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Abstract

Data from the NLSY show that more than a quarter of all younger men experience some period of self-employment. Many of them return to wage work. This paper analyzes a simple model of job search and self-employment where self-employment provides an alternative source of income for unemployed workers. Self-employment is distinct from wage sector employment in two important respects. First, self-employment is a low-income, low-variation alternative to wage work. Second, once a worker enters self-employment, he loses eligibility to receive unemployment insurance benefits—at least until he returns to wage sector employment. The model suggests that flows into self-employment are countercyclical and flows out of self-employment are procyclical. Data from the NLSY for males at least 21 years of age are used to investigate how demographic and economic variables influence the decision to become self-employed. Fixed effects and random effects logit results indicate that young men are more likely to be self-employed when their wage work opportunities are more limited. Specifically, higher local unemployment rates lead workers to self-select into self-employment, as does past unemployment experience. The process is different for Whites and Nonwhites with education being irrelevant for White self-employed workers. In contrast, for Nonwhites higher education reduces the probability of entering self-employment.

I. Introduction

There are two divergent views of the self-employed. The first perception, the one typically encountered in the literature, is one of the visionary or maverick in the mode of Bill Gates. He is an entrepreneur—an independent worker who accepts risk in return for a greater reward. His independent nature may add to his own valuation of self-employment. He may have some kind of ability or entrepreneurial capital that confers greater returns in self-employment than in wage work. His taste for risk may be different from others'. Alternatively, the self-employed may be a discouraged wage worker who finds his offered wages too low or his employment too sporadic in the wage sector. In other words, he chooses self-employment not because the value of self-employment is so high but because his value of wage work is so low.

Understanding which of these viewpoints is true is important. Frequently no distinction is made between the two with researchers and policy-makers alike arguing that the self-employed generate job growth, foment technological change, and promote upward mobility.¹ Entire institutions and various tax codes have been created to encourage entrepreneurship and further the benefits these entrepreneurs create. These alleged benefits may, in fact, be true for the entrepreneurs of the economy. However, for those self-employed who are discouraged wage workers, the benefits may not be as clear. For example, if self-employment is chosen because of a lack of opportunities in wage work, then supplementing self-employment through tax breaks and less restrictive lending standards may be an inferior way for workers to escape poverty. Increasing their human capital and implementing policies aimed at reducing the cost of job search may offer greater social rewards.

According to the household survey, in 2003 almost 7% of private nonagricultural workers were self-employed. Data collected by the U.S. Census Bureau also provides some evidence on the incidence of self-employment. The Census Bureau defines a nonemployer business as one that has no paid employees, has annual business receipts of \$1,000 or more (\$1 or more in the construction industries), and is subject to federal

¹ Hellwig and Irmen (2001) and Lerner (2002) examine small businesses and technological change. The notion that small businesses are responsible for a disproportionate share of job growth has been examined

income taxes. These nonemployers are typically self-employed individuals or partnerships operating businesses that they have not chosen to incorporate.² The number of workers self-employed in these nonemployer firms is large. In 2000, there were close to 16.5 million nonemployer businesses. At the same time, there were 134.4 million nonagricultural worker. Assuming these nonemployer businesses employ only the owner/proprietor, nonemployer businesses employed close to 12.3% of total nonagricultural employment.³

Most nonemployer businesses are very small. In 2000 nonemployers accounted for roughly 3% of business activity in terms of sales or receipts. At the same time nonemployers accounted for nearly ¾ths of all businesses.

Not only do most small businesses have few to no employees aside from the owner; they also require little in the way of start-up capital. Hurst and Lusardi (2002) find that close to 25% of small businesses were started with less than \$5,000. Furthermore, 61% of new business owners in 1994 had less than \$5000 of business equity. Similarly, Meyer (1990) finds that 63% of non-minority males and 78% of black business owners needed less than \$8,700 in 1996 dollars to start their business.

Examining how nonemployers are distributed across industries gives an idea of how important barriers to entry and start-up capital are to new businesses. This distribution is shown in Table 1 for NAICS sectors. These self-employed workers were concentrated in just a few industries. Professional, Scientific, & Technical Services had the largest number of nonemployer establishments with 15% of the total. The majority of these were concentrated in professional fields where education or certification acts as a barrier to entry. These include legal advice; accounting, bookkeeping, and payroll services; computer services; consulting services; research services; and other professional, scientific, and technical services.

and dismissed by Davis, Haltiwanger and Schuh (1996). Entrepreneurs have been shown to be more upwardly mobile than their wage worker counterparts in Bradford (2003) and Quadrini (2000)

² Self-employed owners of incorporated businesses typically pay themselves wages or salary, so that the business is an employer.

³ This is far more than the 7% figure obtained from the household survey for the self-employment rate. There are far more nonemployer firms than there are people reporting that they are self-employed. This can occur for several reasons. First, individuals may own more than one nonemployer firm. Additionally, an owner of a nonemployer firm may also have a job in the wage sector. In contrast, data from the household survey are based upon the respondent's reply and refers to their latest employment or the job on which they spend the most time.

Most of the remaining nonemployer firms are concentrated in industries or occupations having little in the way of barriers to entry. For example, 14% of all nonemployers are found in Other Services excluding public administration. These include repair and maintenance, and personal care services—fields that require little start-up capital. An additional 12% of nonemployer firms are found in Construction and ¾ths of these are special trade contractors involved in plumbing, heating, air-conditioning, painting and drywalling, electrical contractors, masonry, roofing, concrete contractors, and carpentry. It can be argued that most of these jobs require little in the way of costly equipment since the rental market is an available alternative so, again, barriers to entry are relatively low. Retail Trade accounts for 11% of all nonemployer firms. Almost half of these (45.4%) are concentrated in nonstore retailers and are direct selling establishments requiring little overhead. Finally, Real Estate and Rental Leasing account for 10% of nonemployer firms. These include real estate agents and brokers, and property managers. Again, these are firms that require little in the way of start-up capital and require little certification.

These simple data suggest that a large number of firms in the economy are owner-operated with no employees other than the owner, require little in the way of start-up capital, and have few barriers to entry. One obvious reason for their proliferation may be their low start-up costs. An alternative reason for the large number of nonemployer firms may be that these businesses are lucrative. Workers may be attracted to these proprietorships because they pay well relative to alternatives.

