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Abstract

Purpose: *This study examines the relationship between academic success and labor market outcomes among graduating pharmacy students. Unlike previous studies, this paper characterizes labor market outcome not only as an individual's starting salary, but also whether or not the student had a position secured at the time of graduation, whether or not a signing bonus was received, and the setting in which (s)he will practice.* ***Methods:*** *A standard exit survey was administered to graduating Doctor of Pharmacy students at a Midwestern, public university within two weeks of graduation. The relationship between academic success and initial labor market outcome was assessed using cross-tabulations, chi-square and Fisher exact tests.* ***Results:*** *There were no significant relationships between grade point averages and signing bonuses, starting salaries or employment offers. Students with higher grade point averages were less likely to work in chain community pharmacies, and more likely to work in a hospital or other health-system setting.* ***Conclusions:*** *The relationships between academic and direct measures of labor market outcomes (salary and bonuses) were not necessarily positive, as standard economic theory predicts. Rather, the relationship is indirect, as it appears that students with greater academic success obtained employment in more clinical settings, which carry a different mix of pecuniary and non-pecuniary benefits.* ***Keywords:*** *grade point average, exit survey, labor market outcome*

Background

Traditional economic theories of human capital suggest that greater levels of human capital lead to better labor market outcomes. For students completing their educational training and entering the labor market for the first time, human capital is often characterized by the student's academic success, and more specifically by grade point averages (GPAs). For example, Bowman and Mehay[1] find GPA to be positively correlated with job performance measures among U.S. Navy officers. However, the majority of the existing literature on college graduates and labor market outcomes focuses on the determinants of income; more specifically, the relationship between cumulative GPAs and salaries, with the consensus being that there is a significant and positive relationship.[2-6] These samples consist of individuals from one or more firms,[2,4,5] a given university,[6] or a specific degree program.[3]

One factor which seems to have been largely ignored by the literature is that initial labor market outcomes are likely measured by more than just salary. For example, one study finds that the average worker considers earnings to be the single most important factor in determining the desirability of a job.[7] However, when considered cumulatively, nonmonetary characteristics are twice as important as earnings. Another study finds that firms tend to value work and leadership experience more than GPA.[8]

Studies on initial labor market outcomes of newly licensed health care professionals, in particular, are relatively non-existent in the health care literature. However, several factors make these workers interesting to study. Perhaps most important is that most licensed health care professionals have relatively high levels of training and education (often at the professional doctoral level), and by extension exhibit high levels of human capital. As such, wages for these workers tend to be high. Another important factor is licensure, which restricts the supply of practitioners and drives up wage rates beyond traditional market levels (i.e., otherwise equivalent markets that do not require licensure). Related to licensure is the set of state and Federal regulations defining the scope of practice for specific health care professionals. These rigid scopes of practice often result in a smaller number of close substitutes for the practitioner in general.[9] As substitutability declines, labor markets not only experience higher mean wages, but also less variability in wages (i.e., wage compression) since practitioners who are paid substantially less than the market wage can exploit the relative scarcity of practitioners by changing positions or re-negotiating to earn greater compensation (both pecuniary and non-pecuniary) from their current employer(s).[10]

Pharmacists are a group of health care practitioners that embody these characteristics. For more than 15 years, the entry level degree for pharmacists has been the Doctor of

Pharmacy (Pharm.D.).[10] Wages, particularly for those entering the community (or retail) pharmacy industry typically exceed $100,000. The U.S. Bureau of Labor Statistics (BLS) reported that in 2008 (a year in which the U.S. economy was in a recession), the mean annual wage of a community pharmacist was $106,410, with the middle 50 percent of pharmacists earning between $92,670 and $121,310 (http://www.bls.gov/oco/ocos079.htm#oes_links), and less than 10 percent of pharmacists in the U.S. earning less than $77,390 annually. While not all experts agree with this assertion, the BLS also expects the employment of pharmacists to grow by 17 percent between 2008 and 2018.[11,12] Most post-graduate residencies offer salaries nearly 50% less than entry level pharmacy positions. Nonetheless, pharmacy students may choose to pursue residency training to improve their clinical skills, increase their professional opportunities (i.e., gain employment in a specialized clinical setting), and enhance future job satisfaction.[13,14] Additionally, the location of future employment and community size was rated higher than financial reward in a recent study of employment decisions of pharmacy graduates in British Columbia.[15] An earlier study conducted in Nebraska corroborates (but does not prove) this assertion.[16]

