Unraveling in the Sociology Job Market: 1981-2003

A Senior Honors Thesis

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Abstract

The following research investigates unraveling in two-sided matching markets and it's prevalence within the sociological job market. Many two-sided matching markets can be found in a competitive arena where a dual hierarchy exists between groups such as employer and employee. Competition within this arena drives innovation (from market pressure or active participation) while each side of the hierarchy contains participants who attempt to pair with their optimal counterparts. Therefore, an academic institution would prefer to hire an assistant professor with high academic accolades and prestige, just as a new PhD would typically prefer to join as prestigious a university as possible. This thesis tests the sociological job market to see if such competition has progressively shifted deadlines earlier for all universities over time and whether the more prestigious universities are more likely to push deadlines ahead. Using the American Sociological Association's Employment Bulletins from 1981 to 2003, a progressive shift to earlier deadlines has resulted in the top ranked universities setting the application due dates and the lower ranked universities having later application due dates.

Introduction

What do sororities, law firms, medical schools and sociology departments all have in common? They all are engaged in fierce competition within a closed setting where their competition can quickly undermine each group's ability to succeed. In modern competitive markets, all players compete for a small pool of exceptional candidates. For sociologists, the interesting point of this competition is that the local solutions to market pressure can easily result in systemic outcomes that work against everyone's best interests. The following thesis approaches the problem of local vs. global rationality in the hiring process of tenure-track junior faculty sociology departments.

Markets are one of our fundamental institutions, guiding social action with respect to purchasing material goods, gaining access to human resources and sorting individuals into jobs. All markets consist of actors who seek to exchange goods under particular social constraints guided by rules (implicit or explicit) that structure the exchange. Economists have shown that when certain assumptions are met, markets are remarkably efficient at allocating goods (though efficiency is not always the most relevant metric). While markets are common, the same features -- namely individual rationality and competition -- that make markets work in some settings (say commodity markets) can lead to catastrophic failures in other conditions. The long literature on social dilemmas makes this point clear (Olsen, 1965).

Recent work on market failures has focused attention on market timing. In non-commodity markets, "buyers" and "sellers" are often constrained to a very limited exchange period, largely because the goods being exchanged (marriage, sorority pledges, professional jobs) are indivisible and become available at distinct times. In these

settings, competitive actors are often seeking ways to best their competition by pushing deadlines forward, effectively compressing decision time. When all actors engage in this process, the market is said to "unravel".

In this thesis, I examine the sociology job market to see if the market is unraveling. My hypothesis is that competitive pressure in this limited market creates an atmosphere where it is in the self-interest of every department to "jump the gun" in an attempt to hire a little earlier than other schools. As this process spreads across schools, the deadlines should progressively move forward in time. Because this process is generated by market competition, I expect that the rate of change in application deadlines will be faster among the most competitive schools. This hypothesis was tested using unique data (that I coded and collected) on the sociology job market from 1981 to 2003. After reviewing the literature on markets, competition, and status in sociology, I describe the data and report the results.

Literature Review

The following literature review will address the existence of unraveling as it applies to various markets. In each of the following markets, unraveling has occurred to some extent and each market has responded in different ways. The literature review will show some of the effects of unraveling as well as what certain markets have attempted to do in their efforts to lessen the effects.

Definitions

The following paper uses terminology that may not be familiar, and is necessary for understanding the thesis. *Unraveling* can be simply defined as a progressive shift toward the earlier exchanges of contracts due to competitive forces within a market. Unraveling is evident within most markets where competition occurs. These types of markets are called *two-sided matching markets*. The term two-sided matching market is applied to a market when each of the participants in a contract, consisting of only two individual players, are matched with one another. In this type of market, only one match can be made within a single transaction. For example, sororities prefer particular students to join their organizations just as particular students may wish to join certain specific sororities. Each of these players represents an individual unit or side. When the market is open, each side prefers to match itself with the best possible outcome it can.

Examples

There are many historical examples of market unraveling. Some of the markets that have seen such effects include entry-level labor markets (particularly judicial clerkships), postseason college football bowls, fraternity or sorority rushes, and entry level medical labor markets, college admissions, marriage, as well as the NBA. The following sections give examples of unraveling in their respective markets.

In "Jumping the Gun: Imperfections and Institutions Related to the Timing of Market Transactions," Alvin E. Roth and Xiaolin Xing (1994) detail many different markets that have been affected by unraveling. Two of the markets described include federal clerkships and college football bowls.

Federal clerkships are one type of entry-level labor market talked about in "Jumping the Gun," Roth and Xing explain how judicial clerkships were affected by unraveling. There are over 2,200 judicial clerkships within the United States and as the number of clerkships has increased so has the competition for clerks to staff them. The market thus pits the reputation of judges against the best or brightest applicants for the jobs. The two sides of this market then engage in a strategic manner trying to secure the best candidates or positions. Such actions result in candidates trying to delay a low rank choice in hopes of securing better ones.