Some simple calculations put this notion in doubt. According to the U.S. Census Bureau, in 1997 there were 15.4 million nonemployer firms collecting an average receipt of \$37,970 before expenses. Even if 25% of total receipts were profit, average profit per nonemployer firm would be less than \$10,000 in 1997. This figure is probably understated with many businesses underreporting revenues to avoid taxes. On the other hand, in order to be included in the sample, the firm needed to record revenues of at least \$1000 (less for construction firms). This censoring leads to an over-estimate of revenues.

Additionally, data from the Internal Revenue Service for Nonfarm Sole Proprietorship Returns in 2000 show 19.9 million nonfarm businesses with an average

receipt of \$51,398. Unlike nonemployer firms, these sole proprietorships may have multiple employees. Net income per proprietorship after wages and salaries was a relatively small \$10,086 in 1997 dollars. On the surface, these businesses do not appear to generate large incomes for their owners. The same underreporting to escape taxation occurs here. Additionally, owners may pay themselves a wage or salary in addition to the profits they receive further understating the benefit to self-employment.

Nevertheless, the average annual earnings of full time wage and salary workers provides a useful point of comparison. In 1997 private nonagricultural production or nonsupervisory workers had average weekly earnings of \$431.04. This computes to \$22,414 for the year—more than twice the estimated income generated from sole proprietorships and nonemployer firms.

This rudimentary comparison suggests that self-employment in general does not pay well as compared to wage sector employment on average. If workers earn more in wage sector work, why then would anyone choose to become self-employed? One part of the explanation may be that self-employment offers nonpecuniary benefits that a simple comparison of earnings does not capture.⁴ Additionally, the analysis overlooks the fact that not all workers are able to locate acceptable work in the wage sector, so that self-employment may be the best alternative available at the time.

The wage sector is dynamic with workers being laid off and seeking reemployment. If a worker is unable to generate a job offer above his reservation wage, he has the option of self-employment to supplement his income while continuing to search for a wage sector job. Evans and Leighton (1989) and Carrasco (1999) examine the effect of being unemployed on self-employment. Using different data sets, they find that unemployment increases the likelihood of entering self-employment. In contrast, Blanchflower and Oswald (1991) find a negative relation between unemployment rates and entering self-employment.

In Section II a search model of self-employment is formulated in which self-employment is an option available to a worker searching for employment. The model

⁴ Hamilton (2000) infers that nonpecuniary benefits to self-employment are large. He bases this on evidence that entrepreneurs have both lower initial earnings and lower earnings growth than in paid employment.

emphasizes the effect of unemployment insurance on the decision facing an unemployed worker. The worker selects between two alternatives: He can either search for wage work from unemployment or he can search for wage work while self-employed. Self-employment offers low but steady income, but pays no unemployment insurance benefit. The model is simple in that the decision made this period does not influence the probability of success or failure of an entrepreneurial endeavor in the future. There is no learning by doing and no learning about a person's entrepreneurial ability. Liquidity constraints are also not incorporated.⁵

In Section III panel data from the NLSY is used to examine the likelihood of a worker entering self-employment. The sample is restricted to males 21 years of age or older. To preview the results, the local unemployment rate has a significant positive effect on the probability of self-employment. This holds true for both Whites and Nonwhites. Results suggest that Nonwhites select into self-employment because they have more limited wage sector opportunities. Conclusions are found in Section IV.

II. A Simple Model

Many researchers have thought of self-employment as synonymous with entrepreneurship. However, people may self-select into self-employment for other reasons not usually considered in the literature on entrepreneurship. For example, a worker may choose self-employment as a way to supplement his income or self-insure until a better paying job opportunity becomes available in the wage sector. The model presented here focuses on the decisions facing these individuals rather than those who self-select into self-employment because of perceived better entrepreneurial opportunities. The distinction is an important one. In the model presented here, self-employment is a "second best" alternative in that most workers would prefer to work in the wage sector if an acceptable job opportunity arose. In a model of entrepreneurship, the opposite would be the case with wage sector jobs being inferior to the potential rewards to starting one's own business.

⁵ The effect of liquidity constraints on entrepreneurship has been investigated by a number of researchers. A partial list includes Evans and Leighton (1989), Evans and Jovanovic (1989), Blanchflower and Oswald (1991), Cagetti and DeNardi (2002), Holtz-Eakin, Joulfaian, and Rosen (1994a and 1994b), , Dunn and Holtz-Eakin (2000), and Hurst and Lusardi (2002).

The familiar paradigm of job search under uncertainty (Mortensen (1970)) serves as a useful starting point for a model of self-employment for unemployed workers. Workers experience periods of unemployment and receive unemployment insurance benefits for a finite period of time. Searching for wage work is costly and uncertain in outcome with job search not always eliciting an offer of wage work or producing an acceptable offer.

In the standard model, the worker chooses optimally between unemployment and employment in the wage sector. The model presented here differs in that the unemployed have an alternative available aside from searching for work in the wage sector. A worker can supplement his income during spells of unemployment with earnings generated from self-employment. Fixed earnings, lower than those expected to be earned in wage work, characterize self-employment. These earnings accrue each and every period the worker is self-employed and are known to the worker. The model is more appropriately thought of as describing the actions of discouraged workers. These individuals may find it difficult to locate wage sector jobs, may experience frequent spells of unemployment, and may find short spells of self-employment helpful in supplementing their income while unemployed.

A worker can be either employed in the wage sector, unemployed, or self-employed. Searching for wage sector employment from self-employment is more costly than searching for wage sector work from unemployment. Let c' be the cost of search for a self-employed worker. Furthermore, let p' be the probability that search will result in an offer for this individual. Similarly, let c and p be respectively the cost of search and the probability that search will result in an offer for an individual who is unemployed. To capture the idea that search is more costly and less efficient if self-employed, it is assumed that $c' > c$ and $p' < p$.⁶ Additionally, it is costly and time consuming to start a business, however small in scale that business might be. This start-

⁶ The higher cost of search from self-employment makes intuitive sense since the act of search involves time spent away from self-employment. The effect of self-employment on the effectiveness of job search in generating a job offer is not as clear. An alternative possibility is that self-employment makes it easier to locate a job since the worker is already active in the labor market. This scenario has been ruled out.

up cost is fixed, known and given by k . These differing costs of search complicate the choice decision and directly affect the valuations of search strategies.

