Essays on the Economics of Entrepreneurship

Shinjinee Chattopadhyay

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Abstract

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This thesis examines the role of economic markets and agents in promoting entrepreneurship, and their impact on innovation. The first chapter focuses on small business creation within the context of the United States economy, while the second chapter looks at returns to high-technology entrepreneurship internationally.

Chapter 1 examines the impact of economic downturns on entrepreneurship in the United States by illustrating the direct link between the labor market and self-employment sector. When conditions in the labor market deteriorate for certain groups of individuals they are more likely to become entrepreneurs. This chapter shows that while African-American (henceforth Black) entrepreneurship rates have hovered around one-third that of the Caucasian (henceforth White) rate across all industries since 1910, Blacks are significantly more likely than Whites to become entrepreneurs, thereby narrowing the racial entrepreneurship gap. This phenomenon is accompanied by a widening of the racial wage gap - a 1 percent increase in state level unemployment causes Black wages to fall by 5 percent while nominal White wages remain unchanged. This is not a result of a compositional change in the labor force or industry specific shocks and the estimates are robust to an IV approach. This chapter next shows that discrimination reduces the demand for Black labor, resulting in the decrease of Black wages. Black wages fall more sharply with higher unemployment in states with higher racial prejudice compared to that in states with lower racial prejudice. As Black business income does not show corresponding cyclicality these empirical facts suggest that falling wages alter the payoffs from wage employment relative to self-employment, incentivizing Blacks to start businesses. Black businesses started in recessions do not differ from their White counterparts in income generated, incorporation rates or duration of survival. Moreover, it is the higher-ability Blacks who become business owners in recessions, suggesting that these ventures are voluntary and not the result of job termination.

These findings show that Blacks do not differ from Whites in entrepreneurial ability, but face high barriers to entry into entrepreneurship and only cross these barriers when incentives change.

Chapter 2 examines the role played by economic agents and ownership structures in creating incentives for high-technology entrepreneurship. The goal of high-technology entrepreneurship is to go public through initial public offers (IPO). Going public eases access to finance and rewards entrepreneurs for innovation. This chapter examines the links between the corporate ownership structures of an economy, focusing in particular on business groups, and the degree of average underpricing associated with IPOs. This approach allows for an exploratory look at the effects of market competition, information asymmetry, power and conflicts of interest on IPO pricing. Using a cross-country analysis based on two independent data sets, the chapter shows that the amount of money left on the table for investors decreases with the degree of concentration of ownership within the economy. The greater the degree of separation between control and equity ownership, the smaller the average IPO underpricing. These findings are viewed as supporting evidence for IPO pricing theories based on share allocation, social control and power.

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Dedication

For Lahori and Aranya

Dissertation Committee

Raymond J. Fisman
Columbia Business School
Finance and Economics

Marina Halac
Columbia Business School
Finance and Economics
Columbia University
Department of Economics

Morten Sorensen
Columbia Business School
Finance and Economics

Olav Sorenson
Yale School of Management
Management
Yale University
Department of Sociology

Daniel Wolfenzon
Columbia Business School
Finance and Economics

Chapter 1

Linking the Racial Entrepreneurship and Wage Gaps through Business Cycles

Shinjinee Chattopadhyay[1]

1.1 Introduction

Schumpeter's theory of creative destruction (Schumpeter 1942) posits that innovative entrepreneurship sustains economic growth: the process of destruction of assets, capital and personal wealth is cyclical and is accompanied by disruptive innovation which generates growth. Often destruction and creation do not go hand in hand, but one follows the other. The literature on entrepreneurship has only recently begun to examine the relation between entrepreneurship and business cycles; this paper contributes to this emerging area.

Very recently (Fairlie 2013*a*) examined a panel data set from 1996 to 2009 and found that both unemployment and the entrepreneurship rate reached a peak during the years of 2008-2009, coinciding with the period known as the Great Recession. He found that entrepreneurship rates track unemployment, both moving in the same cyclical fashion. Individuals are more likely to become entrepreneurs when unemployment rates are high, making

[1]I am grateful to my committee members Raymond Fisman, Daniel Wolfenzon, Olav Sorenson, Morten Sorensen and Marina Halac for their thoughtful suggestions and advice. I thank Heitor Almeida, Jeffrey Brown, Robert Fairlie, Jonah Rockoff, Supreet Kaur, Suresh Naidu, Ramana Nanda and Daniel Paravisini for their helpful comments and suggestions. I also thank seminar participants at Columbia Business School, London Business School and the University of Illinois at Urbana-Champaign for their comments.

entrepreneurship counter-cyclical.

Who are these individuals that become business owners during downturns, and why do they turn to entrepreneurship at these times? We cannot attribute this to decreasing wages, since since nominal wages have been found to be rigid during downturns in the United States. An alternate view is that unfavorable employment conditions result in individuals seeking out self-employment as an alternative to wage employment. If high job-termination rates and the difficulty of finding suitable employment are the primary determinants of entrepreneurship during recessions then we expect these entrepreneurs to be of lower-than average ability and these businesses to be of lower-than average quality.

Moreover since most entrepreneurs in the United States are likely to be White or Asian, it would be reasonable to expect the increase in entrepreneurship to be driven by White or Asian individuals. This expectation would be further supported by the existence of the racial entrepreneurship gap, which refers to the difference in the entrepreneurship rates between Whites and Blacks. Although past literature on entrepreneurship and business cycles has not looked at the response of individual ethnic groups to economic shocks, the overall Black entrepreneurship rate in the US has consistently hovered around one-third that of the White or Asian rates since 1910. This is not due to Black entrepreneurship being concentrated in industries that have lower self-employment rates in general [2] (Fairlie & Meyer 2000). Given that Blacks are much less likely than Whites to be entrepreneurs in equilibrium a reasonable view would be to expect this pattern to persist during downturns.

In this paper I use the Panel Study of Income Dynamics (PSID) to follow a panel of 1000 individual households beginning in 1968 to 2003 to examine how individual employment choices respond to economic shocks. I find, contrary to my expectations, that Blacks are more likely to become entrepreneurs relative to Whites during periods of high unemployment. Blacks are 18 percent more likely than Whites to become a business owner when local unemployment increases by 1 percentage point (pp). Thus the entrepreneurship gap narrows during economic downturns and widens during booms. I also find, surprisingly, that Blacks who transition into entrepreneurship during economic downturns are high-ability Blacks and

[2] Black entrepreneurship rates are also lowest among all minorities.

these businesses are of the same quality as businesses started during booms.

Why would some higher-ability Blacks prefer to start new businesses during recessions? I posit that the answer is to be found in the labor market dynamics during downturns. I find that the increase in the likelihood of Black entrepreneurship is accompanied by the widening of the racial wage gap. When local unemployment increases by 1 percentage point (pp), White wages remain rigid while nominal Black wages decrease by 5 pp. This decrease is not due to a compositional change in the labor force, or occupation or industry specific shocks. Business income of Blacks however, does not show any cyclicality. These findings suggest that when unemployment increases, the decrease in nominal Black wages and acyclicality of business income alter the payoffs from wage employment relative to self-employment, thereby creating incentives for high-ability Black individuals to become business owners.

These findings then pose a new question: why do Black wages decrease while White wages remain rigid? I argue that discrimination contributes to the widening of the wage gap during high unemployment periods. I find that Black wages decrease by 9 pp with a 1 pp increase in unemployment in a state characterized by high discrimination[3], while wages of Blacks in low discrimination states[4] remain rigid. I find, analogously that business ownership among Blacks in high discrimination states increases by 5 percent over the mean rate with a 1 pp increase in unemployment compared to low discrimination states. Based on these findings I argue the following. When unemployment increases Black wages decrease relative to White, this effect being more pronounced in states with higher discrimination. Since business income does not show cyclicality, payoff from starting a business in a recession can exceed wages and this creates incentives for high-ability Blacks to become entrepreneurs. This effect is stronger in states with higher levels of discrimination. This indicates that discrimination contributes to the decrease in Black wages, and indirectly to the narrowing of the entrepreneurship gap during periods of high unemployment.

This paper begins with a simple conceptual framework to illustrate how a decrease in Black wages, or increase in business income can lead to higher self-employment. An individual

[3]Highly discriminatory states are those whose discrimination index value fall within the upper tercile of the range

[4]Those in the bottom tercile of discrimination index

chooses between a certain wage from labor, or uncertain payoff from self-employment (which is interchangeably used with entrepreneurship in this paper). There exists a racial wage differential, with Black wages being lower than White wages. When unemployment increases Black individuals are more likely than Whites to become self-employed. I show that under these assumptions an increase in unemployment can push Blacks to become self-employed under any or both of the two conditions: a) business income of Blacks increases or b) average Black wages decrease relative to White wages. Empirically I find that business income of Blacks remain unchanged, but wages decrease.

I foresee that this paper has three novel empirical contributions to the literature: (a) establishing the narrowing of the entrepreneurship gap during periods of high unemployment, (b) establishing non-rigidity of Black wages during the same period leading to a widening of the wage gap, and (c) showing that discrimination can explain changes in the wage gap.

The first contribution is to empirically establish that there are transient changes in the entrepreneurship gap. Although past literature (for example (Evans & Jovanovic 1989), (Evans & Leighton 1989), (Hurst & Lusardi 2004), (Meyer 1990), (Holtz-Eakin, Joulfaian & Rosen 1992) and (Borjas & Bronars 1989)) has examined potential causes of the entrepreneurship gap[5], transient changes in the gap and their implications have not been documented extensively. It is only very recently that (Fairlie 2013*b*) in a forthcoming paper found higher unemployment rates to increase entrepreneurship rates of individuals in the United States. While my paper is consistent with this finding, I disaggregate entrepreneurship rates by race and find that it is actually higher Black entrepreneurship that drives this result.

My next contribution is to establish that Black and White wages respond differently to increases in local unemployment rates, leading to an increase in the wage gap. Past literature ((Corcoran & Duncan 1979), (Reimers 1983), (Blau & Beller 1991) among many others) has

[5]Past literature has studied the causes of the entrepreneurship gap but has not documented the transient changes in the gap. (Evans & Jovanovic 1989), (Evans & Leighton 1989) were the earliest to cite liquidity constraints as being a reason for the entrepreneurship gap, but the most recent literature do not find conclusive evidence on this. (Meyer 1990) and (Holtz-Eakin, Joulfaian & Rosen 1992) found that wealth or positive liquidity shocks such as inheritances are significant but very small determinants in becoming an entrepreneur. (Hurst & Lusardi 2004) looked exhaustively at the deciles of income and found that only the top 3 percent of wealthy households drives the correlation between wealth and probability to become a business owner. (Borjas & Bronars 1989) put forward a theoretical model where consumer discrimination was the source of the entrepreneurship gap but this has not been supported by evidence since.

established the existence of the wage gap: the median Black wage in the United States is 74 percent of the White wage[6]. Nominal wage rigidity has also been well-documented in the literature: while wages increase following positive economic shocks, they do not fall after a negative shock ((Tobin 1972); (Greenwald & Stiglitz 1987); (Blanchard 1993); (Clarida, Gali & Gertler 1999); (Akerlof & Yellen 1990); (Gali 2002) and most recently (Kaur 2012)). Past literature, however has not explored how Black and White wages respond separately to economic shocks[7]. In other words, whether the wage gap is cyclical has been largely unexplored. I show that the White-Black wage gap is countercyclical: White wages are nominally rigid, as expected from past literature, but Black wages are not and decrease with increasing unemployment. The White-Black wage gap therefore widens during a bust and narrows during a boom. This decrease coincides with narrowing of the entrepreneurship gap, suggesting that self-employment decisions of Blacks are influenced by wage dynamics.

The last empirical contribution of my paper is to explore the cause of the procyclicality of Black wages or counter-cyclicality of the wage gap. I suggest that the cause is to be found in the cause of the wage gap itself: discrimination. Since 1950 economists have been trying to explain why Blacks earn less than Whites of same productivity. Authors have attributed the unexplained portion of the wage gap to discrimination against Black workers. Becker's (Becker 1957) seminal theoretical work on taste-based discrimination established an entire new area of study[8]. Subsequent theoretical papers that followed, such as (Arrow 1971), (Arrow 1998)

[6]The wage differential exists when Blacks and Whites are matched across a set of observable characteristics such as age, job market experience, education, gender, and occupation and persists across professions and industries, with the only exception being engineering (Lee & Spriggs 2007)

[7]To my knowledge, (Lee & Spriggs 2007) is the only paper that examines cyclicality of the wage gap. They find that the White-Black wage gap is countercyclical, with the gap increasing during recessions and decreasing during booms. They study the Current Population Survey data from 1989 and 2002 and use unemployment as a measure of economic conditions or business cycles. They argue that since the 1999 and 2001 recessions produced "jobless recoveries" NBER designated recessions do not accurately represent local economic conditions. They find that the White-Black wage gap increases during periods of economic contraction and decrease during expansion and they attribute the reason to discrimination against Blacks. Their paper however does not refute that the pro-cyclicality is due to a change in the composition of the workforce or occupation specific movements. I address these issues in my paper.

[8]Becker focused on taste-based discrimination and described a model where prejudice causes an employer to view a minority worker as having lower marginal productivity of labor. Minority workers therefore accept lower wages than Whites for equivalent productivity. The market then sorts minority workers to the least prejudiced employers while the White workers are hired by the more prejudiced employers. This creates incentives for segregation as it is Pareto improving for both minority and White workers to be employed in their own businesses

and (Phelps 1972) modeled employers being subject to more statistical discrimination where discrimination arises from asymmetric information about employee type or skill rather than taste-based preference[9]. Later authors such as (Corcoran & Duncan 1979), (Reimers 1983), (Smith & Welch. 1986), (Blau & Beller 1991), (Oaxaca 1973), (Oaxaca & Ransom 1994), (Darity & Mason 1998) and (Fryer, Pager & Spenkuchm 2011) conducted best attempts to account for observed characteristics and found that they only accounted for 50 percent of the wage gap with the other half being accounted for by discrimination[10].

I hypothesize that discrimination causes Black wages to fall after a negative shock while White wages continue to remain rigid and this in turn affects the entrepreneurship gap. These results follow the work of ((Charles & Guryan 2007)) who show that the wage gap is larger in states with higher prejudice. My specification, however, being at the individual-level, allows greater precision and lower omitted variable bias as I am able to account for cross-sectional unobserved individual correlates. Moreover, I examine the size of the wage and entrepreneurship gaps during business cycles, while their work focuses on equilibrium conditions.

I follow the methodology used by (Charles & Guryan 2007) in creating an index for racial prejudice in each state and each year. States with a higher value of the index are considered to be more discriminatory. I find that the White-Black wage gap increases with the level

[9]Authors have found empirical support for statistical discrimination in different context, such as financial lending. (Ravina 2008) looks at access to finance for Blacks relative to Whites and finds that Black borrowers pay between 139 and 146 basis points more than similar White borrowers, but when ethnic similarity of lender and borrower is taken into account the difference disappears. This suggests that Blacks pay more because there are proportionally more Black borrowers than lenders. This lends more credence to the theory of statistical discrimination and not based on taste-based discrimination.

[10]The limitation of the empirical approach of controlling for observables is that we can only draw a causal inference when unobserved determinants of wages are not systematically correlated to race. (Reimers 1983) estimates that discrimination accounts for 60 percent of the wage gap between White and Black men. (Fairlie & Kletzer 2003) look at job displacement and re-employment rates and find that Blacks have 30 percent higher job displacement and re-employment rates for black workers. (Lang & Manove 2006) demonstrated that racial disparities in wages narrow dramatically and even reverse when conditioning only on age and the scores of the Armed Forces Qualification Test (AFQT) but when education is added to the list of controls the gap begins to re-emerge. The most recent papers such as (Fryer, Pager & Spenkuchm 2011) have continued to find evidence of discrimination with the latter finding that it can explain one-third of the wage gap. (Charles & Guryan 2007) use the General Social Surveys data to establish a measure for the extent of prejudice present across states. They find that the White-Black wage gap varies positively with the level of prejudice of the "marginal" person in the state but is unaffected by that of the most prejudiced persons of the state. This is in keeping with the predictions of Becker taste-based discrimination model. They also find that the gap varies negatively with the fraction of Black population present in the state.

of discrimination predominant in that state and state-year level of unemployment. In other words, Blacks living in states with higher levels of prejudice are likely to see their wages fall at a higher rate than those living in states with lower levels of prejudice when state unemployment increases. Analogously in the self-employment market, I find that Blacks in high discrimination states also start more businesses in poor economic times, compared to those living in low discrimination states. Interestingly, I also find instead that Blacks living in higher discrimination states are more likely to drop out of the labor force entirely.

