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**Entrepreneurship Among  
Knowledge Workers:  
Evidence from Equity  
Analyst Market**

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Evidence from Equity Analyst Market**

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Abstract

What drives entrepreneurial activity among knowledge workers? Are stars more likely to become entrepreneurs? Analysis of entrepreneurial efforts from a panel data set of equity research analysts in investment banks over 1988-1996 (9,531 analyst-year combinations representing 2,602 individual analysts from 24 firms) reveals that (a) star knowledge workers are more likely than their non-star counterparts to become entrepreneurs, (b) the probability of entrepreneurial turnover for knowledge workers is greater in underperforming firms, and (c) the entrepreneurial activity of knowledge workers is procyclical with the performance of the economy.

Key words    Knowledge workers, entrepreneurship, turnover

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News accounts are filled with anecdotes of talented Wall Street professionals making it on their own (Dorfman, 1974; Wallace, 1981; Milligan, 1985; Philips, 1997). Examining entrepreneurial activity on Wall Street, Kostigen (1990) observed:

Take a culture that puts a high premium on entrepreneurship. Make it a people business, in which contacts and relationships are a prime asset. Add to it the probability of making enough money to be financially independent at an early age. Throw in some big egos for good measure. What you have is a surprising number of people leaving established careers on Wall Street to start their own firms, many more so than in most other professions. And with the new uncertainties about security of even the most established jobs, the idea of trying to make a go of it solo is gaining greater appeal.

New venture creation has had an enormous impact not just on Wall Street, but on the entire United States economy across industries. New business firms hit a record high of 898,000 in 1998 (United States Government, 1998). From 1990 to 1995, small businesses (fewer than 500 employees) created 76% of all net new jobs in the U.S. economy (United States Government, 1998). At any given time roughly one out of 30 adults active in the U.S. labor force is involved in a new start-up (Reynolds and Miller, 1992). It is not surprising that entrepreneurship as a field of research has witnessed fruitful development in the past several years.<sup>1</sup> However, few studies have examined empirically the entrepreneurial activity of knowledge workers.

Knowledge workers constitute an important and growing part of the U.S. labor force. More than one fifth of the 14.3 million jobs created in the United States from 1988 to 1996 were in business, engineering, and management services (Neef, 1999). Between 1990 and 1995, “high knowledge” industries (professional services, engineering, science, technical, teaching, consulting, and so forth) accounted for 43 percent of net employment growth (Beck, 1995). By 2005 up to 80 percent of all jobs in the United States are projected to be “cerebral” (Wyckoff, 1996).

What drives the entrepreneurial activity of knowledge workers? What kind of knowledge workers set up their own firms? Are they the best and brightest or their less successful counterparts? To address these questions we collected data on equity research analysts in investment banks between 1988 and 1996. The total sample was 9,531 names (analyst-year combinations) representing 2,602 individual analysts from 24 firms. The data was compiled at four different levels of analysis: individual, firm, sectoral, and macro-economy. The availability of detailed individual and firm level data on equity analysts made this labor market a particularly attractive setting in which to study entrepreneurial activity of knowledge workers.

## **THE ANALYSTS' MARKET**

“Sell-side” analysts employed by brokerage houses to follow companies in a particular industry sector or investment specialty generate information such as earnings forecasts and stock

recommendations for, and detailed research reports on, these companies. “Sell-side” analysts’ clients, institutional investors on the “buy side,” include money management firms and mutual, hedge, and pension funds.

Every year in mid-October and mid-August, the *Institutional Investor* magazine publishes “All-America Research Team” lists of ranked analysts in equity and fixed income categories.<sup>ii</sup>

Analysts are ranked by sector at four levels: first, second, third, and runner-up. Some analysts are ranked in more than one sector in one year. Many analysts are ranked over several years. The result of the exhaustive ranking process is that “[t]here aren’t many other jobs in America where peoples’ performances are externally rated so specifically” (Siconolfi, 1992).

The market recognizes that ranked analysts perform better than their non-ranked counterparts.

All-American ranked analysts “supply more accurate earnings forecasts than other analysts” and “make recommendations that don’t follow the crowd” (Stickel, 1990; Stickel, 1992; Brown and Chen, 1993; Sinha, Brown, and Das, 1997). Consequently, an *Institutional Investor* ranking can mean hundreds of thousands of dollars in extra annual pay for the analysts (Pulliam, 1996). In 1995, for example, a senior unranked analyst earned in the \$200,000-\$300,000 range, a top ranked analyst in the \$600,00-\$900,000 range.

## **RELEVANT LITERATURE AND HYPOTHESES DEVELOPMENT**

### **Entrepreneurship Research**

Literature on entrepreneurship is diffuse and interdisciplinary, originating in economics (Schumpeter, 1934), psychology (McClelland, 1961), sociology (Weber, 1904), history (Cole, 1959), and administrative theory (Stevenson, 1983), among other disciplines. This diversity mirrors the complexity of the entrepreneurial phenomenon, making integrative and rigorous research challenging (Bhide, 2000). Obstacles include the difficulty of getting reliable data and existence of few well-defined hypotheses that researchers can confirm, disprove, or modify. Some even argue that critical aspects of entrepreneurship lie beyond the scope of scholarly inquiry (Baumol, 1993).

Individuals who become entrepreneurs might possess distinguishing traits. Under the assumption that a distinctive psychological profile of successful entrepreneurs exists (McClelland, 1961), researchers have searched extensively for traits of entrepreneurs (Carsrud and Olum, 1986; Brockhaus and Horwitz, 1986; Scheinberg and MacMillan, 1988; Reynolds and Miller, 1988; Cooper, Woo and Dukelberg 1989; Woo, 1991; Gaglio, 1997). Although differences have been observed between entrepreneurs and non-entrepreneurs, a compelling psychological profile of successful entrepreneurs has not been developed (Gartner, 1989).

Research has focused on entrepreneurs having different attitudes toward risk (Knight, 1921), diverse beliefs about information and the value of resources (Shane, 2000), different structural positions (Aldrich and Zimmer, 1986; Aldrich, 1999; Dunn and Holtz-Eakin, 2000) or different ties (Larson, 1992; Higgins and Gulati, 1999; Stuart, Hoang and Hybels, 1999) compared to non-entrepreneurs. Some studies have found that individuals' decisions to become entrepreneurs can be predicted by demographic characteristics such as age, education attainment, and prior self-employment experience (Lin, Picot and Compton, 2000); intellectual ability, articulable knowledge, social contacts, and prestige (Hitt, 2001); financial capital (Evans and Leighton, 1989; Holtz-Eakin Loulfaian and Rosen, 1994; Blanchflower and Oswald, 1998); and human capital (Lucas, 1978; Evans and Leighton, 1989). Researchers have also suggested the relevance of the industry in which the entrepreneur wants to start the company (Bates, 1995), the institutional context (Baumol, 1993; Gompers and Lerner, 1999; Busenitz, Gomez and Spencer, 2000; Steier and Greenwood, 2000), and the general state of the economy (Lin, Picot and Compton, 2000).

Following Schumpeter's (1934), Aldrich's (1999), and Stevenson's (2000) perspectives on entrepreneurship, we argue that the probability of a knowledge worker becoming an entrepreneur is simultaneously influenced by variables at different levels of analysis. We explicitly conduct a multilevel analysis of the drivers of entrepreneurial motivation that incorporates human capital and social capital theories. (**Figure 1** presents the model.)

