

What Happens to Nascent Entrepreneurs? An Econometric Analysis of the PSED

Simon C. Parker
Yacine Belghitar

ABSTRACT. This article follows the progress of a large and nationally representative sample of American nascent entrepreneurs—identified in the initial interview of the Panel Study of Entrepreneurial Dynamics (PSED)—over the next 12 months of the panel. We develop a novel theoretical framework based on maximisation of expected utility and the value of waiting, and estimate it to reveal which personal and economic characteristics are associated with venture start-up—and which are associated with remaining a nascent entrepreneur, or giving up entirely. The value of waiting turns out to play a key role in helping us understand what happens to nascent entrepreneurs. We discuss the implications of our results for entrepreneurs, lenders, business start-up support agencies and policy-makers.

KEYWORDS: Nascent entrepreneurship, New venture creation, Occupational choice

1. Introduction

Individuals who are actively involved in starting a new business are referred to as “nascent entrepreneurs” (NEs). The last decade has witnessed the emergence of a new literature that explores the characteristics, activities and performance of this group of economic agents. The growing interest in nascent entrepreneurship partly reflects deep rooted interest in new

venture creation, which has no doubt been spurred by the emergence of new data sets dedicated to nascent entrepreneurship; and it partly reflects growing awareness of the social and economic importance of nascent entrepreneurship generally. At any point in time in the United States, some 6.2% of adults are engaged in the process of new venture creation (Reynolds et al., 2004)—involving over 10 million adults and 5.6 million new firms. Not surprisingly, this level of activity has also attracted the attention and involvement of a range of stakeholders, including business support agencies, private sector advisory bodies, and small business lenders. Not every nascent entrepreneur makes the full transition to mature entrepreneurship, so it is of considerable academic and policy interest to understand who does so and why.

In this article, we put ourselves in the position of external stakeholders by predicting what NEs will be doing in 12 months’ time—whether continuing as a NE; starting up a venture; or giving up altogether. One of our objectives is to advise stakeholders about the factors they should look for when deciding whether and how to offer support to a NE, as well as the effects of such support on NEs’ behaviour. The question “What happens to nascent entrepreneurs?” has not been widely addressed by previous researchers, who have generally devoted greater effort towards describing the characteristics of nascent entrepreneurs (Reynolds, 1997; Delmar and Davidson, 2000; Reynolds et al., 2004), and their reasons for starting up (see Carter et al., 2003, for a survey). Regarding characteristics, the literature has established that NEs are more likely to be male, well educated, fairly prosperous, and relatively young; and in the United States they are more likely to come from an ethnic minority

Final version accepted on May 26 2006.

Yacine Belghitar
Business School, Accounting & Finance
Middlesex University
The Burroughs, Hendon, London, NW4 4BT, UK
E-mail: Y.Belghitar@mdx.ac.uk

Simon C. Parker
Centre for Entrepreneurship
Durham Business School
Durham, DH1 3LB, UK
E-mail: s.c.parker@durham.ac.uk

group. In a detailed examination based on Swedish data, Davidsson and Honig (2003) decomposed the venture creation process into two distinct stages: discovery (who is a NE?) and exploitation (what factors shape NEs' venture development and performance?). Davidsson and Honig reported that both human and social capital increased the probability that a given individual was a NE, while only social capital affected venture financial performance. Several other authors have scrutinised the activities involved in NEs' start-up efforts, and tried to identify which of them are associated with organisational emergence (e.g., Carter et al., 1996; Delmar and Shane, 2004). For example, Delmar and Shane (2004) asserted that legitimising activities (writing business plans and establishing new ventures as legal entities) promote development and survival of new ventures.

We address the question of what happens to nascent entrepreneurs by developing a simple two-period economic model of NE choices based on expected utility maximisation, in which waiting can be valuable. We go on to estimate the model econometrically using data from the Panel Study of Entrepreneurial Dynamics (PSED). The PSED is a large-scale data set devoted to the analysis of entrepreneurial dynamics in America. NEs were identified from 64,622 randomised telephone interviews of American adults, conducted between July 1998 and May 1999. The PSED classifies an individual as a nascent entrepreneur if they answer "yes" to the question "*Are you, alone or with others, now trying to start a new business?*", and meet several additional criteria designed to identify "genuine" NEs (see below). Asking a large sample of respondents directly if they are nascent entrepreneurs carries several advantages. First, as only about one half of all aspiring business founders succeed in creating new organisations that appear in public records (Aldrich, 1999), the PSED enjoys more complete coverage of NEs than published records of new organisations. Second, the PSED can overcome problems of "hindsight" and "survival" bias that are present in *ex post* studies of entry. Hindsight bias arises when entrepreneurs conflate events that occurred after start-up with those before and at the time of start-up; and survival bias arises from analysing (selected)

samples of start-ups that survived rather than the set of all start-ups (Gartner and Carter, 2003). In practice, many new venture efforts are selected for survival before evidence of them is inscribed in conventional published records.

As well as addressing an important and policy-relevant question, the present article attempts to make two novel contributions. First, it contributes to theory development, with a model of optimal nascent entrepreneurs' choices in the presence of a valuable outside option. The model is estimated using a selectivity-corrected maximum-likelihood multinomial logit estimator to allow for polychotomous choices in the presence of possibly non-random attrition. Second, it analyses NEs' choices using only variables whose values are initially observable and verifiable at the outset to outside stakeholders. We argue that this is likely to enhance the practical value and policy relevance of our results (cf. Cooper et al., 1994).

Our findings can be summarised as follows:

- Nascent entrepreneurs are much more likely to make a transition to actual entrepreneurship if they have established credit with suppliers and received some money from nascent operations already; if they own their home; are planning a sole venture; and if they are a household head. There is also some evidence that involvement in government- and university- or business- funded business assistance programs increases the probability that nascent entrepreneurs start up.
- Sole ventures¹ are initiated by individuals with many years of experience in the industry and tend to involve long gestation periods.
- Nascent entrepreneurs who take longer to launch their ventures tend to be savers who provide more self-finance on average; but who have not yet established strong links with suppliers or customers. They are also more likely to be non-white.
- Nascent entrepreneurs who give up altogether are more likely to be white; to have invested no money of their own in the enterprise; to have no hired workers; and to lack a post-high school degree.
- There appear to be no significant differences in NE outcomes by gender or wealth endowment;

nor are there significant differences by region, industry or product line. These findings highlight the widespread and ubiquitous nature of the nascent entrepreneurship phenomenon.

We draw several policy implications from these results. First, lenders might consider adding several specific venture characteristics and features of the NEs' initial activities to their loan screening criteria. Second, our results provide indirect support for current US Federal policies of targeting loan assistance programs on ethnic minority starts. Third, nascent entrepreneurs might find some particular business assistance programs worth investing in; and participation in those programs might therefore transmit a favourable signal to small business lenders.

The remainder of the article is structured in the following way. Section 2 develops the theoretical model. Section 3 discusses the PSED and issues relating to variable selection. Section 4 describes the variables used in the empirical analysis. Section 5 presents the results, and Section 6 concludes with a discussion of policy implications and possibilities for future research.

2. The model

This section is in two parts. The first contains a model of nascent entrepreneurial outcomes based on the principle of utility maximisation. This model will prove useful later for obtaining a table of hypotheses about how particular socioeconomic variables affect these outcomes. Second, we show how the model leads directly to an operational econometric model, the multinomial logit.

2.1. The utility maximisation problem

Consider a utility maximising nascent entrepreneur indexed by i . There are two time periods: $t = 1$ denotes the current time, and $t = 2$ the future. At $t = 1$, i can choose one of three outcomes, given by the variable Z_i :

$$Z_i = \begin{cases} 0 & \text{if } i \text{ remains a NE} \\ 1 & \text{if } i \text{ starts the firm} \\ 2 & \text{if } i \text{ gives up / quits} \end{cases} \quad (1)$$

This classification is based directly on the PSED questions which ask a NE whether they are still

involved in start-up activities ($Z_i = 0$); whether they are operating their business ($Z_i = 1$); or whether the business is no longer worked on by anyone ($Z_i = 2$). Carter et al. (1996) used a similar classification.

NE i obtains utility $U_i = U(Z_i, X_i)$ from her decision Z_i at $t = 1$ and from a set of personal and environmental characteristics, X_i . But the NE must also take into account utility in the future, i.e., $t = 2$. Future utility is unknown because events are uncertain. Denote the conditional probability of operating a business at $t = 2$ by $p_i = p(Z_i, X_i)$. This depends on the initial choice Z_i at $t = 1$ because, for example, waiting ($Z_i = 0$) might ultimately increase p_i for some NEs. On the other hand, getting started right away ($Z_i = 1$) might be better for other NEs with different characteristics and circumstances X_i . Likewise, if the NE gave up at $t = 1$ (i.e., if $Z_i = 2$), then this might also affect their probability of ever starting a venture in the future.

If the NE i is not in business at $t = 2$, she obtains utility from some other kind of work, e.g., paid employment. Denote that utility by $w_i \equiv U(2, X_i) \geq 0$. Letting j denote one of the three possible choices at $t = 1$, and $\beta > 0$ the intertemporal discount rate, the NE at $t = 1$ seeks to choose Z_i optimally. This involves picking the outcome $Z_i = j$ that yields the highest expected utility. NE i therefore has the objective to maximise her total two-period utility (V_{ij}) which can be expressed as follows:

$$\max_j \{V_{ij}\} \quad (2)$$

where

$$V_{ij} = U(j, X_i) + \beta \cdot \{p(j, X_i) \cdot U(1, X_i) + [1 - p(j, X_i)] \cdot w_i\} \quad j = 0, 1, 2. \quad (3)$$

Note that X_i and w_i affect i 's choice Z_i in two different ways. One is through the current payoff $U(j, X_i)$ —the first term of (3). The other is through the longer-term consequences of their decision at $t = 1$, which is the second term [i.e., $\beta \cdot \{ \cdot \}$] of (3).