There are three main empirical challenges I have faced in this paper. The first challenge lies in establishing changes in the entrepreneurship gap relates to reverse causality and omitted variable bias. Higher self-employment rates may have an affect on local unemployment rates. Moreover, a third exogenous factor such as external opportunity may affect both self-employment and unemployment rates. I use the Bartik instrument (Bartik 1991) to instrument for unemployment to mitigate these concerns and find that my results hold with significance. A second concern relating to changes in the entrepreneurship gap is that Blacks who have higher unemployment rates than Whites in general may be mis-reporting their employment status to a greater extent than Whites. To address this concern I conduct the following robustness checks: I narrow the sample to those who report themselves as 'business owners', not merely those who declare themselves to be 'self-employed'. I do this as 'business owner' is more narrowly defined than 'self-employed' and people are less likely to mis-report themselves as business owners. In addition I examine the ability of individuals starting businesses in recessions, and the quality of these businesses started. I find that as an economy goes from a boom to a bust it is the higher ability individuals who go into business ownership, compared to those who remain in the labor market. Since higher ability individuals are among the less likely to be unemployed (which I verify using a second data set), it is unlikely that they are misreporting their status intentionally. In examining the quality of Black businesses started in recessions I find that that there is no significant difference in average yearly business income generated by businesses started in booms vs. those started in busts for Blacks. Moreover, businesses started by Blacks in recessions are not less likely to be incorporated compared

to those started by Blacks in booms, or compared to those started by Whites in recessions. Lastly, using a Cox-proportional hazard I show that Black businesses are likely to survive for as long as White businesses when started in recessions. These findings suggest that Blacks are not merely mis-reporting their employment status, but are starting legitimate businesses that perform well. The instrumental variable approach along with exhaustive robustness checks on business quality and individual ability empirically establish the transient changes in the entrepreneurship gap.

The second empirical challenge relates to the concerns with establishing non-rigidity of Black wages. They are four-fold: (1) reverse causality, (2) compositional changes in labor force affecting the wages of Blacks and Whites differentially, (3) unobservable correlates affecting the outcome variable and (4) wages of low-ability groups are actually proxying for a decrease in Black wages. To account for the first concern I again use the Bartik instrument to instrument for unemployment, and find that my results hold with significance but an increase in magnitude. To account for the second concern and to establish that the fall in Black wages is not the result of higher wage-earning Blacks losing their jobs in higher proportion to lower wage-earning Blacks, I use individual fixed effects in my estimation, thereby demeaning right-hand side variables. This also mitigates the third concern as individual fixed effects also account for time-invariant unobservable correlates of ability such as innate intelligence or personality. Now, the fourth concern is the argument that low-wage earners see a sharper drop in their wages during recessions, and since Blacks are more likely to be employed in low-wage earning jobs my results are picking up a wage-group (or ability) effect and not a racial effect. To address this concern I divide my sample into high and low wage earners using past market wages, and examine the response to shocks in the two different populations. Finding no significant difference in wages between Blacks and Whites among the low-wage earning group would suggest that Black wage procyclicality is an ability specific phenomenon and not a race specific one. However, I find that Blacks among both populations earn significantly lower compared to Whites with increase in unemployment. The finding that Blacks witness a relatively larger drop in wages across all skill levels is evidence that wage procyclicality is

specific to Blacks and not particular to low-wage earners.

The third empirical challenge lies in establishing that discrimination explains non-rigidity of Black wages lies in accounting for the varied characteristics of the 50 US states, and that of the populations living in them. I use a triple interaction term that allows for differential impact of cycles on Blacks and Whites at different levels of discrimination. In addition I include year Fixed effects for White and Black individuals interacted with Region groups. That is, I control for time-invariant regional characteristics for each race. This allows me to separately identify variation in wages which is not picked up by any time-invariant factors common to individuals of the same race across Regions with the same geography but differing discrimination levels.

To summarize, my paper presents novel findings on transient changes of the entrepreneurship gap during periods of high unemployment. I show that the changes in the entrepreneurship gap is influenced by a widening of the wage gap, and that changes in the wage gap are explained by discrimination. In Section 2 I describe a simple model to illustrate the mechanism through which individuals transition between wage and self-employment. In Section 3 I present the data, in Section 4 the methodology and results. Section 5 is a discussion of the results.

1.2 Illustrative Model

I present a framework illustrating the mechanism through which individuals transition between the labor and self-employment market. This framework is for illustrative purposes and gives me a series of testable implications. I show that a change in economic conditions can affect relative wages which in turn can change the relative payoffs associated with wage employment, leading an individual to choose self-employment at different times of the economic cycle. I provide a series of conditions illustrating the above mechanism, that I further test in the data. The model along with the data establish that business ownership decisions are not taken in isolation with labor market conditions, and the changes in the latter influence decisions to start businesses.

An individual chooses between joining the labor market with a certain outcome of wage ω or joining self-employment which has an uncertain outcome π. Under this structure, unemployment is the same as choosing employment with a wage of 0. Although wage employment can lead to an uncertain outcome in the event of being fired, for the ease of exposition I normalize the probabilities. Therefore, in this model an individual can succeed in self-employment and get a payoff π with a probability p or fail and get a payoff of 0 with a probability of $(1-p)$ or choose wage employment and receive a fixed wage ω.

In this model we take R to denote Race of the individual. Past literature has used unemployment as a proxy for recessions - periods of high unemployment coincide with contractionary periods in the economy. So unemployment U is a proxy for local economic conditions with higher values of U indicating worse economic conditions. a indicates ability and is of two types, High (H) and Low (L). So $R \in \{W, B\}$, $U \in [0, 1]$ and $a \in \{H, L\}$. In my framework payoffs can be from self-employment or from wage. Wage ω depends on local unemployment U, ability a, and Race R, and is indicated by $\omega(U, a, R)$. The literature on wage gaps has established that $\omega(U, a, B) < \omega(U, a, W)$. The self-employment or business payoff is uncertain, with probability of success p and associated payoff π. In the data probability of success p is represented by the length of time that the business is alive, and is calculated by the difference in the year it ended and the year that it started, with the assumption being that longer surviving businesses are more successful. I assume that both p depends on the race, the level of local unemployment and ability. Payoff π is the business income that is reported by the individual. For ease of exposition I assume that payoff π is a function of the race and ability. The race of an individual determines the ease of access to capital and financing opportunities, the degree of consumer discrimination faced by the individual and also the extent of transferred know-how and knowledge that is available to the individual - all factors that determine whether a business can succeed or not. So probability of success is given by $p(R, U, a)$. I assume that local unemployment affects the probability of success and not payoffs as well. Therefore, payoffs are given by $\pi(R, a)$. In order for an individual to prefer self-employment over wage employment expected payoff from Self-Employment has to

be greater than Expected payoff from Wage Employment. Expected payoff from SE can be written as EP_{SE} and EP_{WE} is that from wages, where

$$EP_{SE} = p(R, U, a)\pi(R, a), \tag{1.1}$$

$$EP_{WE} = \omega(R, U, a). \tag{1.2}$$

So for an individual to choose SE over WE it has to be true that

$$EP_{SE} > EP_{WE} \tag{1.3}$$

Or from (1.2)

$$p(R, U, a)\pi(R, a) > \omega(R, U, a), or, p(R, U, a)\pi(R, a) - \omega(R, U, a) > 0 \tag{1.4}$$

Denoting S as the probability of an individual choosing SE over WE we get, $Pr(EP_{SE} - EP_{WE})_R = S_R > 0$. Overall in our sample since Whites are more likely than Blacks to start businesses therefore, $S_{BLACK} < S_{WHITE}$.

Substituting (1.2)

$$Pr[p(R, U)\pi(a, R) - \omega(U, a, R)]_W > Pr[p(R, U)\pi(a, R) - \omega(U, a, R)]_B \tag{1.5}$$

By assumption, $p(B, U) < p(W, U)$ and from empirical data $\omega(U, a, B) < \omega(U, a, W)$ and $S_{BLACK} < S_{WHITE}$. We can then test whether $\pi(a, B) < \pi(a, W)$. Now, when there is a recession or period of high unemployment, that is, U increases, then there is a change in the relative payoffs. Empirically it is true that the probability of Black individuals being self-employed is greater than that of White individuals. Assuming that change in economy leads to change in probability of being self-employed, and because in a recession Blacks have a higher probability of starting a business over Whites, therefore

$$\left[\frac{\partial EP_{SE}}{\partial U} - \frac{\partial EP_{WE}}{\partial U}\right]_{BLACK} > \left[\frac{\partial EP_{SE}}{\partial U} - \frac{\partial EP_{WE}}{\partial U}\right]_{WHITE}. \tag{1.6}$$

Now, 1.6 can happen if unemployment reduces the expected payoff from self-employment for Blacks compared to whites, or because wages drop more for Blacks than for Whites, or neither or, both. Therefore, none, one or both of the following conditions may hold

$$\left[\frac{\partial EP_{SE}}{\partial U}\right]_{BLACK} > \left[\frac{\partial EP_{SE}}{\partial U}\right]_{WHITE} \tag{1.7}$$

$$-\left[\frac{\partial EP_{WE}}{\partial U}\right]_{BLACK} > -\left[\frac{\partial EP_{WE}}{\partial U}\right]_{WHITE} \tag{1.8}$$

We can therefore rewrite Equations 1.7 and 1.8 as the following:

$$\left[\pi(a,B)\frac{\partial p(B,U)}{\partial U}\right] > \left[\pi(a,W)\frac{\partial p(W,U)}{\partial U}\right] \tag{1.9}$$

$$-\left[\frac{\partial \omega(U,a,B)}{\partial U}\right] > -\left[\frac{\partial \omega(U,a,W)}{\partial U}\right] \tag{1.10}$$

$$\tag{1.11}$$

The equations 1.9 and 1.10 are testable in the data. If 1.9 holds then increasing payoffs from SE motivates the transition from WE to SE for Blacks. If 1.10 holds then during recessions, wages fall below a threshold to make SE more attractive over WE. It is important to distinguish between which if any of the above two conditions hold, since it is not known how either business profitability or the wage gap changes with business cycles. I find that wages are pro-cyclical for Blacks but sticky for Whites during high unemployment. Therefore 1.10 holds. I find 1.9 however does not hold as there is no significant difference in business income during periods of high unemployment for Blacks and Whites.

1.3 Data and Summary Statistics

I use the Panel Study of Income Dynamics (hereafter PSID) database which is a panel survey on individuals from 1968 to 2003 that gathers information on income, educational background, wealth, debt, parental history, employment and entrepreneurial history among others. The PSID database has been previously widely used in the entrepreneurship and labor economics literature. The PSID survey was not administered in the years 1998 and 2000 and these

years are therefore dropped from my sample. According to PSID documents a total of 18000 individuals were eventually covered over the 35 years. A new household was spun in the survey when households split due to divorce or death, and the new household was followed subsequently. Each year a questionnaire was administered in person or over the phone to the head of the household. There are 209,000 observations for which business ownership or employment decisions are documented. Table 1.2 shows that 9.3 percent of the sample are business owners. This is similar to other estimates from other samples in past literature. 34.6 percent of the sample is Black[11] 60.7 percent is White while the rest constitute other minorities. 70 percent of the sample is Male. The average family size is around 3 people with a standard deviation of 1.7 persons and the average age is 43 years with the ages ranging from 18 to more than 100 years old. The average number of jobs held by a person during their lifetime is 2.5 with a standard deviation of 2.2.

Tables 1.3 and 1.4 show characteristics of the White and Black samples respectively. The Black sample, with a mean age of 41 is younger than the White which has a mean age of 45. The White sample consists of a higher proportion of males (77 percent) compared to the Black which has 56 percent. The average Black household has 3.2 family members compared to the average White household which has 2.7. Past work experience does not vary significantly across the two races: Black employees hold an average of 2.36 jobs in their lifetime, while a White employee holds 2.52 jobs. However, 63.6 percent of the White sample are homeowners compared to 34.8 percent among Blacks. 80 percent of the White sample are high school graduates compared to 67 percent among the Blacks. 12.9 percent of White individuals in this sample are business owners; compared to only 3.4 percent among Blacks. 29 percent of the White businesses are incorporated, compared to 16.5 percent of Black businesses. The average yearly business income as well as the variance in business income for both Black and White businesses are very similar.

The literature on business cycles uses many different measures to mark recessions or poor

[11] According to PSID documents, the focus of the study was poverty in 1968 and this resulted in an over-sampling of Blacks in the PSID. Questions on consumption, savings, expenditure and others can be adjusted with probability-of-selection weights. The document states the following: *In the absence of non response bias, the PSID's rules for tracking individuals and families over time lead to accurate representation of the non-immigrant U.S. population both cross-sectionally each year, and in terms of change, since 1968.*

economic conditions. Popular measures are NBER designated year dummies, unemployment, and Gross State Product (GSP) or state income. In order to mark recessions or poor economic times I use two measures. Firstly I use a dummy to mark NBER designated recessions. There are 10 such recession years in my sample. Secondly I use state yearly unemployment rates from 1976 to 2003 obtained from the Bureau of Labor Statistics. Thus the sample using unemployment rates is smaller than that using recession dummies from NBER. State income data has been rejected by authors in the past due to high measurement errors that bias the coefficient towards zero, (Wolfers 2007) and I do not use this measure for the same reason.

I use the General Social Survey (GSS) data in order to gauge state-level discrimination. The GSS was administered to individuals in multiple waves starting in 1972 until 2004. There are more than 30 questions on racial sentiment, although each question was not asked each year. Some of these questions focus on governmental policy concerning race matters while others focus purely on racial attitudes. I follow the method adopted by (Charles & Guryan 2007) in constructing the index for racial discrimination. I construct the index using ten questions that appear jointly in the survey each year; these have been listed in Appendix 1. The responses used are by Whites who are 18 years and older.

Lastly, for robustness checks and for detailed unemployment data that is not available in the PSID, I use the March reports of Current Population Survey (CPS) from 1968 to 2003. While the PSID has basic data on unemployment status, it is only the CPS which allows me to distinguish voluntary termination of employment from the layoffs or firings. I use this data to disentangle low-skill wage procyclicality from race-based wage procyclicality.

1.4 Methodology and Results

There are three subsections to this section. The first subsection demonstrates changes in the racial entrepreneurship gap and accompanying changes in the wage gap during worsening economic conditions. These findings suggest that individual decisions to start businesses are influenced by labor market options and when Black wages fall sufficiently Blacks are more likely to start businesses. In the second subsection I explore a potential cause of procyclicality

of Black wages discrimination. I look at the variation of the entrepreneurship and wage gaps with unemployment in states with varying levels of discrimination. In the third subsection I describe endogeneity concerns and conduct extensive robustness checks to address empirical challenges.

1.4.1 Entrepreneurship gap and the Wage gap during Business Cycles

Table 1.1 lists the variable definitions used throughout this paper. Column 1 of Table 1.6 shows that in the overall sample Blacks prefer wage employment to self-employment, leading to the racial gap in business ownership rates. According to Table 1.3 and Table 1.4 the rate of business ownership among Whites is 13 percent while that among Blacks is 3.4 percent which is one-third that of the White rate. Figure 1.1 demonstrates the entrepreneurship rates of Black, White, male and female groups in the panel from the years 1968 to 2003. The mean ownership rate in the sample is around 9 percent as shown in 1.2. Column 1 of Table 1.6 shows that Blacks are 5.6 percentage points (pp) less likely than Whites to be business owners. This makes them around 60 percent less likely than Whites to be Business Owners over the mean rate. I control for variables that can be expected to be correlated to being a business owner: MALE is a dummy indicating that the individual is male; TOTEMPLYR is the total number of employers the individual has had till that year; AGEHD is the age in number of years; FAMSZ is the number of members within the family; FatherSE is a dummy which is set to 1 when the individual's father was reported to be self-employed; lnlaggedHrs is the log of the number of hours that the individual was unemployed the previous year; lnDeflatedWage is the log of the deflated (using 1984 CPI) wages that the individual was paid the past year. lnNominalWages is the log of the nominal wages earned that year.