Factors such as whether or not the individual has secured a job at the time of graduation, whether the graduate received a signing bonus, and the setting in which he or she is going to work are also important. For example, Schommer and colleagues[17] report that pharmacists in hospitals and settings such as mail service, long-term care, home health care, government pharmacies, etc., are more likely than those working in chains and independent pharmacies to report a match between the desired and actual quantity of their time spent on the following work activities: dispensing medication, consulting, business management activities, and drug use management. Overall, the combination of pharmacist scarcity, high wages, wage compression and a strong preference for specific job characteristics suggests that the relationship between academic performance and initial labor market outcomes may be neither simple, nor positive.

Objectives

This paper uses data from an exit survey of 2010 Doctor of Pharmacy (Pharm.D.) graduates from North Dakota State University, to examine whether individuals with relatively high levels of academic success (as defined by grade point averages) in both pre-professional and professional coursework are more likely to achieve initial success in the labor market. In doing so, we extend the previous literature by focusing on additional measures of labor market outcomes besides starting salary.

Methods

Survey Instrument

The data for this study come from a 2010 exit survey (available from the authors upon request), which was administered to students who were graduating from North Dakota State University's Pharm.D. program. The survey was completed online, and collected information on the students' basic demographics and self-reported information on career goals, current employment offers, employment location, wage rates, cumulative GPAs, and other, related measures of academic success. The measures of educational success, as well as the employment and wage information, are routinely (usually on a bi-annual basis) collected by the North Dakota State University's College of Pharmacy, Nursing and Allied Sciences for academic purposes. The survey was approved by the NDSU Institutional Review Board (IRB) prior to administration. We note in passing that self-reported information about grade point averages and other related information was used both to expedite the IRB approval process, and also because (with a discrete set of responses and students having high grade point averages to start with) there is little incentive for students to substantially mis-report this information. The survey was opened to respondents at the conclusion of finals week, and remained open for approximately three weeks. Students were sent several official emails (which is the official means of communication at NDSU) encouraging (and subsequently reminding) students to complete the survey.

The May 2010 graduating class contained 89 entry-level pharmacy students, of which 71 (80 percent) responded. Three of these students responded, but declined to participate in the survey, which further reduced the sample to 68 observations (76 percent). Lastly, of the 68 individuals, 7 had not yet secured employment offers. As such, they were unable to complete several parts of the survey directly pertaining to post-graduate employment. We utilize the base sample of 68 for questions which all respondents can answer; otherwise, the sample of 61 (69 percent) is used.

Statistical Methods

Given the relatively small sample size and the fact that most of the survey questions ask for categorical responses, our approach to analyzing the data was guided primarily by parsimony. We focused on the variables listed in Table 1 (which contains all of their names and definitions), as they represent many of the important factors (as suggested by the literature) which determine the relationship between academic success and initial labor market outcomes.[7,8,15,16] For each of the included variables, we also reduced the possible responses to a minimal number of categories (usually two) based on a priori expectations. This allows us to

explore the determinants of labor market outcomes using cross-tabulations and chi-square tests while decreasing the chance of having cells with expected counts less than five, in which case the chi-square test may not be valid. Fisher's exact test is applied in these instances, as it provides more powerful test results (compared to traditional chi-square tests) when expected cell counts are low. We utilized cross-tabulation-based methods, rather than multivariate analysis techniques such as logit or probit models, since the latter generally require more data than the sample size that was available for our analysis.[18] Consistent with conventional wisdom, any hypothesis test with a probability value below 0.05 is considered statistically significant. Hypothesis tests with probability values between 0.05 and 0.10 are also included for exploratory purposes, and readers can exercise their own judgment about the usefulness and interpretations of those results.