Some variables are likely to affect current and future payoffs, and hence NEs' decisions, in different ways. This insight will prove to be key to understanding our empirical results.

Specifically, it can help explain why some personal characteristics encourage NEs to wait before launching a venture, while others have the opposite effect. For example, consider the following three attributes: social capital, wealth, and education. It seems reasonable to suppose that productive social capital increases the relative payoff from operating a venture [i.e., $U(1, X_i)$] relative to the other alternatives, which therefore increases the likelihood of observing outcome $Z_i = 1$ relative to $Z_i = 2$ (see, e.g., Davidsson and Honig, 2003). In contrast, greater household income or wealth decrease the opportunity cost of remaining a NE, giving the NE opportunities to improve her business idea pre-launch. This increases $p(1, X_i)$ and hence the likelihood that $Z_i = 0$ is chosen relative to $Z_i = 1$ or $Z_i = 2$. In contrast, higher levels of education are associated with greater opportunity costs of being a nascent entrepreneur (Gimeno et al., 1997), because incomes in paid employment (w_i) are positively related to education and experience (Card, 2001).

To see the above arguments formally, consider some characteristic $X_i^a \in X_i$ and notice that a rational NE must anticipate $U(1, X_i) > w_i$ (otherwise, it would not make sense ever to be a NE). Consider what happens if NE i chooses to start up. This corresponds to $Z_i = j = 1$, so we focus on V_{i1} . Write $p_i := p(j, X_i)$ for brevity and differentiate V_{i1} with respect to X_i^a :

$$\begin{aligned} \frac{\partial V_{i1}}{\partial X_i^a} &= \frac{\partial U(1, X_i)}{\partial X_i^a} (1 + \beta \cdot p_i) \\ &+ \beta [U(1, X_i) - w_i] \cdot \frac{\partial p_i}{\partial X_i^a} \end{aligned} \quad (4)$$

The first term on the RHS of (4) is the marginal utility induced by an increase in X_i^a given $j = 1$. The second term gives the discounted utility from the change in X_i^a affecting the probability of future success. The sign of the derivative in this second term—and hence that of $\partial V_{i1} / \partial X_i^a$ as a whole—is ambiguous *a priori*. The result depends on what the particular variable X_i^a is. To illustrate, suppose X_i^a denotes membership of an ethnic minority group which faces discrimination in the small business lending market (Blanchflower et al., 2003). As a result, i obtains a sub-optimal capital stock, and the probability her venture is

successful if started straightaway is low (Bates, 1990, 1997; Cooper et al., 1994). Then $\partial p_i / \partial X_i^a < 0$ and, since $U(1, X_i) > w_i$ as noted above, it follows that the second term of (4) reduces the value of $\partial V_{i1} / \partial X_i^a$ for minority members. But another option for the minority NE is to remain a NE a little longer and save to overcome the credit constraint, thereby eventually obtaining the optimal capital stock (Parker, 2000). Then in the corresponding equation

$$\begin{aligned} \frac{\partial V_{i0}}{\partial X_i^a} &= \frac{\partial U(0, X_i)}{\partial X_i^a} + \beta \cdot p \frac{\partial U(1, X_i)}{\partial X_i^a} \\ &+ \beta [U(1, X_i) - w_i] \cdot \frac{\partial p_i}{\partial X_i^a} \end{aligned} \quad (5)$$

we would have $\partial p_i / \partial X_i^a > 0$, increasing the attractiveness of V_{i0} . Therefore, the theory predicts that NEs who are members of ethnic minority groups might be more likely to continue in nascent entrepreneurship as NEs for a while compared with individuals who are not members of these groups.

The above example is illustrative. Clearly, the model can be used to make predictions for other characteristics, depending on their effects on the two terms on the RHS of (3). We do precisely this below when we outline the explanatory variables used in our empirical analysis; and we use similar reasoning to the foregoing to hypothesise about their likely impact on NE outcomes.

2.2. A statistical framework across individuals

The solution to the problem (2) given (1) and (3) can be written as

$$V_i^* = \max \{V_{i0}, V_{i1}, V_{i2}\} \quad (6)$$

An advantage of the model specification given by (1), (3) and (6) is that an econometric estimator can implement it directly. First, rewrite (3) more compactly as

$$\begin{aligned} V_{ij} &= V_{ij}(X_i, w_i) + \varepsilon_{ij} \\ &= V_{ij}(Y_i) + \varepsilon_{ij} = Y_i^T \gamma_j + \varepsilon_{ij} \end{aligned} \quad (7)$$

where $Y_i \equiv [X_i, w_i]$, and where γ_j are vectors of coefficients to be estimated, with T being the transpose operator. While we will not observe the w_i directly, we will invoke a standard

assumption that they are related to observable covariates X_i (see, e.g., Card, 2001). Also in (7), ϵ_{ij} is a disturbance term, reflecting the possibility of imperfect perception and optimisation, as well as the analyst's inability to measure exactly all of the relevant variables. Following McFadden (1973), if ϵ_{ij} follows the extreme value distribution, then [using (6) and (7)] the probability that a NE i ends up in outcome $Z_i = j$ is

$$\Pr[Z_i = j] = \frac{\exp(Y_i^T \gamma_j)}{\sum_{m=0}^2 \exp(Y_i^T \gamma_m)} \quad j=0,1,2 \quad (8)$$

This is the multinomial logit model, which is an extension of the popular binary logit model where the dependent variable encompasses more than two categories. This model can be estimated by maximum likelihood. The *marginal effects* of the independent variables on the probability of an individual ending up in a particular outcome are given by $\delta_j = \Pr[Z_i = j] \times (\gamma_j - \bar{\gamma})$, where $\bar{\gamma}$ is the mean vector computed across all status groups. Whereas the γ coefficients can be estimated only for outcomes $Z_i = 1$ and $Z_i = 2$, marginal effects can be computed for all three outcomes.

We will also apply a Heckman-type selectivity correction to control for potentially non-random attrition bias. This involves estimating a probit model of attrition and including among the covariates of (8) transformed probit predictions in the form of Inverse Mills Ratios (Van de Ven and van Praag, 1981). These are denoted below by λ_j . Statistically significant values of λ_j flag the importance of correcting for sample attrition. The (probit) determinants of attrition from the PSED will be of some interest in their own right, and so will be reported separately below.

3. Data

3.1. The PSED

The data set used in this study is the Panel Study of Entrepreneurial Dynamics (PSED). This is a representative sample of American adults first interviewed between July 1998 and May 1999 (in the so-called “screener” inter-

view), with the nascent entrepreneurs identified from this process re-interviewed immediately afterwards in what the PSED refers to as “Wave 1”. These cases were then re-interviewed 12 months afterwards in Wave 2.² As well as having to answer “yes” to the question “*Are you, alone or with others, now trying to start a new business?*”, an individual only qualifies as a NE if they expect to be owners or part owners of the new firm; have been active in trying to start the new firm in the past 12 months; and are still in the start-up or gestation phase of an independent firm (Shaver et al., 2001).³ The PSED data come with weights to make them truly representative of the US population: see Curtin and Reynolds (2004) for details. All econometric results reported below are based on weighted data, and were cleaned using Kelly Shaver's ksclean04.sps algorithm available from shaverk@cofc.edu.

To give some idea about the diversity of NEs' outcomes, and hence the value of being able to predict future outcomes based on observable initial characteristics, consider the first column of Table I. This shows the outcome in Wave 2 of the PSED's “Mixed Gender” samples of NEs that are used in this paper.⁴ What is striking is the diversity of outcomes among the NEs in the sample. Continuation in NE is the modal category in Wave 2, one year after the initial interview. This differs from Carter et al.'s (1996) findings from a study of 71 American NEs, summarised in column 2 of Table 1, and from van Gelderen et al.'s (2001) Dutch results summarised in column 3. The PSED outcomes are more similar to those of Diochon et al. (2003) in column 4, for Canadian nascent entrepreneurs. Different sampling conventions and cross-country differences between the PSED and van Gelderen et al. and Diochon et al.'s data, and a small sample size in the case of Carter et al., might explain these differences. Another possible explanation is that PSED study was conducted in the late 1990s when the popularity of entrepreneurship was peaking in the US, and when many dabblers may have been trying to emulate successful entrepreneurship stories that they heard about from the media.

TABLE I
What happens to nascent entrepreneurs after one year

Outcome	PSED	Carter et al. (1996)	Van Gelderen et al. (2001)	Diochon et al. (2003)
Still Nascent	159 (47%)	21 (30%)	89 (27%)	51 (39%)
Operating	112 (33%)	34 (48%)	155 (47%)	45 (34%)
Gave Up	69 (20%)	16 (22%)	86 (26%)	36 (27%)
Total	340 (100.0%)	71 (100.0%)	330 (100.0%)	132 * (100.0%)
Country	USA	USA	Netherlands	Canada

Numbers of cases appear as the first cell entries, with sample percentages in parentheses.

* For comparative purposes, the calculation based on Diochon *et al.*'s data excludes 19 cases who could not be contacted after the first wave.

