Opportunity and Necessity Entrepreneurship: Local Unemployment and the Small Firm Effect

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Low-ability entrants to self-employment are "necessity entrepreneurs" forced into self-employment by adverse circumstances, while high-ability entrants are opportunity entrepreneurs attracted by a promising idea. Effects of local unemployment rates on the propensity of low-ability and high-ability workers to transition into self-employment are tested using two samples from the PSID. The results show a positive correlation between local unemployment rates and entry into self-employment for low-ability workers, but not for high-ability workers. Including firm-size to eliminate possible distortions in the results indicates that the positive association between unemployment and self-employment among low-ability workers is in fact driven by the effect of employer size. Moreover, a negative association between unemployment and self-employment among high-ability workers is observed.

INTRODUCTION

Since entry into self-employment has an important place in the creation of many new firms, products, and services, it affects nearly all markets of the economy. This crucial role of entrepreneurship leads researchers to focus on the determinants of self-employment. Creation of new organizations by entrepreneurs depends on a lot of parameters like personal characteristics, or existing conditions.

Much of the research has focused on the roles of individual characteristics like age, education, and gender in the prediction of entrepreneurial activity. These individual characteristics affect not only the likelihood of becoming self-employed, but also personal income which, in turn, is also related to the likelihood of becoming self-employed. The literature shows that incomes of wage-earners and self-employed individuals are not the same. For example, Hamilton (2000), finds that the median of three distinct measures of self-employment earnings reported in the 1984 Survey of Income and Program Participation (SIPP) were lower than wages, while their variance was greater.[1]

The standard explanation for this result is that self-employment earnings and wages respond differently to variations in ability. Braguinsky & Ohyama (2008) and Astebro, Chen & Thompson (2008), have independently constructed models of employment choice in which the return to ability is convex among the self-employed and linear among wage earners. This induces individuals in the tails of the ability distribution to choose self-employment over wage work. Their models are consistent at the upper end of the earning distribution with the economics of superstars (Rosen, 1981), and at the lower end with Min's (1984) claim that lower end of the earnings distribution is populated by "misfits" who cannot work well with others.

Variations in returns to ability can explain the static distributions of self-employment earnings and wages, but they do not offer a clear explanation of how people enter into self-employment. Instead,

transitions have been explained in the contexts of opportunity and necessity entrepreneurship. Block and Wagner (2006) define opportunity entrepreneurs as individuals who start a business in order to pursue an opportunity, and necessity entrepreneurs as individuals who are driven into self-employment because of limited opportunity in the wage sector. Because the former are attracted into self-employment by the identification of opportunities, it is likely that they are more likely to found new firms when economic conditions are good. In contrast, necessity entrepreneurs are often driven into self-employment after becoming involuntarily unemployed, so they are likely to be more common in periods of rising and high unemployment.

This paper links these two disparate lines of inquiry – variations in ability and the distinction between necessity and opportunity entrepreneurs – by analyzing the effect of variations in the local unemployment rate on the propensity to enter self-employment for individuals of differing ability. Opportunity entrepreneurs tend to have high levels of creativity and personal ability and, as a result tend to be located in the upper end of the earnings distribution, both before and after entering self-employment. As a result, we expect that high-ability individuals are more likely to enter self-employment when local unemployment rates are low. Necessity entrepreneurs, on the other hand, see no better alternative of earning money than becoming self-employed. These people are not generally creative and are often low-ability employees. Consequently, we expect that high local unemployment rates stimulate entry into self-employment among individuals with low ability.

These hypotheses are tested using observations on a large sample of individuals in the PSID, matched in each year to the unemployment rate prevailing in the state of residence. Two panels are constructed, for the periods 1978-1983 and 1993-1995; the latter, shorter, panel is included because I will need to control for employer size in a number of regressions that follow.

Since the likelihood of opportunity and necessity entrepreneurship is related to personal ability, I construct an indicator for innate ability from the residuals obtained in a regression of earnings on age, gender, education, work experience, industry, occupation, and state of residence (cf. Behrman and Rosenzweig, 1999). Individuals are placed in five ability groups, denoted by A1 through A5, with A1 representing the lowest ability group. These are not quintiles. Groups A1, A2, and A3 each account for 25 percent of the observations, A4 accounts for the next fifteen percent, and A5 represents the highest ten percent.

The main analysis consist of logistic regressions examining how the probability of transitioning from wage employment into self-employment is affected by the local unemployment rate, estimated ability, and interactions between ability and local unemployment. My hypothesis is that the coefficient(s) on the interaction between ability and unemployment will be positive among the low ability group(s), and negative for the high ability group(s). The key results are as follows. For the 1978-1983 sample, the probability of becoming self-employed is on average increasing in the local unemployment rate. However, when effects are allowed to vary by ability group, local unemployment stimulates entry into self-employment for groups A1 through A4, but not for the most able individuals, in group A5. These results are robust to the inclusion of controls for age, gender, education, and work experience. Qualitatively similar, but statistically insignificant results, are obtained for the 1993-1995 sample; the lack of statistical significance may be due to the modest sample size resulting from only having two years of transitions. Because of this reduced sample size, I reduce demands on the data by merging ability groups A1 through A4. While the point estimates continue to indicate that local unemployment stimulates entry into self-employment for the low-ability group but not for high-ability group, these results remain statistically insignificant.

The results that have been obtained may be due to the omission of controls for firm size. We know that employees of small firms are far more likely to become self-employed than are employees of larger firms (e.g., Elfenbeim, Hamilton, and Zenger, 2008). We also know that employment in small firms is more volatile and susceptible to negative economic shocks (Davis and Haltiwanger, 1992; Davis et al., 1996; Rob, 1995), and that residual earnings are increasing in employer size (Abowd et al., 1999; Brown and Medoff, 1989; Acs, 1999). Thus, the way that ability appears to mediate the effect of unemployment on entry into self-employment may be the result of employer size rather than ability.

Only the later of the two PSID samples contains information about employer size. Therefore, the 1993-1995 sample is used to test the role of employer size on the previous results.

