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ABSTRACT

Career Choice and the Strength of Weak Ties*

This paper argues that the structure (i.e., size and composition) of the informal search network is a crucial determinant of the career decisions of young workers. Building on the search-theoretic career choice and job mobility model proposed by Neal (1999), I compare the consequences of career advice by one's weak ties versus that by strong ties. The main result is that receiving help from weak ties is associated with early career and job settlements, while the strong ties are more likely to lead to amplified mobility and generate mismatch. Given a network size, I find a strongly positive correlation between the fraction of weak ties among one's informal connections and the likelihood of settling on a stable career path early in the life course. I also find that the sign of this correlation persists, while the magnitude gets smaller as the network size increases. I conclude that the strength-of-weak-ties hypothesis can shed light on the complexity of job mobility patterns among young workers. The model can explain why it takes much longer for blacks – whose informal networks are documented to consist of strong ties – to locate a stable career path than their white counterparts. It also predicts that young workers from closed and segregated neighborhoods tend to spend more time before they find suitable careers.

JEL Classification: J21, J24, J62

Keywords: job mobility, career choice, search, strength of weak ties, social networks

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1 Introduction

Labor mobility exhibits a complex pattern, particularly among young workers [Parnes (1954)]. Although early papers on labor mobility focus exclusively on firm-level transitions, it is now widely recognized that complex shifts occur both at the firm-level and at the career-level (or task-level).[1] There is an emerging, and empirically grounded, consensus that young workers jointly search for job-career pairs and that the optimal search policy features a two-stage strategy: workers search for a career at the first stage and they start shopping for employers once they found a suitable career path [Neal (1999)].[2] This suggests that "career choice" is of primary importance in the job search strategies devised by young workers. The main intuition is that young workers choose to start accumulating specific human capital (i.e., choose a suitable career path) early in the working life, then they select into firms where they are better matched.[3]

Motivated by the view that "young workers search for a career first," I investigate how the structure of a young worker's search network affects his career decisions. Young workers have access to two sources of information on the potential career paths available to them; formal sources and informal sources. Formal sources consist of the impersonal channels of career information that are typically available to everyone upon demand—such as the public and private career advice services, school career centers, the internet, firms, etc. Informal sources include one's personal connections that can further be classified under two categories: strong ties (close friends and relatives) and weak ties (acquaintances). It is often argued in the informal networks literature that weak ties relay useful information more frequently than strong ties, which is known as the "strength-of-weak-ties" hypothesis.[4] The intuition is that weak ties are connected to networks outside the individual worker's reach; therefore, they

[1] Breakthrough papers pointing at this complex shifts include Miller (1984), Shaw (1987), McCall (1990, 1991), and Neal (1999).

[2] See Pavan (2011) for a recent empirical support on the validity of the two-stage strategy. See also Salop and Salop (1976), Johnson (1978), Mortensen (1978), Altonji and Shakotko (1987), Topel and Ward (1992), Sicherman and Galor (1990), Parent (2000), and Kambourov and Manovskii (2009) for alternative views.

[3] See Becker (1962) and Oi (1962) for early motivations of this basic idea.

[4] A non-exhaustive set of papers studying different aspects of this hypothesis include Granovetter (1973, 1983, 1995), Boorman (1975), Lin (1982), Bridges and Villemez (1986), Marsden and Hurlbert (1988), Montgomery (1992), Lai, Lin, and Leung (1998), Yakubovich (2005), Patacchini and Zenou (2008), Goel and Lang (2009), and Zenou (2013). See also Halaby (1988) for a search-theoretic approach to informal job search.

can offer new sources of information and open new career windows. There are studies in the organizational behavior literature clearly documenting the importance of social contacts on the career choices of young workers [see, for example, Higgins (2001)]. But, there is no work studying the impact of network structure—i.e., whether the worker has greater access to weak ties versus strong ties or not, or whether the informal network is large or not—on career decisions of young workers.

The main goal of this paper is to question the respective roles that strong and weak connections play in young workers' career decisions. In particular, I assess whether weak ties or strong ties lead to a more swift (or less volatile) career engagement for young workers. This is important, because if you think the worker population as a mix of those with a larger fraction of weak ties versus those with a larger fraction of strong ties in their social networks, then changes in the composition of these two types of workers in the population influence the patterns of career choice and the associated labor market outcomes, such as wage growth and human capital accumulation.