3.2. Selection of variables

If genuinely practical policy advice is to be given, we need to estimate (8) using only those variables whose values are exogenous, and are both initially observable and verifiable to external stakeholders. By initially observable, we mean the variables take values that are observed strictly prior to the NEs' decisions about whether to launch or not. The alternative—of predicting NE choices using current-dated variables—is unsatisfactory for three reasons. First, it does not mirror the position that stakeholders usually find themselves in, which is to decide whether or not to support NEs before their performance becomes known. Second, “predicting” choices conditional on contemporaneous data is not really prediction in the true sense of the term. This is related to a third problem, which is that the use of contemporaneous data is vulnerable to the problem that some of the “explanatory” variables are jointly determined (endogenous) with the variables being explained. That generally leads to bias and hence inaccurate predictions (Greene, 2003). We address the endogeneity issue by exploiting the panel aspect of the PSED to measure the covariates X_i at the time of the Wave 1 interview, with outcomes Z_i measured at the subsequent Wave 2.

A variable is “verifiable” if its values can be observed accurately and objectively by stakeholders. For example, lenders can only usefully utilise predictive model if loan applicants answer questions accurately and reliably. When NEs know more about their true abilities and commitment than lenders do there is “asymmetric information”, i.e., from the lender's perspective,

a problem of hidden (entrepreneurial) types. Some NEs are good risks and others are bad risks, but lenders do not know which is which. A lender wants to identify variables that enable the good risks to truthfully reveal themselves. Knowing this, “bad” types have incentives to masquerade as “good” ones (Stiglitz and Weiss, 1981; Parker, 2003). By conditioning only on verifiable variables, the lender can make loan decisions that are robust to dissembling by ambitious but dishonest entrepreneurs.

An example of a verifiable variable is wealth, if lenders stipulate accurate disclosure of assets and posting of collateral as part of the loan contract. On the other hand, lenders cannot set too much store by entrepreneurs' own declared success prospects, given (a) entrepreneurs' incentives to over-estimate their abilities (Kessler and Frank, 2004) and (b) their well-known tendencies to do so (Cooper et al, 1988). And, there is no way that lenders can check on whether they are being untruthful, or simply naive. Consequently, few lenders would want to rely on such variables, so it makes sense to exclude them from our empirical framework. Hence our empirical analysis only uses verifiable variables taken from the PSED.

4. Variables used in the econometric analysis

Based on the structure of the model described above, as well as the restrictions placed on admissible covariates by the verifiability condition and the insights gleaned from previous entrepreneurship research, we identified several X_i variables from the PSED data set (italicised

below) that are likely to affect NEs' choices about whether to continue, launch, or quit. These are grouped into several categories for convenience:

In sections 4.1 through 4.5 below the model is used to predict the impact of various covariates under these headings on the outcomes of NEs. Section 4.6 discusses the specification of the sample selection (attrition) process. Precise definitions and details of the PSED variables can be found in Gartner et al. (1994). For convenience, the main hypotheses derived below are summarised in Table II, while empirical definitions and summary statistics of all covariates are collected in Table III. Sample sizes are given in Table I.

4.1. *The cost of waiting*

Research on real options indicates that it is optimal for an investor to wait (delay the

investment) when the option value of waiting exceeds the value of investing immediately (Dixit and Pindyck, 1994). Studies on entrepreneurial initiatives pointed out that an entrepreneur is likely to "wait and see" when committing resources to new ventures (MacDonald and Seigel, 1986; Ingersoll and Ross, 1992; Power and Reid, 2005). It is also generally held that greater wealth and income enable the NEs to get by while they develop their new business (Boden and Nucci, 2000). Similarly, wages do not only contribute to the survival of the individual by covering living expenses, they also contribute to the venture insofar as they can be invested into it (Lévesque and MacCrimmon, 1997). This implies that the presence of resources, in particular financial resources, decreases the opportunity cost of waiting. On the other hand, early starts might involve risking a NE's wealth and increasing the venture's exposure to uncertainties.

TABLE II
Hypothesised effects of explanatory variables on nascent entrepreneurs' outcomes

	Outcome		
	Still NE: Z = 0	Started: Z = 1	Quit: Z = 2
Wealth	+	-	-
Log household income	+	-	-
Invested own money	+	-	-
Saving money for the start-up	+	-	-
Home ownership	-	+	-
Home-based venture	+	-	-
Household head	-	+	+
Household size	-	+	+
Children under 6	-	+	+
Children 7–12 years	-	+	+
Non-white	+	-	-
Has hired workers	-	+	-
Has credit with suppliers	-	+	+
Works full-time	-	+	-
Received money	-	+	+
Time spent planning start-up	-	-	+
Prepared a business plan	-	+	+
Post-high school degree	-	?	?
College degree	-	?	?
Age	-	?	?
Full-time work experience	-	?	?
Previous business experience	-	+	-
Unemployment status	+	-	+
BAP participation	+	+	-
Self-employed parent	?	?	-
Kin own business	?	?	-
Friends own business	?	?	-
Sole start-up	?	?	+

TABLE III
Summary statistics

Variables	Definition	Mean	Std.Dev.
Wealth [§]	Household net worth (\$, hundreds)	2105.27	4322.66
Household income ^ψ	Log income in the previous year (\$)	9.98	3.01
Invested own money	= 1 if so, otherwise coded 0	0.74	0.36
Home ownership	= 1 if so, otherwise coded 0	0.71	0.45
Home-based venture	= 1 if so, otherwise coded 1	0.67	0.47
Household head	= 1 if so, otherwise coded 0	0.93	0.26
Household size ^ψ	# members	3.20	1.63
Children under 6 ^ψ	# children in age range	0.39	0.82
Children 7–12 years ^ψ	# children in age range	0.46	0.80
Non-white	= 1 if so, otherwise coded 0	0.21	0.40
Has hired workers	= 1 if so, otherwise coded 0	0.15	0.35
Has credit with suppliers	= 1 if so, otherwise coded 0	0.36	0.48
Works full time	= 1 if so, otherwise coded 0	0.27	0.44
Received money	= 1 if any received from customers, else 0	0.46	0.50
Prepared a business plan	= 1 if so, otherwise coded 0	0.58	0.49
Saving money	= 1 if so, otherwise coded 0	0.64	0.48
Time planning start-up ^ψ	# months thought about starting up	46.94	70.24
Post-high school degree	= 1 if so, otherwise coded 0	0.31	0.46
College degree	= 1 if so, otherwise coded 0	0.26	0.44
Age ^ψ	In years	41.27	11.32
Full time work experience ^ψ	In years	4.54	8.79
Prev. business experience	= 1 if so, otherwise coded 0	0.54	0.56
Unemployment status	= 1 if so, otherwise coded 0	0.09	0.29
BAP participation	= 1 if so, otherwise coded 0	0.17	0.38
Self-employed parent	= 1 if so, otherwise coded 0	0.50	0.50
Kin own business	= 1 if so, otherwise coded 0	0.64	0.48
Friends own business	= 1 if so, otherwise coded 0	0.76	0.43
Sole start-up	= 1 if so, otherwise coded 0	0.46	0.50
Durable good	= 1 if so, otherwise coded 0	0.03	0.18
High-tech	= 1 if so, otherwise coded 0	0.36	0.48
Married	= 1 if so, otherwise coded 0	0.64	0.48
Female	= 1 if so, otherwise coded 0	0.43	0.50
Homemaker	= 1 if so, otherwise coded 0	0.39	0.49
North-east	= 1 if so, otherwise coded 0	0.19	0.39
Mid-west	= 1 if so, otherwise coded 0	0.25	0.43
West	= 1 if so, otherwise coded 0	0.23	0.42

All variables are dummy variables except for those indicated by ^ψ.

[§] Includes housing equity.

As explained in Section 2.1, covariates that reduce the cost of waiting [i.e., which increase $U(0, X_i)$] and thereby enable NEs to increase their prospects of ultimate successful entry, p_i , are likely to be associated with outcomes $Z_i = 0$. Following the abovementioned arguments, we expect the cost of waiting to be decreased by the following variables: *Wealth*; *Household Income*; and whether the individuals have *Invested their own money*. The cost of waiting could be seen as expensive for those who have domestic commitments and little financial

means (wealth, income) to sustain their families while planning the venture (Nieva, 1985; Brush, 1997). On the other hand, *Household Heads* who have a sufficient source of income—as might be the case for those planning to set up the venture as a side-activity—may prefer to wait in order to assess better the viability of the venture since they have to provide for their families. The inclusion of household income controls for this possibility; the implication is that “part-time” NEs have lower costs of waiting (see below). To control for various domestic commitments we

consider the following variables: *Household Size*, having *Children under 6* or *7–12 years old*.

Home equity can be used as collateral for outside finance⁵ and, hence, *Home ownership* is another factor that increases the likelihood of starting since the capital raised may allow them to become operational quickly: they do not have to wait to accumulate capital by saving (Parker, 2000). Whereas by setting the business from home (*Home-based*⁶) the NE does not incur in additional interest or rental payments, thus the pressure to start early is reduced. Consequently we would expect this covariate to be associated with $Z_i = 0$ outcomes, but not with $Z_i = 1$ or 2 outcomes. The same is true for covariates that substantially increase the probability of ultimate success, p_i . As discussed in Section 2.1, such a variable may be *Non-white* ethnicity.