I first evaluate the effect of firm size without considering unemployment levels. Consistent with the literature, I find that prior employment in a small firm dramatically enhances the probability of entering into self-employment. However, interacting an indicator for small firm size with ability, I find that employment in a small firm stimulates self-employment only for individuals in groups A1 and A2 (i.e. those with ability below the 50th percentile).

The results do not indicate any relationship between the probability of becoming self-employed and employment in a small firm for high-ability individuals. This result contrasts with the findings of Elfenbeim, Hamilton, and Zenger (2008), who found a sizeable small-firm effect at the upper end of the ability distribution. Finally, I control jointly for a small firm effect and the local unemployment rate in regressions run separately by ability group.

Despite the modest sample sizes, the results are surprisingly sharp. For ability groups A1 and A2, employment in small firms raises the probability of entry into self-employment while variations in the local unemployment rate have no effect. In contrast, there is no small firm effect among ability groups A3 through A5, but increases in the local unemployment rate reduce the likelihood of entry into self-employment. As a result, I find no robust evidence that necessity entrepreneurship is stimulated by increases in local unemployment rates, but I do find evidence that opportunity entrepreneurship is stifled by high unemployment.

This paper is organized as follows: The second part describes data and methods used, the third part presents results, and the last part concludes.

DATA AND METHODS

I use two-year panel data constructed from the Panel Study of Income Dynamics (PSID) and local unemployment rates at the state level [2]. My data contain 32,335 individuals in years 1978-1983 and 1993-1995. I add state unemployment rates to the data. These two time periods are chosen because they have all information that I need for this study. The 1978-1983 sample is chosen first to study local unemployment effect. The 1993-1995 sample is added to the study due to the lack of firm size data in the first sample. Even though the 1993-1995 sample is small relative to the first one, it enables me to control for both local unemployment and small firm effects simultaneously. I use household heads in both samples because they are family members about whom the greatest amount of information is available. Since my purpose in this paper is to estimate the impacts of some existing personal characteristics and conditions on the probability of becoming self-employed, there are both wage-earners and self-employed individuals in my samples. Incomes of wage-earners and self-employed people are not the same. Summary statistics of annual total labor income for wage-earners and self-employed individuals for different years are given in Table 1. The distributions of annual labor incomes of household heads for both wage-earners and self-employed can be seen in Figure-1 and Figure-2 for two samples.

TABLE 1
SUMMARY STATISTICS OF ANNUAL TOTAL LABOR INCOME FOR WAGE-EARNERS AND SELF-EMPLOYED PEOPLE FOR DIFFERENT YEARS

	1978-1983		1993-1995	
	Wage-Earners	Self-Employed	Wage-Earners	Self-Employed
Mean	15,770	19,334	22,543	37,435
Std. Dev.	10,452	20,304	24,067	58,748
25th Percentile	7,140	6,419	10,568	9,891
50th Percentile	13,713	13,160	25,858	29,288
75th Percentile	17,660	18,040	33,015	40,533
90th Percentile	21,747	24,751	40,147	51,425
100th Percentile	32,552	42,946	55,316	66,559
Observations	22,752	3,220	5,471	664

FIGURE 1
DISTRIBUTIONS OF INCOME FOR WAGE-EARNERS AND SELF-EMPLOYED; 1978-1983

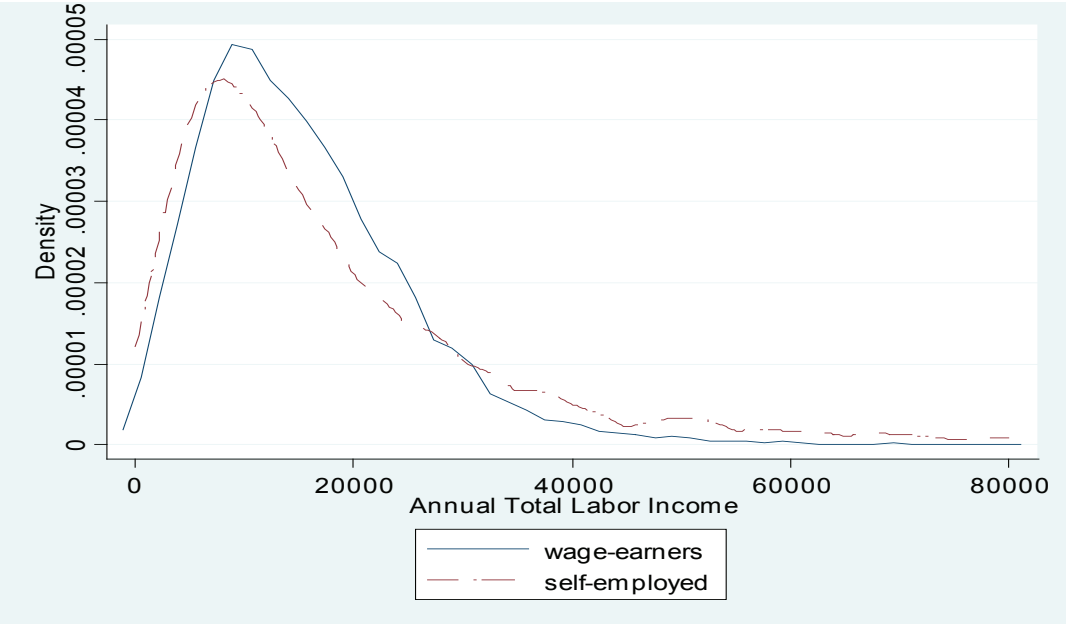
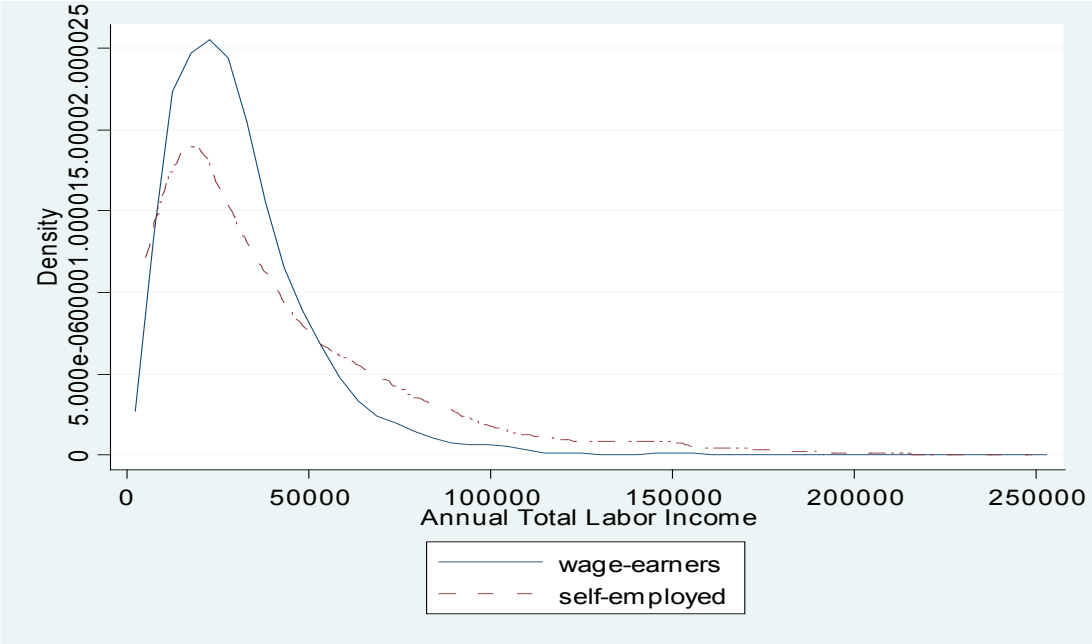