Another example describes how postseason college football bowls have been affected by unraveling. Each bowl sponsor wants to secure a contract with the best teams it can because of the higher potential audience in bowl games. Each team attains a rank based on its play throughout the year and that rank is matched with a certain bowl game. Each bowl's sponsor searches for the game that will get them the highest ratings, and sponsorships or commercial audience. At the same time, the college football teams, wanting to secure the most money and best sports coverage, seek the best possible bowl. Sometimes a problem is created, however, when a school has a larger fan base, but a lower ranking. This may bolster their bid for a more prestigious bowl game since a wider audience would view such a game as opposed to one with higher ranked teams. The competition duly resulted in an unraveling of the deadlines for signing teams to bowl games. Many sponsors, in attempt to secure the best teams for their bowls, contacted teams earlier than the proposed deadline to beat out their competition (other sponsors of bowl games). The NCAA tried to control the date at which bowl agreements were signed. Stiff penalties for violations were enacted including a threat of up to a year's

suspension of bowl eligibility. The same reasoning was used by the Football Bowl Association who threatened to levy a $250,000 fine on any member violating the proposed deadline. Despite NCAA and FBA attempts, the market transaction date failed to stop unraveling and attempts to halt it have been abandoned. After the failure of the NCAA to address unraveling, it considered a centralized matching procedure, which is now known as the Bowl Championship Series. The BCS has created a more stable market have often, but not entirely resulted in satisfactory consequence.

In "Sorority Rush as a Two-Sided Matching Mechanism," Susan Mongell and Alvin Roth (1991) provide another example of unraveling in market transactions. This article describes how fraternities in their early years only recruited from the senior class, but very quickly a rivalry arose among fraternities to recruit the most desirable men which soon resulted in recruitment being pushed back to the junior year. The competition quickly unraveled recruitment until it finally stopped at the freshmen year of college. One complicating result of unraveling in this market occurs when a student joins two fraternities or sororities simultaneously and then leaves one for the other. The student, faced with wanting to join one sorority/fraternity that he prefers, enrolls in another to ensure he/she gets into any. Then, if the student gets into both, he/she chooses the one of higher preference and the other is left with a vacancy. Imagine the coordination problems in a two-sided matching market where contracts are signed in this manner and then vacancies occur. This effect was magnified in Western and Southern colleges in which preparatory schools were closely connected, where recruitment was pushed so far back that pledge pins were given out to boys in high school and even grammar grades.

These problems gave rise to a preferential bidding system that created stability in the market. This bidding system is known as rush. Women, for example, who participate in this formal rush attend parties sponsored by each sorority. The rushees attend these parties to help decide which sorority is right for them. During this process, the sororities are also selecting women they would like to have as their members. The parties continue and only the women picked by each sorority are allowed to attend successive parties. It is here that women are selected for membership as well as themselves select which invitations they wish to accept. This two-sided matching market system of preferential bidding has brought stability within sorority and fraternity rushes, while the National Pan-Hellenic Conference has created guidelines for how often rushes can be held, who they can target, and so on. The NPC coupled with a preferential bidding system has created stability in this market.

In "New Physicians: A Natural Experiment in Market Organization" Alvin E. Roth (1990) shows yet another market in which unraveling had occurred. Prior to the 1950's, the market system for medical school graduates was decentralized and presented an assortment of problems and persistent failures. The competition among hospitals for interns and residents significantly unraveled appointment dates, until students and hospitals were agreeing on post-graduation employment up to two years before the students graduated. This unraveling had many costly problems for both students and medical schools. In 1945, the medical association intervened and attempted to bring the appointment date under control, but by 1949, it was again completely disorderly. The market was characterized by hectic last minute contracting with students trying to improve their positions by contacting the hospitals they preferred, while hospitals

sometimes were pressuring students into premature decisions so they could contact other students on their waiting lists. For yet another attempt at stabilization, the AMA assisted in the creation of the National Resident Matching Program in the 1950s. In this system, each student submits a list of positions whose order is intended to reflect his preferences, and the person responsible for filling each set of positions likewise submits a ranked list of students. The two lists are then matched by preferences. This matching-market mechanism has allowed for more hierarchal stability within the medical model.

In "College Admissions Problem and the Stability of Marriage" Gale and Shapley (1962) shows how college admissions fit in the realm of two-sided matching markets. The market in the college admissions process pits prospective students against prospective colleges. Colleges would prefer to enroll the best and brightest students while the students would like to enroll at the university with the best reputation. This market is a typical two-sided matching market. The instability in this market arises when each student applies to more than one college, is then individually ranked by the colleges applied to, and is finally admitted by more than one. These three occurrences result in uncertainty among universities regarding class size as well as the quality of students entering the university. The students also are presented with the dilemma of rank ordering Universities by preference. The student does not want to discourage colleges that may have been interested, but were put off by an apparently low initial preference-ranking by the student resulting in the student feeling his chances for admission may be lessened.