Another distinction between wage work and self-employment is in eligibility for unemployment insurance benefits. Unemployment that originates from wage work is eligible for unemployment insurance benefits for a finite period of time τ . However, once the worker becomes self-employed, unemployment benefits are terminated. Clearly, there is an incentive for workers to cheat and claim no self-employment income so as to continue to receive unemployment benefits. This complication is ignored in the analysis presented here so as to focus on the clearly defined choices of employment in the wage sector, unemployment, and self-employment. Movements from employment directly into self-employment are eliminated both because of the role of unemployment insurance and because it takes time to set up a business. Consequently, workers enter self-employment only through an intervening spell of unemployment.

The payoff to self-employment is given by π , which is fixed and known to the worker. A wage offer in the wage sector is drawn from a wage offer distribution with cumulative density function given by $F(w)$, where $w \in [\underline{w}, \bar{w}]$.⁷ The profit from self-employment cannot be too large, otherwise all workers would select self-employment over wage work or unemployment. Nor can it be too small since no one would choose self-employment over the alternative of unemployment.

Let $\Pi(\pi)$ be the value of self-employment for a worker who is self-employed earning π and searching optimally for a job in the wage sector. Furthermore, let $W(w)$ be the value of a job in the wage sector paying a wage w for someone who behaves optimally. It follows that:

$$\Pi(\pi) = \pi - c' + \beta \left\{ p'[1 - F(w_{se}^0)]E[W(w) | w > w_{se}^0] + p'F(w_{se}^0)\Pi(\pi) + (1 - p')\Pi(\pi) \right\} \quad (1)$$

The first term $\pi - c'$ is the net income in the current period from self-employment while searching for a wage sector job. The discount rate is β . Job search is successful in generating an offer next period with probability p' . However, this offer may or may not be acceptable. The first term in brackets gives the expected value of an acceptable wage

⁷ In a model of entrepreneurship, the opposite arrangement would likely motivate the model. The payoff to self-employment would be uncertain whereas the earnings from wage work would be fixed and constant.

offer, which occurs with probability $p'[1 - F(w_{se}^0)]$. If the offer is not acceptable, an event occurring with probability $p'F(w_{se}^0)$, the worker continues in his optimal search while self-employed, which is valued at $\Pi(\pi)$. The third term in brackets captures the event of no job offer in which case the worker continues to search optimally while self-employed.

In order to ensure that a worker always prefers to seek wage sector employment to continuous self-employment, it follows that:

$$\Pi(\pi) > \frac{\pi}{(1-\beta)}.$$

After some manipulation, this requirement becomes:

$$E[W(w) | w > w_{se}^0] - \frac{\pi}{(1-\beta)} > \frac{c'}{\beta p' [1 - F(w_{se}^0)]}.$$

The expected gain over continuous self-employment of a successful job in the wage sector must exceed the potential cost of search appropriately discounted. In other words, the potential wage sector opportunities must be large enough to compensate the self-employed for giving up his profits while also covering his search costs.

The reservation wage is given by w_{se}^0 , which is the wage offer at which the self-employed worker is indifferent between the two alternatives of continuing in self-employment and searching optimally or accepting the wage sector job offer, which is optimally valued at $W(w)$. Thus,

$$W(w_{se}^0) = \Pi(\pi) \tag{2}$$

defines the reservation wage for a self-employed worker. The self-employed worker accepts the job offer if the wage exceeds w_{se}^0 and rejects it if the wage offer is less than the reservation wage.

The decision of a person who is unemployed and has reached the end of his unemployment insurance benefits can now be characterized. This person picks the better of two alternatives. He can either remain unemployed, receiving no further unemployment benefits while searching optimally for wage work. Or alternatively he can pay a fee of k to set up his own business and search optimally thereafter for wage

sector work. The worker receives l while unemployed without benefits. This reflects the value of leisure alone since there are no further unemployment benefits for which he is eligible. Let U^0 be the optimal value of being unemployed with no further unemployment benefits available. Then:

$$U^0 = \max_{u, se} \{U_u^0, U_{se}^0\} \quad (3)$$

The maximization is over the two actions of searching optimally for wage work from unemployment and receiving U_u^0 , or becoming self-employed and searching optimally from self-employment, receiving U_{se}^0 .

The value of searching for wage work for an individual who is unemployed and receiving no benefits is:

$$U_u^0 = l - c + \beta \left\{ p[1 - F(w_u^0)]E[W(w) | w > w_u^0] + pF(w_u^0)U^0 + (1 - p)U^0 \right\}. \quad (4)$$

The first term $l - c$ reflects the net value of leisure after paying search costs in the current period. Search results in an offer with probability p . This offer is acceptable with probability $1 - F(w_u^0)$ and generates an expected value of $E[W(w) | w > w_u^0]$. The second term in brackets gives the expected value of a wage offer that is rejected because it is not high enough. A person rejecting this offer receives U^0 , the value of being unemployed and searching optimally. The last term within brackets is the expected value of being unemployed and not receiving any offer—an event occurring with probability $(1 - p)$. Again, the worker receives U^0 .

The reservation wage w_u^0 in this equation is defined as the wage at which the worker is indifferent between remaining unemployed and searching optimally or accepting the wage offer. It is simply defined as:

$$W(w_u^0) = U^0. \quad (5)$$

Note that w_u^0 does not necessarily equal w_{se}^0 . If the value of being unemployed without benefits exceeds the value of searching optimally from self-employment, i.e. $U^0 > \Pi(\pi)$, then $w_u^0 > w_{se}^0$.