## **Individual Performance and Entrepreneurial Turnover**

How does the turnover of star employees differ from that of non-star counterparts? Prior studies have found that low performers are more likely than high performers to leave their employers (Dalton, Krackhardt and Porter, 1981; Hollenbeck and Williams, 1986; Bycio, Hackett and Alvares, 1990; Williams and Livingstone, 1994; Holbeche, 1998).<sup>iii</sup> Harrison, Kubik and Solomon (2000) found that most equity analysts leave the research profession after poor performance. Mikhail, Walther and Willis (1999) found that turnover from one brokerage house to another becomes more likely as analyst performance declines relative to that of peers.

However, a number of researchers have argued that it is not enough to simply study the effect of worker's productivity on their turnover because the visibility of individuals' performance might change the relationship. In knowledge-intensive occupations, as employees' knowledge level rises the information asymmetry between the firm and outsiders regarding the employees' knowledge level declines. External recognition, the extent to which skilled employees are visible to outsiders, increases workers' mobility. The quality and amount of available information about workers' abilities affects turnover, greater external recognition of abilities leading to higher turnover (Lazear, 1986; Milgrom and Oster, 1987). If external recognition is the primary driver and better performance increases visibility, turnover should increase with performance.

In R&D settings star inventors are more likely to leave their companies because their outstanding technological performance becomes visible to outsiders (Ernst and Vitt, 2000). Successful asset managers also receive numerous offers once they are recognized as stars (Phillips, 1997). Stars tend to have a higher turnover rate than their non-star counterparts because star employees' abilities are visible to outsiders, hence, they experience low cost of moving from one organization to another (Woodruffe, 1999; Drucker, 1999; Tulgan, 2001). Hayward and Boeker (1998) claimed that reputable equity analysts have greater access to promotion within the firm and on labor markets and can take their reputation to other firms.

Focusing on entrepreneurial turnover only, high performers are more likely to become entrepreneurs than low performers. Although future success as an entrepreneur is contingent on many other variables, good present performance might increase self-confidence, a factor consistently documented as an entrepreneurial trait (Bhide, 2000), and therefore become a positive motivating factor in the decision to start a new company. Further, if good performance leads to public recognition, external constituencies may value it as a signal of quality and, consequently, facilitate access to the necessary complementary resources needed to start a new firm (Stinchcombe, 1965; Stevenson, 2000). Stars founding new ventures leverage their industry contacts. The stars' reputations attract talent (traders, analysts, and sales staff) and capital to their new businesses (Dorfman, 1974). Their former employers' clients become clients of the new ventures. In 1991, when C. J. Lawrence's long time star economist Edward Hyman quit the firm after a 20-year tenure to set up his own firm, International Strategy and Investment Group, \$400

million of the \$640 million that he used to manage for C. J. Lawrence immediately followed him to his new firm (Uchitelle, 1991).

Star knowledge workers at the top of their industry might also look outside the industry more readily than non-stars for greater challenges and new learning opportunities. Continuous skills development is very important to star knowledge workers (McCall, 1998). Holbeche (1998) claimed that one third of her sample of high flyers would leave if they were not able to broaden their skills and almost half indicated that they needed to experience a strong sense of achievement. Some believe that it is just a matter of time before the best and brightest become entrepreneurs in spite of their comfortable positions and high compensation. According to Probst, Raub and Romhardt (2000: 227): “It is sometimes impossible to keep valuable employees by means of incentives. It is the most able who have ideas of their own and do not want to work for a large organization forever. At some point, they will leave to set up an independent company, in spite of the risks.” Hence, accomplished knowledge workers are more likely than their less accomplished counterparts to leave their firms and pursue entrepreneurial opportunities.

**Hypothesis 1:** High performing knowledge workers are more likely than their low performing counterparts to become entrepreneurs.

## **Work Environment and Entrepreneurial Turnover**

Many prior empirical studies on entrepreneurial activity have suffered from the lack of consideration of contextual factors (Gartner 1989). But creating a new organization requires the mobilization of a substantial array of material and social resources including wealth, power, and legitimacy (Stinchcombe, 1965; Aldrich and Zimmer, 1986). Network theorists have suggested that entrepreneurs' social networks affect the capacity to gather resources and access into new business creation (Granovetter, 1973; Hannan, 1977; Burt, 1992; Stuart, Hoang and Hybels 1999). Shane (2000) argued that structural differences are important factors in explaining the entrepreneurial process.

Contrary to popular myths, most new ventures are founded by people with prior employment experience (Cooper, 1985; Robinson and Sexton, 1994). Career histories shape the entrepreneurial process (Brittain and Freeman, 1986; Higgins and Gulati, 1999). In many cases, new ventures emerge from established firms as the firms' talented employees identify entrepreneurial opportunities during their employment period (Brittain and Freeman, 1986). Cooper et al. (1990) found that 43% percent of entrepreneurial ideas came from previous jobs, only 18% came from personal interests.

Entrepreneurial opportunities and resources accrue to incipient entrepreneurs as a function of the structural position of their employers (Burton, Sorensen and Beckman, 1999). Freeman (1986)

argued that firms' characteristics influence entrepreneurial activities of their employees, some firms being more successful generating entrepreneurs than others. In particular, new ventures are more likely to evolve from firms that are more entrepreneurially prominent, a form of social capital that is transferred to employees as they leave the firm and attempt to launch new ventures (Burton, Sorensen and Beckman, 1999).

A knowledge worker's reputation is a function not only of personal characteristics and position, but also of the firm and associations to which the individual belongs (Berger, Cohen and Zelditch, 1966, 1972; Friedson, 1986; Useem and Karabel, 1986). Working for prestigious firms provides employees with legitimacy, trust, and external perceptions of reliability and skill (Hayward and Boeker, 1998). Important informational, resource, and reputational benefits accrue to employees affiliated with prominent firms. Freeman (1986) concludes that organizations create their own competition by providing the skills and background that provide credibility for the entrepreneur. Burton, Sorensen and Beckman (1999) have shown that the prominence of prior employers reduces external constituents' perceived uncertainty of a new venture.

Knowledge intensive firms such as professional service firms are especially affected by information asymmetries (Lowendahl, 1997), their products being intangible and based on individuals' knowledge and abilities. Coming from a prominent firm is a signal of quality that makes it easier for professionals to set up their own ventures. Being from a prominent firm increases customer and supplier confidence in an entrepreneur's products, services, and abilities.

Working for a reputable firm enables professionals to gain access to clients and resources faster and easier. Entrepreneurs from prestigious firms are able to leverage the firms' brand names to set up their own firms. Therefore, entrepreneurial activity should be higher for knowledge workers belonging to more prestigious firms.

**Hypothesis 2:** Being in a more prominent firm increases the probability of knowledge workers becoming entrepreneurs.

### **Firm Performance and Entrepreneurial Turnover**

Low pay and promotional opportunities lead to low commitment (Rusbult and Farrell, 1983). A low level of commitment results in low motivation and high turnover (Meyer et al., 1989). Freeman and Medoff (1984) reported that wage increases minimize turnover, a 20% increase in wages decreasing the probability of an employee quitting by about 10%. Talented knowledge workers are especially sensitive to compensation levels. In knowledge intensive industries such as investment banks, money is often a signal of success and the "value of human beings" is oftentimes equated with their bonuses (Holbeche, 1998; Eccles and Crane, 1988). Anything that jeopardizes economic rewards is an incentive for knowledge workers to look for alternatives. If employees' compensation is tied to the firm's overall performance, underperformance might incline employees to become entrepreneurs.

**Hypothesis 3:** Poor performance relative to its competitors increases the probability of a firm's knowledge workers becoming entrepreneurs.

