period when self-employed incomes were (-0.09) percentage points below that of workers.

The experience of family business owners was more variable, with significant and positive differences in some years and no statistically detectable difference in others. On average, family business owner's incomes ranked (0.07) percentage points above those reported by workers in 1980-2007 period, a significant result. Positive and significant coefficients in the 1980-1989 and 1996-2005 periods indicate that family business owners held a higher position relative to workers in some periods. However, coefficients in the 1985-1994 and 1990-1999 periods were not significant, indicating that observed differences cannot be differentiated from zero in other periods.

Table 3.5 – Mean Difference in Entrepreneur and Worker Income-to-Needs Ratio Over Time

	1980-2007	1980-1989	1985-1994	1990-1999	1996-2005
	b/t	b/t	b/t	b/t	b/t
Self-employment	-0.198***	-0.226***	-0.280***	-0.257***	-0.092*
	[-7.697]	[-5.028]	[-7.456]	[-7.111]	[-2.496]
N	74529	29456	31448	27333	16544
Fam. Bus. Ownership	0.073***	0.093*	0.064	0.013	0.084*
	[3.494]	[2.156]	[1.906]	[0.394]	[2.457]
N	94945	38609	40448	34668	19969

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust z statistics in brackets. Results are mean percentage point differences in latent family income rank over the measurement period, reported after fitting a weighted fractional logit model. The dependent variable is the relative rank of family income-to-needs ratio, with the individual as the unit of observation. Probit, Logit and OLS specifications yield similar results in terms of coefficient magnitude, sign, and significance.

Estimated coefficients on the control variables used in this regression are consistent with the research literature and reported in the Appendix, see Table 4.9.⁵⁶

Being female is estimated to lower an individual's position in the income distribution by about 5 or 6 percentage points. This effect is significant in most

⁵⁶Please contact the authors to obtain regression tables with all coefficients reported.

but not all years. Relative to being white, the average effect of being non-white is to drop about 28 percentage points in the income distribution, a statistically significant difference.

Relative to a college-educated individual, a lower level attainment is significantly associated with a lower position in the income distribution. Changes in family composition have mixed effects, depending on which family members are affected. One's relative position in the income distribution falls as the number of children in the household rises, even after controlling for family size. Last, relative to married individuals, being unmarried is associated with a lower position in the income distribution.

Mobility

Results of estimating Equation (5.2) for the outcome *up* are reported in Table 3.6. The reported coefficients on self-employment and family business ownership reflect the log odds of upward mobility after controlling for demographic and other factors.

Self-employment decreased the log odds of upward mobility by (-0.173), which corresponds to a 16% decline in the odds of upward mobility, relative to workers. The estimated coefficients are each significant and negative in all but the last period from 1996-2005 when the the difference was zero.

Family business ownership was found to significantly increase the log odds of upward mobility by (0.16), which is the same as a 17% increase in the odds of upward mobility over the 1980-2007 period. Estimates are positive and significant in 1980-1989 and in the 1996-2005 periods, but cannot be differentiated from zero in the intervening years.

Table 3.6 – Benchmark Results, up: 1980-2007

Outcome: up_{it}		1980-2007	1980-1989	1985-1994	1990-1999	1996-2005
Self-employment	coef.	-0.173***	-0.209***	-0.358***	-0.308***	-0.003
	z	[-4.390]	[-3.291]	[-6.012]	[-4.022]	[-0.044]
	N	66564	26285	28118	24366	14677
Fam. Bus. Ownership	coef.	0.160***	0.200**	0.049	0.009	0.221***
	z	[3.985]	[2.845]	[0.797]	[0.143]	[3.632]
	N	85378	34770	36393	31089	17822

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust z statistics in brackets. Coefficients are the odds of upward mobility in comparison to workers after estimating a multivariable logit model with cluster robust standard errors. The dependent variable is equal to one if the individual's position in the income distribution went up over the prior ten years and is zero otherwise. Probit and OLS specifications yield similar results in terms of coefficient magnitude, sign, and significance.

Estimates reported in Table 3.7 show that self-employment increased the log odds of downward mobility by (0.397). This is equivalent to a 48% increase in the odds of moving down the income distribution, relative to workers. The estimated coefficients are each significant at the 1% level in all observed time periods.

Table 3.7 shows that with the exception of the 1990-1999 period when it increased the log odds of downward mobility, family business ownership had a negligible effects on the odds downward mobility in comparison to workers.

Table 3.7 – Benchmark Results, Down: 1980-2007

Outcome: $down_{it}$		1980-2007	1980-1989	1985-1994	1990-1999	1996-2005
Self-employment	coef.	0.397***	0.392***	0.597***	0.539***	0.244***
	z	[8.940]	[5.333]	[11.090]	[8.161]	[3.498]
	N	70228	27944	29692	25700	15514
Fam. Bus. Ownership	coef.	-0.012	-0.076	0.081	0.128*	-0.046
	z	[-0.294]	[-0.976]	[1.365]	[2.187]	[-0.766]
	N	86594	35317	36935	31580	18235

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust z statistics in brackets. Coefficients are the odds of downward mobility in comparison to workers after estimating a multivariable logit model with cluster robust standard errors. The dependent variable is equal to one if the individual's position in the income distribution went down over the prior ten years and is zero otherwise. Probit and OLS specifications yield similar results in terms of coefficient magnitude, sign, and significance.

Mobility of Two Deciles or More

The log odds of moving “far” up the income distribution among the self-employed were significantly larger in comparison to workers in some but not all periods. Self-employment significantly increased the log odds (0.247) of moving far up the distribution over the course of the 1980-2007 period (roughly a 28% increase in the odds of upward mobility). In the 1996-2005 period log odds of moving far up were (0.430) or about 54% increase over the baseline odds. However, log odds of moving far up in the intervening years were no different for the self-employed than they were for workers.

At the same time, the log odds of far downward mobility were considerably higher for the self-employed than they were for workers, as shown in Table 3.9. The log odds that a self-employed individual moved down two deciles or more were (0.73) times greater than the log odds for workers.

Table 3.8 – Ten-year Lagged Upward Mobility, Up Two or More Deciles

Outcome: <i>farup_{it}</i>		1980-2007	1980-1989	1985-1994	1990-1999	1996-2005
	coef.	0.247***	0.128	0.08	0.158	0.430***
Self-employment	z	[4.588]	[1.577]	[1.002]	[1.848]	[5.023]
	N	66564	26285	28118	24366	14677
	coef.	0.408***	0.383***	0.277***	0.278***	0.475***
Fam. Bus. Ownership	z	[8.923]	[4.980]	[3.538]	[3.901]	[6.539]
	N	85378	34770	36393	31089	17822

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust z statistics in brackets. Coefficients are the odds upward mobility of more than two deciles in comparison to workers. Estimated are generated using multivariable logit model with cluster robust standard errors. The dependent variable is equal to one if the individual’s position in the income distribution went up by more than two deciles over the prior ten years and is zero otherwise. Probit and OLS specifications yield similar results in terms of coefficient magnitude, sign, and significance.

The opposite is true for family business owners. The log odds of more substantial upward mobility (0.408) are significantly (50%) greater for family business owners than they are for workers. And likewise, the log odds of moving far down the income distribution among family business owners was negligible in comparison to what workers experienced in most years. The exception is the 1980-2007 period when the log odds that family business owners moved down two deciles or more was (0.159) in comparison to workers, and the 1990-1999 period when log odds were (0.278)—about a 32% increase in the odds of far downward mobility.

Table 3.9 – Ten-year Lagged Upward Mobility, Down Two or More Deciles

Outcome: $fardown_{it}$		1980-2007	1980-1989	1985-1994	1990-1999	1996-2005
	coef.	0.733***	0.843***	0.899***	0.811***	0.475***
Self-employment	z	[12.285]	[9.078]	[10.719]	[9.804]	[5.376]
	N	64903	25843	27476	23812	14382
	coef.	0.159*	0.084	0.174	0.278**	0.127
Fam. Bus. Ownership	z	[2.440]	[0.811]	[1.748]	[3.244]	[1.616]
	N	78350	31916	33490	28691	16595

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust z statistics in brackets. Coefficients are the odds downward mobility of more than two deciles in comparison to workers. Estimated are generated using multivariable logit model with cluster robust standard errors. The dependent variable is equal to one if the individual's position in the income distribution went down by more than two deciles over the prior ten years and is zero otherwise. Probit and OLS specifications yield similar results in terms of coefficient magnitude, sign, and significance.

Upward Mobility from Bottom Decile

The results of estimating equation (5.2) with using the outcome up_{it}^l are shown in Table 3.10. Neither form of entrepreneurship seems to enable individuals to achieve greater upward mobility from the lowest levels of the income distribution. The log odds moving up the income distribution when starting from the lowest ladder rungs are significantly lower (-0.477—about a 37% decline in the odds) in self-employment than among workers.

Likewise, in comparison to work, family business ownership has a consistent and negligible effect on upward income mobility from the bottom in all but the 1996-2005 period when it was significant and positive.