These problems have given rise to a waiting list in an attempt to solve the instability issues. The universities inform students that he may be admitted later if a

vacancy occurs. Although this may solve a small portion of problems, it also creates more in the process. If a student, waitlisted at his college of choice, is accepted at another university, complications arise for the latter if that student is then taken off the waitlist and admitted. The student may also risk not accepting the admission to his second-choice university in anticipation of an offer from his preferred university.

Gale and Shapley postulate a solution to this dilemma by using the stability in marriage markets as a model. The marriage markets stability is certain because only one male can marry one female. It is highly unlikely that a person will be engaged to two separate persons in the context of a monogamous society. Nonetheless, each woman rejects the proposal of the man if he is not her best attainable fit for marriage. The female chooses what male fits this criterion. At the same time, each male who has been rejected may later propose until he is accepted. Therefore, a stable set of marriages is the outcome. Gale and Shapley use this model to propose the idea of "deferred acceptance" to approach the college admissions problem. Deferred acceptance says that if a college is not willing to accept a student under any circumstances then the student should not be able to apply to that college. Then colleges who rank as the first choice by certain students should be given a list of these students. Then the colleges choose which students they will accept and thus reject the rest. Rejected applicants then reapply to the university ranked as their second choice, and that university chooses its quota from these students and the ones waitlisted. The university revises its waiting list from these students and rejects the rest. The procedure then terminates when every applicant is accepted, waitlisted, or rejected from the colleges to which he/she is willing to apply. At this point everyone waitlisted is then to be admitted, which creates stability. This

outcome also is said by Gale and Shapley to create optimality as well, but would slow the process down.

Unraveling is evident within most markets where competition occurs, and one very recent example can be seen within the NBA. In the NBA, contracts for younger and younger athletes are the result of competitive forces. Each team within the NBA wants the next great player and the competition has encouraged the scouting of younger athletes. Instead of going to college, many athletes are encouraged to enter the draft market to be matched with a team. Therefore entering the draft out of high school was becoming a norm. The market unraveled from college athletes toward earlier contracts with high school basketball players. As competitive forces operate, deadlines gradually shift toward earlier transaction dates and typically have only been stopped by organizational pressure.

There is talk among the organization of implementing an age limit for entering the draft. At the start of this thesis, the proposed age limit was twenty years old and it now has been changed to nineteen years of age. This new age limit disables high school students from entering the draft. The organizational pressure may have been the result of an influx of too many athletes, which is the outcome of unraveling. It used to be rare for a player to be drafted out of high school, but in recent years, it became more common. With college and high school players entering the same market, where only a set number of athletes can be selected, it limits the players who might have otherwise been drafted and also may result in the early termination of contracts among veterans. Therefore, the organization is facing pressures to stop the recruitment of younger players for the betterment of the entire organization. Thus, the nineteen-year-old age limit was imposed.

The unraveling effect can be seen in many competitive arenas, including the sociological job market. This literature review not only exemplifies what unraveling is, it also provides substantial evidence toward its existence in various markets. Therefore it is derived that the proposed thesis tackles the extent to which unraveling has effected the sociological job market.

Basic Process

Competition creates an increasing push for earlier deadlines, which have typically only been stopped by organizational pressure. As each participant within each particular market competes against one another, deadlines are moved forward (earlier in time) in an attempt to secure contracts with future prospects. The deadlines slowly unravel over time because of this competition. In most instances, as shown in the previous examples, governmental or organizational intervention becomes necessary due to the problems that arise.

Individual Rationality vs. System Rationality

Each of these are specific examples of the more general problem of how individually rational action can lead to globally inferior solutions. In many settings, such as the provision of public radio, a strike, or a social movement, individuals have interests that are contrary to the full population's interest.

Mancur Olson (1965) makes this point clear. Firms in a perfectly competitive market have the common interest of a higher price for the industry's product. Although all firms have this common interest, a uniform low price eventually prevails. Each

individual firm, in an attempt to maximize profits, sells as much as it can until the cost of producing another unit exceeds the price of that unit. Therefore, these individual firms increase supply, resulting in a decrease in prices throughout the industry. When this occurs the common interest of all the firms is at odds with the individual interest of each firm because all firms have the common interest of a higher price, yet their interests toward output are antagonistic. It is then perfectly understandable that no individual firm attempts to raise their price in a purely competitive market without the collective action of the industry. It is clear that some individuals (single firms) have interests that are contrary to the full system's interests (the industry), which can lead to an inferior solution. Therefore, the collective action of single firms, by increasing supply to sell the most products individually, results in the driving down of prices across the entire industry, despite the entire industry preferring to sell a product at a higher price collectively.

In "The Dynamics and Dilemmas of Collective Action" Douglas Heckathorn (1996) applies the Prisoner's Dilemma to collective action. The Prisoner's Dilemma was named for a situation in which two criminal suspects are questioned separately about a crime. The resulting outcome of this game hinges on the incentives for individuals to "rat out" their accomplice(s). During questioning, each criminal decides if they should cooperate or remain quiet. By cooperating, one of the criminals may benefit while the other, who remains silent, is punished more severely. If the trust between the two criminals is so strong that they both remain silent then they both may receive light sentences. However, if both criminals confess, the resulting sentences for each may be more severe. Another result is when one criminal confesses so their own punishment is

most harsh. Nonetheless, the game is set up so that the optimal outcome for each individual is to snitch on their counterparts in hopes of receiving the lightest sentence for themselves.