### **Professional Specialization and Entrepreneurial Turnover**

Professionals usually specialize in serving a particular field, sector, or industry. For example, attorneys acquire specialized knowledge in a particular aspect of law (e.g., securities offering, mergers) (Gilson and Mnookin, 1989); consultants develop expertise in particular industries (e.g., financial services, pharmaceuticals) (Maister, 1993); investment bankers cover a particular sector (e.g., high-tech, telecommunications) (Eccles and Crane, 1988). Entrepreneurial activity varies by industry (Sandberg and Hofer, 1987; Carter et al., 1994; Dean and Meyer, 1996). Bhide (2000) reported that about 60% of the *Inc.* founders he interviewed had prior experience in the industry in which they launched their ventures. Eisenhardt and Schoonhoven (1990) found that entrepreneurs begin ventures in markets with which they are familiar rather than in so called "attractive markets." This is especially true for professionals who develop firm-specific skills and valuable contacts in particular industry sectors. In many cases, stars' names are closely associated and only known in the sector specialties that they cover.

Industry experts assert that turnover on Wall Street varies with the nature of the sectors analysts cover; some sectors are "hot," others are not (*Institutional Investor*, 1997, 1998). According to the *Institutional Investor* (1997):

Their brains and skills may be comparable, but not all top analysts are created equal. Blame the market. Analysts in health care services and devices are hot; those in biotechnology are not. On the consumer side the hunt is on for trackers of restaurants, business services, and specialty retailing, but the market for auto analysts has cooled. Above average compensation goes to networking and software analysts, but not to semiconductor specialists. Analysts who track real estate investment trusts, energy (especially exploration and production), and any form of financial services that crosses with technology are in demand, but not those covering savings.

As sectors become “hot,” the range of opportunities increases for professionals. It becomes easier for them to set up their own firms.

**Hypothesis 4:** The better the performance of the sector covered by the knowledge worker, the higher the probability of the knowledge worker becoming an entrepreneur.

### **Macroeconomic Performance and Entrepreneurial Turnover**

Turnover depends on general economic activity. Turnover rates increase as the economy grows and declines as growth slows (Carsen and Specter, 1987). Poor economic conditions discourage

people from becoming entrepreneurs because (a) their new ventures have lower probability of survival in a bad economy (Stinchcombe, 1965), and (b) it is more difficult to re-enter employment if their ventures fail (Blanchflower and Oswald, 1998).<sup>iv</sup>

An individual's perception of the probability of a venture's success is positively related to net business growth (Romanelli, 1989). There are more business opportunities during economic expansion than during contraction (Schumpeter, 1934). New entrepreneurs find clients and obtain financing and credit more easily during expansion (Stinchcombe, 1965; Brittain and Freeman, 1986; Schoonhoven and Eisenhardt, 1992). *Ceteris paribus*, chances of success are greater when the economy is strong. Hence, a positive relationship is expected between the performance of the macro-economy and entrepreneurial activities of professionals.

**Hypothesis 5:** The better is the performance of the macro-economy, the greater is the probability of knowledge workers becoming entrepreneurs.

## **DATA SET AND VARIABLES**

This section discusses how the data set was created. We first describe the dependent variables and then various categories of independent and control variables that influence analysts' entrepreneurial activity. **Table 1** presents the summary statistics for the variables used in the subsequent analysis.

From the annual issues of the *Institutional Investor* magazine in which the “All-America Research Team” list of ranked analysts was published, we identified for the nine-year period from 1988 through 1996 3,513 ranked equity analysts belonging to 62 firms. We focused on the top 24 investment banking firms that employed more than 15 ranked analysts over the nine years covered by the study. These 24 firms accounted for 3,408-ranked analyst names, 97% of all the analysts ranked during this period.

From the annual issues of *Nelson’s Directory of Investment Research* (NDIR), published at the end of the calendar year, we identified 6,123 names of unranked senior equity analysts belonging to the top 24 firms. (An analyst was classified as “senior” if he or she covered at least one sector). These 24 firms accounted for 38% of the total equity analysts (25,053) in the United States over this nine-year period. Thus, the total sample was 9,531 names (analyst-year combinations) representing 2,602 individual analysts. Each analyst appeared an average of 4.0 times in the data set.

Although 36% of the analysts in our sample of 24 firms were ranked, if we were to take the entire security industry this proportion would be much smaller: 1/10<sup>th</sup> in 1988, declining to less than 1/30<sup>th</sup> in 1996, because the analysts in smaller firms tended to be primarily unranked. The selection approach of focusing on the top 24 firms biases our data in favor of greater representation of ranked analysts. However, focusing on the top 24 firms helped us control for

demographic, analyst performance, departmental, firm, sector, and macroeconomic variables, information that is more readily available for the top 24 firms. (Demographic and departmental characteristics are often not available for research boutiques.) We made the trade-off in favor of richer information for the smaller subset of the analysts belonging to the top 24 firms.

The dependent variable *Analyst entrepreneur* measures the probability of an analyst becoming an entrepreneur. It is 1 if the analyst becomes an entrepreneur during year  $t$ , 0 if he or she does not. Over the nine-year period, we identified 1,777 total moves among the 9,531 analysts<sup>v</sup> accounting for a turnover rate of 18.6% per annum. Of the analysts that moved, 1,065 moved to competitors and 712 exited the industry. Among analysts that exited the industry, 45 left to start their own company, accounting for an entrepreneurial turnover of 0.5% per annum: 0.8% per annum (28 out of 3,408) among ranked analysts; 0.3 % per annum (17 out of 6,123) among non-ranked analysts.

We defined independent variables and control variables in four groups representing each level of analysis: individual variables; firm variables; sector variables; and macroeconomic variables.

**Individual variables.** *Analyst star* is 1 if analyst  $i$  is ranked in year  $t$ , 0 otherwise. As indicated by hypothesis **H1**, the expected sign of the *Analyst star* variable is positive. In addition, we collected the analysts' demographic and career characteristics (gender and number of years of experience in the industry) by conducting searches on Lexis-Nexis, the NASD web database, and

Dow Jones News. Following previous literature (e.g., Lin, Picot and Compton, 2000), demographic variables were used as control variables. *Analyst experience* is the total number of years analyst  $i$  has worked in the industry as of October 15<sup>th</sup> of year  $t$ . On average, an analyst in our sample had 8.97 years of experience. The group of entrepreneurs had, on average, one more year of experience (9.69 years). In their investigations of a number of human capital measures (e.g., education and experience) in entrepreneurial studies, Evans and Leighton (1989) and Bates (1995) observed that these variables behaved erratically as predictors of self-employment entry due to partial representation of the construct “human capital” or the erroneous assumption that effects of these factors are homogeneous for all individuals. Hence, the expected sign of the *Analyst experience* variable is not clear. However, prior research has found the relationship of experience to the probability of becoming an entrepreneur to be curvilinear (Reynolds and White, 1997). Hence, we also included the quadratic term  $(Analyst\ experience)^2$  in our model.

The dummy variable *Analyst Gender* is 1 if an analyst is male, 0 if female. In our sample, 76.5% of analysts are male. However, 93.3% of entrepreneurs are male. Prior research has shown the probability of starting a company to be greater for men than for women (Kolvereid, 1996; Blanchflower and Oswald, 1998; Bhide, 2000). The expected sign of the *Analyst gender* variable is negative.

**Firm variables.** We control for variation in research department quality. The quality of the research department, *RD overall quality*, is estimated by the Greenwich Research Associates

Institutional Equity Service poll of institutional professionals (IES rankings).<sup>vi</sup> We expect the *RD overall quality* coefficient to be negative as better departments should be better able to retain their workers (Pfeffer, 1994; Holbeche, 1998; Harding, 1998; McCall, 1998; Woodruffe, 1999).