I find that the likelihood of securing a suitable career path early in the life cycle goes up with the fraction of weak ties among a worker's social contacts. The social networks literature states that strong ties have greater motivation to provide help and they are more likely to be available when needed, as Granovetter suggests. But, "weak ties provide people with access to information and resources beyond those available in their own social circle" [Granovetter (1983)]. In this paper, I show that weak ties are crucial in locating stable career paths early, they reduce mobility, and increase match quality. Strong ties, on the other hand, amplify mobility and increase the incidence of mismatch. These findings are consistent and coherent with Granovetter's theory and the subsequent conceptualization of the strength-of-weak-ties hypothesis in the literature.

These results can explain why it takes much longer for blacks to locate a stable career path than whites [see, for example, Wolpin (1992)]. The social networks literature clearly documents that social networks of young black workers mainly consist of strong ties contrary to their white

counterparts, who have considerable access to weak ties [Allen (1995)]. If blacks more heavily rely on strong ties relative to whites, then the results that I present can explain why they spend more time before they settle on a suitable career. Generally speaking, the model that I develop predicts that young workers from closed and segregated neighborhoods tend to spend more time before they find suitable careers.

Another result I report is related to the network size. I show that the positive relationship between the share of weak ties and the likelihood of choosing a career gets weaker (but still persists) as the network size increases. This suggests that the importance of information coming from each weak tie gets smaller as the worker's network becomes larger. An alternative interpretation is that the weight that the worker attributes to the information acquired from each weak ties gets smaller as the network size increases.

This is the first paper in the literature investigating the effects of the structure of social networks on career decisions of young workers. The model is most closely related to the career choice framework developed by Neal (1999). The difference is that the distribution of careers—from which young workers make career draws—has been derived from micro-foundations motivating the strength-of-weak-ties hypothesis. These micro-foundations are similar to those documented and studied by Montgomery (1992). In this sense, my paper bridges the career choice and the social networks literatures. There is only one empirical work, by Higgins (2001), documenting several aspects of the link between career choice and social networks. She finds using survey data that those young workers (at age 27 and below) who have access to a large and diverse advice network are more likely to build career paths early. This is consistent with the predictions of the model that this paper develops. The limitation of her work, however, is that the survey is conducted among MBA students, who are potentially better connected than the average worker in the relevant population, therefore the external validity of her results is limited.

In terms of the results, this paper is also closely linked to Bentolila, Michelacci, and Suarez (2010). They argue that social contacts may be beneficial in finding jobs; but, these benefits are

less pronounced for occupations requiring high worker productivity. According to their view, job search through informal contacts leads to inefficiencies that may reduce match quality. My paper is different from theirs in two major ways. First, they do not distinguish between weak ties versus strong ties. They focus on the role of social networks as a potential source of mismatch, while I distinguish between the type of contacts that may relay useful information (i.e., weak ties) and the type of those that are less likely to produce new information (i.e., strong ties). Second, their primary purpose is to model mismatch within an equilibrium search and matching framework and, thus, they do not formally model career choice, while the model that I develop puts together a coherent framework for career and job choices in the presence of social networks that can influence these choices.

The plan of the paper is as follows. Section 2 presents the model and the characterizes the optimal solution. Section 3 develops several numerical exercises based on the model along with a detailed assessment of the results. Graphical illustrations are provided to clarify the results. Section 4 concludes.

2 Model

The model builds on the theoretical principles of the job search framework developed by McCall (1970). The application to the career choice framework is similar to Miller (1984), McCall (1990) and, in particular, Neal (1999).[5] The punchline in Neal's model is that the young worker employs a two-stage strategy of career and job search. Career choice is of primary importance and the worker does not shop for jobs until he settles on a career. This strategy is also shown to be valid empirically. Based on this view, I assume that young workers allocate their informal networks to career search rather than job search.[6]

The model features a general equilibrium setting in the presence of frictions stemming from career and job search processes. The objective of the worker is to maximize the expected present discounted value of life-time earnings by choosing career-job (θ, ϵ) pairs; i.e., the worker

[5] See also Ljungqvist and Sargent (2004) for an excellent review and interpretation of Neal's model.