I next examine the likelihood of becoming a business owner during a recession. To designate an economic recession I use two measures, unemployment and NBER designated dummies. HPSmoothUnemprate is the state-year Hodrick-Prescott filtered unemployment rate from 1976 to 2003. Contraction is a dummy which is assigned 1 when part or all of that year was designated as a recession by NBER. As a first step I use OLS to estimate the likelihood of

being a business owner during poor economic conditions, shown in Equations 1.12 and 1.13. Here "White business owners" is the omitted category and β_2 gives the differential effect of effect of recessions on likelihood of Blacks to be business owners. Here i designates individual and t designates the year.

$$\begin{aligned} BusOwner_{i,t} &= \alpha_1 + \beta_1 * Contraction_t + \beta_2 * Contraction_t * BLACK_i \\ &\quad + X_i^{'} * \zeta_1 + \epsilon_{i,t} \end{aligned} \tag{1.12}$$

$$\begin{aligned} BusOwner_{i,t} &= \alpha_1 + \beta_1 * HPSmoothUnempRate_{s,t} \\ &\quad + \beta_2 * HPSmoothUnempRate_{s,t} * BLACK_i \\ &\quad + X_i^{'} * \zeta_1 + \epsilon_{i,t} \end{aligned} \tag{1.13}$$

Business owner is a binary variable, and X represents the vector of controls. I control for all variables that previous literature has shown to influence decisions to start businesses: age, past work experience, family size, household income, homeownership status, and whether the individual's father was self-employed or not. In order to account for racial concentrations in different industries, I include industry fixed effects. I also include industry fixed effects interacted with time trends in order to account for differential vulnerabilities of industries to exogenous shocks. I include individual fixed effects to account for unobservable time-invariant characteristics such as innate entrepreneurial ability. I use year and state fixed effects to factor in year or state specific shocks. I also include state-specific linear time trends to account for statewide linearly time-varying factors.

I find that Blacks are more likely to be business owners when economic conditions worsen while White individuals show no such response. In Column 2 of Table 1.6 using Unemployment rate I find that, 1 pp higher unemployment leads to Blacks being 1.4 pp or 17 percent more likely than Whites to be Business Owners. In Column 3 I add state-specific linear time trends and the interaction of year and Industry fixed effects. The reason for this is to account for trends in industries or states that may disproportionately employ Blacks and simultane-

ously be vulnerable to economic shocks. Column 3 of this table shows that when these trends are accounted for Blacks are 18 percent more likely than Whites to be Business Owners during recessions or higher unemployment. The entrepreneurship gap therefore narrows during recessions.

Column 3 of the Table 1.6 shows the variation in business income as unemployment increases. There is no significant difference in business income of Blacks with a 1 percent increase in unemployment.

Figures 1.2, 1.3 and 1.4 show the distribution of nominal wage changes for economies following an economic contraction. The upper and lower 2 percentiles of the past log wage distribution have not been shown in this figure. Figure 1.2 shows how the wages of entire sample responds when the previous year was an NBER designated contraction. Figure 1.4 shows the response of Black wages to a contraction: there is a heavier distribution of Black individuals whose wages change negatively than positively. The nominal wage distribution of Whites in Figure 1.3 however, remains centered on 0 indicating wage rigidity.

I use OLS estimation to determine wage responses to increasing unemployment.

$$\begin{aligned} Lnwage_{i,t} &= \alpha_1 + \beta_1 * HPSmoothUnempRate_{s,t} \\ &+\beta_2 * HPSmoothUnempRate_{s,t} * BLACK_i + X_i^{'} * \zeta_1 + \epsilon_{i,t} \end{aligned} \tag{1.14}$$

The sum of the coefficients β_2 and β_1 gives the impact of unemployment on Blacks while β_1 gives the response of White wages. To allow for the possibility that unemployment across states may be correlated across years I cluster standard errors at the state-year level. In order to counter occupation or industry specific effects on wages, I include occupational and industry fixed effects. I also include individual fixed effects to account for unobservable time-invariant characteristics such as innate ability and personality. I use Year and State fixed effects to factor in year or state specific shocks. Following past literature I control for time-variant observable qualities that are known to be associated with wages: past number of employers, age and the square of age, family size, whether the individual is a high school

graduate or not, and the log of the wages earned in the most recent job. Most recent wages is a proxy for market valuation of individual skill level (Fryer, Pager & Spenkuchm 2011) and of unobservable cognitive abilities.

Columns 4 and 5 of Table 1.6 shows the response in wages to shocks; the dependent variable being log of individual wages. The negative value of β_2 and the positive but insignificant value of β_1 indicate that White wages are rigid with increasing unemployment, while Black wages fall. Column 4 shows that nominal Black wages fall by 5.8 percent when unemployment increases by 1 percent. When state-specific linear time trends and the interaction of industry and time fixed effects are included this magnitude drops to 5 percent, but remains significant. A wage drop of this magnitude changes the relative payoff from wage employment vis-a-vis self-employment, thereby pushing more workers into entrepreneurship.

1.4.2 Discrimination as an explanation for Black wage procyclicality

Theories of discrimination attribute the unexplained portion of the wage gap to discrimination against Blacks. I hypothesize that discrimination also causes changes in the wage gap during recessions. Fairness norms have been cited as a reason that wages are rigid following negative shocks; past literature has speculated that prevailing social mores prevent employers from reducing White wages[12]. However, it is not known how minority populations fare under these fairness norms: do these norms apply to them as well? It is conceivable that in states characterized by high measures of racial prejudice these social norms do not apply symmetrically to Whites and Blacks and it is actually socially acceptable among some populations to treat Black employees differently. I hypothesize that discrimination in periods of high unemployment causes employers to lower Black wages, leading to counter-cyclicality of the wage gap. I use GSS data for the years 1972-2003 to construct an index that captures prevailing racial attitudes in the 50 states. GSS has 20 questions that relate to race relations that were asked of 1000 respondents. I use 9 of these questions to construct my discrimination index. I normalize the value of responses using the 1977 responses. The methodology followed is the same as (Charles & Guryan 2007). Denoting $d^k_{i,t}$ as respondent i's response in year t to the

[12](Kahneman, Knetsch & Thaler 1986)

question k. The normalized response is obtained by subtracting the mean of the responses in 1977 and dividing by the variation in responses in 1972 or the first year that the question was asked. The following shows the normalized response $\tilde{d^k_{i,t}}$:

$$\tilde{d^k_{i,t}} = \frac{d^k_{i,t} - E[d^k_{i,1977}]}{Var(d^k_{i,1972})} \tag{1.15}$$

I then take the mean of the responses $D^k_{i,t}$ across k questions for each individual i and year t. The mean of this by state and year gives the aggregate average value of prejudice for that state and year. The discrimination score assigned to a state is the mean of the prejudice scores over the years 1972-2003. I first calculate state-level average discrimination indices and then delineate the upper and bottom terciles of the discrimination index. I classify states as high discrimination states when their score falls in the top tercile of the distribution of discrimination index. Those states whose discrimination score falls in the bottom tercile are classified as low discrimination states.

Figure 1.7 shows the variation of the discrimination index across the 50 states in the United States using the Census-Bureau designated classification for regions. By this classification all US states can be grouped into 9 regions. The US Map shows the variation of discrimination across these regions - darker green areas have higher average prejudice. The map shows that the Pacific region comprising of the states Washington, Oregon, Hawaii and California have the lowest rate of prejudice against Blacks, followed by the New England States of Massachusetts, Maine, New Hamphshire and Vermont. The East South Central States of Kentucky, Tennessee, Missouri and Alabama document the highest discrimination followed by the South Atlantic States of Florida, Georgia, South and North Carolina, Virginia and West Virginia. Figure 1.7 illustrates how the discrimination index varies across the 9 regions in the United States.

I hypothesize that the effect of higher unemployment on wages is greater in areas of higher discrimination. This should mean that the effect of falling wages on business ownership decisions should also be more pronounced in areas of higher discrimination as well. As a first

pass I estimate the effect of recessions on wages and business ownership decisions in high and low discrimination states while controlling for observable characteristics of individuals. I include state, year, individual and industry fixed effects to account for time-invariant cross-sectional variation. I also include state-specific linear time trends to account for time varying state-level characteristics.

Column 1 and 2 of Table 1.8 show that the wage gap is larger in high discrimination states, and that this gap increases with increasing unemployment. Black wages fall by 8.5 percentage points relative to White wages when unemployment increases by 1 percentage in high discrimination states while the decrease in wages in the low discrimination states is smaller in magnitude and not significant. The entrepreneurship gap also changes with higher unemployment and discrimination index. Blacks are 1.14 pp more likely to be business owners in high discrimination states as unemployment increases by 1pp. The mean probability of being a business owner in the entire sample of US states is around 9 percent. So this is a 13 percentage increase over mean probability of being a business owner. In low prejudice states, this effect is smaller, around 9 percent in magnitude. This suggests that during recessions falling Black wages and higher Black business ownership rates are associated with levels of discrimination predominant in the individual's state.

In the following section I address endogeneity concerns and use an IV approach along with a variety of robustness checks to support my causal inference.

1.4.3 Endogeneity Concerns and Robustness Checks

1.4.4 Instrumental Variable Estimation of changes in Entrepreneurship and Wage Gaps

One significant concern with using unemployment to estimate changes in business ownership rates is that decisions related to voluntary termination of wage employment to start a new businesses could be affecting local unemployment. Another concern is that there is a third exogenous variable such as external opportunity that could be differentially affecting both self-employment decisions by Blacks vs. Whites, as well as local unemployment rates. There

are analogous concerns associated with using unemployment to estimate change in wages. I use an IV two stage least squares (2SLS) approach to address these issues on reverse causality and omitted variable bias.

An appropriate IV for unemployment is one that is correlated with unemployment but exogenous to self-employment decisions or individual wages. I use the Bartik instrument (Bartik 1991) to instrument for unemployment as used previously by (Wolfers 2007). The Bartik instrument is constructed on a state-year basis for 9 sectors as the shock to the national level oil price interacted with earnings from that sector share in that state and year shown below. Here s represents a state, I an industry sector and t the year.

$$Bartik_{s,t} = \sum_{I}^{9Sectors} \theta_I * (SectorEarnings_{I,s,1940} * \Delta LogPriceOil_{t-1}) \tag{1.16}$$

The 9 Sectors used in constructing the instrument are agriculture, mining, construction, manufacturing, transport, wholesale, service, government and military. Sector specific earnings are obtained from Bureau of Economic Analysis (BEA). The sector shares are measured using average share of state earnings in 1940. There are two endogenous variables: *HPSmoothUnempRate* which is instrumented with *Bartik* and the interaction term *HPSmoothUnempRate* which is instrumented with the interaction of *Bartik* and BLACK. The corresponding first stage equations are:

$$HPSmoothUnempRate_{s,t} = \alpha_1 + \delta_1 * bartik_{s,t} + X_i^{'} * \zeta_1 + \epsilon_{i,t} \tag{1.17}$$

$$HPSmoothUnempRate_{s,t} * BLACK_i = \alpha_1 + \delta_2 * bartik_{s,t} * BLACK_i + X_i^{'} * \zeta_1 + \epsilon_{i,t} \tag{1.18}$$

The high F-statistics reported from the Stock and Yogo Weak Instruments test (Stock & Yogo 2005) in the first stage regressions shown in Columns 1 and 2 of Table 1.7 reveal this instrument as unlikely to be a weak instrument and to be strongly correlated with state-

year level unemployment. At the same time it can be reasonably expected to be exogenous to individual self-employment decisions or individual non-industry specific changes in wages as sector share earnings interacted with change in oil price is unlikely to have local impact on these factors. Table 1.7 shows that the results hold as expected with a slight change in magnitude. Column 1 shows that a 1 pp increase in unemployment causes Black wages to fall by 8 pp relative to White wages - the IV estimate is larger (8 pp) in magnitude compared to the OLS estimate (5.3 pp). A one pp increase in unemployment causes a Black person to be .5 pp more likely than a White person to be a business owner which represents a decrease in magnitude compared to the OLS estimate (which is 1.1 pp).

1.4.5 Robustness Checks on the Entrepreneurship Gap

Another empirical challenge faced in this paper is to establish that the decrease in the entrepreneurship gap is a real decrease and not an artifact of misreporting by unemployed individuals. Since the Black unemployment rate is twice that of the White rate in recessions as shown in Figure 1.8, the concern is that a disproportionately greater number of unemployed Blacks misreport their employment status as self-employed compared to Whites. I address this concern in three different ways. Firstly, I confine my sample to only business owners and not all self-employed individuals. So to determine whether a person is a business owner or not I examine the response to the question "Do you own a business". The rationale for doing so is that individuals are less likely to be misrepresent owning a business, than they would about being self-employed, which is a definition that can be more broadly interpreted.

Secondly, I examine the ability profiles of those Blacks that move into entrepreneurship during recessions. If these individuals are misreporting their status as self-employed when they are really unemployed then they should be of a lower ability than those who remain employed. I do not find this to be the case. On the contrary, I find that it is the higher ability Blacks that move into entrepreneurship following a contraction. Figure 1.6 shows the kernel density distribution of the ability of Blacks that move between the Labor market to Business Ownership when going from an expansion to an NBER-designated Contraction.

Here, the log of previous market wages is a proxy for ability. The figure shows that the ability of Blacks moving from labor to business ownership is higher than those who remain in the labor market. This finding suggests that those who start businesses in recessions are likely to be doing so of their own volition on average, and not because they were forced to do so by increasing unemployment. I find a similar pattern among Whites moving from labor to business ownership going from an expansion to a contraction in Figure 1.5.

As a third check of the veracity of the employment status I examine the quality of businesses started in recessions. As a measure of quality I examine three factors: the probability of being incorporated, the average duration that the business is alive, and the business income generated. If unemployed individuals mis-report themselves as business owners then we can expect that these businesses will be less likely to be incorporated, may generate lower income and will last for shorter duration as the owner is likely to revert back to wage employment as soon as possible. I do not, however, find evidence of any of the above, much to the contrary in fact. Column 1 of Table 1.13 shows the difference in likelihood of businesses being incorporated and yearly business income when started in a contraction year. Here *StartContraction* is a dummy which is set to 1 when the business was started in an NBER designated recession year. Column 1 shows that likelihood of a business started in a contraction by a Black owner being incorporated is not significantly different from that started at the same time by a White owner. Nor is there a significant difference in likelihood of incorporation between businesses started in a contraction or a non-contraction year for Blacks. Column 2 of Table 1.13 shows difference in the business income generated by Black and White businesses started in contractions vs. expansions. I do not find any significant difference in yearly income reported by businesses started in contractions vs. expansions or White and Black businesses started in contractions, further supporting the evidence that Black businesses started in recessions are not of inferior quality. As the last check of quality I look at duration of business which is calculated as the number of years the business owner reports himself as owning a business. In order to deal with survivor bias in my sample I estimate hazard ratios for the length of duration of these businesses using a Cox-proportional hazard model. Table 1.5 shows that

on average, businesses survive 3.4 years, with a standard deviation of 5 years. 90 percent of businesses last fewer than 9 years, and more than half of the businesses survive for less than 3 years. Table 1.14 shows that businesses started in recessions are longer-lived than those started in booms. On average, businesses started in recessions are likely to last 0.6 years or 8 months longer. There is, however, no significant difference between those started in recessions by Whites or Blacks. If disproportionately more unemployed Blacks relative to Whites were mis-reporting their employment status then we would expect to see White businesses started in recessions to be longer-lived than Black-owned businesses, but that is not the case. These three findings on the quality of businesses suggest that businesses started by Blacks in contractions or periods of high unemployment are legitimate businesses that are not inferior quality to those started by Blacks in booms, or Whites in recessions.

1.4.6 Robustness Checks on the Wage Gap

One of the main challenges in this paper is to establish that wages of Blacks are not rigid but decrease with increasing unemployment. The first concern is that Black wages may appear to decrease due to a compositional change in the labor force. That is, higher-wage Blacks are eliminated from the labor pool with increasing unemployment, driving down the average Black wages. I address this concern in several ways. Firstly I include individual fixed effects in my estimation; this effectively demeans individual wages and so counters the above argument. It also accounts for time-invariant unobservable correlates of wages, such as personality and innate intelligence. Secondly, I control for observable characteristics by including past job experience, education and past market wages among other correlates[13]. I find that the wage gap procyclicality result holds with similar magnitude even when I control for past wages, shown in Column 5 of Table 1.6 indicating that Black workers do indeed see nominal wages fall relative to Whites, and wage gap procyclicality is not merely an artifact of a change in the composition of the employed labor force. Lastly, I look at the sample of workers that are laid off or fired in recessions. I use the CPS data which makes a distinction between those

[13]Fryer and co-authors argue that past wages determine market valuation of skills and unobservable non-cognitive abilities (Fryer, Pager & Spenkuchm 2011)

workers who were fired or laid off and those who left voluntarily. I divide the sample into workers who have attended some years of college and those who have not attended any college. Approximately half of the unemployed sample was fired while the other half was either not in the labor force, or left voluntarily. Table 1.15 shows that those workers who have attended college for some time are 2 percentage points less likely to be fired than those who have never attended college. While this is statistically significant, the economic magnitude is small. Blacks are more likely to be fired compared to Whites. More educated Blacks, however, are less likely to be fired compared to less educated Blacks. Therefore, the decrease Black average wages is not likely to be coming from higher wage Blacks being eliminated from the labor pool compared to Whites.