4.2. Process activities

Process activities indicate how far along the road towards start-up the NE already is. Prior studies indicate the importance of these activities for NEs in starting a venture. For example, Davidsson and Honig, (2003) argue that “the further into the start up process one gets, the more specific and idiosyncratic will be the resources and information needed for further successful completion of the process” (p. 303). On the other hand Carter et al. (1996) shows that NEs who give up carry out similar activities to those who start. This suggests that those who undertake more activities are less likely to continue to wait: equivalently, they are more likely to either start or quit. The above discussion indicates that some specific activities can lead to either outcomes $Z_i = 1$ or $Z_i = 2$ (starting or quitting), rather than $Z_i = 0$. Hence, we consider variables that measure the extent of the process activity such as *Prepared a business plan*; *Established credit with suppliers*; *Received money* or orders from customers.⁷ By undertaking these activities, a NE might gauge the feasibility of the venture. Conversely, those who are currently *Saving Money* to invest in their business are more likely to continue to wait ($Z_i = 0$).

Carter et al. (1996) also point out that those who eventually give up decrease their activities as time goes by until they stop altogether.

Hence, we expect some activities to be specific to those NEs who are more likely to start [and thereby $U(1, X_i)$]. For example commencing the process of hiring workers (*Has hired workers*) and *Working Full Time* on planning the venture⁸ should increase the likelihood of $Z_i = 1$. Further, we control for the time NEs spend developing their ideas (*Time spent planning the start-up*) since Reynolds (1994) show that American NEs report starting a business within 12 to 18 months, while those who give up tend to take over 2 years to indicate that they quit. So, longer gestation periods should be more commonly associated with the outcome $Z_i = 2$.

4.3. Human capital

Previous research suggests that human capital that can be used productively outside entrepreneurship increases the likelihood that NEs will choose $Z_i = 2$ relative to $Z_i = 0$ or $Z_i = 1$; whereas human capital that can be used productively within entrepreneurship increases the likelihood that NEs will choose $Z_i = 1$ relative to $Z_i = 0$ and $Z_i = 2$ (Carter et al. 1996; Gimeno et al., 1997). Hence the overall impact on NE outcomes of generally productive human capital is ambiguous for the outcomes $Z_i = 1$ and $Z_i = 2$. Human capital that is generally productive includes education and experience (Becker, 1975). The education component of human capital is measured in terms of whether individuals have a *Post-high school degree* or a *College Degree*. The experience component of human capital is measured in terms of *Age*, *Years of full-time work experience*, and *Previous business experience*⁹ (see Evans and Leighton, 1989). We expect the effects of age and years of general experience to have similar effects on NE outcomes as education, whereas previous business experience is associated with a higher probability of success now, suggesting that $Z_i = 1$ is more likely than $Z_i = 0$ or $Z_i = 2$. And to the extent that *Unemployment status* is associated with lower levels of generally productive human capital, we would expect to observe the opposite effects as those predicted for previous business experience.

We also control for another type of human capital that is more or less specific to

entrepreneurship, namely the skills and knowledge obtained via *Business Assistance Program participation* (BAP: see Dennis, 2003; Dennis and Reynolds, 2004). These assistance programmes provide a wide range of specific information, such as, financial (obtaining finance, understanding financial statements and improving accounting understanding); marketing (obtaining customer /industry data and implementing a marketing strategy); and other strategic aspects of starting a venture. This explicit knowledge complements formal education, and if effective, BAPs either equip the NE to start up sooner, or counsel the NE to adopt a more careful and planned approach to start-up. This suggests outcomes $Z_i = 0$ or $Z_i = 1$. And reflecting their pro-business stance, we would not expect this variable to be associated with quits, making $Z_i = 2$ less likely.¹⁰ In our empirical work, we will also dig deeper into the BAP issue in two ways. First, we will control for whether nascent entrepreneurs are *Aware of BAPs*. If this dummy variable is significant, there might be self-selection into programs that would affect our interpretation of their effectiveness. We will also explore separately whether the funding source of the programs (*Government sponsored BAP* or *University/Business Association sponsored BAP*) makes any differences to their impact on NEs.

4.4. Social capital

Social capital is the sum of the actual and potential resources that individuals obtain from their relationships with others. It is generally held that social capital helps NEs to obtain valuable resources needed at the start-up stage (Shane and Cable, 2002). Social capital has been measured in various ways in previous entrepreneurship research (Baron and Markman, 2000). One way is in terms of family or friends who are in business. This might capture the benefits of networks, the transmission of valuable experience, and possibly also beneficial role model effects (Davidsson, 2004). Hence, it could be argued that the presence of social capital makes it more likely for a NE to develop a viable business idea. Although some studies suggest that those who have self-employed relatives or

friends are more than twice as likely to become NEs,¹¹ there is no general consensus as whether having parents or friends owning businesses increases the propensity of a NE of actually starting a venture. For instance, Davidsson and Honig (2003) show that a NE who has neighbours or close friends who own businesses is more likely to report a first sale or profit, whereas Delmar and Gunnarsson (2000) find that having self-employed friends and kin running a business does not have a significant positive impact on successfully starting a venture.

In terms of the theory, social capital increases the value of immediate [and thereby $U(1, X_i)$] or eventual [and thereby $U(0, X_i)$] entry. This makes the likelihood of start-up ($Z = 1$) relative to waiting ($Z_i = 0$) ambiguous, but the likelihood of quitting ($Z_i = 2$) relative to waiting negative.¹² Following De Wit and van Winden (1989) and Davidsson (1995), we measure social capital in terms of whether the NE has a *Self-employed parent*, or know *Kin who own businesses* or *Friends who own businesses*. We also measure the absence of social capital in *Sole starts*, which do not enjoy benefits conveyed by other members of start-up teams, such as networks, complementary strengths, fresh ideas and pressure to expedite the start-up.

4.5. Miscellaneous control variables

We also included several control variables to capture various manifestations of NE heterogeneity in the sample. These are all verifiable and observable, and include whether the entrepreneur is planning to sell a *Durable good*, and whether the venture is a *High-tech start*. We also controlled for whether the individual was *Married*, *Female*, or a *Homemaker*; and all results include (unreported) industry dummies. In contrast to the key variables discussed above, the model does not make predictions about the direction of these variables, so there are no corresponding entries in the set of hypotheses collected in Table II.

Several variables present in the PSED dataset were deliberately excluded from the analysis because they do not satisfy the verifiability criterion. These include the NE's cognitive characteristics and attitudes (Shaver and Scott,

1991); their declared career reasons (Krueger and Brazeal, 1994; Kolvereid, 1996; Carter, Gartner, Shaver and Gatewood, 2003); their expectations, aspirations and satisfaction (Gatewood, 2004); their decision-making style and social skills (Kanfer, 1990; Johnson et al., 2004); and the way that they perceive the entrepreneurial climate and new opportunities (Long and McMullan, 1984; Davidsson and Wiklund, 1997). These variables are difficult or impossible for an outside stakeholder to verify objectively; and they might also be prone to inaccurate responses. As will be seen below, the exclusion of these variables does not appear to hinder the econometric performance of the model, which turns out to be reasonably successful at predicting NE outcomes. This might be because our set of explanatory variables is quite comprehensive, encompassing many of those used in previous studies. And, as Reynolds and White (1997, Chap. 4) point out, there appears to be a weak relationship between start-up outcomes and measures of judgement or attitudes. Of course, it remains possible that we have missed some other important explanatory variables, which future research might help to identify.

4.6. Sample attrition

To control for possible bias caused by attrition from the sample, the probability of attrition is estimated using a bivariate probit model whose Inverse Mills Ratios are added to the multinomial logit model. This procedure was used by van de Ven and van Praag (1981), who argued that in the context of polychotomous choice models it is an approximation to the well-known two-stage Heckman (1979) procedure. To achieve identification, the set of variables used in the selection model were the same as those used in the multinomial logit, with two exceptions. First, the selection equation included three broad regional dummy variables (location in the North-East, North-Central and South) to capture the possibility of different regional migration patterns. The broad-based nature of the start-up phenomenon does not lead us to expect that these factors will help predict NE outcomes. Second,

while our theoretical work suggests that ethnicity may affect NE outcomes through unequal access to credit, we do not have any reason to suppose that there are ethnic differences in attrition. We will provide some empirical support for these exclusion restrictions below.

5. Results

In this section, we present estimates of the determinants of NE outcomes. Table IV presents estimates from the multinomial logit model, while Table V presents results from estimating the sample attrition process. The results at the foot of Table IV indicate reasonably good predictive power for the multinomial logit model.¹³ Both multinomial log-odds (L-O) coefficients and marginal effects (M-E) are reported, including those of the (sample selection) Inverse Mills Ratios, λ_j .¹⁴ The various hypotheses generated by the theory can be tested by comparing the predictions in Table II with the estimates reported in Table IV.

This section is structured as follows. Section 5.1 reports results by category of the variables considered in Section 4; Section 5.2 summarises the determinants of the three outcomes; and Section 5.3 reports results for the attrition process. In all cases, we will focus most attention on the statistically significant covariates.