[6] This is a sensible assumption for young workers, but not necessarily a good approximation for tenured workers. But this paper focuses explicitly on the career decisions of young workers, ruling out the career movements of older workers.

maximizes $\mathbb{E}\sum_{t=0}^{\infty}\beta^t y_t$, where $y_t = \theta_t + \epsilon_t$ defines earnings. There is no unemployment. A career is defined by a draw of θ from the cumulative distribution function (cdf) H, while a job is defined by a draw of ϵ from the cdf F. All draws are independent, and $H(0) = F(0) = 0$, $H(B_\theta) = F(B_\epsilon) = 1$, where $B_\theta < \infty$ and $B_\epsilon < \infty$. The worker cannot draw a career without drawing a job; that is, the worker can make a new career draw only if he draws a new job. However, the worker can draw a new job without drawing a new career. The worker's decision grid is three-dimensional: he can either accept both the current career and job offers, accept the existing career offer but draw a new job next period, or draw a new career-job pair next period. There is no recall.

The network structure that affects the worker's career choice is embedded into the cdf H. The worker has access to formal and informal sources of information on career opportunities. Formal sources are impersonal; that is, they mostly consist of publicly available channels of information—such as the public and private career advice centers, internet resources, school career services, etc.—on career choice. Informal sources, however, are personal connections. Following Granovetter (1973), I group informal sources into two categories: (1) strong ties (i.e., close friends and relatives) and (2) weak ties (i.e., acquaintances).

The structure of the worker's informal network is fully described by two parameters: the size of the network (N) and the composition of the network (ω). Following Montgomery (1992), the composition of the worker's informal network is defined by two fractions: the fraction ω of weak ties and the fraction $(1-\omega)$ of strong ties. Therefore, the worker possesses ωN weak ties and $(1-\omega)N$ strong ties. The probability that a worker receives an offer through each weak tie at each period is p_w, while the probability of receiving an offer through each strong tie at each period is p_s. The weak-tie offers are drawn from a cdf H_w with probability density function (pdf) h_w, while strong-tie offers are drawn from a cdf H_s with pdf h_s. The worker also has access to M sources of formal career information. The probability that a worker receives an offer through each formal source at each period is p_f. The formal offers are drawn from the cdf H_f with pdf h_f. I assume $H_w(0) = H_s(0) = H_f(0) = 0$, $H(B_w) = H(B_s) = H(B_f) = 1$, where $B_w < \infty$, $B_s < \infty$, and $B_f < \infty$.

Under the assumption that career draws are independent across sources, it is straightforward to formulate the cdf H as

$$H(\theta) = \Big[1 - p_f\big(1 - H_f(\theta)\big)\Big]^M \times \Big[1 - p_w\big(1 - H_w(\theta)\big)\Big]^{\omega N} \times \Big[1 - p_s\big(1 - H_s(\theta)\big)\Big]^{(1-\omega)N} \tag{2.1}$$

with the pdf

$$\begin{aligned} h(\theta) = Mp_f h_f(\theta)\frac{H(\theta)}{1 - p_f\left[1 - H_f(\theta)\right]} &+ \omega N p_w h_w(\theta)\frac{H(\theta)}{1 - p_w\left[1 - H_w(\theta)\right]} \\ &+ (1-\omega)Np_s h_s(\theta)\frac{H(\theta)}{1 - p_s\left[1 - H_s(\theta)\right]}. \end{aligned} \tag{2.2}$$

The worker, already holding a career-job (θ, ϵ) offer, chooses between three alternatives: (1) accepting the existing career-job pair; (2) retaining the career offer and drawing a new job (ϵ'); or drawing both a new career and a new job (θ', ϵ'). Let $V(\theta, \epsilon)$ describe the optimal value of this problem. The corresponding Bellman equation is formulated as

$$\begin{aligned} V(\theta, \epsilon) = \max\Bigg\{ &\theta + \epsilon + \beta V(\theta, \epsilon), \quad \theta + \int \Big[\epsilon' + \beta V(\theta, \epsilon')\Big] dF(\epsilon'), \\ &\int\int \Big[\theta' + \epsilon' + \beta V(\theta', \epsilon')\Big] dH(\theta') dF(\epsilon') \Bigg\}. \end{aligned} \tag{2.3}$$

The value function is increasing in both θ and ϵ.