Table 3.10 – Upward Mobility from the Bottom of the Income Distribution

Outcome: up_{it}^1		1980-2007	1980-1989	1985-1994	1990-1999	1996-2005
Self-employment	coef.	-0.477**	-0.441	-0.557	-0.630**	-0.527*
	z	[-3.204]	[-1.316]	[-1.837]	[-2.908]	[-1.974]
	N	9017	3393	3744	3307	2005
Fam. Bus. Ownership	coef.	0.285	0.163	-0.069	0.319	0.589*
	z	[1.436]	[0.385]	[-0.216]	[1.283]	[2.034]
	N	9017	3393	3744	3307	2005

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust z statistics in brackets. Coefficients are the odds of self-employed upward mobility starting from the lowest two deciles, in comparison to workers. Estimated generated using multivariable logit model with cluster robust standard errors. The dependent variable is equal to one if the individual's position in the income distribution went up by more than two deciles over the prior ten years and is zero otherwise. Probit and OLS specifications yield similar results in terms of coefficient magnitude, sign, and significance.

Instrumental Variable Estimation

A limitation of the analysis so far is that it has ignored the endogeneity of entrepreneurship and income mobility. To remedy this, we sought a time-varying policy that would significantly shift self-employment and family business ownership without directly affecting income mobility.

We tested the instrument in the first stage by regressing self-employment and family business ownership on various measures of tax progressivity and the difference in the marginal tax rate on business and non-business income using a variant of the benchmark linear regression model. The specification included all controls, estimated with state dummy variables (fixed effect) and cluster robust standard errors over the 1980-1999 period. We found similar results using a family fixed effect to control for genetic and familial entrepreneurial propensity.

We found that family business ownership is not sensitive to differences in the marginal tax rate of business and non-business income over the 1979-2007 period. However, it is affected by tax schedule progressivity. The first-stage results (estimating equation (5.3)) are shown in Table 3.11. Consistent with *Gentry and Hubbard* (2005, 2000), we find that the coefficient on tax progressivity is negative and significant at the 1% level.

None of the tax policy instruments tested were found to significantly affect self-employment. As a result, we did not continue with instrumented regressions for self-employment.

Table 3.11 – First Stage Results

	UP		DOWN	
	Coef.	t	Coef.	t
Lag 10-year Income	.09***	[5.42]	.11***	[6.66]
Female	-0.02*	[-2.73]	-0.02*	[-2.07]
Non-White	-0.07***	[-5.41]	-0.07***	[-5.42]
Below High School	-0.11***	[-6.66]	-0.11***	[-6.37]
High School	-0.06***	[-4.86]	-0.06***	[-4.53]
Some College	-0.03	[-1.39]	-0.02	[-1.24]
Change: Other	0.01	[1.63]	0.01	[1.34]
Change: Head	0.00	[0.18]	0.01	[0.81]
Age	0.02***	[3.21]	0.02***	[3.99]
Age-Squared	-0.00***	[-3.29]	-0.00***	[-4.07]
Unmarried	-0.02***	[-6.75]	-0.01***	[-7.14]
Dependents: 1	0.02*	[2.28]	0.02	[1.79]
Dependents: 2	0.03*	[2.46]	0.038	[2.23]
Dependents > 2	0.03	[1.63]	0.03	[1.59]
Starting Decile	-0.0	[-0.86]	0.0	[0]
Tax Progressivity	-1472.47***	[-3.43]	-1579.89***	[-3.7]
Cons	-0.22	[-1.57]	-0.31	[-2.45]
N	60990		62963	

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust t statistics in brackets. Reported coefficients result from first-stage instrumental variables regression using two-stages least squares. The outcome is family business ownership and all standard regressors are entered as controls. We test the effect of Tax Progressivity.

After finding that our preferred instrumental variable was suitably strong in the first stage, with an F statistic in excess of 11.7, we estimated equation (5.4) using two-stage least squares or instrumental variables (IV) regression (estimating (5.4) in one step as a projection on a projection, rather than estimating (5.3) and (5.4) separately, makes standard errors easier to calculate). Results are shown in Table 3.12. In contrast to the regressions assuming exogeneity of business ownership, we find that the IV coefficient on family business ownership is positive and significant where the outcome is upward income mobility over the 1980-1999 period. In separate tests of downward mobility, the instrumental variables coefficient is negative and significant, indicating that family business ownership improved mobility prospects in both directions, after controlling for selection.

Upward mobility from the bottom end of the income distribution was additionally tested using the IV procedure. In this regression, the instrumental variables

coefficient on family business ownership is positive but can not be statistically differentiated from zero. A possible interpretation is that family business ownership does not enable families at the lowest level of the distribution to rise any faster than workers do. However, results should be interpreted with caution since the sample size is much smaller (about 9800 observations over 1980-2007) and the instrument was weak in the first stage.

Taken together, the instrumental variables regression suggest that owning or having a management stake in a small business had an unambiguously positive effect on incremental upward income mobility during the 1980s and 1990s after controlling for resources in the 1970s. This result implies family business ownership led to a higher level of economic advancement relative to working for someone else in the 1980s and 1990s.

Table 3.12 – OLS and IV Results

	Up Mobility (Decile)				Down Mobility (Decile)			
	OLS		IV		OLS		IV	
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Family Bus. Ownership	0.02	[1.92]	1.26**	[-2.96]	0.01	[0.42]	-0.90**	[-2.63]
Lag 10-year Income	-.21	[-11.25]	-0.33***	[-6.19]	.15	[8.40]	0.25***	[5.62]
Female	-0.01	[-1.42]	0.01	[0.97]	0.014*	[2.345]	0.00	[0.13]
Non-White	-0.05*	[-2.56]	0.03	[1.01]	0.03	[1.24]	-0.03	[-1.18]
Below High School	-0.20***	[-12.31]	-0.05	[-0.80]	0.18***	[11.14]	0.08	[1.6]
High School	-0.13***	[-9.66]	-0.05	[-1.39]	0.12***	[9.20]	0.06*	[2.34]
Some College	-0.07***	[-5.40]	-0.04	[-1.32]	0.07***	[5.53]	0.05*	[2.4]
Change: Other	0.08***	[9.16]	0.08***	[6.12]	-0.06***	[-7.45]	-0.06***	[-5.59]
Change: Head	0.02	[1.89]	0.02	[1.04]	0.01	[0.23]	0.01	[0.46]
Age	0.10***	[22.63]	0.08***	[7.71]	-0.11***	[-22.04]	-0.09***	[-8.78]
Age-Squared	-0.00***	[-23.42]	-0.00***	[-7.79]	0.00***	[22.70]	0.00***	[8.81]
Unmarried	-0.04***	[-16.25]	-0.02*	[-1.97]	0.04***	[19.91]	0.02***	[3.42]
Dependents: 1	-0.03**	[-2.79]	-0.06***	[-3.57]	0.03**	[3.01]	0.05***	[3.44]
Dependents: 2	-0.16***	[-11.59]	-0.19***	[-9.05]	0.15***	[11.14]	0.18***	[8.4]
Dependents > 2	-0.24***	[-15.17]	-0.27***	[-10.85]	0.22***	[15.59]	0.24***	[12.24]
Starting Decile	0	[0.50]	0.00	[-0.82]	0	[0.34]	0	[0.27]
Cons	-1.44***	[-14.03]	-1.26***	[-6.04]	2.49***	[22.37]	2.28***	[12.07]
N	65859		60990		66897		62963	

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust t statistics in brackets. Reported coefficients result from instrumental variables regression using two-stages least squares. The outcome is the indicator of upward mobility (up) and downward mobility (down) over the 1980-1999 period instrumented with Tax Progressivity. All standard regressors are entered as controls.

To examine if these benefits accrue differently to the children of entrepreneurs

and workers, we next examine intergenerational correlations while controlling for parent's occupational status.

Intergenerational Effects

After creating a data set that matches parents and children, we have 13,730 observations matching children with their fathers when each was at the same age. The mean income-to-needs ratio among working fathers was 3.40 and was 3.82 among self-employed or business-owning fathers. The basic correlation in father/child self-employment and family business ownership is about the same, with both near 0.13.

We estimate that the intergenerational elasticity of father and child's income is .47 and rises to .51 after controlling for father's self-employment.⁵⁷ The difference in the elasticity indicates that the children of self-employed fathers have higher incomes relative to the children of workers. In addition, we interact father's income and self-employment to estimate how they work in concert. The coefficient on the interaction term is negative and significant at the 1% level.

This evidence is suggestive that the children of lower income self-employed fathers experience greater levels of upward mobility than wage and salary workers with comparable income, up to the turning point at about 4.7 times the poverty line (the ratio of .31 over .2, exponentiated). The children of richer self-employed dads, above 4.7 times the poverty line, seem to experience lower levels of upward mobility than wage and salary workers with comparable income. Thus, self-employment may play an equalizing role over the course of a generation. However, such a role may be largely the effect of increased variance in earnings, where greater variance will tend to be advantageous for the poor relative to the rich.

The evidence on family business ownership is different. The intergenerational coefficient remains at .47 after controlling for father's family business ownership. Although the interaction term is negative, its effect size is much smaller. As with self-employment, the children of more resource-constrained family-business owners did better than those whose business-owning father's had higher incomes, however the coefficient on this interaction term was not significant.

⁵⁷It is useful to note that parents' self-employment and income status is exogenous to the child's choices, which removes the possibility of reverse causation.