5.1. Significant covariates

5.1.1. Cost of waiting variables

The cost of waiting appears to be an empirically helpful tool for understanding what happens to nascent entrepreneurs. In line with our hypotheses, non-white Americans are significantly more likely to remain in nascent entrepreneurship, and significantly less likely either to start up or to quit. This might reflect their need to obtain more resources in the face of limited access to credit markets. Also, NEs who invested in their project, and who belonged to households with higher incomes, are significantly more likely to wait than to launch. The presence of financial resources appears to decrease the opportunity cost of waiting. One might speculate that greater wealth allows a NE to spend

TABLE IV
Determinants of outcomes of nascent entrepreneurs: significant marginal effects

Explanatory Variables	Still NE (Z = 0)	Start Operating. (Z = 1)		Quit (Z = 2)	
		M-E	L-O	M-E	L-O
Constant	0.038	-0.260	-0.925	0.222	1.063
<i>Value of an outside option</i>					
Wealth	-0.001	-0.001	-0.001	-0.001	-0.001
Log household income	0.019	-0.019 ^c	-0.098 ^c	0.001	-0.036
Invested own money	0.030 ^a	-0.017	-0.115 ^b	-0.014	-0.128 ^b
Home ownership	-0.091	0.148 ^b	0.664 ^c	-0.058	-0.116
Home-based venture	0.019	-0.079	-0.293	0.061	0.273
Household head	-0.189	0.253 ^c	1.204 ^c	-0.065	0.047
Household size	-0.011	0.033	0.126	-0.022	-0.090
Children under 6	0.026	-0.069	-0.276	0.044	0.176
Children 7–12 years	0.027	-0.020	-0.119	-0.007	-0.087
Non-white	0.225 ^a	-0.104	-0.787 ^b	-0.122 ^b	-1.076 ^b
<i>Process activities</i>					
Has hired workers	0.077	0.120	0.240	-0.196 ^b	-1.159 ^c
Has credit with suppliers	-0.175 ^b	0.224 ^a	1.081 ^a	-0.050	0.095
Works full time	0.033	0.021	-0.001	-0.054	-0.339
Received money	-0.185 ^b	0.198 ^a	1.016 ^a	-0.013	0.307
Time planning start-up	0.001	-0.001	-0.005	0.001	-0.001
Prepared business plan	-0.076	0.009	0.179	0.068	0.501
Saving money	0.128 ^c	-0.100	-0.583 ^c	-0.028	-0.398
<i>Human capital</i>					
Post-high school degree	0.105	0.140 ^b	0.248	-0.244 ^a	-1.461 ^a
College degree	0.027	0.091	0.244	-0.118 ^c	-0.656
Age	0.002	-0.002	-0.009	-0.001	-0.004
Full-time work experience	-0.008	0.004	0.028	0.005	0.037
Prev. business experience	-0.026	0.008	0.077	0.019	0.147
Unemployment status	0.141	-0.11	-0.642	-0.031	-0.441
BAP participation	-0.099	0.099	0.520	0.001	0.203
<i>Social capital</i>					
Self-employed parent	0.130 ^c	-0.113 ^c	-0.627 ^b	-0.018	-0.351
Kin own business	-0.109	0.093	0.522	0.017	0.302
Friends own business	-0.031	0.068	0.280	-0.038	-0.131
Sole start-up	-0.093	0.134 ^c	0.622 ^c	-0.041	-0.023
<i>Control variables</i>					
Durable good	-0.030	-0.047	-0.093	0.077	0.453
High-tech	0.027	-0.050	-0.215	0.023	0.061
Married	0.077	-0.167 ^b	-0.699	0.090	0.306
Female	-0.044	0.021	0.153	0.023	0.204
Homemaker	0.125 ^c	0.015	-0.202	-0.140 ^b	-0.967 ^b
λ (inverse Mill's ratio)	0.162	-0.018	-0.380	-0.145	-1.065
<i>Log-Likelihood</i>			-311.519		
χ^2 (70)			144.583		
<i>Pseudo R-squared</i>			0.129		
<i>Actual Frequency</i>		159	112	69	
<i>Predicted Frequency</i>		183	113	44	

Weighted method of estimation: multinomial logit with robust standard errors. Sample size: 340. L-O is log-odds ratio (β coefficient estimate); M-E is marginal effect (d). Superscripts a, b, and c indicate statistical significance at 1%, 5%, and 10% respectively.

more time exploring the viability of the initial idea of the venture, hence delaying the entry (or exit) decision. Home owners are significantly more likely to start up. This suggests that some NEs may borrow capital and use their homes as collateral. To the best of our knowledge, these are all new findings except the last one; a positive relationship between home ownership and start-ups has been observed by previous authors (see e.g., Black et al., 1996).

5.1.2. *Process activities variables*

Being more involved in the process of start-up—in particular, having received money and established credit with suppliers—is significantly positively associated with venture start-up and negatively associated with remaining nascent. These findings are consistent with previous studies of nascent entrepreneurs which have shown that NEs who reach important “milestones” are more likely to complete the start-up

TABLE V
Attrition from the PSED

Explanatory Variables	Probit coefficient	Standard error
Constant	−0.126	0.475
Wealth	−0.001 ^b	0.001
Log household income	−0.027	0.022
Invested own money	−0.048 ^b	0.022
Saving money	0.218	0.156
Home ownership	−0.119	0.151
Home-based venture	−0.137	0.157
Household head	0.329	0.272
Household size	−0.031	0.074
Children under 6	−0.017	0.117
Children 7–12 years	−0.064	0.127
Has hired workers	−0.115	0.228
Has credit with suppliers	−0.129	0.159
Works full time	0.212	0.164
Received money	−0.301 ^b	0.157
Time planning start-up	−0.002	0.002
Post-high school degree	0.032	0.174
College degree	0.303 ^b	0.175
Age	−0.002 ^c	0.001
Full time work experience	0.005	0.011
Prev. business experience	0.067	0.054
Unemployment status	0.215	0.244
Prepared a business plan	0.421 ^a	0.151
BAP participation	−0.467 ^c	0.230
Self-employed parent	0.185	0.141
Kin own business	−0.062	0.153
Friends own business	−0.186	0.168
Sole start-up	0.266	0.162
Durable good	0.404	0.398
High-tech	0.097	0.147
Married	−0.312 ^b	0.162
Female	−0.247	0.177
Homemaker	−0.010	0.158
North-east	−0.030	0.192
Mid-west	−0.476 ^b	0.206
West	−0.051	0.182
<i>Log-Likelihood</i>	−269.583	
$\chi^2 (36)$	75.765 ^a	

Dependent variable takes value 1 if the individual attrited from the sample and 0 otherwise. Sample size 442. Superscripts a, b, and c indicate statistical significance at 1%, 5%, and 10%, respectively, based on robust estimated standard errors

process (Carter et al., 1996; Davidsson and Honig, 2003; Delmar and Shane, 2004; Kessler and Frank, 2004). As predicted, NEs who are currently saving money are significantly more likely to wait. This could indicate that NEs who are devoting their efforts toward saving money to invest in the venture are forced to wait until the required capital is raised; this would be consistent with the results reported by Carter et al. (1996). However, this does not seem to be the whole story as—contrary to the predictions of our theoretical model—NEs who have hired workers are not significantly more likely to start up or quit after one year. It is possible that the hiring of employees points to the creation of more ambitious enterprises which have a longer planning horizon, and about which the NE is more sanguine. Yet, this is only a tentative conjecture, and more research is needed to investigate it further. Similarly, preparing a business plan does not appear to influence the NE's decision. One possible explanation is that business plans are written on the basis of expectations and hence may not capture effectively how sound the business idea is. It would be interesting for future studies to control for this, by questioning the content rather than merely reporting whether the NE has prepared a business plan. Also unexpected was the insignificance of a control for how long NEs had been planning their start-up. If NEs were serious about start-up, then, *ceteris paribus*, having longer to think about and plan the start-up would be expected to translate into greater readiness to launch. But this variable has no significant effect on NE outcomes. One possibility is that the sample contains numerous dillettante “dreamers” who like to consider themselves as entrepreneurs in the making, but who have no real intention of ever starting up.¹⁵ We did not build this possibility into the theoretical model, though by conditioning on it empirically, we felt that a cleaner test of the other model hypotheses could potentially be made.

5.1.3. Human capital variables

Relatively well-educated NEs, especially those with post-high-school degrees, are significantly less likely to quit NE status within a year, and

significantly more likely to start up. In terms of the theoretical model, this suggests that general human capital is more productive within entrepreneurship than outside it, making start-ups more worthwhile pursuing than quitting. The finding of a positive effect of human capital on start-up choice is consistent with previous studies by Evans and Leighton (1989), Bates (1997), Schuetze (2000) and Lofstrom (2002), among others. However, none of age, previous general experience, experience in business ownership, or unemployment status appears to significantly affect NE outcomes. This is quite a striking finding, contrasting with previous evidence about their impact on *becoming* a nascent or actual entrepreneur (see, e.g., Reynolds, 1997; Delmar and Davidsson, 2000; van Gelderen et al., 2001; Delmar and Shane, 2004; Reynolds et al., 2004). This again illustrates the importance of distinguishing between factors affecting the propensity to be a NE, and the subsequent outcomes conditional on having chosen to be a NE in the first place.