The second concern with establishing Black wage procyclicality is that the procyclicality of Black wages results from procyclicality of low-skill wages, and is not related to race. In other words, as Blacks are disproportionately employed in low-wage jobs compared to Whites, and during bad economic times, wages of these jobs are reduced, and not specifically Black wages. It is therefore required to disentangle the bad economic conditions on ability types from racial groups. I do this in the following way. I use the logarithm of the previous market wages as a proxy for ability. I calculate the mean wage for each state, year and occupation. I then divide the sample into the High Wage Earners, who are those earning greater than the average wage and Low Wage Earners who are the reverse. If wage procyclicality is an ability affect rather than a race affect then we expect there to be no difference in year-to-year wage change following a shock between Blacks and Whites. I do an OLS estimation of year-over year wage change going into a recession with State, Year and Occupation fixed effects, and examine whether this change varies for Blacks and Whites. I control for all known correlates of wages and also for the current unemployment rate. The coefficient on BLACK in Columns 1 and 2 of Table 1.16 shows that for both ability groups, Black wages fall more relative to White wages when going into a recession. From this we can be fairly confident that wages are indeed pro-cyclical for Blacks and not for low-wage earners.

1.4.7 Discrimination as an explanation for the Wage Gap

The third challenge faced in this paper is to establish that discrimination causes wages to decrease more in high discrimination states compared to low discrimination states. And this in turn affects the entrepreneurship gap. These results build on the work of Charles and Guryan ((Charles & Guryan 2007)) who show that the wage gap is larger in states with higher prejudice. In their estimation the authors take the average gap in wages at the state-year level to be the dependent variable, while I look at individual wages. This allows greater precision and lower omitted variable bias as I am able to account for cross-sectional individual correlates.

However, this estimation is also not without its limitations. While the preliminary evidence suggests that discrimination exacerbates the role of wages in affecting business ownership decisions, there are endogeneity concerns that could be biasing the estimates . The foremost concern is related to unobservable correlates of wages and discrimination across states that are not captured by controls, or time-invariant fixed effects or linearly time-variant state-specific trends. Individuals of differing characteristics such as ability, leisure preferences and entrepreneurial spirit may elect to live in different parts of the country, and this could potentially confound estimates. For example within each race ability, leisure-preference and entrepreneurial spirit of individuals living in the rural Mid-Western states may differ from those living in the Coastal States - and these differences may not be captured by observable controls or fixed effects. So the response of wages to shocks is the efficient market response to differing levels of productivity of the local populations in these very different states. Moreover, these factors would simultaneously affect the magnitude of change in wages and the propensity to start businesses. They would also affect the degree of competition for resources, labor, jobs etc and thereby can also influence racial attitudes. Over time these characteristics of individuals shape the character of the state.

It is therefore important to compare regions or states that share similar characteristics, not only of individuals but also markets, geographical endowment, environment and policy preferences. The 50 US States are so widely different from each other that it is challenging

to come up with a perfect match. In this paper I attempt a first approximation. Instead of splitting my sample by discrimination indices I use a triple interaction term that allows for differential impact of unemployment on Blacks and Whites at different levels of discrimination.

$$\begin{aligned} LogWage_{i,t} = \alpha_1 + \beta_1 * HPSmoothUnempRate_{s,t} \\ +\beta_2 * HPSmoothUnempRate_{s,t} * BLACK + \\ +\beta_3 * HPSmoothUnempRate_{s,t} * BLACK * Discrim + X_i^{'} * \zeta_1 + \\ +\epsilon_{i,t} \end{aligned} \tag{1.19}$$

As an additional control I add year fixed effects for White and Black individuals interacted with region groups. That is, I control for time-invariant regional characteristics for each race. This allows me to separately identify variation in wages which is not picked up by any time-invariant factors common to individuals of the same race across regions with the same geography but differing discrimination levels. In addition I have the usual list of fixed effects and controls for year, state, individual and industry. The estimation is shown below:

$$\begin{aligned} LogWage_{i,t} = \alpha_1 + \beta_1 * HPSmoothUnempRate_{s,t} \\ +\beta_2 * HPSmoothUnempRate_{s,t} * BLACK + \\ +\beta_3 * HPSmoothUnempRate_{s,t} * BLACK * Discrim + X_i^{'} * \zeta_1 + \\ +YearFE * RegionFE * BLACK + InteractionTerms + \epsilon_{i,t} \end{aligned} \tag{1.20}$$

Adding all controls and fixed effects interacted with Regions, Column 2 of Table 1.9 shows that log of nominal wages falls 10 percentage points more sharply in higher discriminatory states during recessions relative to Whites. Column 1 shows that simultaneously, Blacks are 50 percent more likely (over the mean rate) to start businesses. This effect is smaller than the overall sample. Thus in highly discriminatory states the magnitude of nominal Black wage

drop is larger than low-discrimination states. This is accompanied by a larger probability of Blacks becoming business owners. It is notable that the magnitude of both effects is also larger than that shown in Table 1.6 which looks at the entire United States and does not account for discrimination.

Table 1.12 presents intriguing results that shed further light on individual employment choices in highly discriminatory states. I use labor market participation data from CPS to evaluate differences in labor force participation by Blacks and Whites in high and low discrimination states. DiscrimIndex gives the discrimination index value of that state. HighDisc is a dummy which is 1 when the average discrimination score falls within the top tercile of distribution of discrimination scores. Unemp is a dummy which is 1 when the individual is unemployed, and nilf is a dummy equal to 1 when the individual is not in the labor force. I have dropped individuals who are home-makers as well as those who are students from my sample. Individuals are 10 percent likely to not be in the labor force, and 6.3 percent likely to be unemployed in this sample. Column 1 of the table shows that Blacks are *less* likely to be unemployed in high discrimination states. Living in a high discriminatory state decreases the likelihood of a Black person being unemployed by .8 percent, which is 13.3 percent over the mean rate. At the same time it increases the likelihood of dropping out of the labor force by .9 percent (shown in Column 2) which is 11 percent over the mean rate. Column 3 and 4 show results when I use a continuous discrimination score as the right hand side explanatory variable instead of the tercile score. I find that increasing the discrimination score by two standard deviations increases the likelihood of a Black individual not being in the labor force by 1 percent overall, or 10 percent of the mean rate. These results underscore the pervasive impact of discrimination. My results in this paper thus show that Black individuals facing higher discrimination see a sharper drop in wages during recessions. They do not, however, start more ventures of their own. On the contrary - they drop out of the labor force entirely. In the presence of discrimination, Blacks thus face a higher barrier in engaging in any productive activity in the economy.

As a third and last check of the impact of discrimination I compare the effect of business

cycles on individual wage and entrepreneurship in Regions and States that have similar characteristics but varying discrimination indices. I compare the Mid-Atlantic and South Atlantic Regions in Table 1.11. The Mid-Atlantic States are NY, NJ and PA, while the South Atlantic States are MD, VA, WV, NC, SC, GA and FL. These Regions are neighbors and share a coastline, and have comparable per capita income (averaged over 1980-2010) and population compositions. However, the Mid-Atlantic States have the second lowest value of Discrimination Index suggesting that racial prejudice is low, while the South Atlantic States have the second highest. Column 3 of Table 1.11 shows that in the Mid-Atlantic States there is no significant change in wages between Blacks and Whites when there is a 1 pp increase in Unemployment. However, in the South Atlantic States the decrease is significantly different between Blacks and Whites, with Black wages falling by 96 percentage points compared to White wages. Column 1 shows that higher unemployment is not associated with any accompanying change in propensity to be entrepreneur in Mid-Atlantic States but in South Atlantic States Blacks are 2 percentage points (or 25 percentage above mean) more likely to be entrepreneurs. The second comparison is between the East North (WI, MI, IL, IN, OH which are the low discrimination states) and East South States (which is the highest discrimination Region comprising of KY, TN, MS, AL), as shown in Table 1.10. Here the magnitudes of the effects do not vary as widely as in the Mid-Atlantic and South Atlantic states, but the pattern remains. Similar to Table 1.9 I find that the drop in Black wages in the East South Central states is not accompanied by a rise in business ownership in these states row 3 of Column 4 shows that the magnitude of the effect of recessions on likelihood of being a business owner is close to zero.

1.5 Discussion

Why have Blacks historically had such a robust predilection towards wage employment over being self-employed? One likely explanation is that Blacks perceive themselves to be of lower entrepreneurial ability than Whites and are therefore less inclined to take on the risk of discarding a certain fixed wage in favor of the uncertain business income. Since it is

now accepted that peer networks influence an individual's decision to become entrepreneurs (Nanda & Sorensen 2010) the lack of a thriving entrepreneurial network among the Black community reinforces traditional preferences in this context. An intriguing finding in this paper is that higher ability Blacks are the ones to transition into business ownership when the economy enters a contraction from an expansion. These businesses also perform as well as comparable White businesses starting at the same time. This suggests that there is no innate difference in entrepreneurial skills among high-ability Blacks and Whites, but that Blacks of all ability profiles have demonstrated a historical preference for wage employment and only venture into self-employment when strongly incentivized. I also find that among second generation entrepreneurs, recessions do not affect their likelihood of starting a business. This, then suggests that the lack of a thriving entrepreneurial network within the Black community could be a contributing factor to the lack of entrepreneurship.

Ethnographers such as (Frazier 1957) have also suggested that the cause is to be found in the Black enslaved past. Oppression, disenfranchisement and the experience of slavery discouraged the formation of trust-based networks among Blacks and the tradition of buying and selling, thereby pushing them towards paid employment. Therefore the tradition of preferring wage employment over self-employment started as early emancipation from slavery. Breaking out of this tradition may not have been as easy as one might be inclined to think because of peer effects. Moreover, ethnographers such as (Fordham & Ogbu 1986), (Corwin 2001), (Suskind 1994) have posited that blacks impose a penalty on peers who do not conform to the racial norm and 'act white'. Individuals engaging in behaviors that are stereotypically associated with Whites such as academic studies, ballet, or proper speech are rejected and penalized by their peer group. (Fryer, Pager & Spenkuchm 2011) formalizes the phenomenon of 'acting white' as acting as a contributor to sustained underachievement among Blacks and this can also explain the persistence of preference for wage employment over self-employment. Since productive entrepreneurship has not traditionally been a popular activity among Blacks penalties imposed by peers may be reinforcing lower rates in entrepreneurship. Understanding the impact of network and peer effects on Black entrepreneurship rates is a potential direction

for future research.

Another important consideration is the access and utilization of finance by Blacks that may be leading to differences in firm start-up rates and growth. (Robb, Fairlie & Robinson 2009) surveys 5000 firms from 2004-2006 and shows that Blacks have lower levels of startup capital as well as second-year capital injections compared to Whites. Is access to financing a barrier for Black entry into entrepreneurship? Does this vary across business cycles? For example, do training programs for the unemployed have an impact in business creation during recessions? These are questions that have been unexplored in this paper and can also be addressed in future work.

1.6 Conclusion

In this paper I establish unknown empirical facts: (a) The entrepreneurship gap narrows during periods of economic downturns or high unemployment because a Black individual is 15-20 percent more likely to start a business than a White individual during these times. (b) The decrease of the entrepreneurship gap is accompanied by the widening of the racial wage gap - higher unemployment causes Black wages to drop by 6pp more than Whites; this decrease is not due to a compositional change in the labor force, or occupation or industry specific shocks. And finally (c) discrimination contributes to the widening of the wage gap during high unemployment periods: Black wages decrease more in states characterized by highly discriminatory attitudes compared to low discriminatory states while White wages are rigid everywhere. Comparing business ownership rates across states, however, I do not find that Blacks in high discriminatory states are more likely to be business owners during periods of high unemployment. I argue that the reason for this unexpected but unsurprising finding is that Blacks in high discrimination states are likely to face higher barrier to entry into entrepreneurship even as they face steeper wage cuts. And this also explains the finding that Blacks in high discrimination states are more likely to drop out of the labor force compared to low discrimination states.

Establishing changes in the racial entrepreneurship and wage gaps, and that discrimination

explains Black wage procyclicality, are challenging empirical exercises due to reverse causality issues and bias resulting from unobserved heterogeneity. To tackle these challenges I use an instrumental variable approach, exploit the longitudinal nature of the dataset to control for time invariant correlates, and also conduct a battery of robustness checks that give a deeper insight into the links between the self-employment and labor markets.

This paper illustrates how changes in economic conditions can cause individuals to move between the labor and self-employment sectors. While these facts do not explain why the racial entrepreneurship gap exists in the first place it shows conditions under which Blacks are incentivized to enter entrepreneurship. The decision to start businesses cannot be decoupled from that to work in wage employment. This link should be an important consideration for policies designed to promote small business creation.

Understanding the impact of network and peer effects on Black entrepreneurship rates seems to be an important area of future research. Another important question is to explore whether lack of financing are creating barriers for Black entrepreneurship. Both these topics can potentially explain the reason for the entrerpreneurship gap, and are therefore important avenues of future research. The third and important avenue for future research is to examine the sources of financing for Black business ownership during recessions.

1.7 Appendix

Appendix 1

1. Do you think there should be laws against marriages between (Blacks/African-Americans) and whites?

2. Now thinking about ten years ago, that is in 1972, did you then think there should be laws against marriages between (Blacks) and whites?

3. White people have a right to keep (Blacks/African-Americans) out of their neighborhoods if they want to, and (Blacks/African-Americans) should respect that right.

4. If your party nominated a (Black/African-American) for President, would you vote for him if he were qualified for the job?

5. Do you think white students and (Black) students should go to the same schools or to separate schools?

6. How strongly would you object if a member of your family wanted to bring a (Black) friend home to dinner? Would you object strongly, mildly, or not at all?

7. (Blacks/African-Americans) shouldn't push themselves where they're not wanted.

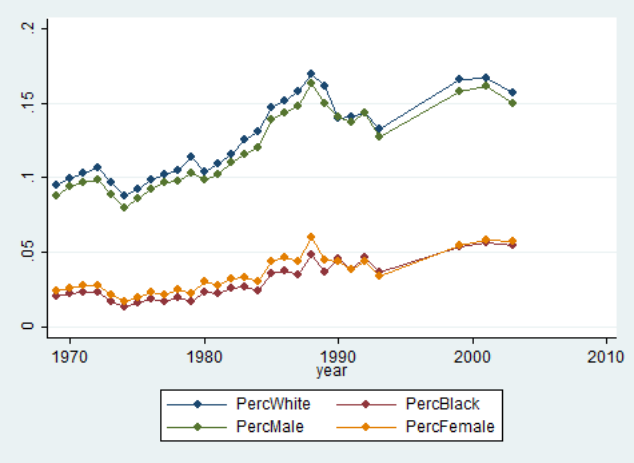
8. During the last few years, has anyone in your family brought a friend who was a (Black/African-American) home for dinner?

9. Do you think Blacks should have as good a chance as white people to get any kind of job, or do you think white people should have the first chance at any kind of job?

10. Do (Blacks/African-Americans)/Whites attend the church that you, yourself, attend most often, or not?

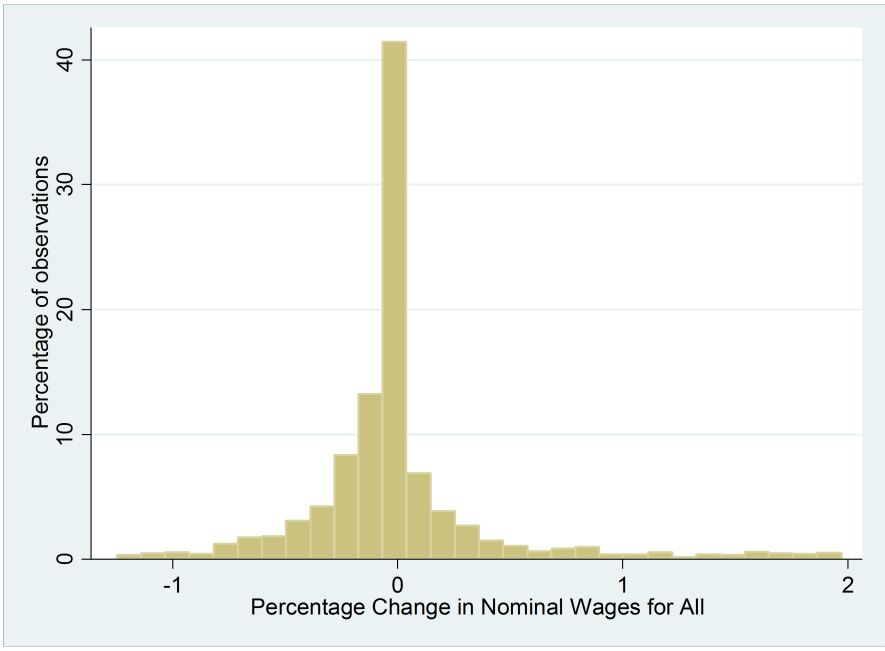
1.8 Figures and Tables

Figure 1.1: Business Ownership Rates



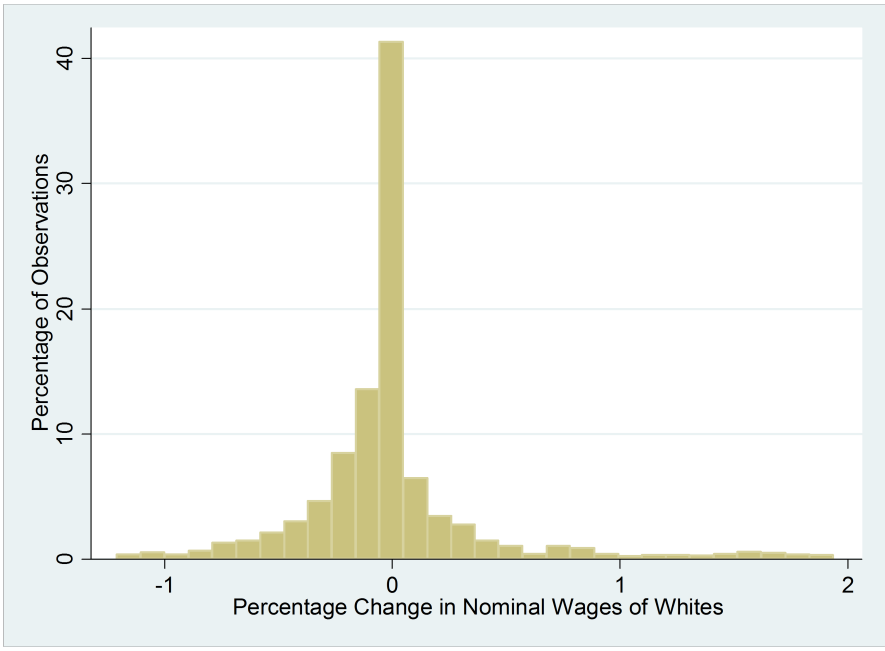
Notes: The figure plots the probability of being a business owner by gender and race in the sample between years 1969 to 2003.