For a worker who is unemployed and not receiving benefits, the other alternative is to set up a business and search optimally from self-employment. The one time start-up cost of a business is k . The value of this alternative is given by:

$$U_{se}^0 = l - k - c' + \beta \left\{ p' [1 - F(w_{se}^0)] E[W(w) | w > w_{se}^0] + p' F(w_{se}^0) \Pi(\pi) + (1 - p') \Pi(\pi) \right\}. \quad (6)$$

The first term before the brackets shows net return in the current period of unemployment after paying the set up cost of a business k while searching for a wage sector job. Job search results in a job offer with probability p' . This job offer is acceptable if it exceeds the reservation wage w_{se}^0 , which is reflected in the conditional expected value. If the offer is unacceptable, the worker searches optimally from self-employment and receives $\Pi(\pi)$. This is captured by the second term within brackets. Finally, in the event that a wage offer is not generated—an event occurring with probability $(1 - p')$, the self-employed worker continues to search and receive $\Pi(\pi)$. If there are no further unemployment insurance benefits,

To examine the role of unemployment benefits, suppose that an unemployed worker is eligible to receive unemployment benefits b for 1 more period provided that he does not become self-employed. Once a worker enters self-employment, he is no longer eligible to receive unemployment benefits until he has an intervening spell of wage work. Let U^1 be the value of searching optimally for a wage sector job for someone who is currently unemployed and is eligible for 1 more period of unemployment insurance benefits. The worker chooses the better of two alternatives:

$$U^1 = \max_{u, se} \{U_u^1, U_{se}^1\}. \quad (7)$$

He can opt to remain unemployed and search for wage work while receiving unemployment insurance benefits. The value of this option is given by U_u^1 .

Alternatively, he can enter self-employment while searching for wage sector work, collecting unemployment benefits until he receives profits from the business. This alternative is valued at U_{se}^1 .

The value of the option to search for wage work from unemployment is given by:

$$\begin{aligned}
U_u^1 &= b + l - c + \beta \left\{ p[1 - F(w_u^0)]E[W(w) | w > w_u^0] + pF(w_u^0)U^0 + (1 - p)U^0 \right\} \\
U_u^1 &= b + U_u^0
\end{aligned} \tag{8}$$

The value of the option to enter self-employment and search for wage work is given by:

$$\begin{aligned}
U_{se}^1 &= b + l - k - c' + \beta \left\{ p'[1 - F(w_{se}^0)]E[W(w) | w > w_{se}^0] + p'F(w_{se}^0)\Pi(\pi) + (1 - p')\Pi(\pi) \right\} \\
U_{se}^1 &= b + U_{se}^0 = b + l - k - \pi + \Pi(\pi)
\end{aligned} \tag{9}$$

Thus,

$$U^1 = b + U^0. \tag{10}$$

For the person eligible to receive one more period of unemployment insurance benefits, whichever option has the greatest value with 1 more period left of benefits also has the greater value after benefits expire. The implication is that unemployed workers will switch to self-employment sooner rather than later. With τ periods of benefits available a person will switch to self-employment no later than $\tau - 1$ periods after being laid off. This result is due to the fact that he receives unemployment benefits for one more period regardless of his choice of where to search.

The above discussion suggests that in order to have more complicated interactions between unemployment benefits and the choices a worker makes upon entering unemployment, it is necessary to have these benefits be contingent upon the worker's state, which in turn reflects the choices he makes. A richer description of unemployment insurance benefits includes the possibility of receiving benefits for multiple periods, but only so long as the worker is unemployed. Movements into self-employment eliminate eligibility.⁸ This type of constraint on benefits alters the tradeoff between searching from unemployment and searching from self-employment. It also alters the valuation of future employment.

Let U^s be the value of search for a worker who is currently laid off and is eligible for s more periods of benefits, $s = 1, \dots, \tau$. The worker must choose optimally between

⁸ Note that it is assumed that the government can completely monitor whether a person is unemployed or self-employed.

searching for work from unemployment or the alternative of setting up a business and searching optimally from there. If he searches from unemployment, he preserves his eligibility to receive unemployment insurance next period even if he does not receive an acceptable job offer. If he instead sets up a business and becomes self-employed, he cannot receive unemployment insurance again until he accepts a wage sector job. U^s is given by:

$$U^s = \max_{u,se} \{U_u^s, U_{se}^s\}. \quad (11)$$

It follows that:

$$U_{se}^s = b + l - k - c' + \beta \left\{ p[1 - F(w_{se}^0)]E[W(w) | w > w_{se}^0] + p'F(w_{se}^0)\Pi(\pi) + (1 - p')\Pi(\pi) \right\}. \quad (12)$$

$$U_{se}^s = U_{se}^1 = b + U_{se}^0$$

The value of becoming self-employed and searching optimally while currently eligible for s more periods of benefits does not depend upon s . The value of this option depends only upon whether benefits have expired.

Considering the value of searching for employment from unemployment,

$$U_u^s = b + l - c + \beta \left\{ p[1 - F(w_u^{s-1})]E[W(w) | w > w_u^{s-1}] + pF(w_u^{s-1})U^{s-1} + (1 - p)U^{s-1} \right\}. \quad (13)$$

The value of search from unemployment depends upon s . The reservation wage is the wage at which the worker is indifferent between accepting a wage offer on the one hand and searching optimally for a job next period from unemployment where there is one less period of unemployment benefit eligibility. The reservation wage is given by:

$$W(w_u^{s-1}) = U^{s-1}.$$

It can be shown that the reservation wage is increasing in s . As eligibility expires, the worker's reservation wage declines so the chances of him accepting a wage sector job offer increase. For workers who are unemployed longer, the value of searching from unemployment declines and the relative value of switching to self-employment rises. A worker will be more likely to switch to self-employment the longer he is unemployed. Furthermore, a worker will find self-employment relatively more attractive than unemployment the lower are unemployment insurance benefits b and the less time these benefits are available τ . The relative valuations will also depend upon the wage offer

distribution, the potential profits from self-employment, the costs of starting a business, the relative costs of search, and the discount rate.

The value of a job paying w is given by:

$$W(w) = w + \beta \{ \lambda U^\tau + (1 - \lambda)W(w) \}.$$

The job earns a wage of w in the current period. The following period there is a probability λ that the worker will be laid off. If he loses his job, he receives the value of being unemployed and receiving unemployment insurance benefits b for τ periods, U^τ . Otherwise, with probability $(1 - \lambda)$ he receives the value of continued employment. Let w_u^τ be the reservation wage. It is the wage offer at which the worker is indifferent between unemployment paying a benefit b for τ periods and accepting a job. It is given by:

$$W(w_u^\tau) = U^\tau > U^0.$$

Thus, the reservation wage for a person receiving unemployment insurance benefits b is higher than for a person who does not receive any benefits.