FIGURE 2
DISTRIBUTIONS OF INCOME FOR WAGE-EARNERS AND SELF-EMPLOYED; 1993-1995



The previous graphs and table show that mean incomes of self-employed people are greater than those of wage-earners for both 1978-1983 and 1993-1995 samples. The same is also true for the variances. That is, variances of incomes for self-employed individuals are larger than those for wage-earners. Incomes of self-employed individuals are lower than those of wage-earners at the 25th percentile and higher at the 90th percentile for the period of 1978-1983. Similarly, incomes of self-employed individuals are lower than those of wage-earners at the 25th percentile and higher at the 75th percentile for the period of 1993-1995.

Total labor income of individuals depends on individual characteristics like age, gender, education, work experience, industry, occupation, state of residence, and personal ability. We can measure age, gender, education, work experience, industry, occupation, and state of residence but we cannot measure personal ability level directly. There are two ways of measuring ability used in literature. The first, which is used by Elfenbeim, Hamilton, and Zenger (2008) holds the education level constant. They construct a percentile rank in the skill distribution separately for people having the same highest degree. They measure relative ability as the position of a given individual within the pay distribution in a given year among individuals with the same highest degree. This method seems logical because we observe large income differences among people having identical observable human capital. However, this method ignores the impacts of work experience, age, gender, and state of residence on personal labor income. These additional characteristics can also create large differences in labor income. The one with more work experience can earn more than others although all have identical highest degrees. Similarly, earnings of a person can be different in two different cities even for people with same job.

The second way of measuring personal ability is to use residual income as a proxy. Juhn, Murphy, and Pierce (1993) use this method to determine ability levels of individuals and therefore their relative positions in the skill distribution. This is a more logical way of measuring ability level. It controls for the effects of age, gender, and education level on personal labor income and uses the residual as a measure of ability. As Behrman and Rosenzweig (1999) indicate, ability has been used as the rubric for all unmeasured earnings endowments, which may include genetic endowments of ability, preschool human capital, or motivation.

I also use residual income in this study as a proxy to determine the position of an individual in the skill distribution. Unexplained incomes used in this paper are residuals from a regression of the logarithm of

income on some observable individual variables. These variables are occupation, industry, state of residence, age, gender, education level, and work experience. A general form of the wage regression is given below.

$$\text{Ln(income)}_{i,t} = \alpha_0 + \alpha_1 X_i + \alpha_2 Y_{i,t} + \varepsilon_{i,t} \quad (1)$$

where the vector X_i represents a set of time-invariant individual characteristics, and the vector $Y_{i,t}$ represents a set of time-varying individual characteristics of person-i in year-t. Since relevant literature indicates that regression of wage on education is biased, I used Heckman two-step correction to obtain unbiased parameters. Since likelihood of working in other words likelihood of wage being observed is a function of marital status and the number of children at home, they are used in the selection equation in addition to the other variables.

TABLE 2
LABOR INCOME REGRESSIONS FOR BOTH SAMPLES

	1978-1983	1993-1995
Constant	7.9309 (0.1290)	7.5821 (0.7840)
Age	0.0018** (0.0015)	0.0049** (0.0023)
Gender	0.5683*** (0.0123)	0.5749*** (0.0360)
Education	0.0580*** (0.0016)	0.0614*** (0.0071)
Work Experience	0.0107*** (0.0007)	0.0089*** (0.0031)
Lambda	- 0.3412*** (0.0261)	- 0.2013*** (0.0124)
R^2	0.3450	0.2408
Number of Observations	26,200	6,135

Standard Errors are reported in parentheses. Regressions include 8 occupation, 10 industry, and 51 state of residence dummies. ***Significant at 1 % level; **Significant at 5 % level; *Significant at 10 % level

Table 2 presents estimates of the wage regressions for both samples, which includes 8 occupation, 10 industry, and the 51 state of residence dummy variables in addition to age, gender, education, and work experience explanatory variables in the wage regressions. The results indicate that education raises earnings, work experience induces higher incomes, and males earn more than females. These are all familiar and unsurprising results. The lambda terms are negative and statistically significant. That is, the error terms in the selection and primary equations are negatively correlated for both samples. Thus, unobserved factors that make participation more likely tend to be associated with lower wages.

Summary statistics of residual income for wage-earners and self-employed individuals for different years are given in Table 3. Table 3, and Figures 3 and 4, show that mean residual income for self-employed people is smaller than that for wage-earners. However, the variance of unexplained income for self-employed people is larger. Unexplained income of self-employed individuals is lower than that of

wage-earners at the 25th percentile and higher above the 90th percentile for both periods 1978-1983 and 1993-1995.