Table 3.13 – Intergenerational Correlations

	Log Child's Income-to-Needs	Correlation	Std. Err.	P-Val.
Average	Log Father's Income-to-Needs	0.47	.015	0.00
	Log Father's Income-to-Needs	0.51***	.028	0.00
Self-employment	Father's Self-employment	0.31**	.067	0.00
	Log F. Income-to-Needs * Self-employment	-0.20**	.051	0.00
Fam. Bus.	Log Father's Income-to-Needs	0.47***	0.01	0.00
Ownership	Father's Family Bus.	0.14*	0.05	0.00
	Log F. Income-to-Needs * Family-Bus.	-0.07	0.03	0.05

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust z statistics in brackets. Coefficients are the intergenerational correlations. Estimates generated using multivariable OLS with cluster robust standard errors.

3.7 Conclusion

Should the government use policy to level the playing field so that even the most disadvantaged can more easily participate in risky ventures so as to achieve economic advancement? The evidence presented here suggests that if these ventures are undertaken by individuals with the same characteristics of the self-employed individuals in this study, then the answer is probably not.

We find no evidence in support of self-employment providing an advantage in achieving upward mobility. In comparison to workers, the self-employed are far more likely to experience downward income mobility. Self-employment both significantly lowers the probability of upward mobility and significantly increases the probability of downward mobility in comparison to paid work. Results are robust and consistent across the analyses, and though we have not ruled out all forms of selection bias, most hypotheses about selection involving unmeasured factors, such as motivation or originality or other noncognitive skills, would imply positive bias, leading us to conclude our estimates are if anything too rosy.

A possible exception to a story of positive selection bias concerns whether the self-employment decision results from a job loss or is instead, strategic. The motivation to become self-employed is heterogeneous and sensitive to one's rank in the income distribution (*Fairlie and Krashinsky, 2012*). A negative bias at the lower end of the income distribution implies that our results overstate the negative effects of self-employment in this group.

We do find some suggestive evidence, however, of an intergenerational benefit to self-employment. In particular, the children of more income-constrained self-employed fathers experience relatively greater levels of upward mobility in comparison to the children of wage and salary workers, and in relation to the children of richer self-employed dads. This implies that self-employment may play an equalizing role over the course of a generation. These long run, intergenerational differentials are small, however the evidence is merely suggestive.

The evidence presented on family business ownership is less ambiguous. Family business ownership is associated with faster upward mobility than observed in paid work, and the findings exhibit the same pattern using state tax progressivity as an excluded instrument affecting business ownership. Should the government identify and support family business with the greatest potential for economic advancement? It is unclear how a policy maker would choose characteristics to identify businesses with the greatest potential for economic advancement. Even if such "tagging" were possible, it is not clear that there is an externality to be corrected via a subsidy or other preferential treatment.

Even though, as a means of economic mobility, the case for self-employment is weak in our data and the case for family business is strong, there is no clear evidence that any family is better off on average from pursuing either option, since variability of outcomes are greater as well. Furthermore, while we may suspect that society as a whole benefits from risky ventures, there is already substantial preferential treatment available to entrepreneurs and small business owners, and it is not clear that further encouragement is indicated in the absence of clear evidence of uncorrected externalities.

If there is a lack of paid work alternatives, government policy should subsidize programs to encourage self-employment and family business ownership. The great risks of downward economic mobility associated with self-employment however suggest that individuals stand a good chance of moving down the economic ladder. Program participants should not only be informed of this risk, but should also be counseled on exactly if and how the social safety net is positioned to assist them.

It is known that the probability of choosing entrepreneurship rises in the presence of entrepreneurial social ties. There is also some evidence to suggest that such ties may increase the chances of business success. If such a connection is a source of relevant business knowledge or access to capital, a personal social tie

to an experienced entrepreneur may provide insurance against the possibility of business failure (*Brown, 2012b*). Enabling and encouraging the formation of such ties to entrepreneurial friends and family should also be a key part of assisting the aspiring self-employed to form their own safety nets.

Areas for Additional Research

This study highlights important differences in the mobility experiences of the self-employed and family business owners over time. However, to date we have little information from the PSID about the nature of businesses or self-employment activity, and we expect much heterogeneity. Additional research is needed on the question of whether there are qualitative differences in the businesses that would help to better explain mobility differences. Industry, occupation, educational attainment, personal characteristics, or behavior (e.g. saving behavior) may help to explain why some self-employed individuals succeed. More nuanced information would provide a window into more targeted subsidies that could facilitate successful entrepreneurship of individuals.

Ultimately, research is needed to measure social externalities that our research has overlooked: valuable innovations in products, services, technologies and management that self-employed and family businesses provide to markets, or externalities in the families of entrepreneurs who may not account for the effects of their risky innovation on future generations. Given the importance of parental investment, the intergenerational model could be enhanced with controls used in other studies, such as government spending (*Mayer and Lopoo, 2008*); race, ethnicity, and family net worth, and occupation; see e.g. (*Dunn and Holtz-Eakin, 2000*).

References

- Acs, Z. J. (2006), How Is Entrepreneurship Good for Economic Growth?, *Innovations*, 1(1), 97–107.
- Acs, Z. J., D. B. Audretsch, P. Braunerhjelm, and B. Carlsson (2005), Growth and Entrepreneurship: An Empirical Assessment, *Discussion Papers on Entrepreneurship, Growth and Public Policy*, 32.
- Acs, Z. J., S. Desai, and L. F. Klapper (2008), What Does Entrepreneurship Data Really Show?, *Small Business Economics*, 31, 265–281, 10.1007/s11187-008-9137-7.
- Aggarwal, A. (2007), Impact of Special Economic Zones on Employment, Poverty and Human Development.
- Aghion, R. B. S. J. R., Philippe, and F. Zilibotti (2008), The Unequal Effects of Liberalization: Evidence From Dismantling the License Raj in India, *American Economic Review*, 98(4), 1397–1412.
- Agosin, M. R., and R. Machado (2000), Foreign Investment in Developing Countries: Does it Crowd in Domestic Investment?, *Oxford Development Studies*, 33(2), 149–162.
- Aldrich, H., B. Rosen, and W. Woodward (1987), *Frontiers in Entrepreneurship Research*, chap. The Impact of Social Networks on Business Foundings and Profit: A Longitudinal Study, pp. 154–168, Wellesley, MA: Babson College.
- Aldrich, H., A. Kalleberg, P. Marsden, and J. Cassell (1989), In Pursuit of Evidence: Sampling Procedures for Locating New Businesses, *Journal of Business Venturing*, 4(6), 367–386.
- Allen, E. I., N. Langowitz, and M. Minniti (2006), Global Entrepreneurship Monitor: 2006 Report on Women and Entrepreneurship.
- Ambedkar, D. B. (1979), *Dr. Babasaheb Ambedkar: Writing and Speeches, Vol. 1*, chap. Castes in India: Their Mechanism, Genesis and Development, pp. 3–22, Bombay: Education Department, Government of Maharashtra.

- Anderson, B. (1991), *Imagined Communities: Reflections on the Origin and Spread of Nationalism*, Verso.
- Ardagna, S., and A. Lusardi (2010), *International Differences in Entrepreneurship*, chap. Explaining International Differences in Entrepreneurship: The Role of Individual Characteristics and Regulatory Constraints, pp. 17–62, University of Chicago Press.
- Audretsch, D. B., M. C. Keilbach, and E. Lehmann (2006), *Entrepreneurship and Economic Growth*, Oxford University Press.
- Bane, M. J., and D. T. Ellwood (1986), Slipping Into and Out of Poverty: The Dynamics of Spells, *The Journal of Human Resources*, 21(1), pp. 1–23.
- Banerjee, A. V., and E. Duflo (2008), Do Firms Want to Borrow More? Testing Credit Constraints Using a Directed Lending Program, *Department of Economics Working Paper Series 02-25*, Massachusetts Institute of Technology.
- Banerjee, A. V., and A. F. Newman (1993), Occupational Choice and the Process of Development, *Journal of Political Economy*, 101(2), pp. 274–298.
- Banerjee, A. V., E. Duflo, R. Glennerster, and C. Kinnan (2012), The Miracle of Microfinance? Evidence From a Randomized Evaluation, *Working Paper 278*, BREAD Working Paper.
- Barro, R. J. (1991), Economic Growth in a Cross Section of Countries, *The Quarterly Journal of Economics*, pp. 407–443.
- Baum, C. F., M. E. Schaffer, and S. Stillman (2007), Enhanced Routines for Instrumental Variables/GMM Estimation and Testing, *Economic Working Paper 667*, Boston College.
- Becker, G. S., and N. Tomes (1979), An Equilibrium Theory of the Distribution of Income and Intergenerational Mobility, *The Journal of Political Economy*, 87(6), 1153–1189.
- Bellucci, A., A. V. Borisov, and A. Zazzaro (2010), Does Gender Matter in Bank-Firm Relationships? Evidence from Small Business Lending, *Journal of Banking and Finance*, 34(12), 2968–2984.
- Besley, T., and R. Burgess (2000), Land Reform, Poverty Reduction, and Growth: Evidence from India, *Quarterly Journal of Economics*, 115(2), 389–430.