*Firm reputation* is a proxy for firms' prominence. The *Firm reputation* variable takes the value of 1 if an analyst is working for a "bulge bracket" firm (CS First Boston, Goldman Sachs, Lehman Brothers, Merrill Lynch, Morgan Stanley, and Salomon Brothers) as of the end of the year, 0 otherwise. A "bulge bracket" ("special bracket") firm is an investment banking firm that leads the bulk of securities underwritten in the United States (Eccles and Crane, 1988). A bulge bracket firm has a track record and reputation that sets it apart from other investment banking firms (Carosso, 1970; Eccles and Crane, 1988). As suggested by hypothesis **H2**, the expected sign of this variable is positive.

*Firm performance* is the proportional change during year *t* in analyst *i*'s firm profits from equity and debt underwriting to merger and acquisition advisory fees. As indicated by hypothesis **H3**, the expected sign of the *Firm performance* variable is negative.

**Sector Variables.** *Sector performance* is the proportional change during year *t* in the stock price of the sector followed by analyst *i*, deflated by the S&P 500 index. On average, deflated stock market performance for the sectors followed by the analysts in our sample increased by 1.2%

during any one year. As suggested by hypothesis **H4**, the sign of *Sector performance* is expected to be positive.

**Macroeconomic variables.** To estimate the effect of the performance of the U.S. economy on analysts' entrepreneurial activity, we introduced the *S&P 500 performance* variable. *S&P 500 performance* is the proportional change during year  $t$  in the S&P 500 index. On average, the S&P index increased by 16.6% during any one year. Hence, although it is not monotonic on average, our study covers a period of economic expansion. The security brokerage industry is pro-cyclical; hence, the boom was even more pronounced in that industry.<sup>vii</sup> Hypothesis **H5** suggests that the *S&P 500 performance* coefficient should be positive.

## **MODEL**

To test the developed hypotheses we built a model to predict the probability of a professional becoming an entrepreneur as a function of demographic characteristics, firm prominence, individual, firm, and sector performance, and the performance of economy.

$$P(\text{becoming an entrepreneur}) = f(\text{individual factors, firm factors, sector factors, macroeconomic factors})$$

Favoring the normality assumption for the errors, we have chosen to use the probit model (Greene, 1997; Wooldridge, 2000). To relax the assumption of independence of observations in our panel data set, we compute a robust variance estimator that produces estimators for clustered data (data independent not within, but across, groups) with “correct” standard errors (in the measurement sense) even if the observations are correlated. The probit, robust, cluster model regression is particularly robust to assumptions about within-cluster correlation (Greene, 1997).<sup>viii</sup>

## RESULTS

**Table 2** reports the results of two hierarchical pooled robust cluster probit regression models on the cross-sectional time-series data set with individual analysts as clusters. The models estimate the probability of an analyst becoming an entrepreneur. Model **M1** brings in only the control variables. Model **M2** adds the independent variables.

Model **M2** has good explanatory power (pseudo  $R^2$  5.8%, log likelihood of  $-152.82$ ) and improves significantly on the predictive power of model **M1**.

The estimated coefficient on *Analyst star* is positive and significant ( $p < 0.05$ ). Hence, hypothesis **H1** is supported. Being ranked by *Institutional Investor* magazine increases the probability of becoming an entrepreneur with a marginal effect of 0.39% over the mean (0.35%).

At the firm level, we hypothesized that coming from more prominent firms increase the probability professionals of becoming an entrepreneurs. The variable *Firm reputation* has a positive, but non-significant coefficient. Hence, our findings do not confirm hypotheses **H2**.<sup>ix</sup>

The effect of firm performance on the probability of becoming an entrepreneur is negative and significant ( $p < 0.10$ ), thus supporting hypothesis **H3**.

Hypothesis **H4** predicts that the better the performance of the analyst's sector, the higher the probability of the analyst becoming an entrepreneur. We do not find an increase in analysts' entrepreneurial activity when sectors are "hot." The estimated coefficient for *Sector performance* is positive, but insignificant.

As predicted by hypothesis **H5**, we find that the greater the expansion of the U.S. economy, the higher the probability of analysts becoming entrepreneurs. The estimated coefficient for the *S&P 500 performance* variable is positive and significant ( $p < 0.05$ ). For a 1% proportional positive change in the S&P 500 index during a particular year, the probability of analyst entrepreneurial turnover increases by 1.5%.

Among the control variables, *Analyst experience* has a significant and convex relationship (coefficient of *Analyst experience* is negative and  $(Analyst\ experience)^2$  positive) with the

probability of becoming an entrepreneur. We also find that being a male increases the probability of becoming an entrepreneur ( $p < 0.10$ ) at the mean by 0.3%. The relationship between the probability of entrepreneurial exit and *Research department quality* variable is negative ( $p < 0.05$ ), indicating that analysts working for better departments have less propensity to become entrepreneurs.

## **DISCUSSION, CONCLUSIONS AND FUTURE RESEARCH**

This paper examines the drivers that affect the probability of a knowledge worker becoming an entrepreneur. **Table 3** summarizes the results. We find that drivers at several levels influence knowledge workers' entrepreneurial decisions. Star knowledge workers have a higher probability than non-stars of becoming entrepreneurs. There are three possible explanations. First, stars can set up their own firms more easily than their non-star counterparts because they can leverage their industry relationships and reputation to attract professionals, clients, and capital to their new ventures. Second, stars may have greater risk-taking ability because of being wealthier than non-stars. Third, stars may not stand to lose as much as non-stars in taking the entrepreneurial route because their reputations make re-entry into the industry within a few years of exit an option. For example, Edward Greenberg, who left telecommunications coverage at Morgan Stanley to start his own consulting firm in 1991, returned to Morgan Stanley a few years later as an investment banker.

Our findings confirm the importance of some contextual variables and disconfirm the importance of other contextual variables in knowledge workers' decisions to quit and start firms. Better research departments tend to lose fewer of their analysts to entrepreneurial turnover. Analysts in firms that are underperforming compared to the industry average leave to set up their own ventures more readily than analysts in firms that are performing on a par with or superior to the industry average. Contrary to some industry insiders' belief that "hot" sectors are especially vulnerable to entrepreneurial turnover, sector performance does not correlate significantly with entrepreneurial activity. Analysts' entrepreneurial activity is pro-cyclical. Perhaps, as business conditions improve, analysts' entrepreneurial opportunity sets expand as well leading them to set up their own firms more actively.

Analysis of entrepreneurial activity across the 24 firms using firm dummies (regressions are not reported) suggests significant inter-firm differences. Analysts from UBS, Montgomery, and Kidder Peabody become entrepreneurs more frequently than do those from DLJ, Lehman Brothers, Merrill Lynch, and Salomon Brothers. Analysts' entrepreneurial activity might depend on the firm's structure and the relationship between the firm and its employees. For example, at DLJ the analysts are treated as entrepreneurs running their own franchises.

We conducted additional regressions to test for the impact on probability of turnover of a number of interaction variables, notably between individuals' performance (star vs. non-star) and departmental, firm, sector and economy variables (regressions are not reported). The only

interaction variable with a significant coefficient was *Analyst star \* Firm performance*. Its positive significant coefficient, in addition to positive significant coefficient for *Analyst star* and positive but non-significant coefficient for *Firm performance*, suggests that firms underperforming their industry counterparts are particularly vulnerable to losing their stars. This finding is in consonance with existing research that, if firm compensation is not competitive with that of other firms in the industry, the best and brightest will depart (Holbeche, 1998). During difficult times, such as downsizing, it is the talented employees who anticipate layoffs and are the first to flee (Hamel and Prahalad, 1994). Cost of moving is low for star knowledge workers because often they, not their employers, own their clients (Woodruffe, 1999; Johnson, 2000; Tulgan, 2001).