TABLE 3
SUMMARY STATISTICS OF UNEXPLAINED INCOMES

	1978-1983		1993-1995	
	Wage-Earners	Self-Employed	Wage-Earners	Self-Employed
Mean	0.015	- 0.121	0.0031	- 0.021
Std. Dev.	0.598	0.852	0.890	1.217
25th Percentile	-0.812	-0.853	-1.229	-1.202
50th Percentile	-0.062	-0.068	-0.034	-0.045
75th Percentile	0.204	0.259	0.430	0.326
90th Percentile	0.515	0.604	0.651	0.593
100th Percentile	0.876	1.037	1.287	1.449
Observations	22,752	3,220	4,312	603

As mentioned in the introduction, I use five ability groups to classify individuals in my samples according to their positions in the skill distribution. People at the first 25th percentile of the skill distribution are in A1. Since they are at the lowest end, they are called low-ability people in this paper. People at the high end of the skill distribution are classified as high-ability people. They constitute the top 10 % of the skill distribution. People in between these two ends are also divided into three additional groups as A2, A3, and A4. Groups A2 and A3 contain the second and the third quantiles of the skill distribution, respectively. People in A4 constitute the fifteen percent of the skill distribution above those in A3.

FIGURE 3
DISTRIBUTIONS OF UNEXPLAINED INCOME FOR WAGE-EARNERS AND SELF-EMPLOYED; 1978-1983

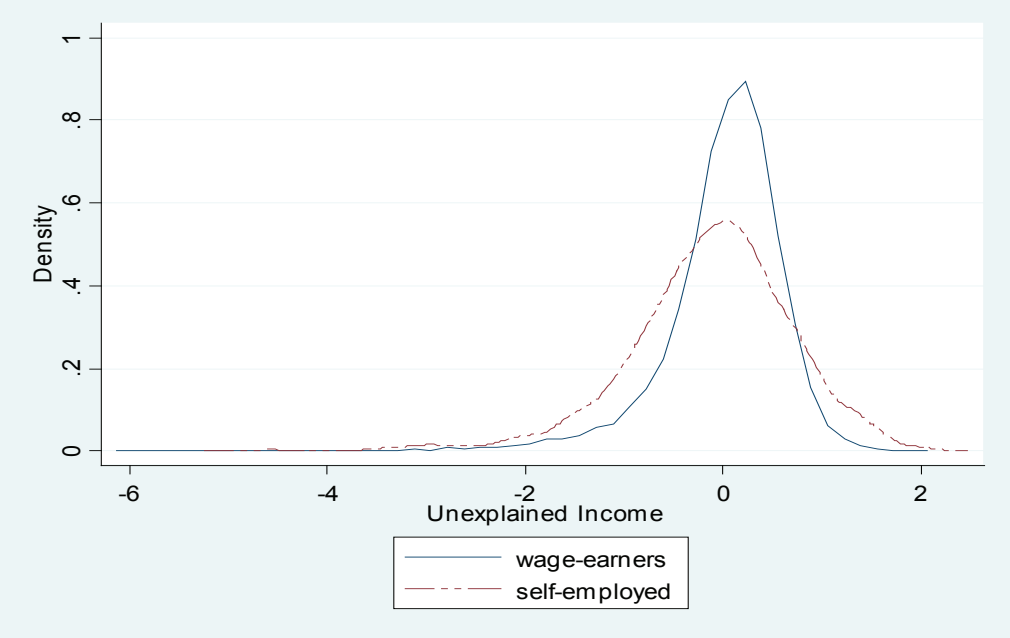


FIGURE 4
DISTRIBUTIONS OF UNEXPLAINED INCOME FOR WAGE-EARNERS AND SELF-EMPLOYED; 1993-1995

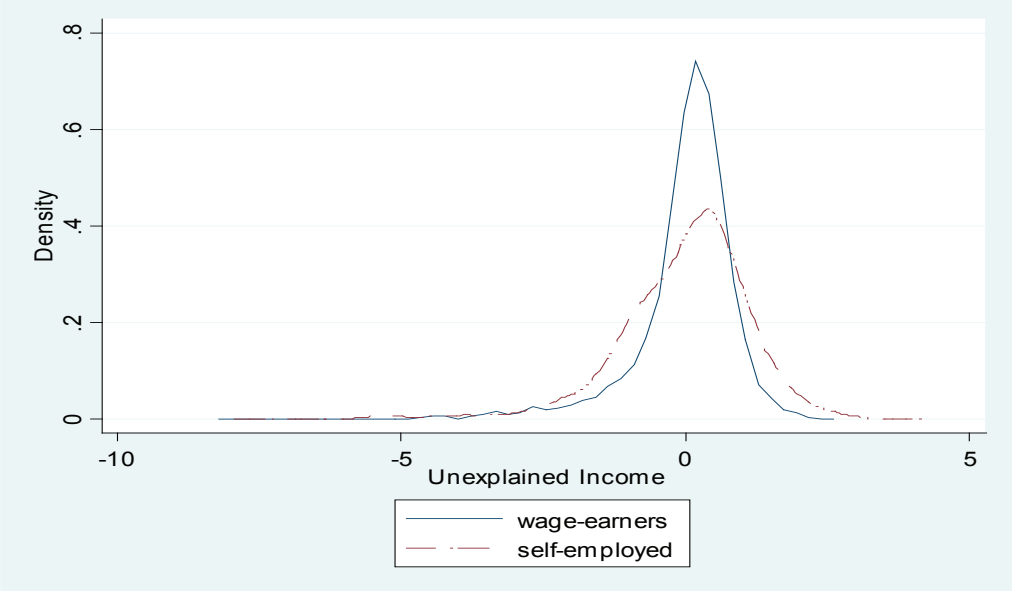
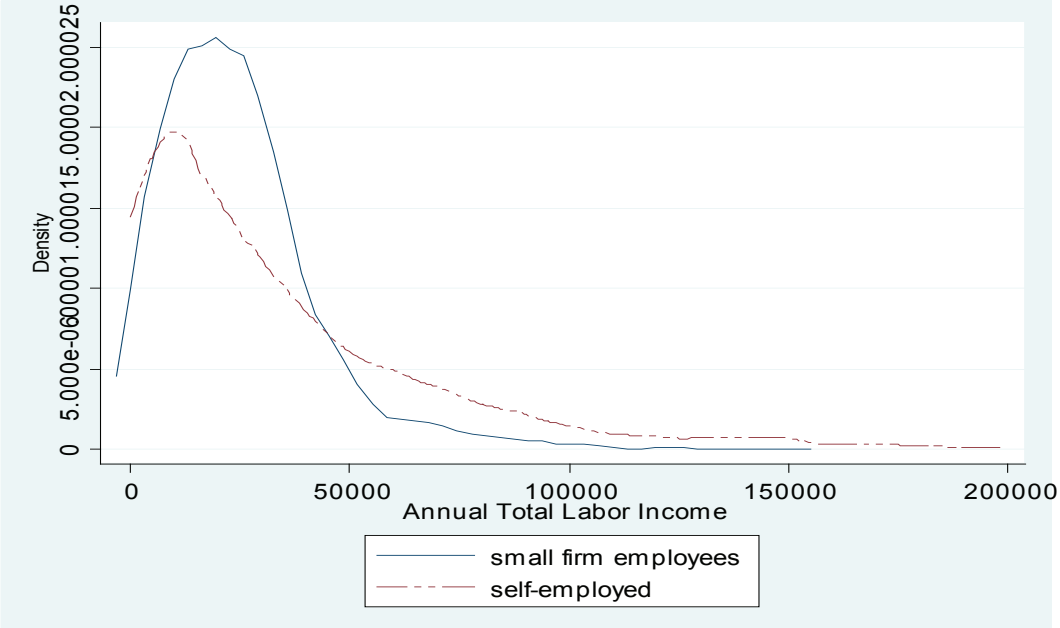