- Besley, T., and R. Burgess (2002a), The Political Economy of Government Responsiveness: Theory and Evidence from India, *Quarterly Journal of Economics*, 117(4), 1415–1451.
- Besley, T., and R. Burgess (2002b), EOPP Indian States Data Base.
- Besley, T., and R. Burgess (2004), Can Labor Regulation Hinder Economic Performance? Evidence From India, *Quarterly Journal of Economics*, 119(1), 91–134.
- Bhasin, V. (2009), Determinants of Technical Efficiency of Women Entrepreneurs in the Food Processing Enterprises in Cape Coast, *Ghana Policy Journal*, 3, 24–47.
- Bradbury, K. (2011), Trends in US Family Income Mobility, 1969-2006, *Tech. Rep. 11-10*, Federal Reserve Bank of Boston.
- Brenner, J. (2007), The Impact of Life-Cycle Bias on Intergenerational Income Mobility: Estimates for the US and Germany applying a Covariance Structure Model.
- Brown, E. D. (2012a), How Indian MSME Policies Affect Early-stage Entrepreneurship: With Analysis of Female and Low-income Subgroups, *Prgs dissertation*, Pardee RAND Graduate School.
- Brown, E. D. (2012b), The Effects of Social Ties on Early-Stage Entrepreneurship in India, *Phd dissertation*, Pardee RAND Graduate School.
- Burt, R. S. (1992), *Structural Holes : The Social Structure of Competition*, Harvard University Press.
- Burt, R. S. (1999), *Shared Cognition in Organizations: The Management of Knowledge*, chap. Entrepreneurs, Distrust, and Third Parties: A Strategic Look at the Dark Side of Dense Networks, pp. 213–43, Mahwah: Erlbaum.
- Bushell, B. (2008), Women Entrepreneurs in Nepal: What Prevents them From Leading the Sector?, *Gender and Development*, 16(3), 549–564.
- Cagetti, M., and M. De Nardi (2008), Wealth Inequality: Data And Models, *Macroeconomic Dynamics*, 12(Supplement S2), 285–313, doi: 10.1017/S1365100507070150.

- Cali, M., S. Mitra, and P. Purohit (2011), Measuring State-Business Relations Within Developing Countries: An Application to Indian States, *Journal of International Development*, 23(3), 394–419, doi:10.1002/jid.1777.
- Chaganti, R., and S. Parasuraman (1996), A Study of Impacts of Gender on Business Performance and Management Patterns in Small Business, *Entrepreneurship: Theory & Practice*, 21(2), 73–75.
- Chirwa, E. W. (2008), Effects of Gender on the Performance of Micro and Small Enterprises in Malawi, *Development Southern Africa*, 25(3), 347–362.
- Cohen, E. B. P. A., J. H., and F. Montiel-Ishino (2009), Gender, Work, and Opportunity in Oaxaca: Some Thoughts on the Importance of Women in the Economic Life of the Rural Village, *Research in Economic Anthropology*, 29, 147–161.
- Cooper, D., and M. J. Luengo-Prado (2011), House Price Growth When Kids are Teenagers: A Path to Higher Intergenerational Achievement?, *Working Paper 11-6*, Federal Reserve Bank of Boston.
- Cox, D. R., and D. Oakes (1984), *Analysis of Survival Data*, Chapman & Hall/CRC.
- Cullen, J. B., and R. H. Gordon (2007), Taxes and Entrepreneurial Risk-taking: Theory and Evidence for the US, *Journal of Public Economics*, 91(7/8), 1479–1505.
- Davidsson, P., and B. Honig (2003), The Role of Social and Human Capital Among Nascent Entrepreneurs, *Journal of Business Venturing*, 18(3), 301–331.
- De Clercq, D., and P. Arenius (2006), The Role of Knowledge in Business Start-up Activity, *International Small Business Journal*, 24(4), 339–358.
- de Mel, S., D. McKenzie, and C. Woodruff (2009a), Are Women More Credit Constrained? Experimental Evidence on Gender and Microenterprise Returns, *American Economic Journal: Applied Economics*, 1(3), 1–32.
- de Mel, S., D. J. McKenzie, and C. Woodruff (2009b), Measuring Microenterprise Profits: Must We Ask How the Sausage is Made?, *Journal of Development Economics*, 88(1), 19–31.

- Deaton, A., and V. Kozel (Fall 2005), Data and Dogma: The Great Indian Poverty Debate, *The World Bank Research Observer*, 20(2), 177–199, doi: 10.1093/wbro/lki009.
- Djankov, S., R. La Porta, F. Lopez-De-Silanes, and A. Shleifer (2002), The Regulation of Entry, *Quarterly Journal of Economics*, 117(1).
- Djankov, S., E. Miguel, Y. Qian, G. Roland, and E. Zhuravskaya (2005), Who Are Russia’s Entrepreneurs?, *Journal of the European Economic Association*, 3(2-3), 587–597.
- Djankov, S., Y. Qian, G. Roland, and E. Zhuravskaya (2006), Who Are China’s Entrepreneurs?, *The American Economic Review*, 96(2), pp. 348–352.
- Djankov, S., T. Ganser, C. McLiesh, R. Ramalho, and A. Shleifer (2010), The Effect of Corporate Taxes on Investment and Entrepreneurship, *American Economic Journal: Macroeconomics*, 2(3), 31–64.
- Dollar, D., and A. Kraay (2004), Trade, Growth, and Poverty, *The Economic Journal*, 114(493), F22–F49.
- Domar, E. D., and R. A. Musgrave (1944), Proportional Income Taxation and Risk-Taking, *The Quarterly Journal of Economics*, 58(3), pp. 388–422.
- Duncan, G. J., and D. H. Hill (1989), Assessing the Quality of Household Panel Data: The Case of the Panel Study of Income Dynamics, *Journal of Business & Economic Statistics*, 7(4), pp. 441–452.
- Dunn, T., and D. Holtz-Eakin (2000), Financial Capital, Human Capital, and the Transition to Self-Employment: Evidence from Intergenerational Links, *Journal of Labor Economics*, 18(2), 282–305.
- E. Brown, T. M. A. M. N. S., K. Kumar, and J. Yoong (2012), Government Policy and Private Sector Entrepreneurship in India.
- Eckhard, J. T., and S. A. Shane (2003), Opportunities and Entrepreneurship, *Journal of Management*, 29(3), 333–349.
- Erikson, E. H. (1956), The Problem of Ego Identity, *Journal of the American Psychoanalytic Association*, 4, 56–121.

- Espinal, R., and S. Grasmuck (1997), Gender, Households and Informal Entrepreneurship in the Dominican Republic, *Journal of Comparative Family Studies*, 28(1), 103–&.
- Fairlie, R. W. (2004a), Earnings Growth Among Young Less-Educated Business Owners, *Industrial Relations*, 43, 634–659.
- Fairlie, R. W. (2004b), *Public Policy and the Economics of Entrepreneurship*, chap. Does Business Ownership Provide a Source of Upward Mobility for Blacks and Hispanics, MIT Press.
- Fairlie, R. W. (2005), Entrepreneurship and Earnings Among Young Adults from Disadvantaged Families, *Small Business Economics*, 25, 223–236.
- Fairlie, R. W., and H. A. Krashinsky (2012), Liquidity Constraints, Household Wealth, and Entrepreneurship Revisited, *Review of Income and Wealth*, 58(2), 279–306.
- Fairlie, R. W., and B. D. Meyer (2000), Trends In Self-Employment Among White And Black Men During The Twentieth Century, *The Journal of Human Resources*, 35 (Autumn)(4), 643–669.
- Fairlie, R. W., and A. Robb (2009), Gender Differences in Business Performance: Evidence from the Characteristics of Business Owners Survey, *Small Business Economics*, 33(4), 375–395.
- Fairlie, R. W., and A. M. Robb (2008), *Race and Entrepreneurial Success: Black-, Asian-, and White-Owned Businesses in the United States*, The MIT Press, Cambridge, Massachusetts.
- Fairlie, R. W., D. Karlan, and J. Zinman (2012), Behind the GATE Experiment: Evidence on Effects of and Rationales for Subsidized Entrepreneurship Training, *Nber working paper*, National Bureau of Economic Research.
- Feldman, M. P., and J. L. Francis (2004), Homegrown Solutions: Fostering Cluster Formation, *Economic Development Quarterly*, 18(2), 127.
- Festinger, L. (1950), Informal Social Communication, *Psychological review*, 57(5), 271–282.
- Field, E., S. Jayachandran, and R. Pande (2010a), Do Traditional Institutions Constrain Female Entrepreneurship? A Field Experiment on Business Training in India, *American Economic Review*, 100(2), 125–129.