The Prisoner's Dilemma is the prime example of how individual rational actions can lead to globally inferior solutions. The two criminals being investigated are given some form of incentive to confess about their activities. Each criminal then rationalizes his position by weighing the costs and benefits of confessing. If the benefit of implicating the other outweighs the cost of keeping quiet then one or (usually) both of the criminals decide it's optimal to confess. In this situation, the best outcome for both the criminals is to keep quiet, but individually it appears it's in their best interest to confess in hopes of receiving little or no sentence at all. Since the optimal individual solution is to confess, each individual may do so, resulting in a globally inferior solution (stringent sentences for all). Although the optimal outcome for the criminals as a group would be to keep quiet, the incentive for the individuals to confess tends to outweigh the collective good of keeping quiet.

In "Mobilizer's Dilemma: Crisis, Empowerment, and Collective Action" Vasi and Macy (2003) detail the impediments of collective action in the environmental movement. Individual and collective rationality usually faces the problems of efficacy and free riding, according to rational choice theory. Efficacy problems occur when a person feels like there is little or no additional benefit from his/her own effort if they should chose to contribute toward a collective action. Free riding occurs when an individual does not contribute to collective action because he/she can reap the benefits of

a contributor without having to actually be one. Both of these instances are prevalent within the environmental movement.

The majority of individuals would agree that the best interest of all humans would be to act collectively to restore the balance of the earth. Many environmental agencies, groups, and movements lack the ability to grasp a global audience. Despite the necessity for a global social movement, it is highly impractical due to the coordination problems of free riding and efficacy. Since all public goods are available to everyone at no cost, a rational minded individual might conclude that there may be little or no additional benefit from contributing, as he/she will enjoy the benefits of others who contribute anyway. Groups attempt to overcome these problems and mobilize collective action by pointing out an impending crisis or using empowerment messages.

However, the simple solution groups use to overcome mobilization problems often results in the opposite problem and thus becomes a dilemma. For example, when mobilizers urge contributors to act due to an impending crisis in an attempt to overcome free-riding problems, it may undermine efficacy by creating the appearance of a hopeless situation. If everyone is depleting resources within the environment, a person may reason that all others are acting irrationally and his rationality thus appears hopeless. Mobilizers also use empowerment messages in attempts to overcome efficacy problems, but empowerment messages point to the willingness of others to act and therefore encouraging free riding. Thus, the dilemma is quite a problem. A majority of experts and non-experts alike would agree that something should be done to help the environment, yet mobilization of a movement takes an aggregate of supporters. Even an individual who sees the environment as a serious issue, may not act because reason might

tell them someone else will act or that he/she lacks the power to make a change. Therefore, the movement cannot achieve its full potential due to individual rationality.

Individual rationality versus system rationality commonly has a paradoxical overtone. Although it seems reasonable for individual rational, action to lead to global rational action, this is not always the case. In fact, what the individual usually rationalizes often goes against system rationality, as was shown in the preceding paragraphs.

Two basic solutions are usually used in attempt to alleviate these problems. The first solution is individual incentives. Individual incentives may come in many various forms such as cash, recognition, or rewards; and they are not necessarily positive. For example, an individual may rationalize that because he/she have not contributed to a cause (such as a union) he/she is disdained by other members. A second solution often comes in the form of regulations. A person who evades taxes may be acting rationally in his/her mind. This individual may reason that because everyone else pays taxes it would not hurt for one fewer person to have to pay. It is because of regulation by the IRS that this does not happen more frequently. Paying taxes is not only regulated by agencies, but is a civic duty as well. It is a norm within society to do so, and therefore evaders may receive public scorn if they are found out.

The Sociology Job Market

Academic markets are classic two-sided markets, and we would expect them to have many of the same kinds of pressures. Academic departments exist in a very competitive environment, where status matters a great deal.

The article, "The Academic Caste System: Prestige Hierarchies in PhD Exchange Networks" by Val Burris (2004) details how prestige plays a role in job opportunities for PhD students. The percentage of PhD's coming from certain academic institutions and being hired by certain academic institutions within this article is strong evidence for the existence of a hierarchy within the department of sociology. It is not by coincidence that, of those Phd's seeking employment in academia, 91% of the hires made by the Top 20 academic institutions for sociology came from the Top 5 schools. This leaves a meager 9% of students who came from a Top 5 school that were hired by a school that does not fall within the Top 20. It also shows that 88% of PhD's from the Top 20 schools who found employment were hired by the same Top 20 schools and thus leaving only 12% of PhD's going to Non-Top 20 schools. The pattern thus follows across the board that the higher ranked institutions are hiring the majority of PhD's coming from the highest ranked institutions. Clearly very strong hierarchies exist. Thus, there is good reason to suspect that those at the top of the hierarchy will compete very strongly. The conclusion that can be drawn from this article is that the clear ranking means that departments tend to agree on which departments produce the best candidates, meaning that the competition is often for the same people. These are the conditions that make the system ripe for unraveling, particularly since there is no governing body that regulates when hiring takes place.