If the worker chooses to accept the existing career-job offer (θ, ϵ), then the value function in Equation (2.3) attains the value $(\theta + \epsilon)/(1 - \beta)$. Clearly, this choice is made when the value of accepting the existing career-job pair is at least as large as the value of the other two alternatives. In other words, this occurs when

$$\frac{\theta + \epsilon}{1 - \beta} \geq \max\Big\{J(\theta), Z\Big\}, \tag{2.4}$$

where Z is the value of drawing both a new career and a new job,

$$Z = \int\int \Big[\theta' + \epsilon' + \beta V(\theta', \epsilon')\Big] dH(\theta') dF(\epsilon') \tag{2.5}$$

and $J(\theta)$ is the value of drawing a new job (ϵ') but retaining the existing career offer (θ):

$$J(\theta) = \theta + \int \Big[\epsilon' + \beta V(\theta, \epsilon')\Big] dF(\epsilon'). \tag{2.6}$$

Notice that Z is a fixed number since the future values of the career-job pairs are both integrated out, while $J(\cdot)$ is a function of the existing career offer θ. To be able to perform a further characterization of the solution of this problem, suppose that we fix the career offer θ and look for a job offer $\epsilon = \bar{\epsilon}(\theta)$ such that the expression (2.4) holds with equality. Obviously, $\bar{\epsilon}(\theta)$ solves the problem

$$\bar{\epsilon}(\theta) = \max\Big\{(1-\beta)J(\theta) - \theta, (1-\beta)Z - \theta\Big\}. \tag{2.7}$$

The worker accepts any career-job pair (θ, ϵ) that satisfies $\epsilon \geq \bar{\epsilon}(\theta)$. When this condition does not hold, the worker will draw either only a new job ϵ' or a new career-job pair (θ', ϵ'). Retaining the current career θ is optimal when $J(\theta) \geq Z$. Using Equation (2.5), the critical career value $\bar{\theta}$ that satisfies

$$J(\bar{\theta}) = Z \tag{2.8}$$

can easily be solved for. Thus, independently of the job draw (ϵ), the worker will never choose to abandon any career $\theta \geq \bar{\theta}$. The decision rule for retaining the career draw at hand can, therefore, be formulated as follows: accept θ if $\theta \geq \bar{\theta}$ or if the current career-job pair (θ, ϵ) satisfies $\epsilon \geq \bar{\epsilon}(\theta)$.

The cutoff job value $\bar{\epsilon}(\theta)$ can further be characterized within the retain-θ region $\theta \geq \bar{\theta}$. When $\theta \geq \bar{\theta}$ is satisfied, it follows that

$$J(\theta) = \frac{\theta}{1-\beta} + \int M(\epsilon') dF(\epsilon'), \tag{2.9}$$

where $M(\epsilon)$ is the optimal value of $\mathbb{E}\sum_{t=0}^{\infty} \beta^t \epsilon_t$ for a worker who has a job draw ϵ at hand, who has already decided to retain the existing career draw θ, and who is deciding whether to draw a new job next period. This is because we know that the worker will keep the career θ

forever. The Bellman equation for M is

$$M(\epsilon) = \max\left\{\frac{\epsilon}{1-\beta}, \quad \epsilon + \int M(\epsilon')dF(\epsilon')\right\}. \tag{2.10}$$

This Bellman equation suggests that the optimal policy is to keep the job offer ϵ for all $\epsilon \geq \bar{\epsilon}$ versus to draw a new job (ϵ') next period, otherwise. Notice that ϵ is independent of θ in the range $\epsilon \geq \bar{\epsilon}$. It is worthwhile to emphasize that it is possible to draw a (θ, ϵ) pair such that the value of retaining the existing career offer (θ) and drawing a new job offer (ϵ') can exceed both the value of accepting both, and the value of rejecting both and drawing a new (θ', ϵ') pair next period. This occurs when a large θ is drawn along with a small ϵ, with $\theta \geq \bar{\theta}$ and $\epsilon < \bar{\epsilon}$.