- Field, E., R. Pande, and J. Papp (2010b), Does Microfinance Repayment Flexibility Affect Entrepreneurial Behavior and Loan Default?, *Tech. rep.*, mimeograph.
- Fitzgerald, J., P. Gottschalk, and R. Moffitt (1998), The Impact Of Attrition In The Panel Study Of Income Dynamics On Intergenerational Analysis, *Journal of Human Resources*, *v33(2, Spring)*, 300–344.
- Gentry, W. M., and R. G. Hubbard (2000), Tax Policy and Entrepreneurial Entry, *The American Economic Review*, *90(2)*, 283–287.
- Gentry, W. M., and R. G. Hubbard (2004), Entrepreneurship and Household Saving, *Advances in Economic Analysis & Policy*, *Berkeley Electronic Press*, *4(1)*, 1053.
- Gentry, W. M., and R. G. Hubbard (2005), *Innovation Policy and the Economy*, vol. 5, chap. "Success Taxes," Entrepreneurial Entry, and Innovation, pp. 87–108, The MIT Press.
- Ghani, E., W. R. Kerr, and S. O’Connell (2011), Local Industrial Structures and Female Entrepreneurship in India, *Working Paper 12-036*, Harvard Business School.
- Gifford, S. (1992), Allocation of Entrepreneurial Attention, *Journal of Economic Behavior & Organization*, *19(3)*, 265–284.
- Glaeser, E. L., and B. Sacerdote (2000), The Social Consequences of Housing, *Journal of Housing Economics*, *9(1-2)*, 1–23.
- Glaeser, E. L., D. Laibson, and B. Sacerdote (2002), An Economic Approach to Social Capital, *The Economic Journal*, *112(483)*, F437–F458.
- Global Entrepreneurship Monitor (2006), Adult population survey, india.
- Gordon, R. H., and J. Slemrod (2000), *Does Atlas Shrug? The Economic Consequences of Taxing the Rich*, chap. Are Real Responses to Taxes Simply Income Shifting Between Corporate and Personal Tax Bases?, Russell Sage Foundation.
- Goswami, A., D. Amlanjyoti, and M. Pradhan (2008), Entrepreneurship in India, *Tech. rep.*, National Knowledge Commission, Government of India.

- Gouskova, E., S. Heeringa, K. McGonagle, R. Schoeni, and F. Stafford (2008), Panel Study of Income Dynamics Revised Longitudinal Weights 1993-2005, *Tech. rep.*, Survey Research Center - Institute for Social Research University of Michigan.
- Government of India (2007-08), Annual Report, *Tech. rep.*, Planning Commission.
- Granovetter, M. (2005), The Impact of Social Structure on Economic Outcomes, *The Journal of Economic Perspectives*, 19(1), pp. 33–50.
- Grawe, N. D. (2006), Lifecycle Bias in Estimates of Intergenerational Earnings Persistence, *Labour Economics*, 13(5), 551–570.
- Grieger, L. D., S. Danziger, and R. F. Schoeni (2009), Accurately Measuring the Trend in Poverty in the United States Using the Panel Study of Income Dynamics, *Journal of Economic and Social Measurement*, 34(2), 105–117.
- Halder, S. R., and P. Mosley (2004), Working With the Ultra-Poor: Learning From BRAC Experiences, *Journal of International Development*, 16(3), 387–406.
- Harding, T., and B. S. Javorcik (2011), Roll Out the Red Carpet and They Will Come: Investment Promotion and FDI Inflows, *Economic Journal, Royal Economic Society*, 121(557), 1445–1476.
- Henton, D. C., J. Melville, and K. Walesh (1997), *Grassroots Leaders for a New Economy: How Civic Entrepreneurs are Building Prosperous Communities*, Jossey-Bass.
- Hertz, T. (2007), Trends in the Intergenerational Elasticity of Family Income in the United States, *Industrial Relations: A Journal of Economy and Society*, 46(1), 22–50.
- Holtz-Eakin, D., H. S. Rosen, and R. Weathers (2000), Horatio Alger Meets the Mobility Tables, *Small Business Economics*, 14, 243–274.
- Hurst, E., and A. Lusardi (2004), Liquidity Constraints, Household Wealth, and Entrepreneurship, *Journal of Political Economy*, 112(2), 319–347.
- Husseini, R. (1997), Promoting Women Entrepreneurs in Lebanon: The Experience of UNIFEM, *Gender and Development*, 5(1), 49–53.

- Iyer, L., T. Khanna, and A. Varshney (2011), Caste and Entrepreneurship in India, *Working Paper 12-028*, Harvard Business School.
- Jeffrey, R. (2000), *India's Newspaper Revolution: Capitalism, Politics and the Indian-language Press 1977-1999*, 223 pp., St. Martin's Press, New York.
- Kakwani, N. C. (1977), Measurement of Tax Progressivity: An International Comparison, *The Economic Journal*, 87, 71–80.
- Kanbur, S. M. R. (1982), Entrepreneurial Risk Taking, Inequality, and Public Policy: An Application of Inequality Decomposition Analysis to the General Equilibrium Effects of Progressive Taxation, *Journal of Political Economy*, 90(1), 1–21.
- Karupiah, P. (2010), Gender, Aspiration and Choice to Become an Entrepreneur among Malaysian Graduates, in *Proceedings of 2010 International Conference on Humanities, Historical and Social Sciences*, edited by A. M. K. H. T. Z. Rawani, pp. 98–102, 2010 International Conference on Humanities, Historical and Social Sciences FEB 26-28, 2010 Singapore, SINGAPORE.
- Kevane, M., and B. Wydick (2001), Microenterprise Lending to Female Entrepreneurs: Sacrificing Economic Growth for Poverty Alleviation?, *World Development*, 29 (7), 1225–1236.
- Kim, P., H. Aldrich, and L. Keister (2006), Access (Not) Denied: The Impact of Financial, Human, and Cultural Capital on Entrepreneurial Entry in the United States, *Small Business Economics*, 27(1), 5–22.
- Klapper, L., L. Laeven, and R. Rajan (2006), Entry Regulation as a Barrier to Entrepreneurship, *Journal of Financial Economics*, 82(3), 591–629.
- Klapper, L., R. Amit, and M. F. Guillen (2008), *International Differences in Entrepreneurship*, chap. Entrepreneurship and Firm Formation across Countries, University of Chicago Press, sSRN eLibrary.
- Klyver, K., K. Hindle, and D. Meyer (2008), Influence of Social Network Structure on Entrepreneurship Participation: A study of 20 National Cultures, *International Entrepreneurship and Management Journal*, 4(3), 331–347, 10.1007/s11365-007-0053-0.

- Kochhar, K., U. Kumar, R. Rajan, A. Subramanian, and I. Tokatlidis (2006), India's Pattern of Development: What Happened, What Follows?, *Working Paper WP/06/22*, International Monetary Fund, Washington DC.
- Kristiansen, S. (2004), Social Networks and Business Success: The Role of Subcultures in an African Context, *American Journal of Economics and Sociology*, 63(5), pp. 1149–1171.
- Kumar, K. B., and J. G. Matsusaka (2008), From Families to Formal Contracts: An Approach to Development, *SSRN eLibrary*, doi:10.2139/ssrn.574803.
- Lee, C.-I., and G. Solon (2009), Trends in Intergenerational Income Mobility, *Review of Economics and Statistics*, 91(4), 766–772.
- Lerner, J., and U. Malmendier (2011), With a Little Help from My (Random) Friends: Success and Failure in Post-Business School Entrepreneurship, *NBER Working Paper 16918*, National Bureau of Economic Research.
- Lillard, L. A., and C. W. A. Panis (1998), Panel Attrition from the Panel Study of Income Dynamics: Household Income, Marital Status, and Mortality, *The Journal of Human Resources*, 33(2), pp. 437–457.
- Lucas, J. R. E. (1988), On the Mechanics of Economic Development, *Journal of Monetary Economics*, 22(1), 3–42.
- Maes, J. P., and L. R. Reed (2012), State of the Microcredit Summit Campaign Report 2012, *Report*, Microcredit Summit Campaign.
- Mahadea, D. (2001), Similarities and Differences between Male and Female Entrepreneurial Attributes in Manufacturing Firms in the Informal Sector in the Transkei, *Development Southern Africa*, 18(2), 189–199.
- Manimala, M. J. (2002), India Report 2002, *National reports*, Global Entrepreneurship Monitor.
- Mayer, S. E., and L. M. Lopoo (2008), Government Spending and Intergenerational Mobility, *Journal of Public Economics*, 92(1-2), 139–158.
- Mazumder, B. (2001), Earnings Mobility in the US: A New Look at Intergenerational Inequality, *Working Paper Series WP-01-18*, Federal Reserve Bank of Chicago.

- McKernan, S.-M., and H. Salzman (2008), Self-Employment and Economic Mobility, *Tech. rep.*, Urban Institute, urban Institute.
- McKinsey Global Institute (2007), The 'Bird of Gold': The Rise of India's Consumer Market, *Tech. rep.*
- Minniti, M. (2005), Entrepreneurship and Network Externalities, *Journal of Economic Behavior and Organization*, 57(1), 1–27.
- Minniti, M. (2010), Female Entrepreneurship and Economic Activity, *European Journal of Development Research*, 22(3), 294–312.
- Minniti, M., and W. Naude (2010a), Female Entrepreneurship in Developing Countries, *Working Papers UNU-WIDER Wider Angle WA2010/08*, World Institute for Development Economic Research (UNU-WIDER).
- Minniti, M., and W. Naude (2010b), What Do We Know About The Patterns and Determinants of Female Entrepreneurship Across Countries?, *European Journal of Development Research*, 22(3), 277–293.
- Morales-Gualdron, S. T., and S. Roig (2005), The New Venture Decision: An Analysis Based on the GEM Project Database, *International Entrepreneurship and Management Journal*, 1(4), 479–499.
- Morduch, J. (1999), The Microfinance Promise, *Journal of Economic Literature*, 37(4), 1569–1614.
- Mueller, P. (2006), Entrepreneurship in the Region: Breeding Ground for Nascent Entrepreneurs?, *Small Business Economics*, 27(1), 41–58.
- Munshi, K. (2011), Strength in Numbers: Networks as a Solution to Occupational Traps, *Review of Economic Studies*, 78, 1069–1101.
- Munshi, K., and M. Rosenzweig (2009), Why is Mobility in India so Low? Social Insurance, Inequality, and Growth, *NBER Working Paper 14850*, National Bureau of Economic Research.
- Muravyev, A., O. Talavera, and D. Schafer (2009), Entrepreneurs' Gender and Financial Constraints: Evidence from International Data, *Journal of Comparative Economics*, 37(2), 270–286.
- Nanda, R., and J. B. Sorensen (2009), Workplace Peers and Entrepreneurship, *Working Paper 08-051*, Harvard Business School, Cambridge, Boston.