For a worker who has recently entered self-employment, the presence of a stream of future unemployment insurance benefits encourages him to have a higher reservation wage than he otherwise would have. If he is not successful at obtaining an acceptable job offer, as these benefits approach expiration, the reservation wage declines. The presence of a self-employment option provides an additional safety net for the worker and supports a higher reservation wage. If the self-employment payoff is high enough, it will induce the worker to switch to self-employment and continue to search.

The model suggests that tax incentives to small businesses and other programs that encourage self-employment may not be appropriate. Suppose that the effect of these policies is to artificially raise π , the payoff to self-employment. Workers respond to this by setting a higher reservation wage than they would have otherwise. Consequently, workers return to wage work less quickly because of the relative attractiveness of self-employment. A better use of resources might be to encourage matches between workers and employers through an information clearinghouse or to subsidize skill programs that make workers more attractive to potential employers.

III. The Data

From the simple model of the previous section, transitions into self-employment or wage work originate in unemployment. This is an artifact of the way in which search is modeled. More broadly, the decision to enter or exit from self-employment depends upon a comparison of the expected values associated with accepting an opportunity in self-employment and the expected utility of the wages a person could command in wage work.

It is assumed that the decision to enter self-employment depends upon personal characteristics that affect the valuations of the alternatives. The model suggests that cyclical conditions can also affect the decision. These cyclical conditions in the model of Section II are the layoff probability and the hiring probability. In the model, it is assumed that cyclical factors do not influence the payoff to self-employment π . Instead, these cyclical variables act mainly through their effect on the expected valuation of wage sector employment. An increase in the layoff probability reduces the expected value of wage work making it more likely that a worker who has been laid off will enter self-employment. A reduction in the effectiveness of job search from unemployment will also result in transfers to self-employment. The extension of the time period for which the unemployed are eligible for unemployment insurance benefits will reduce the flow of workers into self-employment.

Assuming that the distribution of wage offers can be given by a logistic distribution, let the net value of self-employment for individual i at time t , y_{it}^* , be described as an unobserved variable with:

$$y_{it}^* = x_{it}^1 \beta_1 + x_{it}^2 \beta_2 + \varepsilon_{it}. \quad (14)$$

The net value of self-employment is assumed to depend upon variables that affect the returns to self-employment, x_{it}^1 , and those that affect the return to wage work, x_{it}^2 . Some variables have an effect on both. For example, age, experience, education, and race may all have an effect on the return to self-employment. However, these variables influence the wages a person can command in the salaried sector as well. In addition, y_{it}^* depends upon the availability and returns to wage work. As the unemployment rate rises, the

availability of work in the wage sector declines and workers self-select into self-employment.

The net value of self-employment is not observable. Instead, the econometrician observes whether the worker is self-employed. More formally, the data are described by the following standard model:

$$y_{it} = \begin{cases} 1 & \text{if } y_{it}^* > 0 \\ 0 & \text{if } y_{it}^* \leq 0. \end{cases} \quad (15)$$

If the worker is self-employed, then $y_{it} = 1$. If the worker is employed in the wage sector, then $y_{it} = 0$.

The data used in the empirical analysis come from the NLSY panel data covering the years from 1979 to 1998. Females were excluded from the analysis because of the more complicated joint determination of their labor force participation and self-employment decisions. The NLSY follows a group of individuals over time. In 1979 these participants ranged in age from 14 to 22 and included many individuals who had not yet finished their education. The focus of the empirical work is on the self-selection of workers whose decisions to enter self-employment are not complicated by the part-time and summer jobs of students. In an attempt to control for this, only workers who are older than age 21 are included.⁹

Entrepreneurship is a difficult concept to define and to measure. The empirical work presented here concentrates instead on self-employment. In each interview year with the exception of 1994, the NLS inquired as to the class of worker at the current or most recent job. Responses include working for a private company, the government, self-employed, and working without pay. In the empirical work that follows, an individual is defined as self-employed if the worker classifies himself as self-employed and is defined as a wage worker if he is employed in the private sector or works for the government.

Table 2 below provides information on employment status. Only 7.4% of the people-years for those 21 years of age or older represents self-employment. The remaining 92.7% are wage workers. Nonetheless, more than a quarter of the men aged

⁹ Certainly some individuals will not have completed their formal education by the time they are 21. Additional work was done focusing on older individuals with little change in the results.

21 or older (26.7%) have experienced some self-employment, while almost all have been in the wage sector at one time or another during the sample period. Once workers are in the wage sector, they tend to remain in the wage sector. Conditional on ever being employed in the wage sector, 93% of the observations show employment in the wage sector. In contrast, self-employment is a more fluid state. Conditional on ever being self-employed, these individuals are self-employed 26.1% of the time. These figures do not necessarily imply that workers return to wage work from self-employment. The normalized within percentage is 79% indicating that the two labor market states are highly persistent. Similar patterns hold for Whites and Nonwhites, although Nonwhites tend to be less likely to be self-employed and less likely to stay self-employed.¹⁰

Table 3 shows transition probabilities for wage workers and self-employed for the total sample and for Whites and Nonwhites separately. Only a small percentage of wage workers transfer into self-employment the following year. About 97% remain in wage work and 3% transit to self-employment. This general pattern holds true for both Whites and Nonwhites. Transitions from self-employment back to wage work are relatively high with 36% and 47% of Whites and Nonwhites moving from self-employment to wage work while 65% and 53% respectively remain self-employed the following year. The data support the notion that a substantial percentage of people entering self-employment do so for short periods of time and subsequently return to wage work.

The model was estimated using a fixed effects conditional logit model. The estimation was performed for the entire sample and for Whites and Nonwhites separately. The dependent variable is the indicator of self-employment status. Many different independent variables were investigated. These include such standard demographic variables as marital status (MARRY=1 if married and 0 otherwise), urban status (URBAN=1 if the respondent lives in an urban environment and 0 otherwise), educational attainment (discussed below), region of residence, AGE and AGE². Local labor market conditions were captured by the unemployment rate in the labor market of the respondent's current residence.