TABLE 4
SUMMARY STATISTICS OF ANNUAL TOTAL LABOR INCOME FOR SMALL FIRM EMPLOYEES AND SELF-EMPLOYED INDIVIDUALS

	1993-1995		
	Small Firm Employees	Large Firm Employees	Self-Employed
Mean	24,456	31,795	37,435
Std. Dev.	17,936	33,818	58,748
25th Percentile	11,264	10,186	9,891
50th Percentile	21,950	27,501	29,288
75th Percentile	29,779	34,681	40,533
90th Percentile	35,280	43,259	51,425
100th Percentile	40,378	66,522	66,559
Observations	1,127	3,735	664

FIGURE 5
DISTRIBUTIONS OF ANNUAL TOTAL LABOR INCOME FOR SMALL FIRM EMPLOYEES AND SELF-EMPLOYED INDIVIDUALS; 1993-1995



Since this paper analyses the effect of the local unemployment rate on the likelihood of entrepreneurship, unemployment rates of U.S states are added to the data sets. The local unemployment effect is tested for the two samples with and without considering ability levels of individuals. The results of these tests are presented in the following section. In order to check the robustness of these results, I further control for firm size. The PSID contains information about number of employees in last firm an individual worked in. I define a small firm as the one with fewer than 25 employees. The only constraint is that information about the size of the previous employer is available only for the period of 1993-1995. Thus, this period's data is used to control for firm size.

Total labor incomes of small firm employees and self-employed people are not the same. Figure-5 plots their distributions. Summary statistics of annual total labor incomes for small-firm employees, large firm employees, and self-employed individuals are given in Table 4. Figure 5 and Table 4 indicate that mean income of small-firm employees is less than that of self-employed people, while the variance of incomes for self-employed individuals is larger than that for small-firm employees. Incomes of self-employed individuals are lower than those of wage-earners only at the 25^{th} percentile. When we compare incomes of three groups presented in Table 4, we observe that large firm employees earner more than small firm employees, whereas they earn less than self-employed individuals. Incomes of small firm employees are greater than those of large firm workers only at the 25^{th} percentile.

I use year-pairs in my logistic regressions because my aim is to estimate the probability of entry into self-employment from paid-work in the second year by considering individual characteristics and conditions given in the first year. Three main forms of my logistic regressions are given in equations (2), (3), and (4). The dependent variable in each specification is equal to one if person-i is self-employed in the current year and zero otherwise given that he/she was a wage-earner in the previous year. Analogous to specification (1), X_i and $Y_{i,t}$ are two vectors used to test the impacts of individual characteristics on the likelihood of entry into self-employment in all regressions. While the vector X_i represents a set of time-invariant individual characteristics, the vector $Y_{i,t}$ represents a set of time-variant individual characteristics of person-i in year-t.

$$PR(SEL_{i,t+1} = 1 \mid SEL_{i,t} = 0) = \beta_0 + \beta_1 X_i + \beta_2 Y_{i,t} + \beta_3 LU_{i,t} + \varepsilon_{i,t+1} \quad (2)$$

where $LU_{i,t.}$ is a vector consisting of the unemployment rate in year-t of the state of residence of individual-i, and interactions of the unemployment rate with ability. The effect of firm size is tested with the specification

$$PR(SEL_{i,t+1} = 1 \mid SEL_{i,t} = 0) = \theta_0 + \theta_1 X_i + \theta_2 Y_{i,t} + \theta_3 SF_{i,t} + \varepsilon_{i,t+1} \quad (3)$$

where $SF_{i,t}$ is a vector consisting of a dummy equal to one if the employer in period-t had lower than 25 employees, and again an interaction with ability. Finally, I simultaneously control for unemployment and firm size with the specification

$$PR(SEL_{i,t+1} = 1 \mid SEL_{i,t} = 0) = \gamma_0 + \gamma_1 X_i + \gamma_2 Y_{i,t} + \gamma_3 L_{i,t} + \gamma_4 S_{i,t} + \varepsilon_{i,t+1} \quad (4)$$

The variables $L_{i,t}$ and $S_{i,t}$ represent U.S local unemployment rates and prior employer's size. This regression is run for each ability group separately, so there are no interaction terms.

RESULTS

The tables in this section exhibit results for critical explanatory variables. Estimates for occupation, industry, and state of residence variables are not reported because they are not in the main theme of this paper. Estimated marginal effects for the first two logistic regressions are given in Table 5 for 1978-1983, and Table 6 for 1993-1995.