- of Applied Economic Research, N. C. (2009), An Index of Devolution for Assessing Environment for Panchayati Raj Institutions in the States: Empirical Assessment - 2008, *Tech. rep.*, National Council of Applied Economic Research.
- of India, G. (2001), General Population Tables.
- Panel Study of Income Dynamics (2011), Public use dataset, Produced and distributed by the Institute for Social Research, Survey Research Center, University of Michigan, Ann Arbor, MI.
- Planning Commission, Government of India (2008), Eleventh five year plan (2007 - 2012), *Tech. rep.*
- Quadrini, V. (1999), The Importance of Entrepreneurship for Wealth Concentration and Mobility, *Review of Income and Wealth*, 45(1), 1–19.
- Reddy, C. P., A. Prasad, and M. S. Kumar (2009), Balanced Regional Development of India through Special Economic Zones: An Empirical Study, *Journal of Social Sciences*, 20(1), 1–13.
- Reynolds, P., N. Bosma, E. Autio, S. Hunt, N. De Bono, I. Servais, P. Lopez-Garcia, and N. Chin (2005), Global Entrepreneurship Monitor: Data Collection Design and Implementation 1998-2003, *Small Business Economics*, 24(3), 205–231.
- Robb, A. M. (2002), Entrepreneurial Performance by Women and Minorities: The Case of New Firms, *Journal of Developmental Entrepreneurship*, 7(4), 383.
- Rodrik, D. (2008), Second-Best Institutions, *American Economic Review*, 98(2), 100–104.
- Romer, P. M. (1986), Increasing Returns and Long-Run Growth, *Journal of Political Economy*, 94(5), 1002–1037.
- Rowley, T., D. Behrens, and D. Krackhardt (2000), Redundant Governance Structures: An Analysis of Structural and Relational Embeddedness in the Steel and Semiconductor Industries, *Strategic Management Journal*, 21(3), 369–386.
- Schramm, C. F. (2005), Building Entrepreneurial Economies, *Foreign Affairs*, 83(4), 104–115.

- Shane, S. A. (2004), *A General Theory of Entrepreneurship : the Individual-opportunity Nexus*, New Horizons in Entrepreneurship, xiv, 327 p. pp., Edward Elgar, Cheltenham ; Northampton, MA.
- Shane, S. A. (2008), *The Illusions of Entrepreneurship: The Costly Myths that Entrepreneurs, Investors and Policy Makers Live By*, Yale University Press.
- Shane, S. A. (2009), Why Encouraging More People to Become Entrepreneurs is Bad Public Policy, *Small Business Economics*, 33(2), 141–149.
- Shane, S. A., and D. M. Cable (2002), Network Ties, Reputation, and the Financing of New Ventures, *Management Science*, 48(3), 364–381.
- Shukla, R., S. Dwivedi, and A. Sharma (2004), The Great Indian Middle Class, *Tech. rep.*, National Council of Applied Economic Research.
- Singh, P. (2008), Subnationalism: The Concept, a Measure & its Application to Indian States.
- Solon, G. (1992), Intergenerational income mobility in the united states, *The American Economic Review*, 82(3), pp. 393–408.
- Solon, G. (1999), Intergenerational Mobility in the Labor Market, *Handbook of Labor Economics*, 3, 1761–1800.
- Sridhar, V. K. (1909), *The History of Caste in India: Evidence of the Laws of Manu on the Social Conditions in India during the Third Century A.D. interpreted and examined; with an Appendix on Radical Defects of Ethnology*, Taylor and Carpenter.
- Stam, W. (2008), Entrepreneur Orientation and New Venture Performance: The Moderating Role of Intra-and Extra Industry Social Capital, *Academy of Management Journal*, 51(1), 97 – 111.
- Startiene, G., and R. Remeikiene (2008), Gender Gap in Entrepreneurship, *Engineering Economics*, 5(5), 95–103.
- Stevens, A. H. (1999), Climbing Out of Poverty, Falling Back In: Measuring the Persistence of Poverty Over Multiple Spells, *The Journal of Human Resources*, 34(3), 557–588.

- Stock, J. H., and M. Yogo (2002), Testing for Weak Instruments in Linear IV Regression, *NBER Technical Working Paper 284*, National Bureau of Economic Research.
- Stock, J. H., and M. Yogo (2005), *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg*, chap. Testing for Weak Instruments in Linear IV Regression, pp. 80–108, Cambridge University Press.
- Stokey, N. L. (1998), *Frontiers of Research in Economic Theory: The Nancy L. Schwartz Memorial Lectures, 1983-1997*, *Frontiers of Research in Economic Theory: The Nancy L. Schwartz Memorial Lectures, 1983-1997*, vol. Econometric Society Monographs, chap. Shirtsleeves to Shirtsleeves: The Economics of Social Mobility, pp. 210–41, 29 ed., Cambridge University Press, Cambridge; New York and Melbourne.
- Stuart, T. E., and O. Sorenson (2007), Strategic Networks and Entrepreneurial Ventures, *Strategic Entrepreneurship Journal*, 1(3-4), 211–227.
- Thorat, S., and C. Senapati (2006), Reservation Policy in India - Dimensions and Issues, *Working Paper Series 02*, Indian Institute of Dalit Studies, New Delhi.
- Uzzi, B., and R. Lancaster (2003), Relational Embeddedness and Learning: The Case of Bank Loan Managers and Their Clients, *Management Science*, 49(4), pp. 383–399.
- Van Praag, C. M., and J. S. Cramer (2001), The Roots of Entrepreneurship and Labour Demand: Individual Ability and Low Risk Aversion, *Economica*, 68(269), 45–62.
- van Stel, A., M. Carree, and R. Thurik (2005), The Effect of Entrepreneurial Activity on National Economic Growth, *Small Business Economics*, 24(3), 311–321.
- Verheul, I., M. Carree, and R. Thurik (2009), Allocation and Productivity of Time in New Ventures of Female and Male Entrepreneurs, *Small Business Economics*, 33(3), 273–291.
- Wennekers, S., and R. Thurik (1999), Linking Entrepreneurship and Economic Growth, *Small Business Economics*, 13(1), 27–56.

Wong, P. K., Y. P. Ho, and E. Autio (2005), Entrepreneurship, Innovation and Economic Growth: Evidence from GEM data, *Small Business Economics*, 24(3), 335–350, 10.1007/s11187-005-2000-1.

Wooldridge, J. M. (2002), *Econometric Analysis of Cross Section and Panel Data*, The MIT Press.

Zabel, J. E. (1998), An Analysis of Attrition in the Panel Study of Income Dynamics and the Survey of Income and Program Participation with an Application to a Model of Labor Market Behavior, *The Journal of Human Resources*, 33(2), 479–506.

4 Appendix

Table 4.1 – Detailed Policies

Policy Category	Definition
Single window clearance	Single-window clearance policies, aimed at streamlining the time-related bureaucratic burden of firms in start up or expansion activity.
Subsidy: capital / financing (includes capitalization of young firms, and "unemployed educated youth")	Any policy which offers tax credits, interest waivers or concessional financing/working capital loans; may include financing for investment, infrastructure, expansion, etc.
Subsidy: electricity, power	Any policy granting a subsidy or duty waiver for the use, self-use, or production of energy–electric, diesel or gas; also includes policies of state guarantees of continuous power/electrification.
Subsidy: excise sales tax, octroi, subsidies, VAT	Policies reducing the state's cut of business transactions and the cost of business per se, including VAT reduction, excise and octroi reduction, etc.
Subsidy: registration fees, etc. business entry tax waivers, stamp duty	Any policy which reduces the fiscal-related bureaucratic/administrative burden of doing business in the state owed to the government; includes government-induced entry costs (business entry tax, registration fees), as well as other fees (administrative, ma
Subsidy: export orientation	Special concessions to export-oriented business units
Subsidy: FDI	Special concessions to incentivize foreign direct investment; can include specific subsidies, fast-tracking FDI proposals, escort services
Subsidy: marketing assistance	All policies which help to market products, including participation in industry fairs, exhibitions and events as well as direct marketing assistance often through reimbursement, or subsidy. Also includes help in identifying markets (domestic and foreign)
Cluster/park (geography based) regardless of industry	Special incentives for development in an industrial estate or in an industrial cluster. Industrial Clusters: A district having 100 or more registered SSI units that were engaged in manufacturing the same product as per ASICC 2000 (at 5 digit) was considered as a cluster for that product in that district.
Industries (specialization) /thrust area (not necessarily geographically based)	Instances where the state provides industry-specific incentives. This includes incentives for Thrust areas., for example, regardless of geographic location, IT is prioritized for state development.
ISO certification (Quality)	Partial or full state reimbursement for national or international certification in quality assurance, e.g. ISO 9000
Skill development and training, human capital	Partial or full state reimbursement for training in specific industries, subsidies for the creation of sector-specific training institutions, subsidies for providing on the job training to educated, unemployed youths, vocational training. government sets