¹⁰ Fairlie and Meyer (2000) provide evidence on White/Nonwhite differentials in self-employment over time.

A person's health status (ILL=1 if the respondent has health problems that limit his ability to work) was included to investigate the effect of health limitations on the decision to enter self-employment. The hypothesized sign of this effect is ambiguous. People whose health limits the time they can spend working should gravitate to self-employment if self-employment hours are more flexible. However, the presence of health benefits in the wage sector may encourage workers with health problems to remain in the wage sector

Several different specifications were employed to evaluate the effect of education on the self-employment decision. In addition to GRADE, which is defined as the highest grade completed, more simple specifications were investigated. These other variables divided educational attainment into several categories including less than high school, high school, some college, and college graduate or above. Whichever way education is measured, the relation between educational attainment and self-employment is complicated. Those who are better educated may have more labor market opportunities available and will therefore tend to gravitate to wage sector jobs. At the same time, those with poor wage sector options may self-select into the self-employment sector. Alternatively, a higher education may make it easier for workers to recognize and evaluate self-employment opportunities. But more education may not confer any special entrepreneurial ability. This ambiguity of the influence of education makes it difficult to sign *a priori* the effect of education in the analysis.

Table 4 below shows estimation results for the entire sample and for Whites and Nonwhites separately. Higher local unemployment rates increase the likelihood of self-employment for both Whites and Nonwhites. This empirical fact holds true for a wide variety of specifications. In terms of the model of the previous section, higher unemployment rates can be interpreted as higher layoff rates and lower job offer rates for wage sector jobs. The lack of wage sector opportunities pushes workers into self-employment.

Education affects the decision to enter self-employment for Nonwhites but not for Whites. In the results of Table 4, the effect of education on the probability of becoming an entrepreneur is captured by GRADE, which is defined as the highest grade attained. For Nonwhites, those with higher education levels are less likely to choose self-

employment. This suggests that, at least for Nonwhites, self-employment is a reaction to limited labor market opportunities.

Interestingly, results are unaffected by the urban status of the worker. However, the marginal significance level for Urban status of Nonwhites is 11.0%, suggesting that for this group self-employment is more of an urban phenomenon. Marital status does not have much of an empirical effect for Whites. Although for Nonwhites, the coefficient on marital status is insignificant at traditional confidence levels, its marginal significance is 10.6% and suggests that for Nonwhites, married workers are less likely to be self-employed.

A consistent result is that for both Whites and Nonwhites, age and its square are significant determinants of the probability of self-employment. As people age, they are more likely to become self-employed. This age effect peaks at 34.5 years for Whites and 39.8 years for Nonwhites. (The oldest person in the sample is 41 years old.) Because the sample is limited to younger men, the age effect may not capture forces at work for middle-aged males.

To investigate urban and regional effects, an interaction term was included. If the respondent lives in the North East in an urban area, the interaction term equals 1 and is 0 otherwise. The interaction terms are similarly defined for the North Central, South, and West regions. The results of these urban-region interactions are also found in Table 3. Interestingly, a regional pattern appears with urban Whites being less likely to choose self-employment in the North Central region. A different pattern emerges for Nonwhites with nonwhites in urban areas of the South tending to self-selecting into self-employment.

In addition to the results presented in Table 4, other specifications were examined. Adding the measure of health status, ILL, does not significantly alter the results. Including regional dummies without the urban interaction term also has no effect on the results. Estimation was also carried out investigating the effect of the presence of children on the probability of self-employment. Several different specifications were evaluated. These include dummy variables indicating the presence of minor children age 17 or younger, young children age 6 or less, and interaction terms with the presence of children interacted with marital status. None of these variables were significant.

Alternative specifications of age were investigated. Specifically, AGE26_30 is 1 for respondents who are between the ages of 26 and 30 and 0 otherwise. OLD takes on the value of 1 if the respondent is over 30 years of age and is 0 otherwise. The results are similar to those presented in Table 3 and are unreported here.

Although the model presented in Section II does not incorporate a liquidity constraint, other researchers have found that access to capital may be an important determinant of self-employment status. Those who are better able to self-finance are less likely to be restricted by liquidity constraints. Thus, people with more wealth should be more likely to enter self-employment than their wealth-constrained counterparts.

As an attempt to capture this liquidity constraint, lagged household income is added to the specification. Household income is used rather than a measure of wealth because of the difficulty in obtaining such a measure. The results for both fixed effects and random effects conditional logits are found in Table 5. Examination of the fixed effects estimates show results largely consistent with previous results. Specifically, higher unemployment increases the likelihood of self-employment. This effect is significant for Whites only—the effect on Nonwhites is no longer significant. Age and its square continue to be significant determinants of self-employment. For Nonwhites education has a significant negative impact on the likelihood of self-employment, as does marriage. This does not hold true for Whites in the sample.

The effect of lagged income on self-employment is consistent with the liquidity constraint story. Specifically, the larger is past household income, the more likely are workers to switch to self-employment. However, there are other reasons why lagged household income may be an important determinant of current self-employment status aside from the liquidity hypothesis. For example, high past household income may indicate the presence of another household wage earner who provides an opportunity for the partner to be less actively engaged in the wage sector. The analysis does not shed any light on this conjecture.

It is notable that for the fixed effects estimates, the unemployment rate is no longer significant for Nonwhites once lagged household income is incorporated. This finding suggests that lower household income for Nonwhites is correlated with higher persistent local unemployment rates for Nonwhites. While the notion that liquidity

constraints hinder movement into self-employment has some validity for Whites, it is possible that for Nonwhites the effect is really one of restricted access to labor market opportunities.

Random effects estimates are also shown in Table 5. Interestingly in this specification, the unemployment rate has a positive and significant effect on the likelihood of Nonwhites entering self-employment, as does lagged income. The effect of marital status becomes more sharply estimated for Nonwhites and clearly has a negative and significant effect on Nonwhite self-employment. In contrast to the estimates of Table 4 and the fixed effects estimates of Table 5, urban white workers are less likely to be self-employed in North East, Central, and South regions. Nonwhites are more likely to be self-employed in the North East, South, and West. The differing regional impact between the fixed effects and random effects estimates is likely due to the relative lack of variation in geographic location of respondents. The fixed effects estimates are dominated by movers. The random effects estimates do not have the same interpretation.