The field of entrepreneurship research, from the times of Schumpeter (1934) and McClelland (1961) to the present, has been primarily conceptual and theoretical. By conducting an empirical study of the potential drivers of entrepreneurship, this paper addresses the frequent expressions of the need for, and paucity of, rigorous empirical research (Gartner, 1989; Aldrich and Baker, 1997; Bhide, 2000).

Our data set on equity analysts enables us to address two criticisms commonly leveled against existing empirical research in entrepreneurship, that the analysis is (a) cross-sectional and (b) single-level. Cross-sectional data are simultaneously too restrictive in underrepresenting failures and too broad in assuming similar entrepreneurial efforts across industries. Cross-sectional

analysis is susceptible to self-selection bias since it underrepresents individuals that attempt, but fail in, entrepreneurial pursuits. Longitudinal observations identify more completely the expanse of entrepreneurial initiatives (Evans and Leighton, 1989). Further, research suggests that the practice typically followed by cross-sectional studies, of grouping entrepreneurs into overly broad classifications without regard to industry-specific conditions, increases the imprecision of the research results and interpretations generated (Carsrud and Olum, 1986; Bates, 1995; Lunn and Steen, 1999). Our focus on entrepreneurship in one labor market, equity analysts, is based on the belief that the industry's structural characteristics affect the organization formation patterns that emerge from the industry (Dean, Brown and Bamford, 1998).

The second criticism of existing entrepreneurship research is that it tends to focus on either individual or situational factors to the exclusion of the other (see Aldrich and Baker, 1997 for a review of entrepreneurship research). Focusing on different levels of variables and not controlling for the omitted variables has generated empirical findings that are mutually inconsistent and sometimes contradictory (Aldrich and Baker, 1997). Our study empirically examines drivers of entrepreneurial activity at four levels: individual, firm, sector, and macroeconomy. This enables us to study the impact on entrepreneurship of potential drivers across a range of levels while controlling for other levels. This is the first study to our knowledge to provide formal evidence that links individuals' performance to their decision to become entrepreneurs.

A benefit of focusing on research analysts is that our study sheds light on new venture creation among knowledge workers, a subject that has not been explored previously, except for physicians (Headen, 1990; Wholey, Christianson and Sanchez 1993). By exploring the phenomenon of entrepreneurship within the context of knowledge workers in a particular labor market, equity security analysts, the paper also contributes to research in talent allocation (Rosen, 1981; Murphy, Shleifer and Vishny, 1991) and labor market competition (Greenwald, 1986; Lazear, 1986).

Besides its contribution to research, this paper has normative implications for the managers of knowledge-intensive firms seeking to retain their star employees. It suggests that managers should take care to make their star employees feel that they are running entrepreneurial operations to not lose them to the “entrepreneurial bug.” Further, managers should be particularly careful about losing their employees to entrepreneurial projects when the firm is underperforming the industry and when the economy is expanding.

Future research can examine whether entrepreneurs who were stars are more successful than entrepreneurs who were non-stars. We are contemplating small-sample case studies and empirical data analysis to address this question. The results of our current study are based on findings in one industry, investment banking. Comparing the entrepreneurial activity of star analysts with entrepreneurial activities of star programmers, management consultants, lawyers,

accountants, money managers, and other professionals could help test for generalizability of our conclusions to knowledge workers across industries.

## NOTES

<sup>i</sup> We acknowledge the confusion in the field about the definition of entrepreneurship (Gartner, 1990; Bygrave, 1993; Venkataraman, 1997; Bhide, 2000; Stevenson, 2001). In this paper, we define entrepreneurship as the starting of a new company (Gartner, 1985; Cooper and Dunkelberg, 1987; Campbell, 1992). Throughout the paper, entrepreneurship, business entry, and entrepreneurial activity are used to describe the starting of a new company.

<sup>ii</sup> Here after, we use the terms ranked analysts and star analysts interchangeably to refer to analysts ranked by *Institutional Investor* magazine.

<sup>iii</sup> Jackofsky (1984) suggested that performance and turnover have a U-shaped curvilinear relationship, claiming that performance and turnover would be inversely related for poor performers who experience an actual or a perceived threat of firing, unrelated for average performers, and positively related for good performers who have better employment opportunities.

<sup>iv</sup> Scheutze (1998) argued, however, that high unemployment and the lack of paid employment opportunities push people to start their own companies at a faster rate.

<sup>v</sup> For simplicity of exposition, we refer to an analyst in a particular year ( $Analyst_{i,t}$ ) simply as “analyst.”

<sup>vi</sup> This study involves measuring the opinions of investment officers at more than 500 institutions. The rankings are based on the percentage of times a broker is mentioned by institutions as being among their top 15 brokers for trading and top 10 for research. The Greenwich Associates results are based on the total number of responses for each firm given by the survey respondents, thus favoring larger staffs with broader coverage.

<sup>vii</sup> The performance of the investment banking industry, as measured by the proportional change in the security brokers industry index during year  $t$ , deflated by the S&P 500 index, is highly correlated with the *S&P 500* variable (71%).

<sup>viii</sup> We tested the alternative specification of random effects for the probit regressions. The results of two specifications are quite similar. Only robust cluster regressions are reported.

<sup>ix</sup> The *Research department quality* variable is highly correlated with *Firm reputation* variable (0.55). The signs of coefficients and their significance remain unchanged when we run regressions excluding one or the other of these two variables. (Regressions are not reported.)

## References

Aldrich, H., C. Zimmer

1986 "Entrepreneurship through Social Networks." In D. S. a. R. Smilor (ed.), *The Art and Science of Entrepreneurship*: 3-23. Cambridge MA: Ballinger.

Aldrich, H., Baker, T.

1997 "Blinded by the Cites? Has there been Progress in Entrepreneurship Research." In D. L. S. a. R. W. Smilor (ed.), *Entrepreneurship 2000*: 377-400. Chicago: Upstar.

Aldrich, H.

1999 *Organizations Evolving*. SAGE Publications.

Bates, T.

1995 "Analysis of Survival Rates among Franchise and Independent Small Business Startups." *Journal of Small Business Management*, April.

Baumol, J.

1993 *Entrepreneurship, Management and the Structure of Payoffs*. Cambridge, MA: MIT Press.

Beck, N.

1995 "Shifting Gears: Triving in the New Economy.", *Fortune*: 40-41.

Berger, J., B. P. Cohen, M. Zelditch

1966 "Status Characteristics and Expectation States." In M. Z. B. A. J. Berger (ed.), *Sociological Theories in Progress*: 29-46. Boston: Houghton Mifflin.

Bhide, A.

2000 *The Origin and Evolution of New Business*: The Oxford University Press.

Blanchflower, D. G., A. J. Oswald

1998 "What Makes an Entrepreneur." *Journal of Labor Economics*, 16: 26-60.

Brittain, J. W., J. Freeman

1986 *Entrepreneurship in the Semiconductor Industry*: University of California, Berkeley.

Brockhaus, R. P. Horwitz

1986 "The Psychology of the Entrepreneur." In D. S. a. R. Smilor (ed.), *The Art and Science of Entrepreneurship*: 25-48. Cambridge, Mass: Ballinger.

Brown, L., D. Chen

1993 "A New Approach to Formulating Composite Analyst-Based Earnings Forecast." In M. G. J. Guerard (ed.), *Handbook of Security Analyst Forecasting and Asset Allocation: Contemporary Studies in Economic and Financial Analysis*: 67-72. Greenwich, Conn: JAI Press.