Figure 1.2: Nominal Wage Change of All Individuals



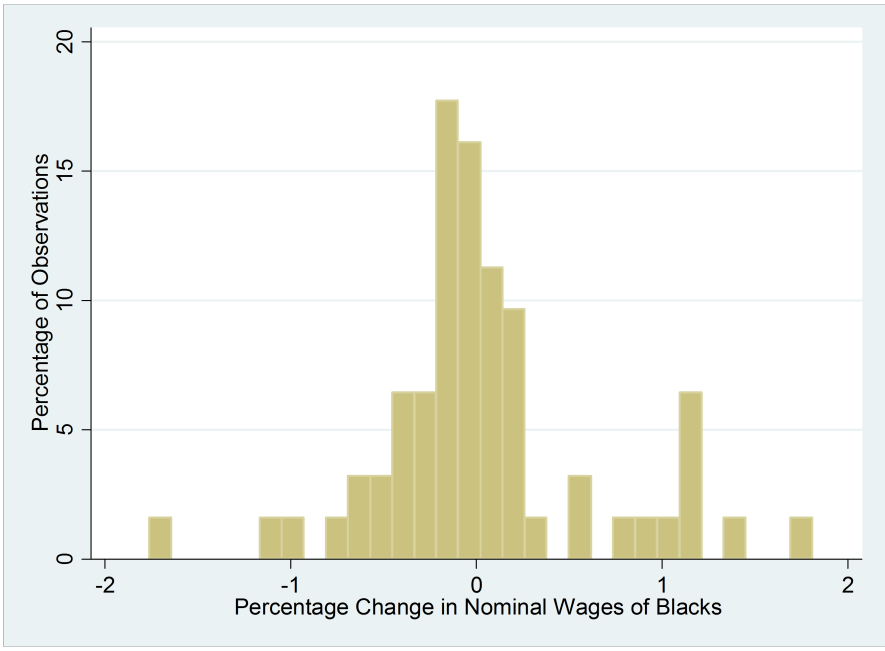
Notes: The figure plots the nominal wage changes of all individuals in the sample as the economy went from an expansion to a contraction.

Figure 1.3: Nominal Wage Change of White Individuals



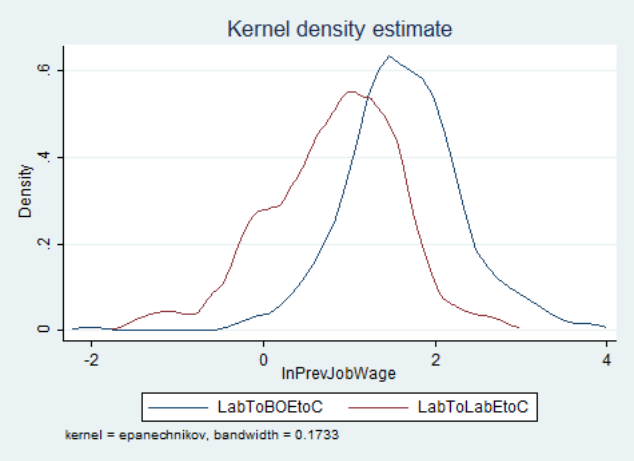
Notes: The figure plots the nominal wage changes of White individuals in the sample as the economy went from an expansion to a contraction.

Figure 1.4: Nominal Wage Change of Black Individuals



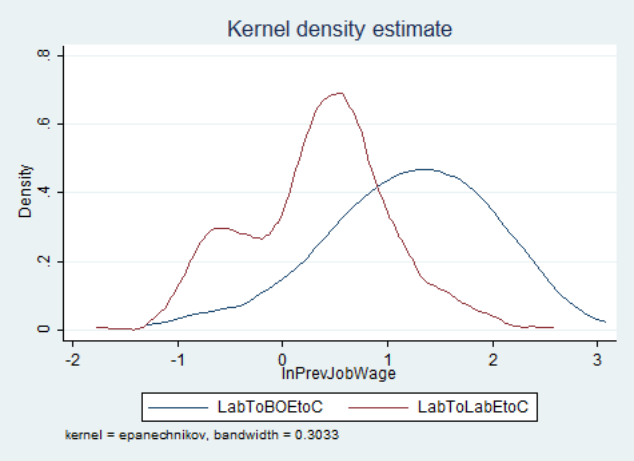
Notes: The figure plots the nominal wage changes of Black individuals in the sample as the economy went from an expansion to a contraction.

Figure 1.5: Kernel Density Estimates of White individuals



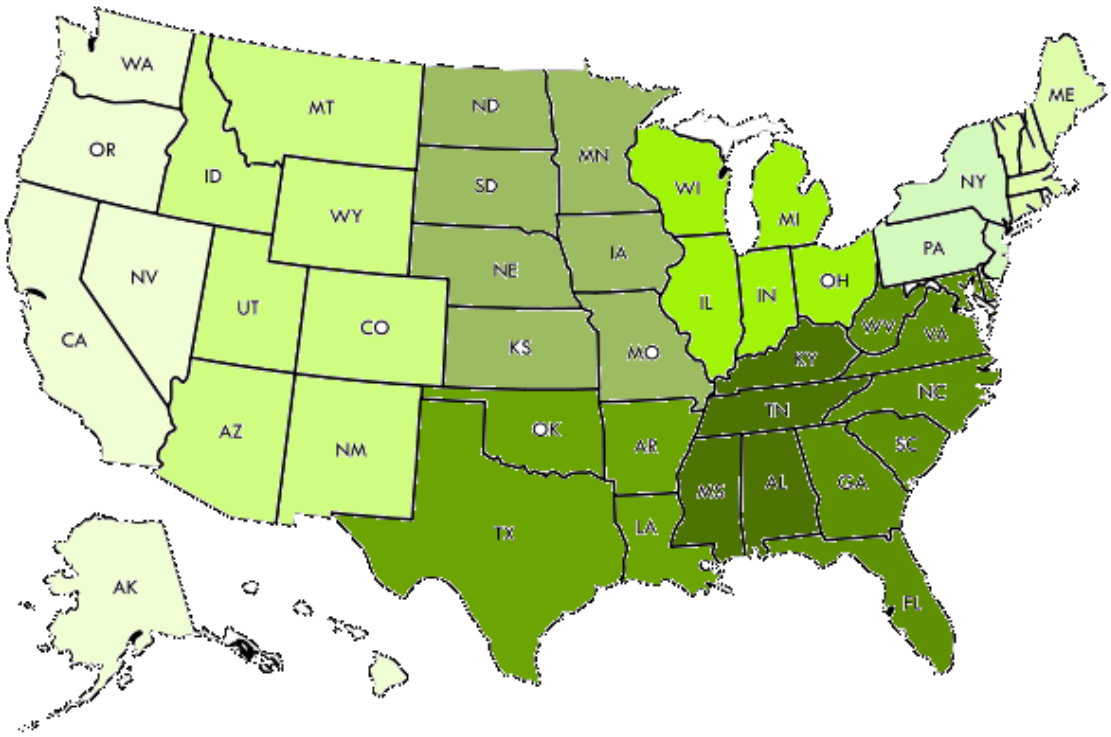
Notes: The figure plots the kernel density estimates of log of wages of White individuals becoming business owners and staying in wage employment when the economy transitions from an expansion to a contraction. LabToBOEtoC indicates those individuals who transitioned from labor market to business ownership when the economy went from an expansion to a contraction. LabToLabEtoC indicates those individuals who remained employed in labor market when the economy went from an expansion to a contraction.

Figure 1.6: Kernel Density Estimates of Black individuals



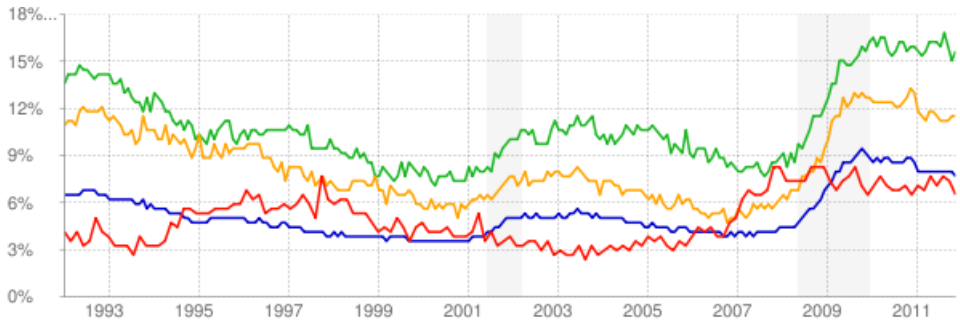
Notes: The figure plots the kernel density estimates of log of wages of Black individuals becoming business owners and staying in wage employment when the economy transitions from an expansion to a contraction. LabToBOEtoC indicates those individuals who transitioned from labor market to business ownership when the economy went from an expansion to a contraction. LabToLabEtoC indicates those individuals who remained employed in labor market when the economy went from an expansion to a contraction.

Figure 1.7: Map of United States showing variation of discrimination by Region



Notes: This figure shows the variation of discrimination across the United States. Darker green shades indicate more discrimination. The Pacific Region has the lowest measured discrimination while the East South Central Region has the highest.

Figure 1.8: Unemployment Rates of ethnic groups in US from 1991 to 2011



Notes: This figure shows the unemployment rate of Whites, Blacks, Hispanics and Asians in the United States from 1991 to 2011. The Red line indicates unemployment for Asians, Blue for Whites, Green for Blacks and Yellow for Hispanics.

Table 1.1: List of Variables

lnNominalWages	Log Nominal Wages
BusOwner	1 if the individual is a Business Owner
BLACK	1 if individual is Black
HPSmoothUnempRate	Hodrick-Prescott filtered State-Yr unemployment rate
HPSmoothUnempRate_BLACK	HPSmoothUnempRate*BLACK
TOTEMPLYR	Total Number of Past Employers
JM_BLACK	TOTEMPLYR*BLACK
HSGrad	1 if Individual is a high school graduate
HSGrad_BLACK	HSGrad*BLACK
HDEDUCATION	Number of years of education
AGEHD	Age of Individual
AGEHD_BLACK	AGEHD*BLACK
AgeSq	Square of Age
AgeSq_BLACK	AgeSq*BLACK
FAMSZ	Number of family members in household
FAMSZ_BLACK	FAMSZ*BLACK
lnPrevJobWage	Log of Previous Hourly Wages
lnPrevJob_BLACK	lnPrevJob*BLACK
FatherSE	1 if father of individual was self-employed
FatherSE_BLACK	FatherSE*BLACK
HomeOwner	1 if individual is a home owner
SomeCollege	1 if individual has attended any college

Table 1.2: Summary statistics

Variable	Mean	Std. Dev.	N
AGEHD	43.21	17.82	190610
MALE	0.701	0.458	190610
BLACK	0.363	0.481	181619
FAMSZ	2.956	1.762	190610
TOTEMPLYR	2.449	2.258	150563
HomeOwner	0.527	0.499	190610
HSGrad	0.754	0.431	133187
HDEDUCATION	11.908	6.49	145865
FatherSE	0.018	0.132	190610
lnNominalWages	2.023	1.514	132093
lnPrevJobWage	1.583	1.241	107018
HRSUNEMP	95.114	318.089	84683
CollegeCompleted	0.977	1.634	93847
BusIncome	564.955	7588.101	195815
BusIncorp	0.276	0.447	14640
BusOwner	0.093	0.291	185745
HPSmoothUnempRate	6.629	1.094	148074

Table 1.3: Summary statistics Of Whites

Variable	Mean	Std. Dev.	N
AGEHD	44.702	17.879	115768
MALE	0.772	0.419	115768
FAMSZ	2.755	1.523	115768
TOTEMPLYR	2.519	2.354	93715
HomeOwner	0.636	0.481	115768
HSGrad	0.805	0.396	86890
HDEDUCATION	12.614	6.022	89662
FatherSE	0.025	0.157	115768
lnNominalWages	2.187	1.568	82318
lnPrevJobWage	1.7	1.178	69379
HRSUNEMP	63.417	242.431	53015
BusIncome	419.87	3416.414	63325
BusIncorp	0.291	0.454	12509
BusOwner	0.129	0.336	112712

Table 1.4: Summary statistics of Blacks

Variable	**Mean**	**Std. Dev.**	**N**
AGEHD	40.847	15.756	65851
MALE	0.569	0.495	65851
FAMSZ	3.237	2.049	65851
TOTEMPLYR	2.351	2.094	50875
HomeOwner	0.348	0.476	65851
HSGrad	0.671	0.47	40767
HDEDUCATION	10.747	6.963	52247
FatherSE	0.004	0.065	65851
lnNominalWages	1.702	1.336	44374
lnPrevJobWage	1.347	1.327	34532
HRSUNEMP	151.386	415.309	29633
BusIncome	417.069	3362.761	35747
BusIncorp	0.165	0.371	1653
BusOwner	0.032	0.176	64200

Table 1.5: Length of Business estimated by Cox-Proportional Model

Variable	**Mean**	**Std. Dev.**
LengthBus	3.642	5.053

Table 1.6: OLS Regression of Variation of probability of being a Business Owner and Wages with Unemployment

Observations are at individual- year level. Robust Standard errors are clustered at State-Year level. For Column 1-4, covariates are number of past employers, age of individual, number of family members in individual's household, whether the individual's father was self-employed or not, educational level attained, whether the individual owns a home or not, and all of these interacted with a dummy for race. Column 5 and 6 include all of the above covariates along with square of age, log of past wages, and their interaction terms with the dummy. *, **, *** indicate significance at 10%, 5% and 1% level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	BusOwner	BusOwner	BusOwner	lnBusIncome	lnNominalWages	lnNominalWages
HPSmoothUnempRate	0.00212	0.0101*	-0.0163	6.147	0.0292*	0.312
	(0.00373)	(0.00561)	(0.245)	(14.45)	(0.0176)	(0.815)
HPSmoothUnempRate_BLACK		0.0143***	0.0158***	-0.0797	-0.0598***	-0.0493***
		(0.00320)	(0.00337)	(0.115)	(0.0203)	(0.0189)
MALE	0.0614***					
	(0.00248)					
BLACK	-0.0560***					
	(0.00264)					
Observations	84,979	84,979	84,976	2,345	58,554	58,554
R-squared	0.143	0.564	0.561	0.857	0.920	0.924
STATE FE	x	x	x	x	x	x
Year FE	x	x	x	x	x	x
Individual FE		x	x	x	x	x
Industry FE	x	x	x	x	x	x
State-Specific Linear Time Trend			x	x		x
Industry FE*Year FE			x	x		x

Table 1.7: IV Estimation of Entrepreneurship and Wage Gap during Business Cycles

Observations are at individual- year level. Robust Standard errors are clustered at State-Year level. For Column 2, covariates are number of past employers, age of individual, number of family members in individual's household, whether the individual's father was self-employed or not, educational level attained, whether the individual owns a home or not, and all of these interacted with a dummy for race. Column 1 includes all of the above covariates along with square of age, log of past wages, and their interaction terms with the dummy. *, **, *** indicate significance at 10%, 5% and 1% level respectively.