To investigate the idea that unemployment pushes workers towards self-employment, the employment status at the time of the previous interview was included as an explanatory variable. If self-employment is a response to poor market opportunities, then a person who is employed should be *less* likely to enter self-employment subsequently than a person who is unemployed. A dummy variable indicating whether a person was employed in the previous year was included in a fixed effects logit model. The results are reported in Table 6. For Whites, the higher unemployment rates significantly increase the probability of self-employment. Interestingly, if a white person was employed in the previous year (either self-employed or working for a wage), they are significantly less likely to switch to self-employment in the current period. Results unreported for unemployment status in the prior year show that the likelihood of being self-employed in the current year increases significantly if the person was unemployed in the previous survey year. Prior household income is still associated with an increase in the likelihood of self-employment. The results suggest that at least for those Whites who have experienced unemployment, self-employment offers an alternative. For Nonwhites, the effect of employment in the prior year is not significant. This insignificance holds true for prior unemployment status as well. However, for Nonwhites the current

unemployment rate is not significant after including both the income and lagged employment status variable. As before, the reason is likely due to the high correlation among the variables for Nonwhites.

IV. Conclusions

The simple model of selection into self-employment models the choices that workers make in selecting between wage work on the one hand and unemployment or self-employment on the other. Self-employment is specifically modeled as an alternative to unemployment. It offers a steady income but pays no unemployment insurance benefits. Workers who have not been successful in their job search are more likely to enter self-employment as a stop-gap measure until they successfully locate wage sector work.

The simple model is deficient in a number of areas. Specifically, the model is static in that previous decisions do not have a lasting effect upon the selection problem the worker faces. The only avenue for past decisions to influence the current state is through the assumption that unemployment benefits terminate once self-employment is entered. Obviously, this is an oversimplification that has many options for complications. The accumulation of wealth and the introduction of liquidity constraints are one avenue that many researchers have explored. Learning about one's entrepreneurial ability is another. Still another avenue for expansion stems from the human capital literature where workers learn about being an entrepreneur through experience. In addition to adding these dynamics, the model can be criticized as being a partial equilibrium analysis. If workers find self-employment more desirable than wage sector employment, the wages in the wage sector must rise. The more fundamental question is what determines the returns to self-employment.

The correct interpretation of the factors influencing selection into one sector or the other is an important one for policy-makers. The empirical results for younger men suggest that self-employment may be less desirable than wage sector employment because it is a reaction to limited wage sector opportunities. For Whites and Nonwhites, workers enter self-employment in response to increasing unemployment. This result holds consistently across models estimated. For Whites, education does not appear to be

an important determinant of the decision to enter self-employment. This does not hold true for Nonwhites. As education increases and presumably opportunities available to Nonwhites become more available, the likelihood of entering self-employment declines. The same discrepancy holds for marital status with Nonwhites who are married tending to remain in the wage sector. As numerous others have found, greater prior household wealth or income increases the likelihood of self-employment. This effect holds true for both Whites and Nonwhites. If self-employment is less desirable than a wage sector job, as the empirical work suggests, then policies touting self-employment as a panacea for unemployment, poverty, and economic growth should be rethought or at least evaluated more carefully. The more pertinent question is whether the self-employed are better off economically than they would have been had they remained in the wage sector. As is the norm, more work remains to be done.

Table 1: Nonemployers by Industry, 2000

NAICS	Firms	% of Total
Forestry	223,175	1%
Mining	85,626	1%
Utilities	13,879	0%
Construction	2,014,035	12%
Manufacturing	285,118	2%
Wholesale Trade	388,300	2%
Retail Trade	1,743,474	11%
Transportation & Warehousing	746,529	5%
Information	238,425	1%
Finance & Insurance	691,765	4%
Real Estate & Rental Leasing	1,696,311	10%
Professional, Scientific, & Technical Services	2,420,023	15%
Administration & support and waste management and remediation services	1,032,306	6%
Educational Services	283,231	2%
Health Care & Social Assistance	1,317,393	8%
Arts, Entertainment, & Recreation	781,691	5%
Accomodation & Food Services	218,447	1%
Other services (except public administration)	2,350,227	14%
Total	16,529,955	100%

Source: <http://www.census.gov/epcd/nonemployer/>

**Table 2: The Incidence of Wage Work and Self Employment
1979-1998, Males, Age >20**

	Overall		Between		Within
	Freq	Percent	Freq	Percent	Percent
Wage Work	46385	92.65%	4577	99.37%	93.05%
Self-Employed	3679	7.35%	1231	26.73%	26.06%
Total	50064	100.00%	5808	126.10%	78.85%

(n = 4606)

White

	Overall		Between		Within
	Freq	Percent	Freq	Percent	Percent
Wage Work	34250	91.87%	3385	99.33%	92.32%
Self-Employed	3032	8.13%	961	28.20%	27.31%
Total	37282	100.00%	4346	127.52%	77.95%

(n = 3408)

Nonwhite

	Overall		Between		Within
	Freq	Percent	Freq	Percent	Percent
Wage Work	12135	94.94%	1192	99.50%	95.18%
Self-Employed	647	5.06%	270	22.54%	21.45%
Total	37282	100.00%	1462	122.04%	81.56%

(n = 1198)

Source: NLSY

**Table 3: Transitions between Wage-Work and Self Employment
Males over Age 21, 1979-1998**

	Total		White		Nonwhite	
	Wage Work	SE	Wage Work	SE	Wage Work	SE
Wage Work	96.65%	3.35%	96.38%	3.62%	97.36%	2.64%
nobs	36301	1266	27055	1015	9246	251
SE	36.92%	63.08%	35.55%	64.45%	47.14%	52.86%
nobs	1048	1752	834	1512	214	240
Total	92.47%	7.53%	91.69%	8.31%	95.07%	4.93%

Source: NLSY

Table 4: Estimation Results for Conditional Fixed Effects Logit Model of Self-Employment, by Race*