Results

Table 2 presents some brief summary statistics for each of the variables identified in Table 1. Just over 54 percent of the respondents are female, and most were fairly young. Approximately 28 percent of the individuals in the sample were 25 years of age, or older at the time the survey was completed. Of those under 25, roughly 19 percent were 23 years of age, and almost 53 percent were 24 years. The majority (93 percent) of the respondents had not earned a bachelor's degree prior to being accepted to the Pharm.D. program. Furthermore, prior to being admitted to the program, students are required to complete a set of pre-professional (or pre-pharmacy) core courses, which takes approximately 2 years to complete. The cumulative grade point average (GPA) from these pre-professional courses is factored into the typical student's admittance decision. Overall, the students in this sample did very well in these core courses, with roughly 54 percent earning a cumulative GPA between 3.81 and 4.0, 26 percent falling in the 3.61 to 3.8 range, and 12 percent in the 3.41 to 3.6 range. Only one student earned a GPA below 3.0. The cumulative GPAs for the Pharm.D. program are slightly lower. Approximately 21 percent of the graduates earned a GPA in the 3.81 to 4.0 range, 31 percent fell in the 3.61 to 3.8 range, and 15 percent landed in the 3.41 to 3.6 range. Just over 10 percent of our sample received GPAs below 3.0 in the Pharm.D. program.

In terms of labor market outcomes, just under 90 percent of the individuals in the sample had secured a position at the time the survey was given. Of the individuals who had secured employment, approximately half had a prior working relationship with their employer. Almost 56 percent of those with jobs secured starting annual salaries of $100,000 or more. Two individuals (3 percent) received starting salaries of $125,000, or more, while the majority, 52 percent, received salaries in the $100,000 to $124,000 range. Roughly 23 percent fell in the $75,000 to $99,000 range; one individual accepted a position in the $50,000 to $74,000 range; and the remaining 20 percent were going to earn salaries somewhere between $25,000 and $50,000. Only three individuals had plans to work less than 40 hours per week. Of those, one was in the $75,000 - $99,000 salary range; one was in the $50,000 to $74,000 range; and one individual, who planned to work fewer than 20 hours per week, was in the lowest salary category of $25,000 to $50,000. Additionally, almost 38 percent of those who had secured a position also received a signing bonus such as (but not limited to) cash, relocation expenses and reimbursement for licensing exams and/or student loans.

Approximately 38 percent of respondents with secured jobs accepted positions in communities with populations of 100,000 or more people; another 25 percent in communities with populations between 25,000 and 100,000 people. Just over 60% of employed individuals had accepted positions in *retail* pharmacies including *chain* (49%) and *independent* (12%) stores. Almost 38 percent of students accepted positions in a hospital setting (roughly half as post-graduate residents). Finally, 36 (44) percent of the employed sample perceived job opportunities to be either *good* or *very good (average)*, while 20 percent perceived them to be poor.

Given the nature of the institution, the pharmacist labor market, and the timing of the survey (i.e., at the time of graduation), these numbers are consistent with both the overall student population and historical employment trends. For example, in the 2006 incoming class (which is largely the group surveyed here), 7 percent held bachelor degrees at the time of admission and the average pre-professional grade point average of these students was 3.72.[19] Evidence from the 2008 employment survey indicates that approximately 92.5 percent of graduates had secured employment by the end of the semester. Of these students, nearly a quarter obtained employment in a hospital setting, either as a full-time pharmacist or as a pharmacy resident.[20] As such, issues of generalizability and sample bias do not appear (but cannot be proven) to be of significant concern.

Table 3 contains our cross-tabulations and hypotheses tests examining the set of student characteristics that influence positions taken, starting salaries and the receipt of signing bonuses. Regarding the first measure of labor market outcomes, that is, whether or not the individual had secured a position at the time the survey was completed, only two variables are statistically significant. A significantly larger number of females had secured a position than males

(p=0.04) at the time of survey completion. Additionally, individuals who had earned a cumulative GPA in the 3.81 to 4.0 range in their pre-pharmacy core courses were significantly more likely to have a position locked down (p=0.04) than those with a lower average. Interestingly enough, the relationship between having a job and GPA in the Pharm.D. program was not statistically significant (p=0.33).