These previous articles provide the basis for the research and hypotheses in this paper. Based upon the literature review, there is substantial evidence of instability in matching markets. This instability affects all participants and in almost all of these instances, each market has needed some form of external intervention to resolve such

issues. Market stability has more benefits in its entirety than market failure. The "unraveling effect" found in the sociology job market extends previous research within this field and again is another example of how competition can give rise to instability.

The two hypotheses proposed in this research paper are that 1.) the due dates will progressively be earlier for all schools over time, and 2.) the more prestigious a school is, the more likely it is to push deadlines ahead and thus the rate of change should be faster in the upper tiers. As competition increases, the more prestigious schools push deadlines ahead to "one up" each other in the race to get the best and brightest students and thereby unraveling the entire market as a result.

Data and Methods

The data used in this research project was taken from the American Sociological Association's *Employment Bulletin*, from the July, August, and September issues of each year from 1981 to 2003.

Each advertisement was coded for the *college* and *department* offering the job, the *position* rank advertised, the *year* of the bulletin in which it was taken, the specialty *area* desired, and the *due date***.** Information on the school's rank (for the relevant year) was coded from Burris (2004) and earlier years of the USNEWS and World Report rankings.

The data was initially entered into Excel, but converted to SAS. The sample was limited to job openings for tenure-track assistant professors in ranked graduate programs offering a PhD in sociology. The sample was limited in this manner to ensure a uniform market process (the market for senior faculty, for example, is much more idiosyncratic). The resulting sample consists of 1256 job advertisements.

The main hypothesis is tested by regressing the calendar date on the year in which the job was offered, including interactions for rankings.

Results

Descriptive Results

An ANOVA test was performed as an initial test to ensure that the relationship existed.

The results shown in Table 1 support the main hypothesis.

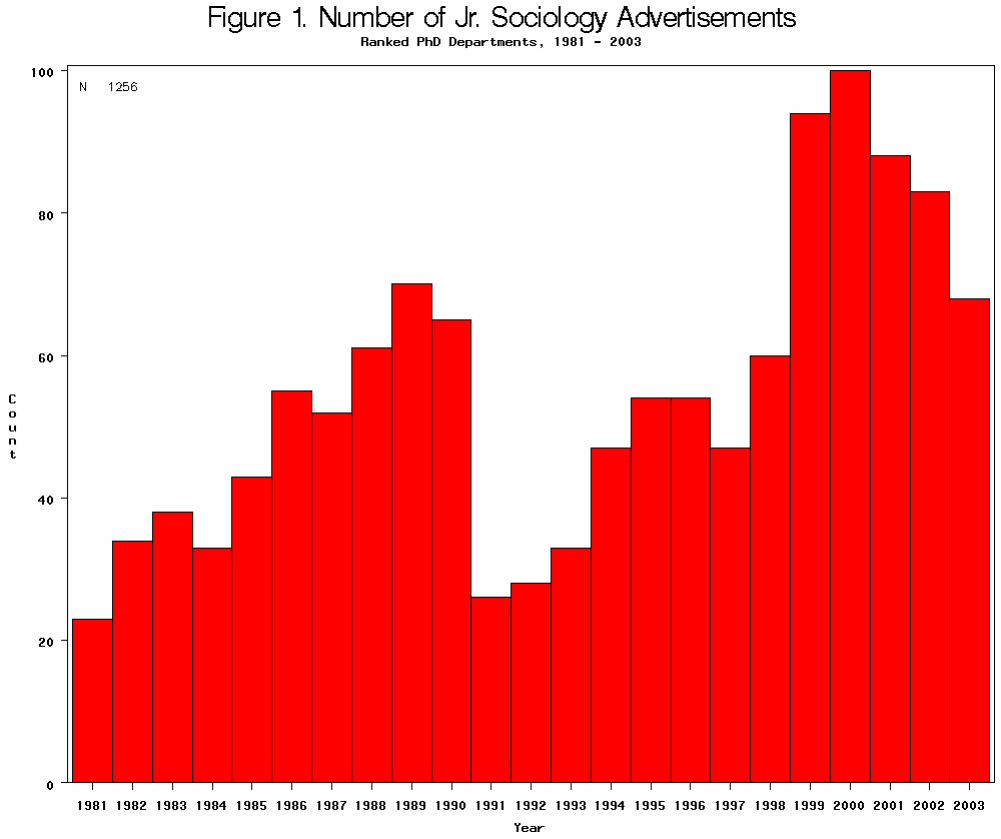
Table 1. Analysis of Variance

ANOVA			
Year*Rank	**Parameter Estimate (b)**	**Standard Error**	**T-Value**
Year	-0.61604	0.142	-4.35
Year*Top 10	-1.03575	0.303	-3.42
Year*Top 11-20	-1.06339	0.287	-3.71
Year*Top 21-40	-0.72274	0.266	-2.72
Year*Top 1-40	Ave Slope -1.08652	0.10403	-10.44