Interestingly, participation in business assistance programs (BAPs) does not appear to significantly affect NE outcomes. This raises a question about the value (in terms of facilitating start-ups) of investing in these activities. To explore the BAP issue more deeply, we checked whether the results might merely reflect ignorance about BAPs within the sample. To test this possibility, we created a dummy variable *Awareness* which takes the value unity for cases who were aware of BAPs and zero otherwise. If, conditional on awareness, BAPs still play an insignificant role, then this strengthens our inference about their genuine lack of importance. Re-running the model to include this variable did not change the results; the awareness variable was insignificant in every outcome.¹⁶ Another possibility is that the use of a single BAP dummy variable for participation in schemes is too blunt an instrument to identify the impact of individual assistance programs. We explored this issue by creating separate dummy variables for whether BAPs were provided by the government (*G-BAP*) or by university/business associations (*UB-BAP*).¹⁷ These variables both load positively on to the start-up outcome, with marginal effects of 0.239 and

0.228, respectively, and standard errors of 0.143 and 0.126, making them significant at the 10 per cent level. The similarity of the two marginal effects suggests that these programs are virtually equally effective in turning NEs into actual entrepreneurs. However, we acknowledge an important caveat that these results do not necessarily capture the long term effects of BAPs. We lack information about when the NEs participated in them; and we would need a longer span of data to identify any further delayed effects.

5.1.4. *Social capital variables*

Social capital seems to have relatively weak effects on NE outcomes. Among the variables considered, only having self-employed parents and operating a sole venture affect the likelihood of start-up. The role of parents is broadly consistent with evidence of strong intergenerational links in the self-employment literature (Dunn and Holtz-Eakin, 2000; Lin et al., 2000) and suggests that there is on average a substantial benefit from waiting, perhaps in order to inherit the parent's business. Regarding sole starts, although previous studies (e.g., Aldrich et al., 2004; Delmar and Shane, 2004) point to the fact that the majority of NEs work in teams, there is some evidence that team ventures are only half as likely to realise their start-ups (Kessler and Frank, 2004).¹⁸ This could be related to the complex nature of team start-up, in which conflicts may arise between the members as the business unfolds over time. Comparison between sole ventures and non-sole ventures in our sample is revealing: the former have, on average, greater experience in the industry (7.5 years compared to 1.8); take longer to start (50.8 months as opposed to 37.1); and have significantly less wealth (to be precise, 57% less). This suggests that NEs who have more experience in their industry are more likely to start solo.¹⁹ Moreover, relatively low levels of wealth might be both a motivation for becoming a NE (the venture is seen as a side-line activity that could boost long term wealth) and an explanation for the long gestation period, during which capital is raised.

5.1.5. *Control variables*

Only two control variables were significant. Homemakers were significantly less likely to quit nascent entrepreneurship relative to remaining nascent, while married NEs were significantly less likely to start-up. Homemakers might be more likely to remain a NE if they can plan in a more leisurely fashion while doing household chores. Gender, however, made no significant difference to NE outcomes, even though males are more likely to be NEs. Nor did industry dummies or the nature of the good (durable, high-tech) affect NE outcomes, suggesting that the prospects for NEs are broadly similar in these respects.

5.2. *Determinants of the three outcomes*

Here we look "down the columns" of Table IV rather than "across the rows", in order to determine which factors characterise NEs who start-up or quit rather than continuing in nascent entrepreneurship.

5.2.1. *Start operating*

Looking down the middle set of columns of Table 4, those NEs who go on to start a venture are significantly more likely to have established credit with suppliers; to have already received money from customers; to own their home; to be planning a sole venture; and to be a household head. This indicates a dominant role for financial waiting (opportunity) costs and process activities in driving the transition to start-up. However, unlike Carter et al. (1996), working full time on planning the venture does not appear to have a significant effect on start-up. This could be because NEs prefer to carry on working until the venture generates enough income to subsidise their needs. Human capital and social capital variables seem to play a lesser role: only a post-high-school degree and having self-employed parents affect (positively and negatively, respectively) the probability that a NE will start up after one year. The weakness of human capital indicators (years work experience, previous business experience and BAP participation) on the likelihood of starting is consistent with Davidsson and Honig's (2003)

who argue that human capital alone is not sufficient to start a new business.

5.2.2. *Still nascent entrepreneurs*

Looking down the first column of Table IV, NEs who continue to wait before launching do so for a mixture of reasons. Waiting appears to be beneficial for non-white NEs who might have to prepare for entry more thoroughly in the face of discrimination. This might be deemed a negative reason for waiting. Positive reasons for waiting are associated with the luxury of being able to plan start-ups in a more leisurely way, as tends to be the case for homemakers, and NEs who are investing their own money in the proposed venture. Thus the continuation decision seems to be shaped primarily by financial waiting (opportunity) cost factors. Process activity factors are also important, with NEs who have established networks with suppliers and who have received money being less likely to wait. On the other hand, NEs who are in the process of saving are more likely to wait. This may suggest that some NEs require longer periods to build up capital to invest in the venture. This period could be even longer for those who require substantial financial resources (Carter et al. 1996; Parker, 2000). Human capital plays a more secondary role: neither experience nor education is significant. Also, having self-employed parents is significantly associated with waiting. It is worth pointing out that our model envisages the benefits of waiting in terms of greater prospects of ultimate business success, which rational forward-looking agents take into account when making their choices. This is not the only possible explanation, however. Some NEs might be lethargic dreamers, whose declared intentions of eventually running a business are never really very likely to amount to anything; while others might genuinely be waiting in order to gather more information and resources before launching. To test this, we controlled for how long NEs had been thinking about starting their own business, but we found no evidence that this has a significant effect on any NE outcomes.

5.2.3. *Quitters*

A mix of different factors shapes NEs' decision to give up. Quitters are more likely to be white and to work without hired workers, while they are less likely to possess a post-high school degree or to have invested their own money in the enterprise. These factors point to limited investment of resources. It is worth noticing that 62% of the quitting sample reported they were saving money for the venture. Hence, it could be argued that at least some of these NEs had intended to invest some of their own money at a later stage, but the realisation that the business was not viable prevented them from doing so. NEs who give up are also less likely to be homemakers. Social capital variables do not seem to significantly affect the quit decision.

5.3. *Sample attrition*

Table V shows that attrition from the PSED is non-random.²⁰ Nascent entrepreneurs who leave the PSED between Waves 1 and 2 tend to have significantly lower wealth, and invest smaller amounts in their enterprises. They are more likely to be young, single, and well-educated, who have not yet received payments for their endeavours. These then would appear to be individuals with numerous valuable outside options, who are relatively mobile and have a low opportunity cost of leaving nascent entrepreneurship (c.f. Bates, 2005). Mid-Westerners are significantly less likely to attrit than NEs located in other regions of the USA.

Despite its non-random structure, attrition does not seem to affect our estimates of what happens to nascent entrepreneurs. All of the Inverse Mills Ratios in Table IV are statistically insignificant, suggesting that valid inferences can be made without worrying about this possible form of bias. This finding may increase our confidence in interpreting future panel data results obtained from the PSED more generally.

6. Conclusion

We have used PSED data in an attempt to answer the question: "What happens to nascent entrepreneurs?" Over a one year time horizon, there is considerable heterogeneity with respect

to whether nascent entrepreneurs start up, quit, or continue in a state of nascent entrepreneurship. Explaining the factors associated with these outcomes was the main empirical contribution of the paper. Based on a theoretical model which emphasised the value of waiting, several hypotheses about the determinants of nascent entrepreneurs' destinations were derived which were tested using a selectivity-corrected multinomial logit estimator. Among our key findings are that nascent entrepreneurs are much more likely to make a transition to actual entrepreneurship if they have established credit with suppliers and received some money from nascent operations already; if they own their home; are planning a sole venture; and are a household head. This contrasts with characteristics that make nascent entrepreneurs likelier to quit, which include being white; to have invested no money of their own in the enterprise; to have no hired workers; and to lack a post-high-school degree. Nascent entrepreneurs who continue in nascent entrepreneurship are significantly more likely to be non-white, homemakers, and to have saved and invested their own money in the proposed venture, but to have not yet established strong links with suppliers or customers. We found no significant differences in outcomes by gender or wealth endowment; nor could we detect variations in NE outcomes by region, industry or product. We believe the robustness of our findings is enhanced by the exogeneity of the explanatory variables used in our multinomial logit analysis. We deliberately used initial pre-determined variables, rather than current-dated variables, to mirror the kind of data that external stakeholders can gather themselves, and to avoid potentially damaging endogeneity biases.

We believe that we have advanced the literature on nascent entrepreneurship in two ways. First, we have added a simple but versatile model to the theoretical literature on nascent entrepreneurship, which we hope will be used and extended in future research. The model provides a basis for generating further hypotheses about variables that we have not studied in this article, but which might be incorporated in future work. At the heart of the model is the insight that nascent entrepreneurs need to

consider the impact of waiting on future success probabilities and the likely value of options outside entrepreneurship given the possibility that they may quit in the future. In its empirical manifestation, the model encompasses several different strands of thought arising from previous research approaches, including social capital, human capital, process activities, and factors associated with opportunity costs of waiting. Second, the theoretical model gives rise naturally to the tractable and convenient multinomial logit model, which was used to generate a set of novel empirical results. While sample attrition appears to be non-random in our sample, it does not have significant effects on the outcomes of nascent entrepreneurs. This finding might instil greater confidence among future researchers contemplating the use of the panel dimension of the PSED.

We commenced this article by claiming that our findings might carry implications for lenders, government-backed and private-sector business support agencies, and entrepreneurs. We believe that the findings summarised above identify several variables that lenders might usefully want to take into account when making lending decisions. Presumably, lenders wish to separate nascent entrepreneurs who are likely to start from those who will quit or fail to start up at all; our results identify some of the factors that separate the various entrepreneurial types. With regard to government policy generally, we claimed that the evidence that non-whites remain in nascent entrepreneurship for longer than whites is consistent with the notion that they face steeper borrowing constraints, which necessitates a longer period of waiting before launch. If this reflects discrimination in the capital markets, then current US Federal policies seem justified in targeting assistance to ethnic minorities in the form of special loan guarantee programs. And our evidence relating to government-sponsored business support programs in particular (though not business support programs in general) suggests that they do help nascent entrepreneurs make the transition into full entrepreneurship. Furthermore, their impact on the start-up decision appears to be similar to those of programs sponsored by universities and businesses. Clearly, this is a

topic where further research is needed to strengthen and deepen our knowledge.