We find no clear, significant evidence of a relationship between starting salary and student-specific characteristics. However, several variables carry p-values of between 0.05 and 0.10. Out of the individuals who received a salary of $100,000, or greater, slightly more students (p=0.09) had GPAs from the Pharm.D. program of 3.8 or lower. Individuals with Pharm.D. GPAs of 3.8 or lower also appear more likely to make $100,000 or more. Individuals who had a prior working relationship with their employer were slightly (but not significantly, p=0.09) more likely to receive a salary of $100,000 or more. Individuals under 25 years of age were also more likely to secure a salary of at least $100,000 (p=.09). No significant relationships exist between the student characteristics and the receipt of a signing bonus.

Table 4 examines the relationship between a typical student's practice setting and initial labor market outcomes. Among those individuals with employment offers, students who accepted positions in chain pharmacies were much more likely to receive salaries in the $100,000 or above category (p<0.01). Conversely, those with positions in hospital settings were less likely to receive salaries of $100,000 or more (p<0.01). Given that most students entering careers in hospital and health-system pharmacy complete residencies before finding permanent employment, this salary differential is not surprising. The relationship between independent pharmacies and salary was not statistically significant (p=0.22). Another finding of note is that none of the individual characteristics we analyzed appear to have a significant impact on receiving a signing bonus.

Table 5 identifies the set of student characteristics that significantly influence their chosen practice setting, considering only those individuals who have employment offers. For such students, those with pre-pharmacy core GPAs in the 3.81 to 4.0 range were less likely to accept positions at chain pharmacies. This holds for professional coursework GPA, but only at the p=0.08 significance level. And as one might expect, there is a positive relationship between the size of the community and the number of individuals accepting positions at community chain pharmacies (p=0.05).

Of the individuals who accepted a position at a hospital and/or health-system setting, significantly more had cumulative professional coursework GPAs below 3.81 (p=0.02). The opposite appears to be true for pre-pharmacy core GPAs, but the effect is only significant at the p=0.07 level. Finally, of those who took positions in independent pharmacies, all were located in an area with fewer than 100,000 people (p=0.04).

Discussion and Conclusions

The relationship between academic success and direct measures of initial labor market outcomes appear to be fairly weak. An individual's cumulative GPA from his or her pre-pharmacy core courses seems to be positively related with having a position secured at the time of graduation; however, a graduate's cumulative GPA from the Pharm.D. program does not. This is an interesting finding, as one would think, if any, the latter relationship would be statistically significant. It may be that the pre-pharmacy core GPA is measuring a factor, or factors, that are not available in our dataset, such as innate aptitude or intellectual curiosity. An individual's GPA in his/her professional coursework appears to be marginally significantly related to salary; however, not in the expected direction. A slightly larger number of graduates receiving a salary in the $100,000, or more, range had cumulative GPAs less than 3.81 (p=0.09). These findings seem to contradict those from prior studies in non-health related fields.[2-6] Other factors, such as practice setting, job responsibilities, and professional goals may be more important, at least initially, than financial security.

Regarding practice setting, both GPA measures indicate that fewer individuals with perfect, or near perfect, scores accepted positions with a chain pharmacy. The opposite was true for cumulative Pharm.D. GPAs and hospital positions. These findings would seem to coincide with those of Schommer and colleagues[17], who report that pharmacists in hospitals are less likely to feel that there is a significant gap between the desired and actual quantities of time spent dispensing medication, consulting, performing business management activities, and managing drug use, than those working in chains and independent pharmacies. Furthermore, note that salaries are significantly higher for *chain* positions, and significantly lower for *hospital* positions, versus the respective alternatives. None of the factors we analyzed are significantly related to whether or not the individual received a signing bonus.