For the first category Year, the slope is -0.61604. Since this slope occurs at 0, it must be added to the slopes of the other ranks. Therefore it follows for Year*Top10 (-0.61604 + -1.03575) = -1.65179. Continue this to find the slope of the other variables (Year*Top 11-20 = -1.67943 and Year*Top 21-40 = -1.33878). Deadlines are unraveling over time at this rate. Each year yields a constant unraveling of -0.61604 or roughly half a day. This is varied depending on rank and is the reason we added the constant rate of change to our ranks. Thus Year*Top 10 and Year*Top 11-20 show change of roughly

1.5 days per year while the Year*Top 21-40 shows a slight difference of roughly 1.25 days per year, with the Year*Top 1-40 as reference in what follows.

Figure 1 below describes the number of advertisements found for each year of the sample.



There were a total 1256 advertisements. The number of jobs available has been increasing over time, but not at a steady rate. The early 1980s and early 1990s were clearly a difficult time for sociology graduates, while the early 2000s saw the most job openings. Competition among schools increased in the late 1980s and early 2000s when the pool of job openings substantially increased as opposed to previous years. As Figure 2 shows, from the 2nd period to the 3rd, deadlines were relatively stagnant as the competition for jobs decreased.

The distribution of application dates over time is given in Figure 2 below.

Figure 2. Distribution of Sociology Jr. Application Deadlines

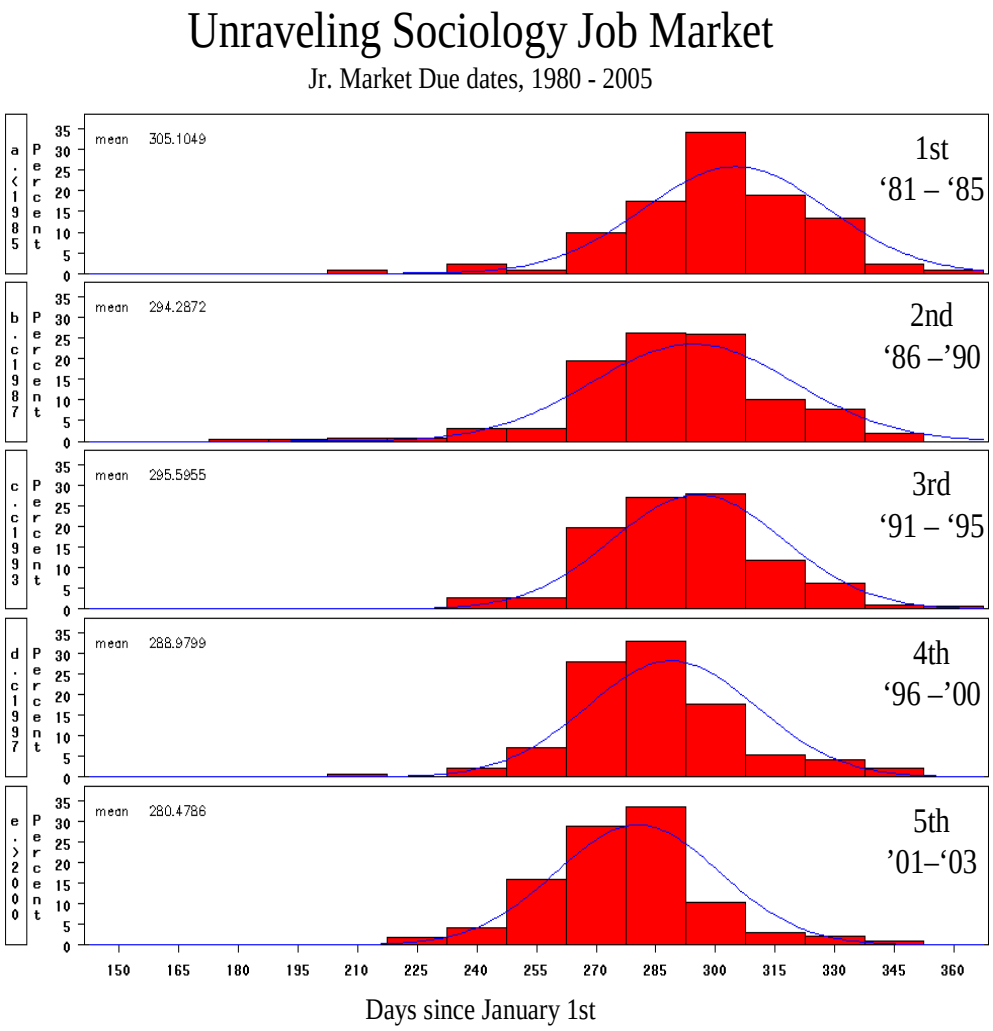


Figure 2 plots the mean deadline distribution in 5 groups: (a) 1981 – 1985, (b) 1986 – 1990, (c) 1991 – 1995, (d) 1996 – 2000, (e) and 2001 – 2003. The results illustrate that the mean deadline has moved forward by about a month overall (from day 305 to day 280 or November 1st to October 7th). Interestingly, the majority of the shift

seems to have occurred between the first and second period and between the 4th and 5th period. As previously stated, this shift is consistent with increased competition in the late 1980s and early 2000s.