3 Numerical Exercises, Results, and Discussion

The results of the model have both normative and positive implications. On the normative side, the model says that young workers should not shop for a firm (or job) until they have found a career suitable for them. On the positive side, the model predicts that workers do not switch careers after they have settled on one; but, they do switch jobs after they have settled on a career path. Although this prediction is too stark to fit all the life cycle properties of the career choice problem, it is viewed as a good first approximation.[7]

The results suggest that the young worker employs a multi-stage reservation wage strategy as the optimal behavioral outcome. In this section, I provide visual and numerical characterizations of the optimal solution over the (θ, ϵ) plane. Following the design in Neal (1999) and without loss of generality I set 20 equispaced job grid in the unit interval [0.05,1] and 20 equispaced career grid in the interval [0.25,5]. I start the parameterization by choosing the grid-space for the offer distributions. There are mainly four offer distributions to define: H_f, H_w, H_s, and F. H_f is the cdf of career offers received from formal sources. H_w is the cdf of career offers received from weak ties. H_s is the cdf of career offers received from strong ties.

[7] Neal (1999) suggests that extending the model to include learning, along the lines of Jovanovic (1979), could help explain the later career switches that his model misses.

These three distributions are combined to generate the career offer distribution H that the worker uses to draw careers. F is the cdf of job offers. I set the offer distributions H_f, H_s, and F to be uniform with 20 grids in the unit interval [0.05,1]. Choice of H_w is a rather subtle issue. It is well-documented in the literature that weak ties enable worker to have access to offers that they cannot normally reach. This should be reflected in the formulation of H_w. To capture this fact, I set 20 grids in the same unit interval, but I construct a slightly tilted probability distribution: the offer probability is 0.025 percent for each possible career value in the interval [0.25,2.5], but it becomes 0.075 percent in the interval [2.75,5]. This means that, it is three times more likely to receive a career offer from the upper half of the distribution than the lower half when weak ties generate an offer.

The subjective discount factor β is set to be 0.99. The number of formal career sources, M, is 5. The probability of receiving an offer through a formal source (p_f) and the probability of receiving an offer through a strong tie (p_s) are set to be 0.3 each, while the probability of receiving an offer through a weak tie (p_w) is 0.8—to reflect the stylized fact that weak ties are more likely to generate offers.

The comparative statics exercises are performed over the parameters N and ω, which define the size and composition of the informal job search network of the young worker, respectively. Figures (1) - (3) present the results of these exercises. In each figure, the vertical axis describes the career-job decision rule, the left-horizontal axis is the job grid, and the right-horizontal axis is the career grid. The horizontal axes are self-explanatory, but it will perhaps be useful to describe what the vertical axis tells. There are three distinct decisions that a worker currently holding a career-job offer (θ, ϵ). First, the worker can accept both the career and job offers. This is described by the top-level of the surface of the three-dimensional plot (i.e., with pink color). Second, the worker can retain the career offer while rejecting the job offer hoping to draw a better job (ϵ') next period. This is described by the middle-level of the surface (i.e., with purple color). Third, and finally, the worker can reject both the career and job offers, hoping to draw a better career-job pair (θ', ϵ') next period. The final decision is described by the bottom level (i.e., with cyan color).

In Figure (1), the size of the informal network is small, i.e., $N = 5$. The composition parameter is set to take three values: 0.2 (top panel), 0.5 (middle panel), and 0.9 (bottom panel). The parameter $\omega = 0.2$ means that 20 percent of the worker's informal connections are strong ties, while the remaining 80 percent are the weak ties. Figure (1) states that when the fraction of weak ties among one's informal contacts is large, the likelihood of settling on a career path early in the working life is also large. In other words, there is a positive correlation between the fraction of weak ties that a young worker possesses and the likelihood of finding a suitable career early in the working life.

The same patterns persist as the size of the informal network increases. $N = 10$ in Figure (2) and $N = 20$ in Figure (3). Although the positive correlation between the fraction of weak ties and the likelihood of finding a suitable career path persists for all network sizes, the strength of the correlation gets weaker as the network size gets larger. To sum up, I concentrate on two results: (1) there is a positive correlation between the fraction of weak ties among one's informal connections and the likelihood of finding a suitable career early in the working life and (2) this positive correlation persists but gets smaller in magnitude as the network size increases.

This result can explain two phenomena. First, it can explain why it takes much longer for blacks to settle on a stable career path than whites. It is clearly documented in the empirical literature that the informal networks of young black workers mostly consist of strong ties, while whites have greater access to weak ties. If the informal networks of blacks consist of strong ties, then the results that I present can explain why they spend more time before they settle on a suitable career. Young black workers tend to live in closed/segregated neighborhoods that would force them to rely more heavily on their strong ties in career selection, while whites have access to greater career options as they tend to have better access to a large set of weak ties.