Table 4.2 – Detailed Policies Continued

Policy Category	Definition
R&D and Knowledge Capital Development	State subsidies for public and private R&D activities including actual research, administrative support for R&D institutions, subsidies/awards for incentivizing excellence in R&D, establishing research facilities (e.g. testing labs, centers), and patents and patent protections. Also includes subsidizing business incubation activities as well as innovation centers
Women entrepreneurs	Special incentives (e.g. a reduction in VAT) provided by the state to encourage women and handicapped persons to start businesses.
SC/ST (scheduled castes and scheduled tribes)	Special incentives (e.g. a reduction in VAT) provided by the state to encourage members of SC/ST to start businesses or for businesses to employ SC/ST members or expand in Backwards areas.
Sick firms	State incentives for the takeover or rehabilitation of firms in "sick" industries, policies allowing firms in sick industries to receive concessionary interest rates and favorable financial arrangements with major banks
Labor regulations	Industry-friendly labour policies, removing labour protections such as minimum wage, max work hours, workers comp, etc. Policies that increase the flexibility of labour regulations, for example by allowing working hours to be increased to 60 hours per week.
Technology upgradation	Government-provided incentives for private firms to make technological acquisitions, investments or purchase technological products and services. Support for institution to acquire externally-created technology. Technology consulting and assistance to firms.
Infrastructure support	Physical infrastructure improvements carried out by the state or by state-incentivized private-sector developers for Roads, electrification, clusters, internet, telecom, etc.
Improving state services to business	Any investment made to improve state administrative services to business. This includes staff training, skills upgrades, computerization (e.g. of offices or business registries) and other improvements to enable a more business friendly environment. May include efforts to reduce the bureaucratic burden firms face, e.g. by easing state inspections Haryana)
Land use subsidy	Special subsidies to entrepreneurs for land development in special economic zones, industrial parks and other places.
Environment/quality of life	Policies encouraging private sector development of land State subsidies for water, waste and energy conservation measures, environmental management and environmental impact studies
SEZ: Special Economic Zone	Subsidies to support the development of a Special Economic Zone

Table 4.3 – Summary Statistics for Individual, Policy and State-level Data

Variable	Obs	Mean	Std. Dev.	Min	Max
Age	1386	35	11	18	64
Age-squared	1386	1340	831	324	4096
Low-Income	1386	0.63	0.48	0	1
Female	1386	0.40	0.49	0	1
Social Ties	1254	0.61	0.49	0	1
Self-reported Skills	1386	0.51	0.50	0	1
Openness	1386	0.83	0.79	0	2
Special Economic Zone	1386	0.32	0.47	0	1
Human Capital/ Technology	1386	3.37	1.53	1	5
Single Window Clearance	1386	0.85	0.36	0	1
Business Environment	1386	1.75	0.95	0	3
Capital / Finance	1386	0.89	0.32	0	1
Individual Special Treatment	1386	0.96	0.84	0	2
Industry Special Treatment	1386	5.34	1.66	3	8
Econ. Policy Devolution	1386	0.58	0.29	0	1
Log Per Cap Income 2005	1386	9.89	.3875302 8	.819517 1	0
Log Population 2001	1386	17.86	.5254046 1	6.86689 1	9

Table 4.4 – Weighted Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Social Ties	1254	0.60	0.49	0	1
Early-stage Entrepreneurship	1386	0.13	0.33	0	1
Self-reported Skills	1386	0.51	0.50	0	1
Female	1386	0.40	0.49	0	1
Age	1386	36	12	18	64
Hhold Income: Rs 5000 or less	1386	0.66	0.47	0	1
Hhold Income: Rs 5001-10000	1386	0.19	0.39	0	1
Hhold Income: Rs 10001-15000	1386	0.08	0.26	0	1
Hhold Income: Rs 15001-20000	1386	0.03	0.18	0	1
Hhold Income: > Rs 20000	1386	0.04	0.18	0	1
Educational attainment: None	1386	0	0	0	1
Educational attainment: Primary	1386	0	0	0	1
Educational attainment: Secondary	1386	0.33	0.47	0	1
Educational attainment: College					

Note: Summary statistics are estimated using data from the Adult Population Survey of the Global Entrepreneurship Monitor for India in 2006. Fifteen states are included in the analysis for a total sample size of 1386. Weights provided by GEM—representative of the 18-64 labour force, adjusted to Census data—are applied in the estimation.

Table 4.5 – Summary of Policy and State-level Data

Variable	Obs	Mean	Std. Dev.	Min	Max
Openness	1386	0.83	0.79	0	2
Special Economic Zone	1386	0.32	0.47	0	1
Human Capital/ Technology	1386	3.37	1.53	1	5
Single Window Clearance	1386	0.85	0.36	0	1
Business Environment	1386	1.75	0.95	0	3
Capital / Finance	1386	0.89	0.32	0	1
Individual Special Treatment	1386	0.96	0.84	0	2
Industry Special Treatment	1386	5.34	1.66	3	8
Econ. Policy Devolution	1386	0.58	0.29	0	1
Log Literacy 2001	1294	4.22	0.14	4	5
Log Per Cap Income 2005	1386	9.89	0.39	9	10
Log Population 2001	1386	17.86	0.53	17	19

Note: MSME Policy data are derived from the policy documents produced by each of the 15 states included in the analysis. Economic devolution data is collected from the Ministry of Panchayati Raj; Literacy, Per Capita Income, and Population data are provided by the Census.

Table 4.6 – Comparison of Entrepreneurs and Workers

Observables	Ever Entrepreneurs				Workers (Never Entrepreneurs)			
	mean	sd	min	max	mean	sd	min	max
Size-adjusted	31,115	26,938	0	536,360	25,715	21,390	0	346,077
Family Income (\$2007)								
Female	0.51	0.50	0	1	0.55	0.50	0	1
Non-White	0.11	0.31	0	1	0.24	0.43	0	1
Below High School	0.14	0.34	0	1	0.26	0.44	0	1
High School								
Some	0.21	0.41	0	1	0.17	0.38	0	1
College								
College	0.28	0.45	0	1	0.16	0.37	0	1
Change:	0.16	0.37	0	1	0.16	0.37	0	1
Other								
Change:	0.07	0.25	0	1	0.07	0.26	0	1
Head								
Change: No	0.77	0.42	0	1	0.76	0.43	0	1
Age	43	11	25	65	42	12	25	65
Unmarried	0.24	0.43	0	1	0.34	0.47	0	1
No Children	0.49	0.50	0	1	0.52	0.50	0	1
One Child	0.18	0.39	0	1	0.18	0.39	0	1
Two	0.20	0.40	0	1	0.17	0.38	0	1
Children								
More than Two	0.13	0.34	0	1	0.12	0.33	0	1
Children								

Statistics are weighted using the core individual PSID weight. Average family income is reported in 2007 dollars and has been adjusted for inflation using the CPI-U (all items using current methods, series CUUR000SA0) available at: <http://data.bls.gov/cgi-bin/surveymost?cu>.

Table 4.7 – Weighted and Unweighted Summary Statistics

Variable	Weighted				Unweighted			
	mean	sd	min	max	mean	sd	min	max
Family Income (\$2007)	28,840	24,896	0	536,360	23,321	22,136	0	536,360
Female	0.53	0.50	0	1	0.55	0.50	0	1
Non-White	0.16	0.37	0	1	0.40	0.49	0	1
Below High School	0.19	0.39	0	1	0.28	0.45	0	1
High School	0.38	0.49	0	1	0.38	0.48	0	1
Some College	0.20	0.40	0	1	0.18	0.38	0	1
College	0.23	0.42	0	1	0.17	0.37	0	1
Change: Other	0.16	0.37	0	1	0.18	0.39	0	1
Change: Head	0.07	0.25	0	1	0.07	0.26	0	1
Change: No	0.77	0.42	0	1	0.74	0.44	0	1
Age	43	12	25	65	42	12	25	65
Unmarried	0.28	0.45	0	1	0.33	0.47	0	1
No Children	0.50	0.50	0	1	0.45	0.50	0	1
One Child	0.18	0.39	0	1	0.19	0.39	0	1
Two Children	0.19	0.39	0	1	0.19	0.39	0	1
More than Two Children	0.13	0.33	0	1	0.17	0.38	0	1

The core PSID individual weight is used to generate weighted estimates.