Burt, R. S.

1992 *Structural Holes*. Cambridge, MA: Harvard University Press.

Burton, D. M., J. B. Sorensen, C. Beckman

1999 "Coming from Good Stock: Career Histories and New Venture Formation." Working paper.

Busenitz, L. W., Gomez C., Spencer J. W.

2000 "Country Institutional Profiles: Unlocking Entrepreneurial Phenomena." *Academy of Management Journal*, 43: 994 - 1003.

Bycio, P., R. D. Hackett, K. M. Alvares

1990 "Job Performance and Turnover: A Review and Meta-Analysis." *Applied Psychology: An International Review*, 6139: 47-76.

Bygrave, W. D.

1993 "Theory Building in the Entrepreneurship Paradigm." *Journal of Business Venturing*, 8: 255-280.

Campbell, C.A.

1992 "A Decision Theory Model for Entrepreneurship Acts." *Entrepreneurship Theory and Practice*, 17: 21-27.

Carosso, V. P.

1970 *Investment Banking in America: A History*. Cambridge, MA: Harvard University Press.

Carsrud, A. K. Olum, G. E.

1986 "Entrepreneurship: Research in Quest of a Paradigm." In D. S. a. R. Smiler (ed.), *The Art and Science of Entrepreneurship*: 367-378. Cambridge, Mass: Ballinger.

Carsen, J.M., P. E. Specter

1987 "Unemployment, Job Satisfaction, and Turnover: A Metaanalytic Test of Muchinsky Model." *Journal of Applied Psychology*, 72: 374-381.

Carter, N.M., T. M. Stearns, P. D. Reynolds and B. A. Miller

1994 "New Venture Strategies: Theory Development with an Empirical Base." *Strategic Management Journal*, 15: 21-41.

Chacar, A., R. Coff

1999 "Deconstructing a Knowledge-Based Advantage: Rent Generation, Rent Appropriation and Performance.", Strategic Management Society, 19th Annual International Conference. Berlin, Germany.

Cole, A. H.

1959 Business Enterprise in its Social Settings. Cambridge, MA: Harvard University Press.

Cooper, A. C.

1985 "The Role of Incubator Organizations in the Founding of Growth-Oriented Firms." Journal of Business Venturing, 1: 75-86.

Cooper, A. C., W. C. Dunkelberg

1987 "Entrepreneurship and Paths to Business Ownership." Strategic Management Journal, 7: 53-68.

Cooper, A. C., C. Woo, W. Dunkelberg

1989 "Entrepreneurship and the Initial Size of Firms." Journal of Business Venturing, 4: 317-332.

Cooper, A. C., W. C. Dunkelberg, C. Y. Woo, W. J. Dennis

1990 New Business in America: the Firms and their Owners. Washington, DC: NFIB Foundation.

Dalton, D. R., D. M. Krackhardt, L.W. Porter

1981 "Functional Turnover: An Empirical Assessment." Journal of Applied Psychology, 66: 716-721.

Dean, T. J., G. D. Meyer

1996 "Industry Environments and New Venture Formations in US Manufacturing: A Conceptual and Empirical Analysis of Demand Determinants." *Journal of Business Venturing*, 11: 107-132.

Dean, T. J., R. L. Brown, C. E. Bamford

1998 "Differences in Large and Small Firm Response to Environmental Context: Strategic Implications Form a Comparative Analysis of Business Formations." *Strategic Management Journal*, 19: 709-728.

Dorfman, D.

1974 "The Rise of the Entrepreneurial Analysts." *Institutional Investor*, July: 43-106.

Drucker, P. F.

1999 *Management Challenges for the 21th Century*. New York: Harper Business.

Dunn, T., Holtz-Eakin D.

2000 "Financial Capital, Human Capital, and the Transition to Self-Employment: Evidence from Intergenerational Links." *Journal of Labor Economics*, 18: 282 - 305.

Eccles, R. G., D. B. Crane

1986 *Doing Deals*. Cambridge, MA: Harvard Business School.

Eisenhardt, K. M., C. B. Schoonhoven

1990 "Organizational Growth-Linking Founding Team, Strategy, Environment, and Growth among United States Semiconductors Ventures, 1978-1988." *Administrative Science Quarterly*, 35: 504-529.

Ernst, H. J. Vitt

2000 "The Influence of Corporate Acquisitions on the Behavior of Key Investors." R&D Management, 30: 105-119.

Evans, D. S., L. Leighton

1989 "Some Empirical Aspects of Entrepreneurship." The American Economic Review, 79: 519-535.

Freeman, J.

1986 "Entrepreneurs as Organizational Products: Semiconductor Firms and Venture Capital Firms." Advances in the Study of Entrepreneurship, Innovation and Economic Growth, 1: 33-52.

Freeman, R. B., J. L. Medoff

1984 What Do Unions Do? New York.

Friedson, E.

1986 Professional Powers: A study of the Institutionalization of Formal Knowledge. Chicago: University of Chicago.

Gaglio, C. M.

1997 "Opportunity Identification: Review, Critique and Suggested Research Directions." Advances in Entrepreneurship, Firm Emergence and Growth, 3: 139-202.

Gartner, W. B.

1985 "A Conceptual Framework for Describing the Phenomenon of New Venture Creation." Academy of Management Review, 10.

1989 "Who is an Entrepreneur? Is the Wrong Question." Entrepreneurship Theory and Practice, 13: 47-68.

1990 "What are we talking about when we talk about Entrepreneurship?" *Journal of Business Venturing*, 5: 15-28.

Gilson, R. J., R. H. Mnookin

1989 "Coming of Age in a Corporate-Law firm. The Economics of Associate Career Patterns." *Stanford Law Review*, 41: 567-595.

Gompers, P. A., J. Lerner

1999 *The Venture Capital Cycle*. Cambridge, MA: MIT Press.

Granovetter, M. S.

1973 "The Strength of Weak Ties." *American Journal of Sociology*, 78: 1360-1380.

Greene, W. H.

1997 *Econometric Analysis*: Prentice-Hall, Inc.

Greenwald, B. C.

1986 "Adverse Selection in the Labor Market." *Review of Economic Studies*, 53: 325-347.

Hammel, G. S., C. K. Prahalad

1994 *Competing for the Future*. Boston: Harvard Business School Press.

Hannan, M. T., J. H. Freeman

1977 "The Population Ecology of Organizations." *American Journal of Sociology*, 82: 929-964.

Harding, F.

1998 *Creating Rainmakers*. Massachusetts: Adam Media Corporation.

Harrison, H., J. Kubik, A. Solomon

2000 "Security Analysts' Career Concerns and Herding of Earnings Forecasts." *Rand Journal of Economics*, 31: 121-144.

Hayward, L. A., W. Boeker

1998 "Power and Conflicts of Interest in Professional Firms: Evidence from Investment Banking." *Administrative Science Quarterly*, 43: 1-22.

Headen, A. E.

1990 "Wage, Returns to Ownership, and Fee Responses to Physician Supply." *The Review of Economics and Statistics*, 72: 30-37.

Higgins, M. C., R. Gulati

1999 "The Effects of IPO Team Ties on Investment Bank Affiliation and IPO Success." Harvard Business School Working Paper #00-025.

Hitt, M., A., L. Bierman, K. Shimizu, R. Kochhar

2001 "Direct and Moderating Effects of Human Capital on Strategy and Performance in Professional Service Firms: A Resource-Based Perspective." *Academy of Management Journal*, 44: 13-28.

Holbeche, L.

1998 *High Flyers and Succession Planning in Changing Organizations*: Roffey Park Management Institute.