What can be learned from our findings? It appears that financial resources play a key role in explaining NE outcomes. Those who start have clearly shown commitment and belief in the venture by investing their own money and establishing links with suppliers and potential customers. Our theoretical approach and empirical findings provide insights into the characteristics of those who wait, therefore advancing the research on nascent entrepreneurs. We argue that greater wealth reduces the cost of waiting and hence enables some NEs to delay their investment (wait) in order to explore the business idea in more depth. Clearly, a lot still needs to be done to be able to distinguish between committed NEs and so-called “dreamers” who mainly talk about wanting to set up a venture but who take little concrete action towards becoming operational, such as saving money to invest. Setting up a sole venture appears to affect positively the likelihood of starting; our empirical findings show that these ventures are initiated by individuals with many years of experience in the industry and tend to involve long gestation periods. This is further indication of the fact that time alone is not a good measure of the likelihood of starting. Sole ventures may conceivably benefit from targeted assistance in order to speed up their process. As for quitters, there is some evidence to suggest that the decision to abandon a venture idea is linked to a limited investment of resources. Since more than half of the quitting sample report to have been saving money for the venture, it could be argued that for at least some of these NEs the absence of personal financial investment does not represent a lack of commitment and that quitting is a response to the realisation that the business is not viable.

Finally, we acknowledge several limitations of our investigation which we hope will serve as a prompt for future research. Our theoretical model could be enriched by building into it household decision-making, and possibly also explicit treatment of borrowing constraints. This might help to identify more precisely the effects of some of the variables on nascent entrepreneur outcomes, such as wealth, ethnicity, marital

status, household production, and the number of children. As it stands, the fit between the predictions of the model and the empirical results was not perfect: this suggests opportunities for further theory development. The theoretical model could also be extended to consider also payoffs in the various outcomes, assuming that accurate data for these become available. Just because a nascent entrepreneur starts up does not mean that he or she becomes financially successful or that it is even objectively the best action entrepreneurs generally could take. So it is to be hoped that a richer theoretical framework might connect more transparently the outcome-specific returns to transitions into the different outcomes. This would require more and better data; and different data sets might also be used to assess the robustness of the results presented here. Quite separately, longer time horizons over which to follow nascent entrepreneurs would shed light on whether the factors that affect outcomes of nascent entrepreneurs over one year are the same as those over several years. That might be especially valuable if the effects from some factors (e.g., assistance programs) take time to emerge. And more work could be done with other components of the PSED data set, including the gender and minority over-samples to investigate further the gender and ethnic dimensions of nascent entrepreneurs' entry, exit and continuation decisions.

Acknowledgements

The authors would like to thank two anonymous referees, as well as participants at Imperial College, London; Palm Springs (USASBE 2005); Babson College (BKERC 2005); and Clemson University (2004 PSED Symposium) and in particular Tom Lumpkin and Kelly Shaver for helpful comments on an earlier draft. The usual disclaimer applies.

Notes

¹ The legal form of these ventures is sole proprietorship (only one person owns the business)

² Wave 3 data are publicly available but do not contain information on nascent entrepreneurs who had quit or

started up by the time of Wave 2. The possibility that by Wave 3 some start-ups quit and some quitters re-entered NE status therefore prevents accurate analysis from being performed on those data.

³ For complete descriptions of the interview protocol, the mail questionnaire, and the 463-page codebook for the project, see <http://projects.isr.umich.edu/psed/>

⁴ Several samples comprise the PSED. As its name suggests, the mixed gender sample contains information about a representative sample of men and women, while other samples deliberately over-sample minorities and women specifically.

⁵ As a way of raising outside funds, collateral is hypothesised to be associated with entry ($Z = 1$) rather than waiting or exit - see Reid (1991).

⁶ Wealth is measured in levels (scaled by 100), since it can take negative values; income is strictly positive and logs are taken. See Table 3 for definitions and summary statistics for these and the other variables.

⁷ As pointed out in Davidsson's review (2006), some NEs might have first sales even before thinking about a business plan; hence these variables do not in themselves indicate that the venture is operating.

⁸ We consider NEs to be working full-time when they devote 35 hours or more per week to the planning of the venture.

⁹ This variable indicates whether the respondent has previous start-up experience.

¹⁰ However, as an anonymous referee points out, BAPs might advise NEs to quit if the proposed ventures seem doomed to failure for reasons that the NE cannot perceive. If so, the prediction with respect to quitting becomes ambiguous.

¹¹ See for example Reynolds et al. (2001) and Arenius and Minniti (2005).

¹² Again, as with BAPs, social capital might help persuade myopic NEs to quit when it is in their interests to do so.

¹³ Cramer-Ridder tests for pooling states in the multinomial logit model emphatically reject the pooling hypothesis: chi-square statistics for pairwise pooling were 76.8, 90.2 and 99.9, all with p-values of less than 1 per cent.

¹⁴ Significant marginal effects and log-odds coefficients generally share the same sign, and we do not dwell on any differences between them with respect to insignificant coefficients below.

¹⁵ Indeed, nearly 10% of the sample (32 cases) claimed to have been thinking about start-up for 10 years or more prior to the first interview.

¹⁶ Detailed results for the new specification are available from the authors on request.

¹⁷ These were the two most widely used types of program, attracting 29 and 23 cases, respectively. It was not possible to separate the latter into two parts, owing to the limited number of observations.

¹⁸ Davidsson (2006, p.25) questions whether team entrepreneurship is a common phenomenon and argues that previous studies may have over-sampled team start-ups because of their sampling frame.

¹⁹ Similar differences in industry experience between sole and non-sole ventures were also noticed for those who wait and quitters.

²⁰ Recall that exclusion restrictions were used to identify the parameters of this model. The Wald statistic for the exclusion restrictions in the multinomial logit model was 0.42 (p-value = 0.94), while that for the probit model was 0.12 (p-value = 0.72). Hence the identifying restrictions are supported by the data.

References

- Aldrich, H., 1999, *Organizations Evolving*, Newbury Park, CA: Sage.
- Aldrich, H. E., N. M. Carter and M. Ruef, 2004, 'Teams', in W. B. Gartner, K. G. Shaver, N. M. Carter and P. D. Reynolds (eds.), *Handbook of Entrepreneurial Dynamics*, Thousand Oaks: Sage.
- Arenius, P. and M. Minniti, 2005, 'Perceptual variables and nascent entrepreneurship', *Small Business Economics* **24**, 233–247.
- Baron, R. A. and G. D. Markman, 2000, 'Beyond social capital: How social skills can enhance entrepreneurs' success', *Academy of Management Executive* **14**, 106–116.
- Bates, T., 1990, 'Entrepreneur human capital inputs and small business longevity', *Review of Economics & Statistics* **72**, 551–559.
- Bates, T., 1997, *Race, Self-employment and Upward Mobility: An Illusive American Dream*, Baltimore: John Hopkins University Press.
- Bates, T., 2005, 'Analysis of young, small firms that have closed: delineating successful from unsuccessful closures', *Journal of Business Venturing* **20**, 343–358.
- Becker, G. S., 1975, *Human capital, Second Edition*, New York: Columbia University Press.
- Black, J., D. de Meza and D. Jeffreys, 1996, 'House prices, the supply of collateral and the enterprise economy', *Economic Journal* **106**, 60–75.
- Blanchflower, D. G., P. B. Levine and D. J. Zimmerman, 2003, 'Discrimination in the small-business credit market', *Review of Economics & Statistics* **85**, 930–943.
- Boden, R. J. and A. R. Nucci, 2000, 'On the survival prospects of men's and women's new business ventures', *Journal of Business Venturing* **15**, 347–362.
- Brush, C. G., 1997, 'Women-owned businesses: Obstacles and opportunities', *Journal of Developmental Entrepreneurship* **2**, 1–24.
- Card, D., 2001, 'Estimating the returns to schooling: Progress on some persistent econometric problems', *Econometrica* **69**, 1127–1160.
- Carter, N. M., W. B. Gartner and P. D. Reynolds, 1996, 'Exploring start-up event sequences', *Journal of Business Venturing* **11**, 151–166.
- Carter, N. M., W. B. Gartner, K. G. Shaver and E. J. Gatewood, 2003, 'The career reasons of nascent entrepreneurs', *Journal of Business Venturing* **18**, 13–39.
- Cooper, A. C., F. J. Gimeno-Gascon and C. Y. Woo, 1994, 'Initial human and financial capital as predictors of new