Table 4.8 – Weighted and Unweighted Summary Statistics of Self-employment and Family Business Ownership Rates

Year	Weighted				Unweighted			
	Self-employed		Fam. Bus. Owner		Self-employed		Fam. Bus. Owner	
	mean	sd	mean	sd	mean	sd	mean	sd
1968	0.15	0.36	0.11	0.31	0.15	0.36	0.08	0.27
1969	0.14	0.35	0.11	0.31	0.14	0.35	0.08	0.28
1970	0.13	0.33	0.12	0.32	0.13	0.33	0.09	0.28
1971	0.14	0.35	0.12	0.33	0.14	0.35	0.09	0.29
1972	0.14	0.34	0.13	0.33	0.14	0.34	0.10	0.30
1973	0.13	0.34	0.12	0.32	0.13	0.34	0.09	0.29
1974	0.13	0.34	0.11	0.31	0.13	0.34	0.08	0.28
1975	0.14	0.35	0.11	0.32	0.14	0.35	0.09	0.28
1976	0.14	0.35	0.12	0.33	0.14	0.35	0.09	0.29
1977	0.13	0.34	0.13	0.33	0.13	0.34	0.09	0.29
1978	0.13	0.33	0.12	0.33	0.13	0.33	0.10	0.29
1979	0.14	0.35	0.13	0.34	0.14	0.35	0.10	0.30
1980	0.14	0.35	0.12	0.33	0.14	0.35	0.10	0.29
1981	0.14	0.35	0.12	0.33	0.14	0.35	0.09	0.29
1982	0.15	0.35	0.13	0.33	0.15	0.35	0.10	0.30
1983	0.15	0.36	0.14	0.35	0.15	0.36	0.11	0.31
1984	0.15	0.36	0.15	0.35	0.15	0.36	0.11	0.31
1985	0.15	0.36	0.16	0.37	0.15	0.36	0.12	0.33
1986	0.14	0.35	0.17	0.37	0.14	0.35	0.13	0.33
1987	0.14	0.35	0.18	0.38	0.14	0.35	0.13	0.34
1988	0.14	0.35	0.18	0.39	0.14	0.35	0.14	0.35
1989	0.14	0.35	0.17	0.38	0.14	0.35	0.13	0.33
1990	0.14	0.35	0.17	0.38	0.14	0.35	0.14	0.34
1991	0.15	0.35	0.17	0.38	0.15	0.35	0.13	0.34
1992	0.15	0.36	0.18	0.38	0.15	0.36	0.13	0.34
1993	0.14	0.35	0.17	0.37	0.14	0.35	0.12	0.33
1994	0.14	0.35	0.17	0.38	0.14	0.35	0.13	0.34
1995	0.14	0.35	0.17	0.37	0.14	0.35	0.13	0.33
1996	0.14	0.34	0.18	0.38	0.14	0.34	0.14	0.34
1997	0.14	0.34	0.18	0.39	0.14	0.34	0.15	0.36
1999	0.12	0.33	0.17	0.38	0.12	0.33	0.14	0.34
2001	0.13	0.33	0.18	0.38	0.13	0.33	0.14	0.35
2003	0.13	0.33	0.16	0.37	0.13	0.33	0.13	0.34
2005	0.13	0.33	0.15	0.36	0.13	0.33	0.12	0.33
2007	0.13	0.33	0.15	0.36	0.13	0.33	0.12	0.33
2009	0.13	0.34	0.15	0.36	0.13	0.34	0.12	0.33
Total	0.14	0.35	0.15	0.36	0.14	0.35	0.11	0.32

Table 4.9 – Mean Difference in Entrepreneur and Worker Income-to-Needs Ratio, With Regressors

	1980-2007		1980-1989		1985-1994		1990-1999		1996-2005	
	b/t	b/t								
Self-employment	-0.20***		-0.23***		-0.28***		-0.26***		-0.09*	
	[-7.70]		[-5.03]		[-7.60]		[-7.11]		[-2.50]	
Fam.		0.073***		0.09*		0.06		0.01		0.08*
Bus.Own.		[3.50]		[2.16]		[1.91]		[0.39]		[2.46]
Lag 10-yr Inc.	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.01***	0.01***
	[39.49]	[42.470]	[32.31]	[35.05]	[27.73]	[29.96]	[25.84]	[27.45]	[25.41]	[26.03]
Female	-0.05***	-0.08***	-0.07***	-0.12***	-0.04	-0.06**	-0.02	-0.023	-0.07**	-0.07**
	[-3.98]	[-5.87]	[-4.50]	[-7.54]	[-1.92]	[-3.18]	[-0.96]	[-1.26]	[-3.01]	[-2.96]
Non-White	-0.28***	-0.29***	-0.23***	-0.25***	-0.24***	-0.25***	-0.30***	-0.30***	-0.31***	-0.35***
	[-7.10]	[-7.71]	[-5.12]	[-5.99]	[-5.01]	[-5.68]	[-6.56]	[-6.96]	[-7.22]	[-6.91]
Below HS	-0.88***	-0.95***	-0.91***	-0.96***	-1.03***	-1.05***	-1.00***	-1.06***	-0.85***	-0.96***
	[-26.09]	[-25.49]	[-17.84]	[-16.87]	[-21.94]	[-21.39]	[-26.31]	[-24.90]	[-18.52]	[-16.22]
High School	-0.57***	-0.59***	-0.55***	-0.57***	-0.64***	-0.66***	-0.67***	-0.69***	-0.57***	-0.59***
	[-21.59]	[-20.54]	[-12.23]	[-11.61]	[-17.19]	[-15.78]	[-26.75]	[-22.14]	[-16.63]	[-17.56]
Some College	-0.35***	-0.35***	-0.33***	-0.33***	-0.40***	-0.39***	-0.42***	-0.40***	-0.33***	-0.33***
	[-13.03]	[-12.38]	[-7.81]	[-7.08]	[-10.09]	[-9.48]	[-10.06]	[-10.41]	[-9.00]	[-8.57]
Change_Oth	-0.02	0.00	-0.00	0.02	-0.01	0.01	-0.04*	-0.02	-0.01	-0.00
	[-1.29]	[0.18]	[-0.11]	[0.72]	[-0.37]	[0.47]	[-2.44]	[-1.34]	[-0.61]	[-0.08]
Change_Head	0.08***	0.04	0.14***	0.08*	0.14***	0.12***	0.07	0.04	0.04	-0.01
	[3.95]	[1.76]	[3.73]	[2.26]	[3.82]	[3.58]	[1.77]	[0.99]	[1.09]	[-0.32]
Age	0.03**	0.08***	0.03	0.08***	0.032	0.09***	0.04**	0.09***	0.05**	0.07***
	[3.16]	[7.75]	[1.75]	[5.75]	[1.84]	[5.21]	[2.68]	[5.26]	[2.89]	[4.75]
Age-squared	-0.0***	-0.0***	-0.0**	-0.00***	-0.00**	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***
	[-4.93]	[-9.99]	[-3.02]	[-7.79]	[-2.91]	[-6.83]	[-3.91]	[-6.69]	[-3.86]	[-6.12]
Unmarried	-0.12***	-0.13***	-0.12***	-0.13***	-0.12***	-0.13***	-0.12***	-0.13***	-0.10***	-0.11***
	[-23.48]	[-22.13]	[-16.26]	[-15.49]	[-18.43]	[-18.75]	[-17.12]	[-17.08]	[-15.51]	[-18.32]
Dep: 1	-0.38***	-0.32***	-0.46***	-0.40***	-0.39***	-0.35***	-0.35***	-0.30***	-0.31***	-0.25***
	[-22.26]	[-16.74]	[-16.04]	[-12.89]	[-15.93]	[-13.19]	[-13.71]	[-9.97]	[-10.86]	[-8.51]
Dep: 2	-0.74***	-0.67***	-0.84***	-0.77***	-0.75***	-0.68***	-0.69***	-0.61***	-0.63***	-0.57***
	[-32.09]	[-28.24]	[-22.03]	[-19.68]	[-21.77]	[-19.99]	[-22.37]	[-18.32]	[-19.50]	[-17.70]
Dep > 2	-1.16***	-1.10***	-1.27***	-1.22***	-1.22***	-1.16***	-1.13***	-1.05***	-1.01***	-0.95***
	[-37.54]	[-34.49]	[-28.77]	[-25.92]	[-34.29]	[-31.15]	[-30.05]	[-29.62]	[-23.76]	[-26.58]
Initial Rank	-0.00*	-0.00**	0	-0.00*	-0.00**	-0.00***	0	-0.00**	0	0
	[-2.13]	[-2.96]	[-1.91]	[-2.55]	[-2.65]	[-3.55]	[-1.91]	[-3.08]	[-0.79]	[-0.65]
Constant	-0.18	-1.29***	0.01	-1.14***	-0.05	-1.43***	-0.35	-1.56***	-0.65	-1.25***
	[-0.69]	[-5.22]	[0.03]	[-3.60]	[-0.11]	[-3.36]	[-0.87]	[-3.57]	[-1.58]	[-3.41]
N	74529	94945	29456	38609	31448	40448	27333	34668	16544	19969

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust z statistics in brackets.

Results are mean percentage point differences in latent family income rank over the measurement period, reported after fitting a weighted fractional logit model. The dependent variable is the relative rank of family income-to-needs ratio, with the individual as the unit of observation. Probit, Logit and OLS specifications yield similar results in terms of coefficient magnitude, sign, and significance.