More generally, the model that I present in this paper predicts that the structure of neighborhoods can constrain a young worker's career choice and development. Young workers living

in segregated neighborhoods or environments tend to experience difficulties in find suitable careers, while those who are exposed to more heterogeneous neighborhood effects have access to more diversified and effective information sources regarding career options. A further implication is related to experience accumulation and the associated wage growth. The ones who have a better access to weak ties tend to locate stable careers early, which brings together a potentially steeper wage trajectory over the life cycle. As a result, the size and the composition of the informal networks is an important factor determining the career prospects and related labor market outcomes of the young workers.

4 Concluding Remarks

This paper investigates the effects of social network structure on the career decisions of young workers. Modifying Neal's two-stage model in a way to incorporate the micro-foundations of the strength-of-weak-ties hypothesis, I ask whether or not the size and composition of one's informal network can influence career choices. This is a potentially important question, because the structure of the social network is often regarded as an indispensable component of one's human capital and, thus, should play a role in the determination of labor market outcomes over the life cycle.

The informal contacts of young workers consist of two groups of individuals: strong ties (friends and relatives) and weak ties (acquaintances). I find that there is a strongly positive relationship between the share of weak ties among one's social contacts and the likelihood of choosing a stable career path early in the working life. A rise in the size of the network tends to weaken the degree of this positive correlation, but the positive correlation persists regardless of the size. I conclude that the size and composition of social networks can diffuse into the career choice processes of young individuals. Those with a greater chance of access to weak ties have advantages over those who live in segregated neighborhoods with only a little chance to access information outside of their closed networks.

This finding can successfully explain the black-white differences in the likelihood of choosing

a career path early. Blacks, whose social networks mostly consist of strong ties, are less likely to choose stable careers early in their working lives, unlike their white counterparts who have greater access to weak ties. The model that I propose brings an explanation to these racial differences in career choice and mobility. The model also suggests that living in closed and segregated neighborhoods reduces earnings growth prospects of young workers and, thus, reduces welfare.

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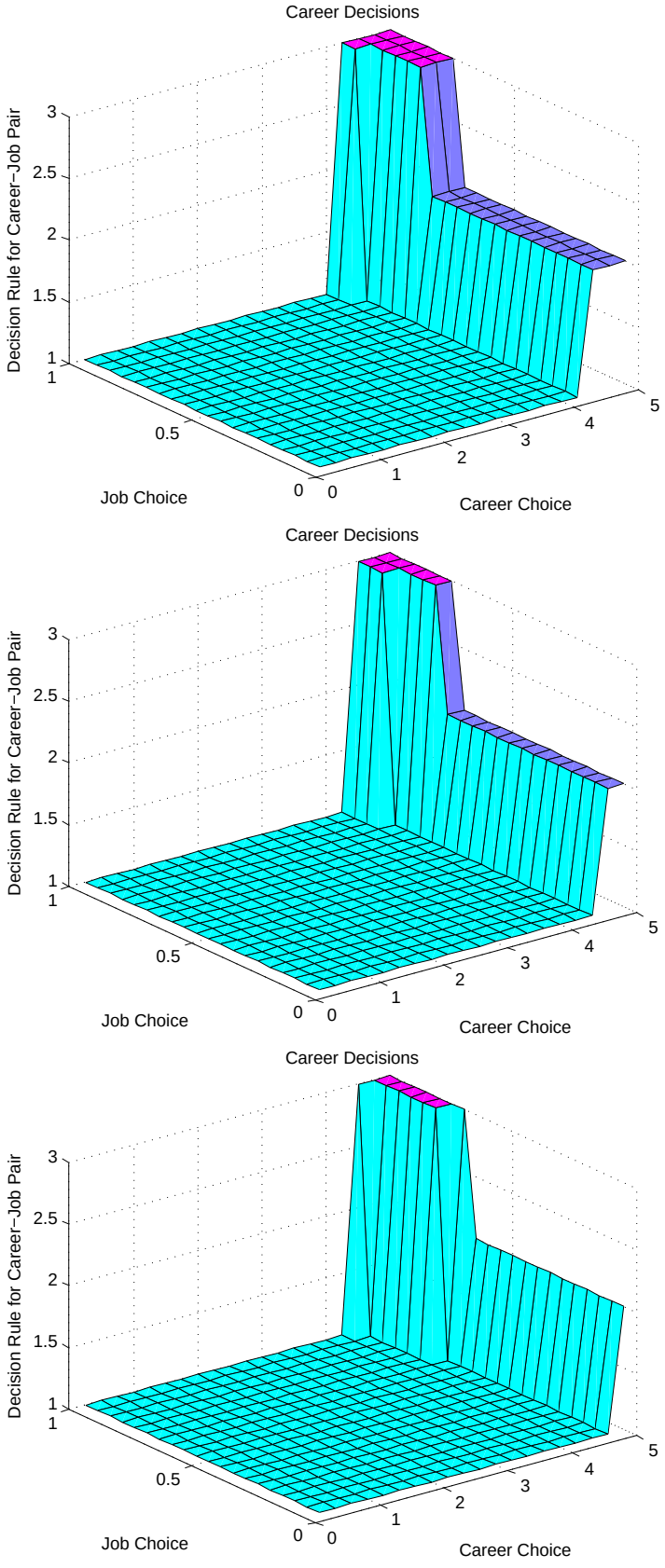