Hollenbeck, J. R., C. R. Williams

1986 "Turnover Functionality versus Turnover Frequency: A Note on Work Attitudes and Organizational Effectiveness." *Journal of Applied Psychology*, 71: 606-611.

Holtz-Eakin, D, D. Joulfaian, H. S. Rosen

1994 "Entrepreneurial Decisions and Liquidity Constraints." *Rand Journal of Economics*, 23: 340-347.

Jackofsky, E. F.

1984 "Turnover and Job Performance: An Integrated Process Model." *Academy of Management Review*, 9: 74-83.

Johnson, M.

2000 *Winning the People Wars*. Great Britain: Prentice Hall.

Knight, F.

1921 *Risk, Uncertainty and Profit*. New York: H H.

Kolvereid, L.

1996 "Prediction of Employment Status Choice Intentions." *Entrepreneurship in Theory and Practice*, Fall: 47-58.

Kostigen, T.

1990 "Captain of your Own Ship." *Investment Dealers' Digest*, February: 22-29.

Larson, A.

1992 " Networks Dyads in Entrepreneurial Settings: A Study of the Governance of Exchange Relationships." *Administrative Science Quarterly*, 37: 76-104.

Lazear, E. P.

1986 "Raids and Offer Matching." *Research in Labor Economics*, 8: 141-165.

1995 *Personnel Economics*. Cambridge, MA: MIT Press.

Lin, Z., G. Picot, J. Compton

2000 "The Entry and Exit Dynamics of Self-Employment in Canada." *Small Business Economics*, 15: 105-125.

Lowendahl, B. R.

1997 *Strategic Management of Professional Service Firms*: Handelshojskolens Forlag.

Lucas, R. E.

1978 "On the Size Distribution of Business Firms." *Bell Journal of Economics*, 9: 508-523.

Lunn, J., T. Steen

1999 "An Empirical Investigation into the Effects of Ethnicity and Immigration on Business Formation.", 47th International Atlantic Economic Conference. Vienna.

Maister, D. H.

1993 *Managing the Professional Service Firm*. New York: Free Press.

McCall, M. W. Jr

1998 *High Flyers*. Massachusetts: Harvard Business School Press.

McClelland, D. C.

1961 *The Achieving Society*. Princeton, NJ: D. van Nostrand Co, Inc.

Meyer, J. S. Paunonen, I. Gellatly, R. Goffin, D. Jackson

1989 "Organizational Commitment and Job Performance: It's the Nature of the Commitment that Counts." *Journal of Applied Psychology*, 74: 152-156.

Mikhail, M. B., B. R. Walther, R. H. Willis

1999 "Does Forecast Accuracy Matter to Security Analysts?" *The Accounting Review*, 74: 185-200.

Milgrom, P., S. Oster

1987 "Job Discrimination, Market Forces and the Invisibility Hypothesis." *Quarterly Journal of Economics*, CII: 453-476.

Milligan, J. W.

1985 "The Boutiques are Making it Big." *Institutional Investor*, November: 175-187.

Murphy, K. M., A. Shleifer, R. W. Vishny

1991 "The Allocation of Talent." *Quarterly Journal of Economics*, 106: 503-530.

Neef, D.

1999 *A Little Knowledge is a Dangerous Thing*. MA: Butterworth-Heinemann.

Pfeffer, J

1994 *Competitive Advantage through People*. Boston: Harvard Business School Press.

Phillips, B

1997 "Free at Last?" *Institutional Investor*, August: 48-55.

Probst, G., S. Raub, K. Romhardt

2000 *Managing Knowledge. Building Blocks for Success*: England: John Wiley & Sons, Ltd.

Pulliam, S.

1996 "Institutional Investor's Offer of a Peek at Data on Analysts Raises Eyebrows.", *The Wall Street Journal*.

Reynolds, P. D., P. B. Miller

1988 "1987 Minnesota New Firm Study.". Minneapolis: MN: Center for Urban and Regional Affairs. University of Minnesota.

1992 "New Firm Gestation: Conception, Birth, and Implications for Research." *Journal of Business Venturing*, 7: 405-417.

Reynolds, P. D., S. B. White

1997 *The Entrepreneurial Process. Economic Growth, Men, Women, and Minorities*: Greenwood Publishing Group.

**Robinson, P. B., E. A. Sexton**

1994 "The Effect of Education and Experience on Self-Employment Success." *Journal of Business Venturing*, 9: 141-156.

Romanelli, E.

1989 "Organization Birth and Population Variety: a Community Perspective on Origins." In B. M. S. L. L. Cummings (ed.), *Research in Organizational Behavior*. Greenwich, CT JAI.

Rosen, Sherwin

1981 "The Economics of Superstars." *American Economic Review*, LXXV: 845-858.

Rusbelt, C. E., D. Farrell

1983 "A Longitudinal Test of the Investment Model: The Impact of Job Satisfaction, Job Commitment, and Turnover of Variations in Rewards, Costs, Alternatives, and Investments." *Journal of Applied Psychology*, 68: 429-438.

Sandberg, W. R., C. W. Hofer

1987 "Improving New Venture Performance: The Role of Strategy, Industry Structure and the Entrepreneur." *Journal of Business Venturing*, 2: 5-28.

Scheinberg, S, I. C. MacMillan

1988 "An 11 Country Study of Motivations to Start a Business." In W. A. L. B. A. Kirchoff, W. E. McMullan, K. H. Vesper, W. E. Wetzel (ed.), *Frontiers of Entrepreneurship Research*: 337-356. Wellesley, MA: Babson College.

Scheutze, H.

1998 "Taxes, Economic Conditions and the Recent Trends in Male Self-Employment: A Canada-US Comparison.", Canadian Economics Association Meetings. University of Ottawa, On Canada.

Schoonhoven, C. B., Eisenhardt, K. M.

1992 "Entrepreneurial Environments: Incubator Region Effects on the Birth of New Technology-Based Firms." In M. L. L Gomez-Mejia (ed.), *High Technology Venturing*: 210-252: Greenwich, CT: JAI.

Schumpeter, J. A.

1934 *The Theory of Economic Development*. Cambridge, Mass: Harvard University Press.

Shane, S.

2000 "Prior Knowledge and Discovery of Entrepreneurial Opportunities." *Organization Science*, 11: 448-469.

Siconolfi, M.

1992 "Shearson Research Analysts Finish First on 'All -America Team' for Third Year." The Wall Street Journal: C18.

Sinha, P., L. Brown, S. Das

1997 "A Re-examination of Financial Analysts' Differential Earnings Forecast Accuracy." Contemporary Accounting Research, 14: 1-42.

Steier, L., R. Greenwood

2000 "Entrepreneurship and the Evolution of Angel Financial Networks." Organization Studies, 21: 163-192.

Stevenson, H. H.

1983 "A Perspective on Entrepreneurial Management." Unpublished paper. Harvard Business School.

2000 "Intellectual Foundations of Entrepreneurship." Unpublished paper. Harvard Business School.

Stickel, S. E.

1990 "Predicting Individual Analyst Earnings Forecast." Journal of Accounting Research, 28: 409-417.

1992 "Reputation and Performance among Security Analysts." Journal of Finance, 47: 1811-1836.

Stinchcombe, A.

1965 "Social Structure and Organizations." In J. G. March (ed.), Handbook of Organizations: 142-193.

Stuart, T. E., H. Hoang, R. C. Hybels

1999 "Interorganizational Endorsements and the Performance of Entrepreneurial Ventures."

Administrative Science Quarterly, 44: 315-349.

Tulgan, B.