Table 5 provides logistic regression results for the period 1978-1983. Both regressions include age, gender, education, and work experience as independent variables. Results are very similar for these variables in both models. Age and education are positively correlated with probability of becoming self-employed, while men are more likely to become self-employed than women. There is also a positive correlation between work experience and the probability of entering self-employment, but this correlation is statistically insignificant.

The table also provides evidence about the effect of local unemployment rates on the likelihood of entrepreneurship. Column (1) indicates that local unemployment rates and the probability of entry into self-employment are positively correlated. Moreover, a high local unemployment rate is a strong significant predictor of entrepreneurship.

Column (2) displays results from a deeper examination about local unemployment effect by considering five ability groups. Consistent with earlier literature, I find a statistically significant positive correlation between local unemployment rates and the probability of becoming self-employed for people at the lower end of the skill distribution. In fact, the correlation between local unemployment rates and the likelihood of being an entrepreneur is positive and statistically significant for individuals in all ability groups except A5. In other words, high local unemployment rates are strong predictors of entry into entrepreneurship for all but the most able individuals.

Consistent with the literature, I was expecting a negative correlation between local unemployment rates and the probability of entry into self-employment for workers at highest end of the skill distribution. Surprisingly, the estimates reveal no correlation between them in A5.

Table 6 repeats results from the second sample. The effects of age, gender, education, and work experience are similar to those found in the first sample.[3] Column (1) of Table 6 shows that local unemployment rates have a positive, but statically insignificant, influence on the transition of workers into self-employment.

Estimates for interaction terms between local unemployment rates and the five ability groups are similar for the two samples, except for A4 and A5. That is, lower-ability individuals in A1, A2, and A3 are more likely to be self-employed when local unemployment rates are high. However, the point estimates ones for the second sample are statistically insignificant. There is no correlation between local unemployment rates and probability of self-employment for individuals in A4, suggesting that this group is not affected by local unemployment in their entrepreneurial decisions. Also contrary to the first sample, local unemployment rates and the probability of transition into self-employment are negatively correlated for people in A5, although these results are statically insignificant.

The insignificant results in the second sample may be due to its smaller size. The first sample has six years of data, while the second sample has only has only two years. I reduce demands on data in the second sample by dividing individuals into just two ability groups: L.Group and H.Group. L.group includes individuals having ability levels up to the 90th percentile of the skill distribution, while H.group includes individuals in the top 10 percent. Table 7 reports outcomes of the same analysis done before by using these two new ability groups. Unfortunately, this combination of ability groups did not resolve the insignificance problems.

TABLE 5
PROBABILITY OF BECOMING SELF-EMPLOYED, 1978-1983, (MARGINAL EFFECTS)

Dependent variable = 1 if self-employed in current year, 0 otherwise.		
	(1)	**(2)**
Age	0.0005** (0.0002)	0.0003* (0.0002)
Gender	0.0302*** (0.0037)	0.0297*** (0.0034)
Education	0.0010** (0.0004)	0.0011*** (0.0004)
Work Experience	0.0001 (0.0002)	0.0001 (0.0002)
Local Unemployment Rates	0.0031*** (0.0008)	- 0.0001 (0.0013)
A1	----	0.0459*** (0.0110)
A2	----	0.0091 (0.0119)
A3	----	- 0.0084 (0.0122)
A4	----	Dropped
A5	----	0.0586*** (0.0127)
Local Unemployment Rates-A1	----	0.0025* (0.0013)
Local Unemployment Rates-A2	----	0.0041*** (0.0014)
Local Unemployment Rates-A3	----	0.0052*** (0.0015)
Local Unemployment Rates- A4	----	0.0049*** (0.0016)
Local Unemployment Rates-A5	----	Dropped
Pseudo R^2	0.0838	0.1070
Number of Observations	22,848	22,848

Standard Errors are reported in parentheses. ***Significant at 1 % level; **Significant at 5 % level; *Significant at 10 % level.

TABLE 6
PROBABILITY OF BECOMING SELF-EMPLOYED, 1993-1995 (MARGINAL EFFECTS)

Dependent variable = 1 if self-employed in current year, 0 otherwise.		
	(1)	**(2)**
Age	- 0.0005 (0.0004)	- 0.0009*** (0.0003)
Gender	0.0071 (0.0064)	0.0063 (0.005)
Education	0.0040*** (0.0012)	0.0028*** (0.0009)
Work Experience	0.0011** (0.0005)	0.0008** (0.0003)
Local Unemployment Rates	0.0007 (0.0076)	- 0.0051 (0.0063)
A1	----	Dropped
A2	----	0.0045 (0.0341)
A3	----	0.0038 (0.0292)
A4	----	0.0354 (0.0299)
A5	----	0.0260 (0.0279)
Local Unemployment Rates-A1	----	0.0050 (0.0043)
Local Unemployment Rates-A2	----	0.0006 (0.0053)
Local Unemployment Rates-A3	----	0.0031 (0.0046)
Local Unemployment Rates-A4	----	Dropped
Local Unemployment Rates-A5	----	- 0.0005 (0.0044)
Pseudo R^2	0.0804	0.0782
Number of Observations	4,187	5,375

Standard Errors are reported in parentheses. ***Significant at 1 % level; **Significant at 5 % level; *Significant at 10 % level.

TABLE 7
PROBABILITIES OF BECOMING SELF-EMPLOYED, 1993-1995(MARGINAL EFFECTS)

Dependent variable = 1 if self-employed in current year, 0 otherwise.

	(1)	(2)
Age	- 0.0005 (0.0004)	- 0.0009*** (0.0003)
Gender	0.0071 (0.0064)	0.0055 (0.0052)
Education	0.0040*** (0.0012)	0.0030*** (0.0009)
Work Experience	0.0011** (0.0005)	0.0009** (0.0003)
Local Unemployment Rates	0.0007 (0.0076)	- 0.0063 (0.0065)
L.Group (bottom 90%)	----	Dropped
H.Group (top 10%)	----	0.0166 (0.0244)
Local Unemployment Rates-L.Group	----	0.0034 (0.0034)
Local Unemployment Rates-H.Group	----	Dropped
Pseudo R^2	0.0804	0.0657
Number of Observations	4,187	5,375

Standard Errors are reported in parentheses. ***Significant at 1 % level; **Significant at 5 % level; *Significant at 10 % level.