	(1)	(2)
Dependent Variables	lnNominalWages	BusOwner
HPSmoothUnempRate	-2.315	-0.418*
	(1.594)	(0.243)
HPSmoothUnempRate_BLACK	-0.0190***	0.00575***
	(0.00101)	(0.00193)
BLACK	-.0648221	-.001016
	(.1205679)	(.0213151)
Observations	37,033	81,731
R-squared	0.829	0.51
StateFE	x	x
Year FE	x	x
Individual FE	No	No
Industry FE	x	x
F stat	31.58	25.50

Table 1.8: Variation of Wage Gap with Unemployment and Discrimination Index

Observations are at individual- year level. Robust Standard errors are clustered at State-Year level. For Columns 3 and 4, covariates are number of past employers, age of individual, number of family members in individual's household, whether the individual's father was self-employed or not, educational level attained, whether the individual owns a home or not, and all of these interacted with a dummy for race. Column 1 and 2 include all of the above covariates along with square of age, log of past wages, and their interaction terms with the dummy. HighDiscrim indicates those individuals living in states with discrimination higher than average, while LowDiscrim indicates those where measured discrimination is lower than average. *, **, *** indicate significance at 10%, 5% and 1% level respectively.

Dependent Variable	(1) lnNominalWages HighDiscrim	(2) lnNominalWages LowDiscrim	(3) BusOwner HighDiscrim	(4) BusOwner LowDiscrim
HPSmoothUnempRate	0.00744	0.136***	0.00699	0.0207*
	(0.0250)	(0.0516)	(0.00583)	(0.0120)
HPSmoothUnempRate_BLACK	-0.0856*	0.00914	0.0114***	0.00836*
	(0.0503)	(0.0486)	(0.00386)	(0.00494)
Observations	18,335	17,213	59,270	44,991
R-squared	0.932	0.922	0.569	0.621
STATE FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes
Occupation	Yes	Yes	Yes	Yes

Table 1.9: Using Triple Interaction term and Regional Controls for Discrimination Across States

Observations are at individual- year level. Robust Standard errors are clustered at State-Year level. BLACK is a dummy set to 1 when the individual is 1. HighDiscrim is a dummy set to 1 when the individual lives in a state where discrimination exceeds average discrimination. For Column 1, covariates are number of past employers, age of individual, number of family members in individual's household, whether the individual's father was self-employed or not, educational level attained, whether the individual owns a home or not, and all of these interacted with a dummies BLACK and HighDiscrim. Column 1 includes all of the above covariates along with square of age, log of past wages, and their interaction terms with the two dummy variables. *, **, *** indicate significance at 10%, 5% and 1% level respectively.

	(1)	(2)
Dependent Variable	BusOwner	lnNominalWages
HPSmoothUnempRate_High	-0.000707	0.103***
	(0.000905)	(0.0140)
HPSmoothUnempRate_High_BLACK	0.00579**	-0.105***
	(0.00261)	(0.0231)
HPSmoothUnempRate	-0.0840***	-0.0198
	(0.00893)	(0.0819)
HPSmoothUnempRate_BLACK	0.0187***	-0.0618
	(0.00293)	(0.0657)
Black_High	-0.0262	0.878***
	(0.0185)	(0.170)
Observations	77,026	59,127
R-squared	0.565	0.504
STATE FE	Yes	Yes
Year FE	Yes	Yes
Individual FE	Yes	Yes
Industry FE	Yes	Yes
State-Linear Trend	No	No
Industry*Year	No	
Industry*Year FE		No

Table 1.10: Wage Gap and Entrepreneurship in East-North and East-South Central Regions

Observations are at individual- year level. Robust Standard errors are clustered at State-Year level. BLACK is a dummy set to 1 when the individual is 1. Covariates are number of past employers, age of individual, number of family members in individual's household, whether the individual's father was self-employed or not, educational level attained, whether the individual owns a home or not, square of age, log of past wages, and all of these interacted with a dummy BLACK. *, **, *** indicate significance at 10%, 5% and 1% level respectively.

Dependent Variable	(1) lnNominalWages EN Central	(2) lnNominalWages ES Central	(3) BusOwner EN Central	(4) BusOwner ES Central
HPSmoothUnempRate	-0.597	-2.626	-0.243	1.538***
	(3.144)	(2.494)	(0.578)	(0.591)
HPSmoothUnempRate_BLACK	-0.128**	-0.184	0.0159	-0.00506
	(0.0588)	(0.131)	(0.0167)	(0.0326)
Observations	2,854	6,079	5,937	11,055
R-squared	0.906	0.914	0.585	0.561
STATE FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes
Occupation	Yes	Yes	Yes	Yes

Table 1.11: Wage Gap and Entrepreneurship in Mid and South Atlantic States

Observations are at individual- year level. Robust Standard errors are clustered at State-Year level. BLACK is a dummy set to 1 when the individual is 1. Covariates are number of past employers, age of individual, number of family members in individual's household, whether the individual's father was self-employed or not, educational level attained, whether the individual owns a home or not, square of age, log of past wages, and all of these interacted with a dummy BLACK. *, **, *** indicate significance at 10%, 5% and 1% level respectively.

Dependent Variable	(1) BusOwner Mid-Atlantic	(2) BusOwner South-Atlantic	(3) lnNominalWages Mid-Atlantic	(4) lnNominalWages South-Atlantic
HPSmoothUnempRate	0.188	1.231***	-0.143**	0.233*
	(0.757)	(0.374)	(0.0646)	(0.128)
HPSmoothUnempRate_BLACK	-0.0589	0.0227**	0.0175	-0.952**
	(0.0548)	(0.0101)	(0.0673)	(0.435)
Observations	8,212	16,533	8,398	4,811
R-squared	0.580	0.591	0.921	0.912
STATE FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes
Occupation	Yes	Yes	Yes	Yes

Table 1.12: Unemployment and Labor Force Participation by Race and Discrimination

Observations are at individual- year level. Robust Standard errors are clustered at State-Year level. BLACK is a dummy set to 1 when the individual is 1. HighDisc is a dummy set to 1 when the individual lives in a state with higher than average level of measured discrimination. DiscrimIndex is the actual value of discrimination index. Covariates are age of individual, educational level attained and marital status, and all of these interacted with a dummy BLACK. *, **, *** indicate significance at 10%, 5% and 1% level respectively.

	(1)	(2)	(3)	(4)
VARIABLES	Unemp	nilf	Unemp	nilf
HighDisc_Black	-0.00742***	0.0124***		
	(0.00271)	(0.00210)		
Black	0.0448***	0.0561***	0.0507***	0.0548***
	(0.00359)	(0.00384)	(0.00376)	(0.00400)
Observations	2,561,092	4,308,980	1,856,409	3,201,321
R-squared	0.078	0.592	0.086	0.595
STATE FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Individual FE	No	No	No	No
Occupation	Yes	Yes	Yes	Yes
SE Clustering	State Year	State Year	State Year	State Year

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 1.13: Business Incorporation and Business Income during Business Cycles

Observations are at individual- year level. Robust Standard errors are clustered at State-Year level. BLACK is a dummy set to 1 when the individual is 1. StartContraction is a dummy set to 1 when the business was started in a recession year. Covariates are number of past employers, age of individual, square of age of the individual, number of family members in individual's household, whether the individual's father was self-employed or not, educational level attained, whether the individual owns a home or not, and all of these interacted with a dummy BLACK. *, **, *** indicate significance at 10%, 5% and 1% level respectively.

	(1)	(2)
VARIABLES	BusIncorp	BusIncome
BLACK	0.356*	-920.5
	(0.196)	(1,791)
StartContraction	-0.00804	-199.7
	(0.0234)	(209.9)
StartContraction_BLACK	-0.0469	-633.7
	(0.0441)	(810.7)
Observations	9,482	10,690
R-squared	0.189	0.083
StateFE	Yes	Yes
Year FE	Yes	Yes
Individual FE	No	No
Industry FE	Yes	Yes
SE Clustering	Individual	Individual

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 1.14: Cox Proportional Estimation of Duration of Business

Observations are at individual- year level. Robust Standard errors are clustered at State-Year level. BLACK is a dummy set to 1 when the individual is 1. StartContraction is a dummy set to 1 when the business was started in a recession year. Covariates are number of past employers, age of individual, square of age of the individual, number of family members in individual's household, whether the individual's father was self-employed or not, educational level attained, whether the individual owns a home or not, log wages of previous job held, and all of these interacted with a dummy BLACK. *, **, *** indicate significance at 10%, 5% and 1% level respectively.

	(1)
VARIABLES	LengthBus
StartContraction	0.592***
	(0.0731)
StartContraction_BLACK	0.0568
	(0.183)
BLACK	0.221
	(0.640)
Observations	12,579
StateFE	Yes
Year FE	Yes
Individual FE	No
Industry FE	Yes
SE Clustering	UniqueID

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 1.15: OLS Estimation of being Fired in Contraction years

	(1)
VARIABLES	Fired
SomeCollege	-0.0209***
	(0.00519)
SomeCollege_BLACK	-0.00183
	(0.0116)
BLACK	0.0431***
	(0.00610)
age	0.00498***
	(0.000161)
sex	-0.103***
	(0.00507)
Constant	0.356***
	(0.0207)
Observations	56,554
R-squared	0.198
StateFE	Yes
Year FE	Yes
Individual FE	No
Occupation FE	Yes

Clustering StateYr
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 1.16: Wage Change of Blacks and Whites in High and Low Wage Earning groups

Observations are at individual- year level. Robust Standard errors are clustered at State-Year level. BLACK is a dummy set to 1 when the individual is 1. StartContraction is a dummy set to 1 when the business was started in a recession year. Covariates are number of past employers, age of individual, square of age of the individual, number of family members in individual's household, whether the individual's father was self-employed or not, educational level attained, whether the individual owns a home or not, log wages of previous job held, and all of these interacted with a dummy BLACK. *, **, *** indicate significance at 10%, 5% and 1% level respectively.

	(1)	(2)
VARIABLES	High Wage Earners	Low Wage Earners
BLACK	-2.416**	-2.553*
	(1.225)	(1.413)
HPSmoothUnempRate	-0.0939	0.322***
	(0.119)	(0.116)
HPSmoothUnempRate_BLACK	0.249*	0.173
	(0.128)	(0.119)
Observations	41,024	20,494
R-squared	0.016	0.025
STATE FE	Yes	Yes
Year FE	Yes	Yes
Individual FE	No	No
Occupation FE	Yes	Yes
SE Clustering	StateYear	StateYear

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Chapter 2

IPO pricing and ownership structure: the Business-Group effect

Shinjinee Chattopadhyay, Gitit Gershgorn and Aharon Mohliver[1]

2.1 Introduction

When firms first go public, they tend to experience a surge in share price. Academics have been documenting this phenomenon, and trying to explain it, since the 1970s ((Ibbotson 1975), (Reilly 1973), (Ritter & Welch 2002), (Stoll & Curley 1970)). Citing studies produced as early as 1957, (Stoll & Curley 1970) make these observations on this remarkable price appreciation:

"In the short run, the stocks in the sample showed a remarkable price appreciation. Between the initial offering date and the first market date, the average 6-month rate of return for all companies in the sample, over and above the 6-month rate of return on the Standard and Poor's Index, was 42.4 percent. On the average, an investor would have done almost 50 percent better per 6-month period by buying new small issues at the offering price [italics in original] than by investing in a portfolio of larger stocks."

This phenomenon, commonly referred to in the IPO literature as "first-day return" or "underpricing", is both persistent and global. It has been a constant from the very first studies conducted in the 1950s through the dot.com bubble. In a cross-country comparison,

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each and every country studied showed average IPO prices increasing from the offer stage to market close on the first day of trading. In fact, first-day return is so prevalent that the authors (Ritter & Welch 2002), in their review paper assert that "We know of no exceptions to the rule that the IPOs of operating companies are underpriced, on average, in all countries." (p. 8). The counterparty in an IPO is the issuing firm. When prices rise on the first day of trading, this translates into a transfer of (potential) capital from the issuing firm to investors in the IPO. The literature commonly refers to this as "money left on the table". The rationale behind "leaving money on the table" varies according to the theoretical lens used. Signaling theories suggest that good firms signal their quality by willingly leaving money on the table for investors ((Welch 1989)). One strand of the literature suggests that firms undertake a "book-building" exercise to gauge investor interest before they issue an offer price, and underpricing is merely compensation to investors for revealing private information on their preferences ((Benveniste & Spindt 1989),(Benveniste & Wilhelm 1990)). Another relates to preferential share allocation: underwriters allocate shares to favored business partners as a quid pro quo to strengthen the relationship and in expectation of repeated interaction. ((Cornelli & Goldreich 2001), (Ljungqvist & Jr 2002)).

In this chapter, we argue that the ownership structure of an economy, particularly dominant business groups, is a key source of heterogeneity of IPO underpricing between economies and can help shed light on some of the debates within the IPO pricing literature. We incorporate the concept of dominant groups' market power by allowing for heterogeneity in the corporate ownership structure of the economy where the IPO is issued. Based on empirical facts, we suggest that the ownership structure of an economy should be incorporated into existing theories on IPO underpricing. We make two main observations. Firstly, we show that over and above predictors such as market size, legal origin and corruption, the extent of underpricing and the resulting amount of money left on the table is smaller when the economy comprises fewer family-owned business groups. If the number of family-owned groups increases by 1, underpricing decreases by .61 percentage points. Secondly, we show that as the average number of pyramidal layers within business groups increases, the average under-

pricing decreases. If the average number of pyramidal layers increases by 1, average IPO underpricing decreases by 28.3 percentage points. Both the number of family-owned groups and the number of pyramidal layers are proxies of the distribution of power, competition and control within an economy. Past literature suggests that as a family-owned group gains additional layers, it separates ownership from control by diluting ownership with non-family shareholders. This is explained as an indication both of optimizing ownership structure for rent extraction ((Almeida & Wolfenzon 2006*a*)) and of the increased ability to "tunnel" funds from one group firm to another ((Bae, Kang & Kim 2002);(Bertrand et al. 2008), (Jiang, Lee & Yue 2010); (Johnson et al. 2000)).

We find that when economic power becomes concentrated in the hands of fewer agents, the average level of IPO underpricing decreases, leaving less money on the table for participating institutional investors. We conjecture that this indicates the greater influence of the business group on institutional investors who depend on the group for business unrelated to the IPO (such as pension-fund management, insurance and loans). Similar types of agency behavior have been documented among U.S. mutual funds voting at shareholders' meetings for companies whose 401(k) portfolios they manage ((Davis & Kim 2007)).

We also view our findings as supporting existing theories on asymmetric information. Past literature suggests that one reason for underpricing is that high-quality firms "signal" their quality by leaving money on the table. As the number of groups in an economy increases, intensifying competition makes it more important to send such signals, and underpricing increases. In a more general sense, the more pyramidal business groups there are in an economy, the more costly it is to assert each groups true quality and since there is a clear group component to a single firm's performance ((Bertrand et al. 2008), (Chang & Hong 2000)), this should be reflected in the pricing of the IPO. The second theory that may speak to such evidence is that on book-building: as the number of groups increases, competition for investors also increases, and therefore investors are compensated more for revealing private information.

We next examine how IPO underpricing varies with the average number of pyramidal layers

in the economy, which we consider as a proxy for the degree of separation between ownership and control ((Claessens, Djankov & Lang 2000), (Morck, Wolfenzon & Yeung 2005)). We control for the market size of the economy and anti-director measure, following past literature. Corruption is also likely to affect underpricing, and is therefore included as a control. We also control for legal origin, since it has been found to be strongly correlated with the strength of small investors and the institutions protecting them. Theories on agency conflict and asymmetric information predict lower underpricing when there is a greater separation between ownership and control. Previously, authors have theorized that when groups have more pyramidal layers, firms are more likely to divert cash in order to benefit the owners of the groups. ((Almeida & Wolfenzon 2006*b*)). We find support for this theory. When there are more pyramidal layers, more funds are diverted into the firm and less money is left on the table. The chapter is organized as follows. We begin with a review of the literature on business groups, their financing constraints and how they function. We then move on to discuss the IPO underpricing phenomenon, why it happens and the various agency conflicts that are associated with it. Finally, we present the data and results, a discussion and our conclusion.