- venture performance', *Journal of Business Venturing* **9**, 371–395.
- Cooper, A. C., C. Y. Woo and W. C. Dunkelberg, 1988, 'Entrepreneurs' perceived chances for success', *Journal of Business Venturing* **3**, 97–108.
- Curtin, R. T. and P. D. Reynolds, 2004, Data documentation, data preparation and weights, Appendix B, in W. B. Gartner (eds.), *Handbook of Entrepreneurial Dynamics*, Thousand Oaks: Sage.
- Davidsson, P. (1995) Determinants of entrepreneurial intentions, Jönköping International Business School Working Paper No. 1995:1.
- Davidsson, P., 2004, Role models and perceived social support, in W. B. Gartner et al. (eds.), *Handbook of Entrepreneurial Dynamics*, Thousand Oaks: Sage.
- Davidsson, P., 2006, 'Nascent entrepreneurship: Empirical studies and developments', *Foundations and Trends in Entrepreneurship* **2**(1), 1–76.
- Davidsson, P. and B. Honig, 2003, 'The role of social and human capital among nascent entrepreneurs', *Journal of Business Venturing* **18**, 301–333.
- Davidsson, P. and J. Wiklund, 1997, 'Values, beliefs and regional variations in new firm formation rates', *Journal of Economic Psychology* **18**, 179–199.
- De Wit, G. and F. van Winden, 1989, 'An empirical analysis of self-employment in the Netherlands', *Small Business Economics* **1**, 263–272.
- Delmar, F. and P. Davidsson, 2000, 'Where do they come from? Prevalence and characteristics of nascent entrepreneurs', *Entrepreneurship & Regional Development* **12**, 1–23.
- Delmar, F. and J. Gunnarsson, 2000, How do self-employed parents of nascent entrepreneurs contribute?, in P. D. Reynolds et al. (eds.), *Frontiers of Entrepreneurship Research 2000*, Wellesley, MA: Babson College.
- Delmar, F. and S. Shane, 2004, 'Legitimizing first: organising activities and the survival of new ventures', *Journal of Business Venturing* **19**, 385–410.
- Dennis W. J., Jr. (eds.), 2003, *National and Small Business Poll: Contacting Government (Vol 3, No. 1)*, Washington, DC: NFIB Research Foundation.
- Dennis, W. J., Jr. and P. D. Reynolds, 2004, Knowledge and use of assistance, in W. B. Gartner et al. (eds.), *Handbook of Entrepreneurial Dynamics*, Thousand Oaks: Sage.
- Diochon, M., T. V. Menzies, Y. Gasse (2003), Insight into the dynamics of Canadian nascent entrepreneurs' start-up effort and the role individual factors play in the process, Proceedings of the 20th CCSBE/CCPME Conference, Victoria, British Columbia, 11, November 6–8.
- Dixit, A. K. and R. S. Pindyck, 1994, *Investment under Uncertainty*, Princeton NJ: Princeton University Press.
- Dunn, T. and D. Holtz-Eakin, 2000, 'Financial capital, human capital and the transition to self-employment: Evidence from intergenerational links', *Journal of Labor Economics* **18**, 282–305.
- Evans, D. S. and L. S. Leighton, 1989, 'Some empirical aspects of entrepreneurship', *American Economic Review* **79**, 519–535.
- Carter, N. M., W. B. Gartner, K. G. Shaver and E. J. Gatewood, 2003, 'The career reasons of nascent entrepreneurs', *Journal of Business Venturing* **18**, 13–29.
- Gartner, W. B. and N. M. Carter, 2003, Entrepreneurial behaviour and firm organising processes, in Z. J. Acs and D. B. Audretsch (eds.), *Handbook of Entrepreneurship Research (International Handbook Series on Entrepreneurship, Volume 1)*, Boston: Kluwer.
- Gartner, W. B., N. M. Carter and P. D. Reynolds, 2004, Business start-up activities, in W. B. Gartner et al. (eds.), *Handbook of Entrepreneurial Dynamics*, Thousand Oaks: Sage.
- Gatewood, E. J., 2004, Entrepreneurial expectancies, in W. B. Gartner (eds.), *Handbook of Entrepreneurial Dynamics*, Thousand Oaks: Sage.
- van Gelderen, M., Bosma, N. and R. Thurik (2001) Setting up a business in the Netherlands: Who starts, who gives up, who is still trying, Unpublished Report, <http://ssrn.com/abstract=370874>.
- Gimeno, J., T. B. Folta, A. C. Cooper and C. Y. Woo, 1997, 'Survival of the fittest? Entrepreneurial human capital and the persistence of underperforming firms', *Administrative Science Quarterly* **42**, 750–783.
- Greene, W. H., 2003, *Econometric Analysis*, 5th edition, New Jersey: Prentice-Hall.
- Heckman, J. J., 1979, 'Sample selection bias as a specification error', *Econometrica* **47**, 475–492.
- Ingersoll, J. E., Jr. and S. A. Ross, 1992, 'Waiting to Invest: Investment and Uncertainty', *Journal of Business* **65**, 1–29.
- Johnson, K. L., W. M. Danis and M. J. Dollinger, 2004, Decision-making (innovator/adaptor) style, in W. B. Gartner (eds.), *Handbook of Entrepreneurial Dynamics*, Thousand Oaks: Sage.
- Kanfer, R., 1990, Motivation theory and industrial and organizational psychology, in M. L. Dunnette Hough (eds.), *Handbook of I/O Psychology*, Palo Alto: Consulting Psychologists Press.
- Kessler, A., and H. Frank (2004) Nascent entrepreneurship in longitudinal perspective, Paper presented at BKERC 2004, Strathclyde University, Scotland.
- Kolvereid, L., 1996, 'Prediction of employment status choice intentions', *Entrepreneurship Theory & Practice* **21**, 47–58.
- Krueger, N. F., Jr. and D. V. Brazeal, 1994, 'Entrepreneurship potential and potential entrepreneurs', *Entrepreneurship Theory & Practice* **19**, 91–104.
- Lévesque, M. and K. R. MacCrimmon, 1997, 'On the interaction of time and money invested in new ventures', *Entrepreneurship Theory & Practice* **22**, 89–110.
- Lin, Z., G. Picot and J. Compton, 2000, 'The entry and exit dynamics of self-employment in Canada', *Small Business Economics* **15**, 105–125.
- Lofstrom, M., 2002, 'Labour market assimilation and the self-employment decision of immigrant entrepreneurs', *Journal of Population Economics* **15**, 83–114.
- Long, W., and W. E. McMullan (1984) Mapping the new venture opportunity identification process in *Frontiers of Entrepreneurship Research*, Babson College: Wellesley, MA.
- McFadden, D., 1973, Conditional logit analysis of qualitative choice behaviour, in P. Zarembka (ed.), *Frontiers in Econometrics*, New York: Academic Publishers.

- Nieva, V. L., 1985, Work and family linkages, in L. Larwood, A. H. Stromberg and B. Gutek (eds.), *Women and Work: An Annual Review*, Beverly Hills, CA: Sage.
- McDonald, R. and D. Siegel, 1986, 'The value of waiting to invest', *Quarterly Journal of Economics* **101**, 707–727.
- Parker, S. C., 2000, 'Saving to overcome borrowing constraints: implications for small business entry and exit', *Small Business Economics* **15**, 223–232.
- Parker, S. C., 2003, 'Asymmetric information, occupational choice and government policy', *Economic Journal* **113**, 861–882.
- Power, B., and G. C. Reid (2005), A test of real options logic, CRIEFF Discussion Papers, St-Andrews University, No 0509, Scotland.
- Reid, G. C., 1991, 'Staying in business', *International Journal of Industrial Organisation* **9**, 545–556.
- Reynolds, P. D. (1994), Reducing barriers to understanding new firm gestation: Prevalence and success of nascent entrepreneurs. Paper presented at the Academy of Management Meetings, Dallas, TX, US.
- Reynolds, P. D., 1997, 'Who starts new firms? Preliminary explorations of firms-in-gestation', *Small Business Economics* **9**, 449–462.
- Reynolds, P. D., N. M. Carter, W. B. Gartner and P. G. Greene, 2004, 'The prevalence of nascent entrepreneurs in the United States: Evidence from the Panel Study of Entrepreneurial Dynamics', *Small Business Economics* **23**, 263–284.
- Reynolds, P. D. and S. B. White, 1997, *The Entrepreneurial Process. Economic Growth, Men, Women and Minorities*, Westport, MA: Quorum.
- Reynolds, P. D., S. M. Camp, W. D. Bygrave, E. Autio and M. Hay, 2001, *Global Entrepreneurship Monitor 2001. Executive Report*, Kansas MO: Kauffman Foundation.
- Schuetze, H. J., 2000, 'Taxes, economic conditions and recent trends in male self-employment: A Canada-US comparison', *Labour Economics* **7**, 507–544.
- Shane, S. and D. Cable, 2002, 'Network ties, reputation, and the financing of new ventures', *Management Science* **48**, 364–381.
- Shaver, K. G. and L. R. Scott, 1991, 'Person, process, choice: The psychology of new venture creation', *Entrepreneurship Theory & Practice* **16**, 23–45.
- Shaver, K. G., N. M. Carter, W. B. Gartner and P. D. Reynolds, 2001, *Who is a nascent entrepreneur? Decision rules for identifying and selecting entrepreneurs in the Panel Study of Entrepreneurial Dynamics*, Jönköping, Sweden: Paper presented at the BKER Conference.
- Stiglitz, J. and A. Weiss, 1981, 'Credit rationing in markets with imperfect information', *American Economic Review* **71**, 393–410.
- Van de Ven, W. P. and B. M. S. Praagvan, 1981, 'The demand for deductibles in private health insurance: A probit model with sample selection', *Journal of Econometrics* **17**, 229–252.
- Wit, G. De and F. Windenvan, 1989, 'An empirical analysis of self-employment in the Netherlands', *Small Business Economics* **1**, 263–272.

Copyright of *Small Business Economics* is the property of Springer Science & Business Media B.V. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.