The results so far suggest that local unemployment influences transitions of low-ability individuals into self-employment but has no impact for the most able people. These results may change if firm size is also controlled for in the regressions. We know that size of prior employer also affects self-employment transitions of wage-earners significantly. Elfenbeim, Hamilton, and Zenger (2008) prove that prior employment in small firms increases the likelihood of self-employment than prior employment in larger firms. In particular, this implication is valid for workers having positions at the lower and the upper tails of the skill distribution. In addition, we know that employment volatility is inversely related to firm size (Davis and Haltiwanger, 1992; Davis et al., 1996; Rob, 1995). As shown by Robbins, Pantuosco, Parker, and Fuller (2000), large numbers of new jobs are created by small firms [4]. However, these jobs tend to be less permanent than those created by large firms (Davis and Haltiwanger, 1992; Davis et al., 1996; Rob, 1995). Moreover, we also know that employer size and wage rates are positively correlated. That is, individuals having higher residual earnings are hired by large firms (Abowd et al., 1999; Brown and Medoff, 1989; Acs, 1999). This means that high-ability people are working for large firms rather than small firms. Consequently, we can infer that low-ability workers are hired by local small firms. Thus, low-ability individuals who are affected significantly from high local unemployment in their self-employment transitions are also more likely to be employees of small firms.

TABLE 8
PROBABILITIES OF BECOMING SELF-EMPLOYED, 1993-1995
(MARGINAL EFFECTS)

Dependent variable = 1 if self-employed in current year, 0 otherwise.		
	(1)	**(2)**
Age	- 0.0009*** (0.0003)	- 0.0005 (0.0003)
Gender	0.0051 (0.0051)	0.0081 (0.0055)
Education	0.0031*** (0.0009)	0.0036*** (0.0010)
Work Experience	0.0009** (0.0003)	0.0009** (0.0004)
Small-Firm	0.0175*** (0.00473)	- 0.0146 (0.0157)
A1	----	- 0.0177 (0.0109)
A2	----	- 0.0544*** (0.0116)
A3	----	- 0.0138* (0.0082)
A4	----	0.0005 (0.0078)
A5	----	Dropped
Small Firm Employees in A1	----	0.0399** (0.0173)
Small Firm Employees in A2	----	0.0657*** (0.0188)
Small Firm Employees in A3	----	0.0241 (0.0178)
Small Firm Employees in A4	----	0.0074 (0.0185)
Small Firm Employees in A5	----	Dropped
Pseudo R^2	0.0722	0.1152
Number of Observations	5,375	4,187

Standard Errors are reported in parentheses. ***Significant at 1 % level; **Significant at 5 % level; *Significant at 10 % level.

Therefore, the observed positive correlation between local unemployment rates and likelihood of entrepreneurship for low-skilled workers may be due to a small firm effect. This possibility leads me to check robustness of my results by controlling for firm size. For this purpose, I first analyze the role of prior employment in small firms in self-employment transitions of wage-earners at various skill levels (Table 8). Then, I test both the local unemployment effect and the small firm effect simultaneously for each ability group (Table 9). Only one sample, 1993-1995, is used for this analysis because the other one, 1978-1983, does not have firm size data.

Effects of personal characteristics like age, gender, education, and work experience are again controlled for in the logistic regressions presented in Table 8.[5] The dummy variable Small-Firm identifies prior employment in small firms. The estimate associated with this variable indicates that prior employees of small firms are, on average, more likely to be self-employed. This outcome is consistent with the literature.

In order to analyze the small firm effect in more detail, I add in column (2) of Table 8 interaction terms that allow for separate small firm effects in each ability group. Employees of small firms in A1 and A2 are more likely to be entrepreneurs. Moreover, associated marginal effects are statistically significant at 5% and 1% levels for those in A1 and A2, respectively. Therefore, prior employment in small firms is a strong predictor of self-employment for individuals in lower ability groups. Although workers in A3 and A4 show the same positive correlation between the probability of entering self-employment and employment in small firms, the coefficients are all statistically insignificant.

Entry into self-employment does not depend on prior employment in local small firms in group A5. This result contrasts with the findings of Elfenbeim, Hamilton, and Zenger (2008). They found that those entering into self-employment from small firms are drawn from both the upper and the lower tails of the skill distribution, and the association is much stronger for those from the upper tail of the distribution. My findings, however, indicate that those entering into self-employment from small firms are drawn from the lower tail of the skill distribution, and the association is stronger for individuals in A2 than the ones in A1.

A logistic regression model is run for each ability group separately. Explanatory variables representing personal characteristics, prior employment in small firms, and local unemployment rates are included. The associated estimates are displayed in Table 9.[6] Since I control for both local unemployment and small firm effects for each ability group in the last analysis, I can observe relative strengths of these effects at each ability level.

Column (1) uses the full sample. Small firm employment raises the likelihood of transition into self-employment. The estimated marginal effect is statistically significant at the 1% level. Therefore, it can be inferred that prior employment in small firms is a strong predictor of self-employment. Local unemployment has no significant effect on the probability of entry into self-employment. These results hold for the sub-samples A1 and A2 as indicated by columns (2) and (3). This indicates that local unemployment is not a condition forcing low-ability workers into necessity entrepreneurship. The small firm effect is much stronger for them. Thus, it can be said that previously observed positive correlations between local unemployment rates and probability of being self-employed for low-skilled individuals are mostly due to the small firm effect.

On the other hand, prior employment in small firms has no influence on the likelihood of self-employment for workers in A3, A4, and A5. That is, there is no small firm effect for high-ability people constituting the upper 50 % of the skill distribution. However, these highly-skilled individuals are less likely to be entrepreneurs when local unemployment rates are high. In other words, opportunity entrepreneurship is affected negatively by high local unemployment. Associated significance levels, 5 % for A3 and 1 % for other two groups, point out that these results are strong although sample size is moderate. In fact, it is the strongest for the top 25 % of the skill distribution. Since it is consistent with the literature, this outcome is as expected. It suggests that opportunity entrepreneurs postpone or cancel their self-employment plans when there are high unemployment rates indicating a bad economic situation.