2.2 Business groups around the world, internal dealings and financing constraints

With few exceptions , corporate ownership around the world follows one of two archetypal structures: the Anglo-Saxon diverse-ownership structure, which is common in the English-speaking world (predominantly in the United States and the United Kingdom), and the business-group structure that prevails in other economies around the world. In business-group economies, large portions of public and private corporations are held by a small number of individuals or families. This ownership structure was first observed by (Leff 1978) with regards to the ownership structure in South America, but was not explored extensively by academics until the publication of two seminal papers by La Porta et al in the late 1990s that observed both the prevalence of this structure and its dependence on the distantly determined legal origins of the country (La Porta, Lopez-De-Silanes & Shleifer 1999); (La Porta et al. 1998).

Subsequently, researchers began to map individual economies, and established that business groups are dominant and common in both developing and most developed economies ((Barca & Becht 2001), (Claessens, Djankov & Lang 2000), (Faccio & Lang 2002), (La Porta, Lopez-De-Silanes & Shleifer 1999), (Sacristan-Navarro et al. 2007)).

Several explanations have been put forward to account for this discrepancy in ownership structure. The foremost theory focuses on inefficient institutions being substituted early in the countries' development, followed by a political and economic entrenchment that precludes a shift toward diversified ownership structure. Emerging economies are often characterized by poorly developed institutions or financial intermediaries alongside well-functioning product and labor markets. This lack of developed institutions increases the cost of establishing contractual relationships and acquiring capital (Khanna & Yafeh 2007). Large business groups can mitigate some of these problems by allocating capital more efficiently within the group rather than entrusting it to underdeveloped external institutions ((Chang & Hong 2000), (Khanna & Yafeh 2007), (Khanna & Rivkin 2001)).

Business groups compete with each other in various markets: goods, labor, access to government benefits and contracts and in financing their activities. In some of these markets, they often control mechanisms through which they can obtain preferential access. When financing their activitiese, for example, groups often influence banks, insurance companies and asset-managing firms. (Khanna & Palepu 1999) find that in India, firms affiliated with business groups have better access to international sources of capital than non-affiliated firms. Weaker regulation also helps groups gain preferential access to capital (La Porta et al. 1998).

The literature finds much evidence of internal business within groups. (Shin & Park 1999), for example, find that investments made by firms within a business group are less sensitive to their own cash flow (compared to non-group affiliated firms) but are highly sensitive to the cash flow of other firms in the group. They interpret this finding as pointing to an internal capital market within the groups, in which funds flow between firms that are unrelated except for their membership of the group. In a similar vein, } show that various forms of internal business exist within Korean groups, including debt guarantees, internal trade and equity

investments. (Gopalan & Seru 2007) find that intra-group loans are common among Indian business groups, with lending usually flowing from stronger firms to weaker ones in the same group. Such loans come with zero-interest terms, and are most common when firms are hit by negative earnings shocks. The authors also find that such loans reduce the probability of future bankruptcy of firms. These and other related papers suggest that firms in business groups are not unrelated, but rather assist each other in ways that are not observed in diversified-ownership economies.

It is important to note that while intragroup capital markets create better financing possibilities for affiliated firms, they can reduce the efficiency of capital allocation in the wider economy even when they are efficient in allocating funds within the group (Almeida & Wolfenzon 2006*a*). Critically, Almeida and Wolfenzon show that a group's choice of a pyramidal structure (as opposed to dual-class shares, which offer the same equity control) can be explained theoretically as an attempt to maximize the ultimate owner's potential extraction of cash-flow gains. Divergence of cash-flow rights from control rights has also been tied to agency problems at the firm level for firms controlled by a group, where the controlling shareholder's interests diverge from those of minority shareholders as the cash-flow rights of the major shareholder diminish ((Morck, Wolfenzon & Yeung 2005)).

Intragroup dealings such as capital allocation, debt guarantee and internal trade can work to the benefit of the group or to the benefit of the group owner, by diverting funds from firms in which they have only modest cash-flow rights to others in which their cash-flow rights are larger. This phenomenon is known as "tunneling" a term first used by (Johnson et al. 2000).

There is mounting evidence that business groups around the world make use of tunneling. (Bae, Kang & Kim 2002) show that while minority holders of Korean business groups tend to lose out during a merger or acquisition, the controlling shareholders of the group benefit through value added to other firms within the group. (Bertrand, Mehta & Mullainathan 2002) find that in a sample of Indian business groups, more than 25 percent of the marginal rupee value of profits in low-cash-flow firms are ferreted away through tunneling. (Bertrand et al. 2008) study Thai business groups and find that the sons of business founders exert

great control over their businesses, especially after the founder dies. They also find that such control is associated with lower firm-level performance. They hypothesize that there is an inter-generational dilution of control and ownership, leading to a "race to the bottom" in tunneling resources out of group firms.

The key question about tunneling is why it exists in the first place. Why do minority shareholders continue to buy into firms offering low cash-flow rights, despite the evidence that tunneling takes place? Bertrand et al (2002) propose a few explanations. They suggest that these firms may provide other benefits that offset investors' losses from tunneling, such as political contacts that are especially valuable in emerging economies. A second explanation is that shareholders are not ex ante informed which firms offer high or low cash flow. The third is that efficient markets ultimately absorb the effects of tunneling through the growth of firms following acquisitions. These explanations all apply not only to tunneling funds from lower cash-flow firms to those higher up in the pyramid, but also to tunneling funds from institutional investors, both inside and outside the group, to firms that are publicly traded.

(Morck, Stangeland & Yeung 1998) argue that when business groups form a significant percentage of operational firms within an economy, the poor corporate governance and agency conflicts within firms impede overall economic growth. In a different paper, (Morck, Wolfenzon & Yeung 2005) suggest that family businesses and groups invest more in political lobbying than in innovation or creative destruction, which also contributes to economic stagnation.

It is becoming increasingly clear that business groups use their unique structures of ownership and control to facilitate better access to funds for their member firms and to increase the wealth of the individuals who control them. This complex relationship between firms within a group, and between the group and its environment, can manifest itself in the actions taken by investors considering trades offered by business-group firms.

We postulate that groups' use of intragroup capital markets, bank loans and trade to finance their activities, combined with agency conflicts affecting asset managers' investment decisions, leads to heterogeneous compensation for IPO investors. Agency-driven behavior in fund management is a well-documented phenomenon. Davis and Kim showed that even

in highly regulated and transparent markets such as the U.S., there is a positive association between business ties and the propensity of mutual funds to vote with management (Davis & Kim 2007). This behavior is prominent until votes are mandatorily published, at which point it disappears. Analysts issue a disproportionally high number of "buy" recommendations for IPOs underwritten by their firm ((Michaely & Womack 1999), and are slower to downgrade their recommendations than unaffiliated analysts (O'Brien, McNichols & Hsiou-Wei 2005), Affiliated analysts issue more optimistic growth forecasts ((Dechow, Hutton & Sloan 2000)). Interestingly, (Bradshaw, Richardson & Sloan 2006)demonstrate that over-optimism is positively related to net corporate financing activities. In business-group economies, IPOs for individual firms affiliated with groups are rarely independent of other firms in the group. Agent-based behavior that benefits the group can therefore show up as increased participation in IPOs from firms in the same group, as compared with non-group related IPOs. This enables the group to infuse the firm with investor capital while also maintaining control over future proxy voting. The group's asset managers maintain a consistent strategy of heightened participation, which results in higher pricing for all the group's IPOs.

2.3 Underpricing: theories and existing evidence

(Stoll & Curley 1970), (Reilly 1973) and (Ibbotson 1975) were among the first to show evidence on IPO underpricing. On average, IPOs are more likely to be underpriced than not. (Ritter & Welch 2002) find that, in the US market, the average first-day return or underpricing is 18.8 percent. The comparable daily market return is an average of 0.05 percent, so market misevaluation is unlikely to explain this large number. Several explanations for underpricing have been put forth in past literature.

A number of papers theorize or document evidence based on asymmetric information. They argue that when the issuer is better informed about the quality of the firm than investors, underpricing functions as a mechanism for signaling this quality to the market. The implication is that only high-quality firms would agree to leave money on the table. Later, the issuer can recover the cost via additional issues (Welch 1989)), market response to future div-

idend announcements ((Allen & Faulhaber 1989)) or analyst coverage ((Chemmanur 1993)).

According to (Amihud, Hauser & Kirsh 2003), another reason for underpricing IPOs is to use the resulting oversubscription as a signal of investor interest. The authors find that IPOs tend to be either heavily oversubscribed or undersubscribed, depending on how investors judge the sentiment of other investors. Overpricing means that some investors are priced out, which signals lack of interest to other investors. Underpricing makes undersubscription less likely, and is a preferred strategy for a "noisy" environment where investors' decisions are not mutually independent and information on subscription is available.

However, there is also some evidence against signaling theories. (Jegadeesh, Weinstein & Welch 1993) find that neither underpricing nor post-first day returns tend to lead to future issuing activity. (Michaely & Womack 1999) find no evidence of higher dividends following greater underpricing; nor do they find that firms with greater underpricing are more likely to return to the market for a second offering. Although popular, signaling theories appear to fall short in some instances. An important theme in the literature on IPO underpricing relates to conflict of interest, and particularly the role of "book-building". (Benveniste & Spindt 1989), (Benveniste & Wilhelm 1990) and (Spatt & Srivastava 1991) argue that the practice of "book-building" allows underwriters to obtain information from informed investors. First, they set a preliminary price range for the offer, before going on a "roadshow" with issuers to market the company to potential investors. The underwriters record indications of interest and use them to gauge demand for the share, revising the offer price upwards if demand is strong. However, since investors know that expressing interest results in a higher offer price, they must be offered incentives in return for revealing how much they are willing to pay; IPO share allocations and underpricing are among such incentives. (Hanley 2010) was the first to document the mechanism of book-building empirically, by showing that the degree of underpricing is positively related to the percentage revision in offer price from the original offer price. (Ritter & Welch 2002) show that in the period from 1980 to 2001, the average underpricing was 53 percent in those cases when the offer price exceeded the upper limit of the price range originally filed. This is significantly above the 12 percent for IPOs priced

within their filing range, or the 3 percent for IPOs that adjust their offer price downward.

On a related theme, news publications have speculated that underwriters deliberately leave money on the table and also allocate shares preferentially to investors of their choice. Since underpricing creates an excess demand for shares, issuers and underwriters can pick and choose who to allocate shares to. In the academic literature, (Sherman & Titman 2000) have argued that share allocation is a one of the methods by which investors are compensated for revealing costly information during the "book-building" process. (Loughran, Ritter & Rydqvist 1994) suggest that underwriters do not always distribute shares equitably, but allocate them preferentially to their favored buy-side clients when they are in a position to do so. But if firms know this, why are they still content to leave money on the table? The authors use prospect theory ((Kahneman & Tversky 1979)) to argue that firms will be more tolerant of underpricing if they know that their post-market valuation will be higher than expected. The larger a post-market revision they anticipate, the less likely they are to negotiate with underwriters on the offer price. (Ritter & Welch 2002) report that 66 billion USD was left on the table during the Internet bubble, and that IPO allocation shares accounted for as much as 10 percent of shares traded during this period. While there is no clear evidence on how shares are allocated among the various parties, there is some evidence on how institutional investors, who are better informed clients, benefit from share allocation. (Hanley 2010) showed that they benefit significantly from the short-run benefits of IPO underpricing but at the cost of participating in less attractive offerings. (Aggarwal, Prabhala & Puri 2002) look at US offerings between 1997 and 1998 and report similar findings, while (Cornelli & Goldreich 2001) look at UK offerings and also reach the same conclusion.

Since institutional investors are also potential block-holders with voting rights, share allocation during IPOs gives them the power to influence the long-term performance of the firm. For example, (Brennan & Franks 1997) look at a sample of 69 British firms and find that when shares are distributed more widely among minority holders, the founder is less likely to be ousted from the firm. (Stoughton & Zechner 1999) suggest that the promised benefit of underpricing not only attracts large institutional investors, but also incentivizes them to take

control of management and monitor the firm's activities more closely. (Mello & Parsons 1999) develop a model to show that rather than allocating all shares to institutional investors, it is optimal for a firm to issue dispersed holdings to small and passive investors, before marketing the controlling blocks to larger and more active shareholders.

We propose a similar argument. Preferential business partners acting as institutional investors compensate the group through higher IPO pricing, in the hope of receiving future business from companies affiliated with the group. When these investors are under the group's control, the business-group literature suggests this may cause conflicts of interest that will be reflected in a similar price pattern. The stronger the control exerted by business groups over the economy, the less is the money left on the table through IPOs.

2.4 Data

We use data on average underpricing spanning 35 countries gathered by (Loughran, Ritter & Rydqvist 1994) from various papers independently documenting underpricing around the world. We only use countries for which we could find ownership data, namely Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Denmark, Finland, France, Germany, Greece, Hong Kong, India, Indonesia, Ireland, Israel, Italy, Japan, , Malaysia, Mexico, the Netherlands, Norway, the Philippines , Portugal, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Thailand, Turkey, the United Kingdom and the United States. We could not find either detailed ownership mapping, anti-director rights or corruption measures for Bulgaria, China, Cyprus, Egypt, South Korea, Singapore, Poland, Jordan, Nigeria, Russia, or Saudi Arabia, and therefore excluded those countries from the analysis.

Our data covers samples that range between 20 IPOs (Argentina) and 12,246 IPOs (United States). The mean underpricing for the countries in the sample is 23.86 percent, with a minimum of 4.4 percent and a maximum of 88.5 percent. We match this data to corporate ownership characteristics in these economies based largely on mapping done by (Masulis, Pham & Zein 2011). In their study, the authors used data on 28,635 firms in 45 countries to construct a comprehensive map of ownership structures. They found that of the 28,635 firms,

3,007 were controlled by business groups (using a holdings threshold of at least 20% of voting rights, or 10% if the owners held additional control mechanisms such as CEO or Chairman positions). They report two variables that are central to our analysis: average pyramid layer depth, defined as the average number of pyramid layers across all firms in the economy, and the number of family groups, defined as the number of family-controlled business groups in the economy. The average number of pyramidal business groups in the sample is 16.5, ranging from one group (Austria) to 61 groups (South Korea). The average pyramid layer depth is 0.23, with a minimum layer depth of 0.029 (Switzerland) and a maximum of 0.89 (Israel). Together, these two variables allow us to proxy the extent to which groups have the incentive and power to influence the allocation and pricing of their IPOs.

We can also proxy the information cost relating to each group (which we postulate increases as the number of business groups increase). On average, the more layers a pyramidal group has, the greater the separation between ownership and control, and the more prevalent conflicts of interest are. The more business groups there are in an economy, the less power each individual group has vis-a-vis institutional investors and underwriters, both directly (through the control of financial intermediaries) and indirectly (through the ability to restrict or enhance future business with external intermediaries).

The functioning of capital markets is highly influenced by the quality of institutions that regulate trades, the strength and origin of legal institutions and the level of corruption in the economy.

We estimate an OLS regression, predicting IPO underpricing by the structure of corporate ownership (average depth of pyramid layers and number of pyramidal business groups), market size, legal origin and anti-director rights. We introduce corruption, economic risk and legal risk in different models to avoid multicollinearity. The results are reported in table 1.

Anti-director rights have no significant effect on the pricing of the IPO, while the legal origin of the country is significant for the countries with French legal origin (Argentina, Belgium, Brazil, Chile, France, Greece, Indonesia, Italy, Mexico, the Netherlands, Philippines, Portugal, Spain and Turkey).

Corruption is positively related to underpricing, suggesting that when economies are perceived as more corrupt, the average price discount sought by investors is higher. Economic and legal risks also increase the average underpricing. We can attribute the difference in magnitude to the different methodologies and scales used by the institutions collecting the data. The range of the economic and legal risk scales is 1 to 5, with a standard deviation of 0.74 and 0.64 respectively. This implies that two standard deviations out, IPOs are discounted by 20 percent in economies where the economic risk is high a significant discount in a sample where underpricing is centered at 23 percent with a standard deviation of 18 percent.

The number of business groups is positively related to the amount of money that is left on the table for investors, increasing by an average of 0.6 percentage points for each additional business group. The variance on the number of pyramidal family groups is large, ranging from 1 to 61 with a mean of 16.5. This implies that two standard deviations out in the number of pyramidal business groups increases the average underpricing by 15 percent.

The average pyramid layer is marginally significant, but interestingly loses significance when we introduce the variable capturing the countries' level of legal risk. Since much of the gains to tunneling are contingent on weak enforcement of contracts and weak legal protection, the loss of significance when legal risk is modeled suggests that tunneling may be a factor in IPOs being less underpriced in these economies. The average pyramid layer is 0.229 and the variable ranges from 0.029 to 0.89 in our sample with a variance of 0.175. This implies that two standard deviations out on the group pyramid layer, the average underpricing drops by 9.9 percent.