2001 Winning the Talent Wars: Bruce Tulgan.

United States Government

1998 "The State of Small Business: a Report of The President.". Washington: Office of

Advocacy's Annual Report on Small Business and Competition.

Useem, M., J. Karabel

1986 "Pathways to Top Corporate Management." American Sociological Review, 51: 184-200.

Uchitelle, L.

1991 "2 Leading Economists Moving on Wall St." The New York Times, March 21: D4.

Venkataraman, S.

1997 "Distinctive Domain of Entrepreneurship." In J. A. Katz (ed.), Advances in

Entrepreneurship, Firm Emergence and Growth: 119-138.

Wallace, A.

1981 "The New Entrepreneurs." Institutional Investor, September: 83-90.

Weber, M.

1904 The Protestant Ethic and the Spirit of Capitalism. New York: Routledge.

Wholey, D. R., J. B. Christianson, S. M. Sanchez

1993 "The Effect of Physician and Corporate Interests on the Formation of Health Maintenance Organizations." *American Journal of Sociology*, 99: 164 - 200.

Williams, C. R., L. P. Livingstone

1994 "Another Look at the Relationship between Performance and Voluntary Turnover." *Academy of Management Journal*, 37: 236-298.

Woo, C. Y., A. Cooper, W. C. Dunkelberg

1991 "The Development and Interpretation of Entrepreneurial Typologies." *Journal of Business Venturing*, 6: 94-114.

Woodruffe, C.

1999 *Winning the Talent War*. New York: John Wiley & Sons, LTD.

Wooldridge, J. M.

2000 *Introductory Econometrics*: Southwester College Publishing, Thomson Learning.

Wyckoff, A.

1996 "The Growing Strength of Services.": *OECD Observer* 2000.

Figure 1. Dispositional and situational factors that might affect the probability that knowledge workers become entrepreneurs

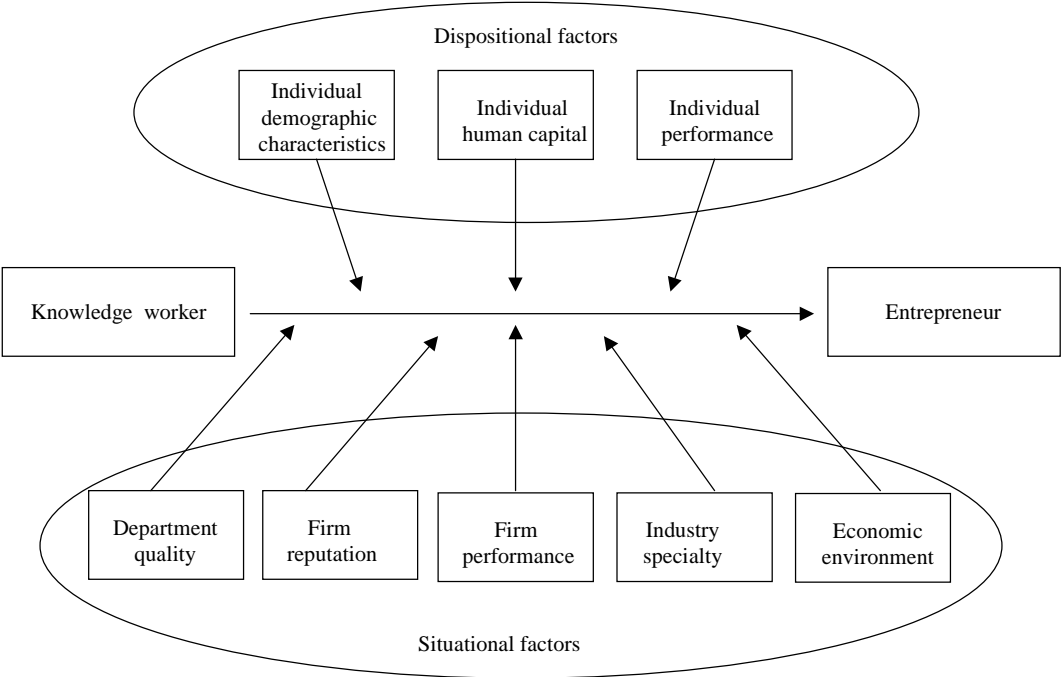


Table 1

**Descriptive Statistics and Correlations\***

<b>Variable</b>	<b>N</b>	<b>Mean</b>	<b>S.D.</b>	<b>Min</b>	<b>Max</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
1. Analyst entrepreneur	9531	.005	.069	0	1								
2. Analyst star	9531	.358	.479	0	1	.024							
3. Analyst gender	9531	.765	.424	0	1	.024	.120						
4. Analyst experience	6659	8.968	5.950	.011	57.823	.016	.299	.060					
5. Research department quality	9148	32.123	14.797	1	58	-.014	.149	-.077	.116				
6. Firm reputation	9531	.399	.490	0	1	.003	.112	-.071	.025	.548			
7. Firm performance	8916	.465	1.309	-.884	11.800	-.016	-.008	.004	-.009	-.152	-.115		
8. Sector performance	7265	.012	.192	-.730	.838	.007	-.024	.001	-.002	-.031	-.022	.044	
9. S&P500 performance	9531	.166	.141	-.091	.375	.021	-.079	-.009	.087	.126	.011	.133	.151

\* Correlations greater than .01 and less than -.01 are significant at  $p < .05$

Table 2

<b>The Pooled Probit Regressions to Estimate the Probability of Becoming an Entrepreneur<sup>a</sup></b>			
<b>Variable</b>	<b>MODEL M1</b>	<b>MODEL M2</b>	<b>dF/dx<sup>b</sup></b>
Analyst gender	.494 ** (.222)	.428 * (.230)	.003
Analyst experience	.011 (.021)	-.046 * (.028)	.000
Analyst experience-square	-.000 (.001)	.002 ** (.001)	.000
Research department quality	-0.001 (.003)	-.007 ** (.003)	.000
Analyst star		.354 ** (.145)	.004
Firm reputation		.150 (.153)	.002
Firm performance		-.182 * (.111)	(.002)
Sector performance		.102 (.323)	.001
S&P500 performance		1.429 ** (.555)	.015
Number of observations	6450	4905	
Log Likelihood	-218.890	-152.820	
Wald chi2	5.220	27.670	
Prob > chi2	.266	.001	
Pseudo R-squared	.017	.058	

\*p < .10; \*\*p < .05; \*\*\*p < 0.01

<sup>a</sup> Each observation is an analyst-year pair. The robust cluster model adjusts standard errors for correlation because it assumes that data is not independent within clusters but independent across clusters. Only adjusted robust standard errors are reported.

<sup>b</sup> dF/dx is the marginal increase due to a given variable controlling for every other variables.

Table 3

<b>Hypotheses Summary and Findings</b>			
<b>Hypotheses</b>	<b>Variables</b>	<b>Predicted sign</b>	<b>Findings</b>
<b>H1:</b> High performing knowledge workers are more likely to become entrepreneurs than their low performing counterparts	Analyst star	+	<b>Supported</b>
<b>H2:</b> Being in a more prominent firm increases the probability of knowledge workers becoming entrepreneurs	Firm prominence	+	<b>Not-supported</b>
<b>H3:</b> Poor firm performance relative to competitors increases the probability of its knowledge workers becoming entrepreneurs	Firm performance	+	<b>Supported</b>
<b>H4:</b> The better the performance of the sector covered by a knowledge worker, the greater the probability of the knowledge worker becoming an entrepreneur	Sector performance	+	<b>Not-supported</b>
<b>H5:</b> The better the performance of the U.S. economy, the greater is the probability of knowledge workers becoming entrepreneurs	S&P500 performance	+	<b>Supported</b>