TABLE 9
PROBABILITY OF BECOMING SELF-EMPLOYED, 1993-1995
(MARGINAL EFFECTS)

Dependent variable = 1 if self-employed in current year, 0 otherwise.						
	Subsamples by Ability Groups					
	Full SampleA1	A2	A3	A4	A5	
Age	- 0.0004 (0.0004)	- 0.0006 (0.0013)	0.0006 (0.0005)	- 0.0032** (0.0012)	- 0.0003 (0.0014)	- 0.0013*** (0.0004)
Gender	0.0059 (0.0063)	0.0052 (0.0193)	- 0.0015 (0.0090)	- 0.0013 (0.0150)	0.0462** (0.0234)	0.0149* (0.0089)
Education	0.0040*** (0.0012)	0.0076* (0.0041)	0.0019 (0.0020)	0.0065** (0.0032)	0.0035 (0.0036)	0.0019 (0.0014)
Work Experience	0.0010** (0.0005)	0.0004 (0.0016)	- 0.0008 (0.0006)	0.0048*** (0.0014)	0.0014 (0.0015)	0.0005 (0.0005)
Unemployment rate	0.0017 (0.0074)	0.0004 (0.0097)	- 0.0038 (0.0037)	- 0.0138** (0.0067)	- 0.0253*** (0.0096)	- 0.0134*** (0.0043)
Pseudo R^2	0.0877	0.1309	0.2636	0.1780	0.2357	0.1526
Number of Observations	4,187	723	563	715	451	1,108

Standard Errors are reported in parentheses. ***Significant at 1 % level; **Significant at 5 % level; *Significant at 10 % level.

CONCLUSION

This paper presents results exploring the existence of a local unemployment effect on entry into self-employment. Initially, I showed that the probability of entry into self-employment is increasing in the local unemployment rate. Moreover, the correlation between local unemployment rates and the probability of entry into self-employment was found to be positive for all but the top 10 % of the skill distribution. For the top 10 % of the skill distribution, there is no correlation between them. These results for low-ability workers are consistent with the theory of necessity entrepreneurship. The literature indicates that individuals with lower ability levels become necessity entrepreneurs because they are forced into entrepreneurship by some external factors. From the estimates presented in this paper, high local unemployment appears one of these external factors. The literature suggests that high-ability people are more likely to be opportunity entrepreneurs, and I conjectured that they could be discouraged by high local unemployment. The initial results provided no support for this conjecture. The initial results may be confounded by the absence of a control for firm size.

Low-ability individuals are more likely to be employees of small firms, prior employment in small firms increases the likelihood of entrepreneurship, and small firms are more sensitive to the economic fluctuations that cause changes in unemployment rates. Therefore, the observed positive correlation

between local unemployment rates and the probability of self-employment for low-skilled workers may be due to small firm effect. In order to explore this possibility, I checked the robustness of my results by controlling for employment in small firms. Analysis of the small firm effect shows that prior employment in small firms, on average, increases the probability of entry into self-employment. This inference is consistent with the literature. When this effect is tested by considering different skill levels of people, it is observed that prior employment in small firms is positively correlated with the likelihood of self-employment for workers in the first four ability groups, although estimates for A3 and A4 are statistically insignificant. For high-ability individuals, however, there is no correlation between the probability of self-employment and employment in small firms. Thus, my findings are consistent with the earlier literature only for low-skilled workers. Last, I test the local unemployment effect and small firm effect simultaneously for each ability group. The results are highly significant despite the moderate sample size. While prior employment in small firms increases the likelihood of self-employment significantly, local unemployment rates have almost no effect for low-ability workers in A1 and A2. This means that high unemployment is not one of the factors forcing these low-skilled workers into necessity entrepreneurship. The small firm effect has a greater impact on their self-employment transitions than local unemployment effect. In contrast, these results are not valid for more skilled individuals in A3, A4 and A5. The estimates show that prior employment in small firms has no influence on the probability of becoming self-employed for them. Instead, their likelihood of entrepreneurship is affected significantly by high local unemployment. Moreover, it is consistent with the literature that this impact is negative. Thus, high-ability workers in A3, A4, and A5 are less likely to be self-employed when local unemployment rates are high. That is, opportunity entrepreneurship is reduced by high unemployment.

ENDNOTES

1. Gort and Lee (2007), found that average earnings of self-employed respondents in the NSF Scientist and Engineers Statistical Data System (SESTAT), were *higher* than those of wage-earners. However, the SESTAT sample is biased towards high earners, where self-employed incomes are higher. On the other hand, they find that incomes of wage-earners are higher than those of self-employed individuals at the lower end of the distribution.
2. Source: U.S Bureau of Labor Statistics
3. Education and work experience are both positively correlated with the probability of self-employment. Estimates for them are statistically significant. Males are more likely to be self-employed than females but, the estimate is statistically insignificant.
4. In fact, their contributions to job creation are greater than those of large firms (Davis and Haltiwanger, 1992).
5. Estimates are statistically significant for age, education level, and work experience but insignificant for gender. While education and work experience are positively correlated with the likelihood of self-employment, age is negatively correlated. That is, more work experience and high education level are significant predictors of entrepreneurship.
6. Estimates imply that education and work experience are positively correlated with the probability of being self-employed for all individuals from all ability levels. Both high level of education and more work experience are statistically significant predictors of self-employment however significance level of education is greater than that of work experience. Males are more likely to be self-employed than females at all ability levels. Estimates for gender are statistically significant only for individuals in A4 and A5. While high education level is a significant predictor of self-employment for workers in A1 and A3, more work experience is a significant predictors of self-employment only for those in A3. Only significant estimates for age are the ones for people in A3 and A5. These two results show negative correlations between age and probability of entry into entrepreneurship. That is, individuals in A3 and A5 are more likely to be self-employed when they are younger.

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