I looked at differences by specialty area (open vs. all others) and found no suggestive differences.

Multivariate Results

To test my main hypotheses, I regress application date (measured as days since Jan 1 of that year) on the **Year** that the job was advertised. If the market is unraveling then the coefficient between year and deadline should be significant. To test for the effect of school rank, I created an interaction term between school **Rank** and **Year**. If the increased effect of competition among higher-ranked departments puts them under more pressure, then we should see a negative coefficient for **Year.** These results are presented in Table 2 below.

Table 2. OLS Regression of Application Date on Year Job Was Advertised and Rank, including Interactions of Year and Rank

	Model 1	Model 2	Model 3
Intercept	2454	3675.08***	1521.08***
Year	-1.09***	-1.69***	-0.61***
Dept Rank	0.078**	-32.67***	
Year*Rank		0.016***	
Top 10			2061.58***
Top 11-20			2114.51***
Top 21-40			1441.53**
Year*Top 10			-1.04***
Year*Top 11-20			-1.06***
Year*Top 21-40			-0.722**
Adj. R^2	.093	.104	.103

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$
† Reference category is schools ranked greater than 40

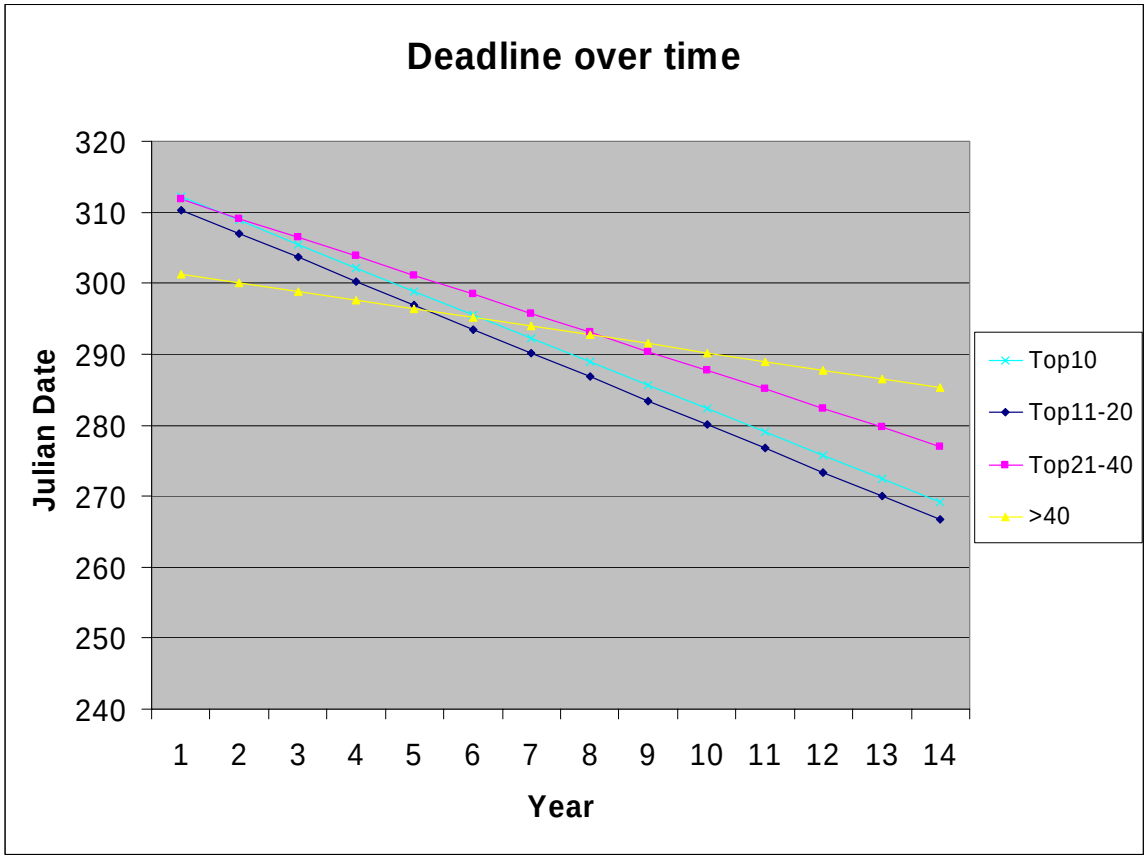
In the above table, Model 1, the simplest model, supports hypothesis 1: that over time, the application date has become increasingly earlier. Model 1 shows the effect of time and rank on application due dates. Both variables are significant. The coefficient for **Year** is negative (b=-1.09), which means that there is an inverse relationship between year and deadline. Thus, for a one-year increase, deadlines are earlier by approximately one day (1.09). Also in Model 1, **Dept Rank** has a positive relationship with deadlines. Therefore as **Dept Rank** increases, application dates increase as well. This means lower ranked schools have later application dates.