2.5 Discussion

This chapter examines the way ownership structure of firms affect average IPO underpricing, potential agency conflicts and information effects within an economy. In many countries, markets are dominated by family-owned business groups rather than smaller independent firms, and both agency conflicts and information friction manifest differently within these economies. In previous literature, IPO underpricing has been posited as a reward for investors for sharing

private information, a signal to investors of the firm's quality or a way to increase demand among investors. These explanations are supported by our findings in the previously unexplored context of ownership heterogeneity. We find that greater underpricing is associated with lower numbers of pyramidal layers within business groups in the economy. We postulate that lower underpricing may indicate more tunneling: business groups with more pyramidal layers are more likely to divert funds within the group, as has been shown in previous research. In the context of IPO pricing, this would imply leaving less money on the table for participating investors when firms go public. A second possible explanation for this finding is that factors endogenous to the group-ownership model change the information gathering characteristics investors provide during the IPO. A third possible explanation is that inherent advantages of group ownership are reflected in the risk characteristics of the IPO, providing more stable but lower underpricing across group firms, we mention a few such advantages in this chapter.

There is the evidence of co-insurance within firms belonging to the same group, or between layers of the same group. Since there is evidence that intragroup loans at low interest rates are prevalent among business groups, there may be less reason to leave money for investors.

A second argument we present is based on reputation. Large pyramidal business groups with more layers separating ownership from control are often well known, with established reputations within the economy. This would also lead them to leave less money on the table, because they have less need to signal their quality to the market than independent firms. The same holds for building demand during an IPO: membership of a business group with a large number of pyramidal layers may signal high quality in itself, therefore generating greater demand for shares and reducing the need to compensate investors and to underprice the IPO. It is important to understand that there are potential welfare consequences of funds being diverted. Lower IPO underpricing can reduce the returns to being a non-family shareholder, thereby affecting economic growth and development. It can also reduce transparency in terms of the firm's financial health or accounting practices, which can lead to potentially harmful consequences.

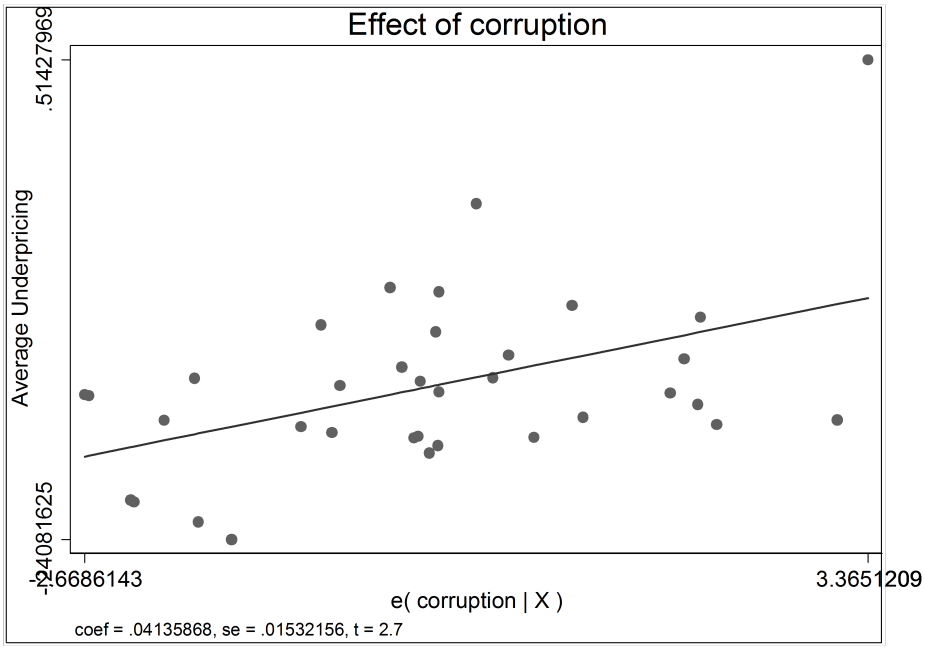
Higher underpricing is also associated with a larger number of business groups within an economy. We postulate that competition drives this finding; the larger the number of groups, the greater the competition for investor funds and share purchases during an IPO. Therefore, the need to signal quality increases as competition increases. Our third finding is that underpricing increases as endemic corruption increases, which suggest interesting future avenues of inquiry. Do more corrupt countries have a higher concentration of groups with more pyramidal layers? Is corruption a proxy for the prevalence of tunneling, and lower returns for shareholders? Or, more generally, do investors demand a higher premium at IPO because the future benefits or costs of economic corruption are not yet revealed? IPO pricing is a vast literature, encompassing multiple time periods, industries, countries and firms, but the theme of heterogeneity in ownership structure remains relatively underexplored. We believe that it holds the key to resolving many of the unanswered questions and competing theories in the field.

2.6 Conclusion

This chapter demonstrates links between firm ownership structure and the average IPO underpricing in an economy. We aim to exhibit new avenues of exploring the effects of market competition, information asymmetry, power and conflicts of interest on IPO pricing. Using a cross-country analysis based on two independent datasets, we show that the amount of money "left on the table" for investors decreases with the degree of concentration of ownership within the economy. We also show that the greater the degree of separation between power and equity ownership, the smaller the average IPO underpricing. We view these findings as providing support for IPO pricing theories based on share allocation, social control and power.

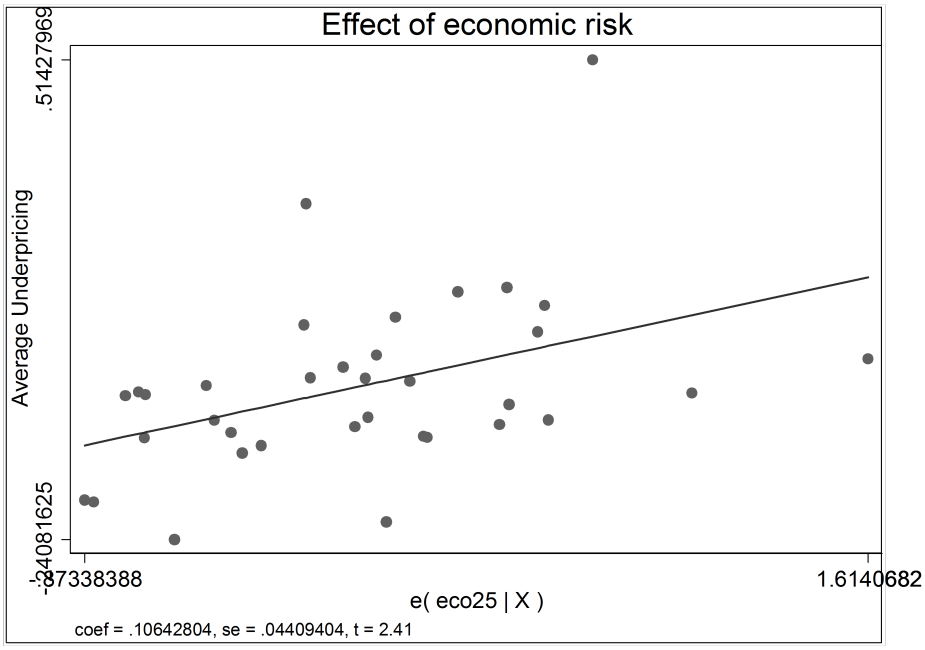
2.7 Tables and Figures

Figure 2.1: Marginal effect of corruption on underpricing (model 2)



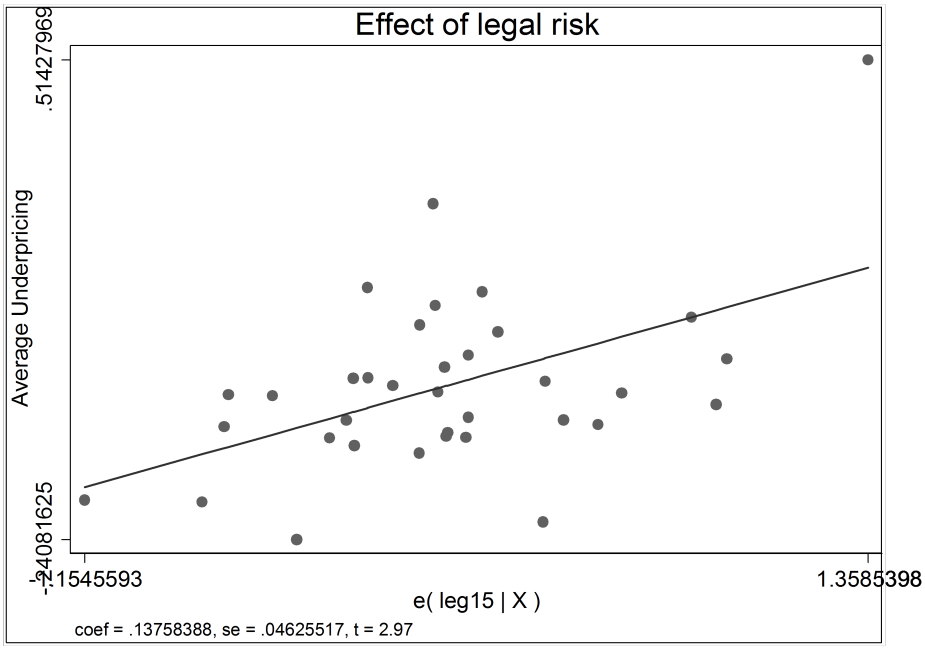
Notes: The figure shows the variation of corruption with underpricing. The y-axis plots the average underpricing while the x-axis plots the corruption index.

Figure 2.2: Marginal effect of Economic Risk on underpricing (model 3)



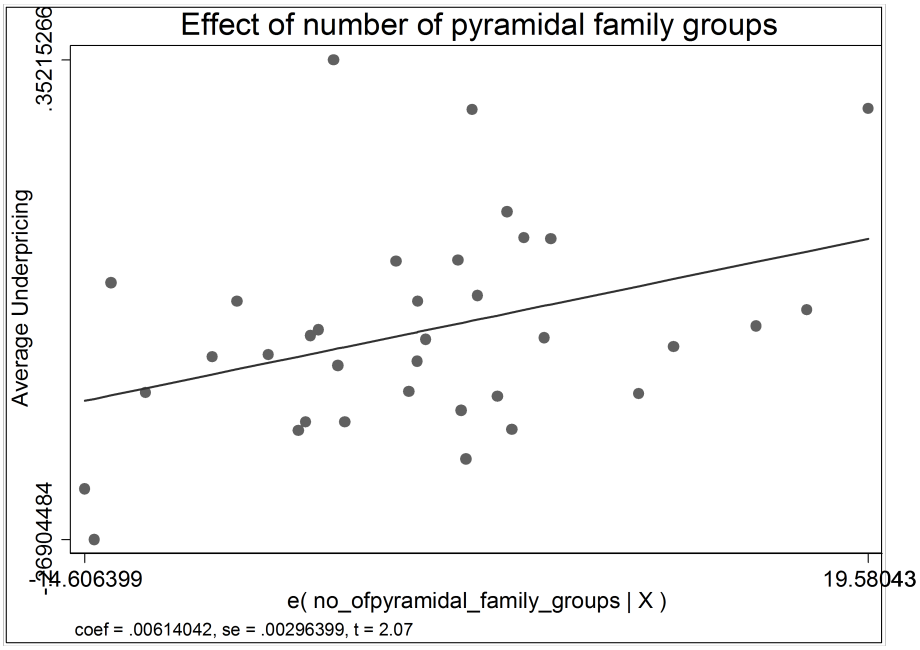
Notes: The figure shows the variation of economic risk with underpricing. The y-axis plots the average underpricing while the x-axis plots the economic risk.

Figure 2.3: Marginal effect of legal risk on underpricing (model 4)



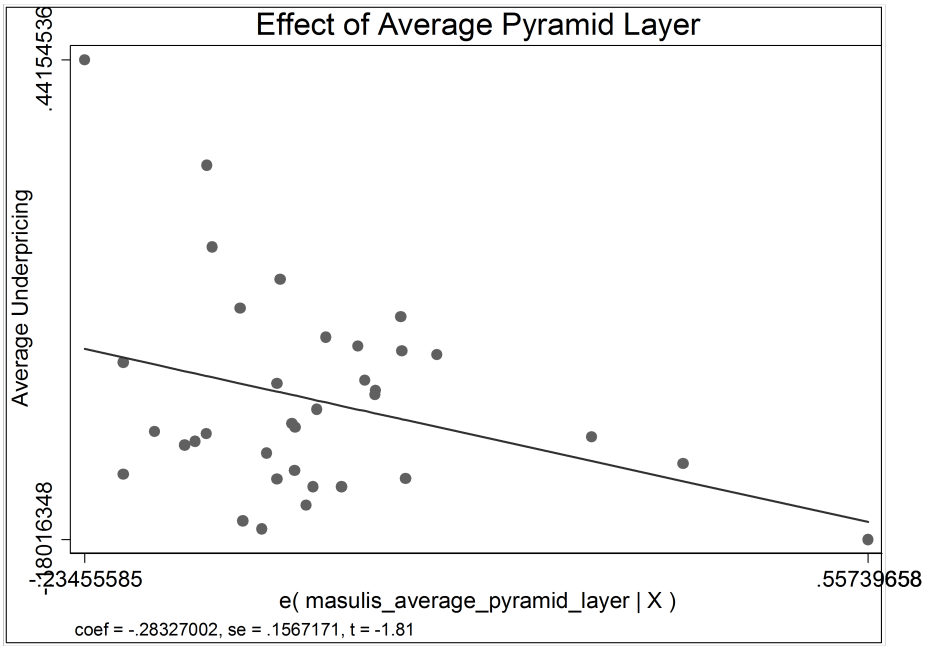
Notes: The figure shows the variation of legal risk with underpricing. The y-axis plots the average underpricing while the x-axis plots the legal risk.

Figure 2.4: Marginal effect of number of pyramidal family groups on underpricing (model 2)



Notes: The figure shows the variation of number of pyramidal family groups with underpricing. The y-axis plots the average underpricing while the x-axis plots the number of pyramidal groups.

Figure 2.5: Marginal effect of average pyramid layer on underpricing (model 2)



Notes: The figure shows the variation of number of pyramidal layers with underpricing. The y-axis plots the average underpricing while the x-axis plots the number of pyramidal layes.

Table 2.1: Summary Statistics and Correlations

Return refers to the first day trading return, PLayer is the number of Pyramidal layers, Groups refers to the number of business groups in the economy, MV refers to the Market Value, Corruption refers to the corruption index, EconSta refers to the measure of economic stability, and LegalSta refers to the measure of legal stability.

	(1) Mean	(2) SD	(3) Return	(4) PLayer	(5) Groups	(6) MV	(7) Corruption	(8) EconSta	(9) LegalSta
first day return	0.22	0.17	1.0000						
Average pyramid layer	0.23	0.18	-0.0502	1.0000					
No. of pyramidal groups	15.9	11.3	0.5467	-0.0185	1.0000				
Market value(Millions USD)	1,136	2,706	-0.0223	-0.2790	0.4163	1.0000			
corruption	1.39	2.24	0.3345	0.3555	0.1937	-0.1421	1.0000		
Economic stability	2.08	0.75	0.5360	0.3897	0.4329	-0.1395	0.7317	1.0000	
Legal stability	1.61	0.65	0.4020	0.2291	0.1473	-0.1907	0.8856	0.7272	1.0000

Table 2.2: OLS Regression of First day return

Observations are at country level. *, **, *** indicate significance at 10%, 5% and 1% level respectively.

	(1)	(2)	(3)	(4)
Dependent	First_day_return	First_day_return	First_day_return	First_day_return
average_pyramid_layer		-0.283*	-0.305*	-0.189
		(0.157)	(0.164)	(0.149)
no_ofpyramidal_family_groups		0.00614**	0.00606*	0.00574*
		(0.00296)	(0.00310)	(0.00292)
mktw	-1.03e-08	-2.30e-08*	-2.04e-08	-1.86e-08
	(1.24e-08)	(1.18e-08)	(1.24e-08)	(1.19e-08)
llsvantidirector	0.00295	0.000467	-0.00525	0.00405
	(0.0288)	(0.0232)	(0.0237)	(0.0228)
Legal_origin=French	-0.143*	-0.181**	-0.114	-0.159**
	(0.0836)	(0.0719)	(0.0694)	(0.0678)
Legal_origin=German	-0.0345	-0.0447	-0.0464	-0.0238
	(0.106)	(0.0916)	(0.0938)	(0.0906)
Legal_origin=Scandinavian	-0.168	-0.0327	-0.0480	-0.0344
	(0.109)	(0.0950)	(0.0963)	(0.0924)
corruption		0.0414**		
		(0.0153)		
Eco_risk			0.106**	
			(0.0441)	
Leg_risk				0.138***
				(0.0463)
Adj. R-Square	0.0034	0.369	0.340	0.397

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