Dependent Variable=1 if Self-Employed, Standard Errors are in Parentheses

	Total	White	Nonwhite	Total	White	Nonwhite
UR	0.12287*** (0.03070)	0.11040*** (0.03413)	0.15676** (0.07117)	0.12426*** (0.03072)	0.11081*** (0.03414)	0.16173** (0.07152)
GRADE	-0.02352 (0.04743)	0.02759 (0.05204)	-0.37865*** (0.12709)	-0.02715 (0.04749)	0.02394 (0.05208)	-0.37844*** (0.12708)
URBAN	-0.06906 (0.10134)	-0.15050 (0.10775)	0.51800 (0.32399)	-	-	-
AGE	0.63779*** (0.05876)	0.67359*** (0.06661)	0.50203*** (0.12594)	0.63458*** (0.05887)	0.66916*** (0.06672)	0.50276*** (0.12613)
AGE2	-0.00902*** (0.00098)	-0.00975*** (0.00112)	-0.00631*** (0.00209)	-0.00895*** (0.00098)	-0.00966*** (0.00112)	-0.00631*** (0.00210)
MARRY	0.02612 (0.07068)	0.08804 (0.07821)	-0.28037 (0.17321)	0.02248 (0.07074)	0.08396 (0.07826)	-0.28072 (0.17737)
North East	-	-	-	0.10808 (0.18325)	0.01974 (0.19975)	0.58186 (0.50823)
North Central	-	-	-	-0.36486** (0.16106)	-0.40191*** (0.16742)	0.13345 (0.62456)
South	-	-	-	0.02468 (0.13267)	-0.08992 (0.14856)	0.5706673* (0.32982)
West	-	-	-	0.02468 (0.17407)	-0.03376 (0.18457)	0.49528 (0.57274)
NOBS	13,266	10,393	2,873	13,266	10,393	2,873
N_GROUPS	1,181	920	261	1,181	920	261

* *** indicates significance at the 2% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 5: Estimation Results for Conditional Fixed Effects and Random Effects Logit Model of Self-Employment, by Race*

Dependent Variable=1 if Self-Employed, Standard Errors are in Parentheses

	<i>Fixed Effects</i>			<i>Random Effects</i>		
	Total	White	Nonwhite	Total	White	Nonwhite
UR	0.15316*** (0.03694)	0.15036*** (0.04034)	0.12691 (0.09493)	0.13856*** (0.03429)	0.12256*** (0.03734)	0.20439*** (0.08433)
GRADE	-0.08603 (0.05450)	-0.04290 (0.05902)	-0.46286*** (0.16264)	-0.03089 (0.02187)	-0.02509 (0.02409)	-0.20792*** (0.07260)
AGE	0.68773*** (0.07054)	0.72840*** (0.07803)	0.48037*** (0.16639)	0.66318*** (0.06750)	0.71920*** (0.07485)	0.47140*** (0.15893)
AGE2	-0.00993*** (0.00118)	-0.01076*** (0.00130)	-0.00584*** (0.00275)	-0.00964*** (0.00113)	-0.01069*** (0.00126)	-0.00585** (0.00265)
MARRY	0.00379 (0.08336)	0.07437 (0.09061)	-0.39895* (0.22462)	-0.03073 (0.07411)	0.02079 (0.07982)	-0.57418*** (0.19328)
North East	-0.07065 (0.21206)	-0.12396 (0.23356)	0.20125 (0.57082)	-0.25388* (0.13897)	-0.39911*** (0.15236)	0.64326* (0.35652)
North Central	-0.32268* (0.18397)	-0.37852** (0.19081)	0.64155 (0.78084)	-0.38315*** (0.14053)	-0.41456*** (0.13992)	0.10352 (0.35756)
South	-0.13833 (0.15313)	-0.21162 (0.16878)	0.33077 (0.39981)	-0.20107* (0.12054)	-0.29422** (0.13040)	0.50019* (0.30355)
West	-0.02218 (0.19840)	-0.07507 (0.20888)	0.36985 (0.70189)	-0.02565 (0.13977)	-0.18166 (0.15834)	0.85198** (0.39061)
Income(t-1)	0.00114*** (0.00028)	0.00108*** (0.00030)	0.00233** (0.00107)	0.00160*** (0.00027)	0.00150*** (0.00029)	0.00247*** (0.00087)
Constant	-	-	-	-15.31576*** (1.03333)	-15.87654*** (1.12914)	-12.02637*** (2.52318)
NOBS	9,392	7,779	1613	38,442	29,729	8,713
N_GROUPS	991	797	194	4,495	3,334	1,161

* *** indicates significance at the 2% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Table 6: Estimation Results for Conditional Fixed Effects Logit Model of Self-Employment, by Race*

Dependent Variable=1 if Self-Employed, Standard Errors are in Parentheses

	Total	White	Nonwhite
UR	0.14822*** (0.03703)	0.14434** (0.04047)	0.12456 (0.09502)
GRADE	-0.08249 (0.05443)	-0.03872 (0.05899)	-0.45866*** (0.16197)
AGE	0.70251*** (0.07095)	0.74569*** (0.07856)	0.48876*** (0.16685)
AGE2	-0.01016*** (0.00118)	-0.01103*** (0.00131)	-0.00597** (0.02757)
MARRY	0.00775 (0.08343)	0.07821 (0.09067)	-0.39581* (0.22497)
North East	-0.06980 (0.21211)	-(0.12170) (0.23342)	0.19482 (0.57250)
North Central	-0.32588* (0.18369)	-0.38507** (0.19048)	0.67090 (0.78236)
South	-0.13312 (0.15313)	-(0.20587) (0.16882)	0.33522 (0.40037)
West	-0.01491 (0.19863)	-(0.06417) (0.20920)	0.35530 (0.70289)
Income(t-1)	0.00116*** (0.00028)	0.00110*** (0.00298)	0.00235** (0.00107)
Employed(t-1)	-0.20395** (0.08880)	-0.22830** (0.10125)	-0.14199 (0.18653)
NOBS	9,392	7,779	1,613
N_GROUPS	991	797	194

* *** Indicates significance at the 2% level; ** indicates significance at the 5% level; and * indicates significance at the 10% level.

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