Model 2 adds the interaction of rank over time. The interaction of **Year** by **Dept Rank** is significant in the predicted direction. Both **Year** and **Dept Rank** are significant and **Year** maintains its negative coefficient, but with the inclusion of the interaction term, **Dept Rank** now has a positive coefficient. However, the interaction of **Year** and **Rank** has a positive coefficient, which implies that over time the lower ranked schools have later application dates.

Model 3 includes interactions for year (the time effect) and polychotomous dummy variables for ranking, Top 10, Top 11-20, Top 21-40, which permits comparisons among the different ranked schools by allowing for a different slope for higher and lower ranked school and for easier interpretations (See Graph 2). The polychotomous variables for rank all have positive coefficients compared to the reference category of schools that are ranked greater than forty, implying that all ranks of schools have later application dates. However, the interaction terms for year and rank (i.e. the effect of time and departmental ranking on application date) indicates that over time all ranks have earlier

application dates. Thus, as a school's prestige decreases over time, the application date is later in the year. In addition, the more prestigious a school is, the increased likelihood of deadlines being pushed earlier in time. Therefore, the rate of change in the Year*Top 1-20 schools is much higher than that of the Year*Top 21-40 schools.

Graph 2. Deadline over Time



Graph 2 supports the findings from the previous graphs and figures by illustrating how deadlines have unraveled for each category of ranks. The least prestigious colleges start out with the earliest deadlines but end up with the latest deadlines. It is possible that, the 1980s, the least prestigious schools were trying to be competitive by pushing

their deadlines ahead, but once this pattern emerged, other schools made earlier deadlines, causing the market to become more competitive and the least prestigious schools fell behind. As a final point, Graph 2 highlights the competitiveness of the top 1-20 schools. The two groups essentially have parallel slopes and are nearly equal in deadlines as opposed to the lower ranked schools.

Conclusion

This research has shown considerable evidence for the unraveling of the sociology job market, implying that application due dates for assistant professor positions have, over time, become increasingly sooner. The literature review illustrates the dynamics of two-sided matching markets and how the competition involved in such a process can lead to unraveling. The results employed also confirm that unraveling is occurring in the sociology job market. It is clear that over time the deadline application dates for all competitors in this market have progressively shifted earlier in time. It is also apparent that the more prestigious a school is, the more likely they are to push deadlines ahead and thus the rate of change is faster in the upper tiers. The more prestigious schools are able to stay competitive in the market by having the application dates due sooner while the less prestigious schools progressively fall behind (or out of the competition).

The research included in this paper is potentially limited by using application dates, instead of interview dates. A more extensive research project including the interview date and hiring negotiations for the most popular individuals in each job, among other things, would be optimal. Thus, application dates are only one of many different measures that can be employed in obtaining data on the unraveling of markets.

Although the research is limited, application dates are understandably strong measures of market competition and are the most externally visible indicators.

Despite overall problems with an unraveling market, individual players may find the hierarchical structure useful. It is not proposed that a market should include equal access to individual players nor that competition entirely is negative, rather the effects of such a market, as an aggregate, toward earlier deadlines can be uniquely problematic. For instance, the most prestigious universities should get the best and the brightest students and the competition within the sociology job market has allowed for this. Over time each grouping of schools has shifted to their correct standings, according to rank, which has allowed the most prestigious schools to set the deadlines and be followed by those of lesser rank. Thus, it can be considered positive in such regard and may even be optimal if the market could stay at its present state (via governing body, or implementation of programs). However, as competition continues to drive the deadlines earlier the market, as a whole, should continue to unravel as there is no reason to suggest otherwise. Therefore, it is the individual interests of schools to remain competitive that drives the unraveling process and detracts from the full system's interest of stability.

The results of this research paper can be applicable to a variety of different disciplines. Although this research paper focused on whether or not unraveling has occurred within the sociology job market, it was also shown to have occurred in many other two-sided matching markets whereby a contract is sought and hierarchies exist. For the most part, this type of effect should be seen in nearly all academic disciplines and is great cause for more research. One can certainly understand how the impact of unraveling could affect other academic markets, as well. For instance, in medical

markets increased competition may lead to earlier deadlines and contracts between doctors and hospitals, which have negative implications for securing medical doctors with less information prior to completion of their degrees. In most disciplines, particularly sociology, it is cause for concern as application processes take place increasingly earlier with less information about potential candidates, less time for applicants to finish their MD's, and other negative effects that go along with hiring individuals at progressively earlier dates.

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