Figure 1: SCENARIO I: The choices of a worker with a small network ($N = 5$) for $\omega = 0.2$, $\omega = 0.5$, and $\omega = 0.9$, respectively.

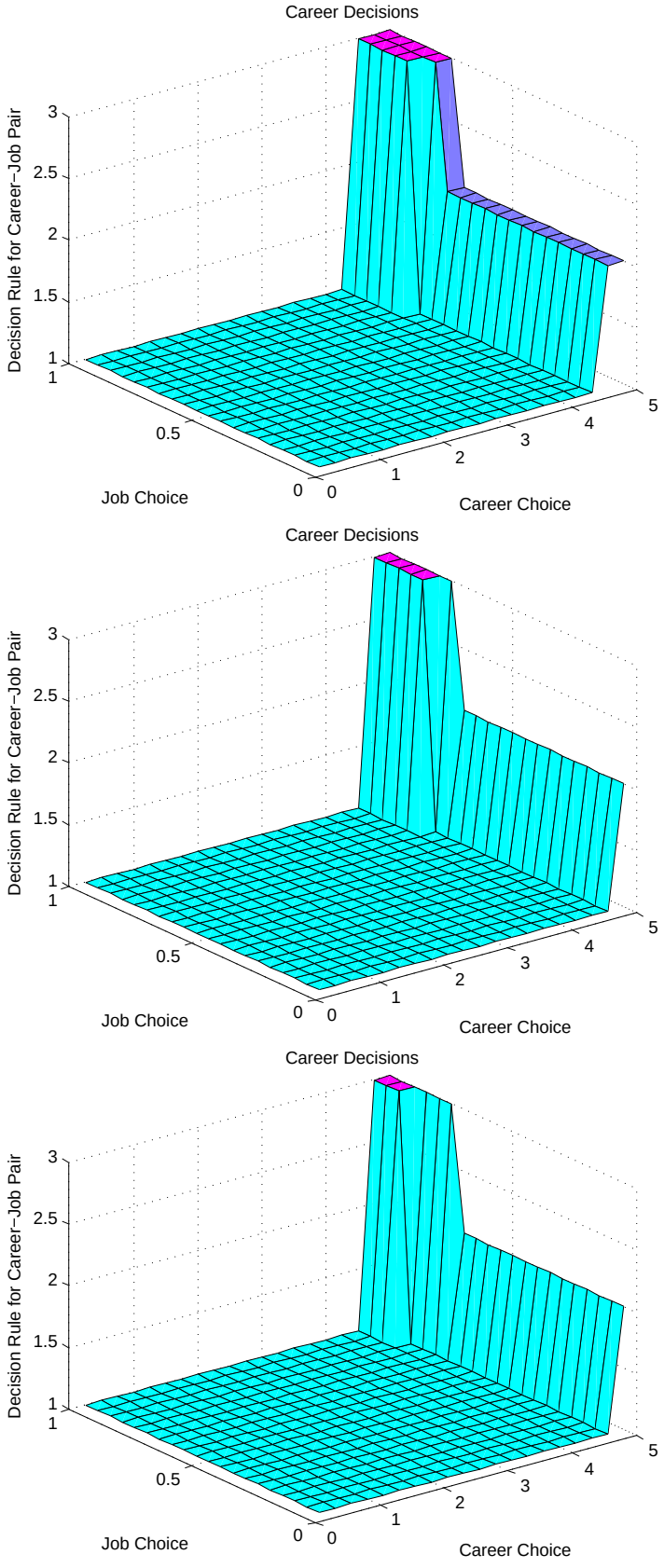

Figure 2: SCENARIO II: The choices of a worker with a medium-size network ($N = 10$) for $\omega = 0.2$, $\omega = 0.5$, and $\omega = 0.9$, respectively.

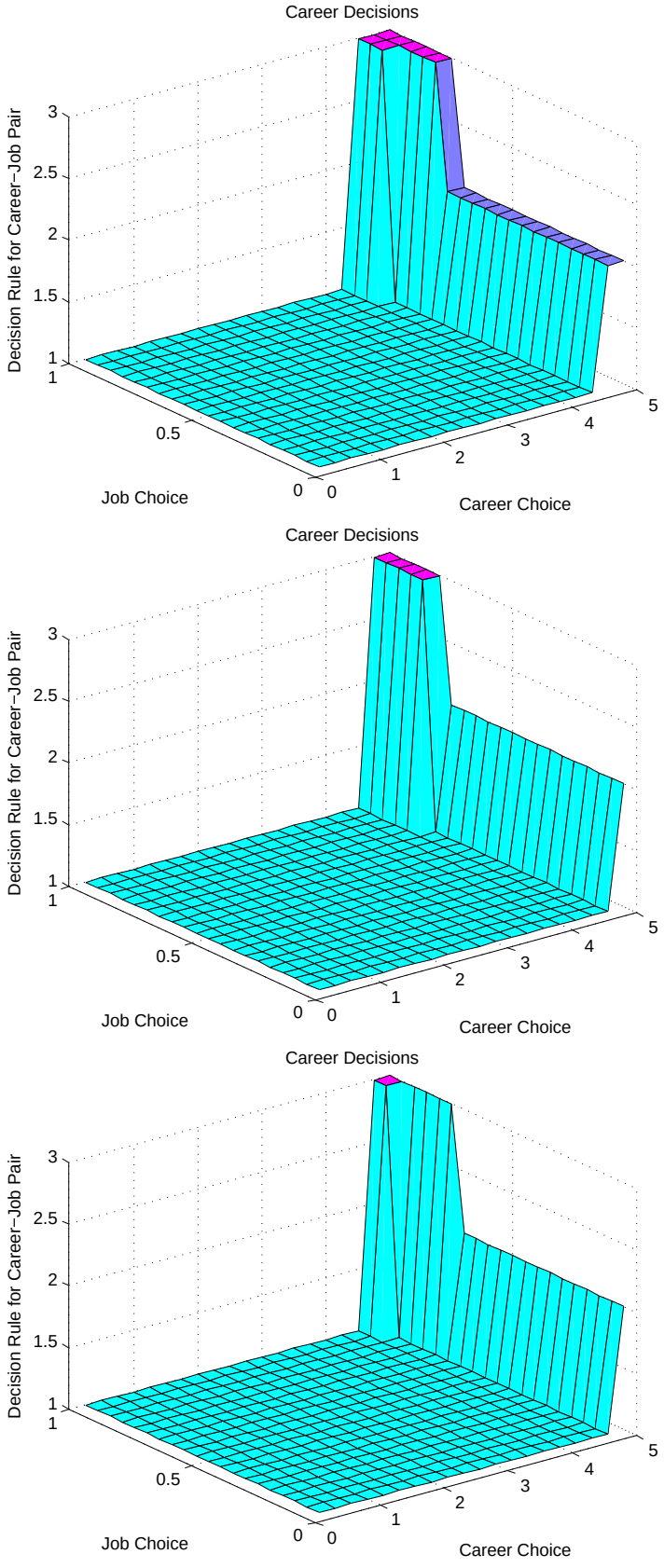

Figure 3: SCENARIO III: The choices of a worker with a large network ($N = 20$) for $\omega = 0.2$, $\omega = 0.5$, and $\omega = 0.9$, respectively.