Overall, it appears that factors external to academia have a larger impact on labor market outcomes. A significantly larger number of females had positions secured at the time the survey was completed. Of those receiving salaries of at

least $100,000, a significantly larger number were under 25, and/or had a prior working relationship with the employer. Finally, the population of the community in which the position is accepted also appears to have a significant impact on practice setting. Combining our results with previous studies suggests that proximity to family and friends and/or familiarity with a particular pharmacy and its community matter more than salary or bonuses.[15,16]

The primary limitations of our study arise from our small sample size, which forced us to discretize many of our variables, and which may lead to a loss of information. Expanding our survey to include graduates from multiple colleges of pharmacy, multiple health professions programs and/or multiple years would substantially increase the sample size and allow for a much richer and more robust analysis. Secondly, our analysis was limited to simple metrics, specifically chi-square (and Fisher's Exact) tests via cross-tabulations. Future work using a larger dataset could also facilitate more technical analysis (perhaps using regression or other multivariate techniques) which can control for potentially confounding and/or co-varying factors. Third, it is possible that our survey does not capture all determinants of an individual's labor market outcome. The use of a more general survey, such as one used in the literature to measure compensation among seasoned, experienced pharmacists, would reduce the possibility of omitted variable bias.[10,17] Lastly, our survey asks respondents for self-reported data. While the responses were generally consistent with actual outcomes available to us (and the use of discretized data helps alleviate reporting bias), future work that explicitly collected and utilized non-self-reported data would provide a valuable check on the reliability of our results.

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Table 1: Data Descriptions

Variable	Description
Position	Binary variable indicating whether the individual had secured a position with an employer at the time the survey was completed.
Salary	Binary variable where one indicates that the respondent's starting salary is $100,000 or more.
SigningBonus	Binary variable indicating whether the individual received a signing bonus or another form of compensation when he or she accepted employment.
Chain	Binary variable indicating whether the individual's primary practice setting is *Chain Retail/Community Pharmacy.*
Hosp	Binary variable indicating whether the individual's primary practice setting is *Health System/Hospital/Clinic Pharmacy.*
Indep	Binary variable indicating whether the individual's primary practice setting is *Independently Owned Community/Retail Pharmacy.*
Age25	Binary variable equaling one if the respondent was 25 years of age or older at the time the survey was completed, and zero otherwise.
Gender	Binary variable equaling one if the respondent is male.
Degree	Binary variable indicating whether the individual earned bachelor degree (or higher) prior to being accepted into the Pharm.D. program.
Prior	Binary variable indicating whether the individual had a prior working relationship with his or her employer prior to graduation?
CoreGPA	Binary variable equaling one if the respondent's cumulative GPA from his or her pre-pharmacy core courses is in the 3.81 - 4.0 range, and zero otherwise.
PharmDGPA	Binary variable equaling one if the respondent's cumulative GPA from the Pharm. D. program is in the 3.81 - 4.0 range, and zero otherwise.
Population	Binary variable indicating whether the population in the community where he or she will practice pharmacy is greater than, or equal to, 100,000 people.

Table 2: Summary Statistics

Variable	Total Number of Responses	Number of Responses = 1*
Position	68	61 (89.7%)
Salary	61	34 (55.7%)
SigningBonus	61	23 (37.7%)
Chain	61	30 (49.2%)
Hosp	61	23 (37.7%)
Indep	61	7 (11.5%)
Age25	68	19 (27.9%)
Gender	68	31 (45.6%)
Degree	68	5 (7.4%)
Prior	61	30 (49.2%)
CoreGPA	68	37 (54.4%)
PharmDGPA	68	14 (20.6%)
Population	61	23 (37.7%)

* Please see Table 1 for variable definitions.

Table 3: Cross-Tabulations between Student Characteristics and Labor Market Success

Variable	Category Description	Position		Salary		Signing Bonus	
		Not Employed	Employed	Less than $100,000	$100,000 or More	None	Bonus
Age 25	24 or Younger	6	45	23	22	29	16
	25 or Older	1	10	2	8	7	3
	P-value	0.92		0.09	#	>0.99	#
Gender	Female	1	36	18	18	25	11
	Male	6	25	9	16	13	12
	P-value	0.04*		0.28		0.17	
Degree	No Bachelor Degree	6	57	25	32	36	21
	Bachelor Degree	1	4	2	2	2	2
	P-value	0.43	#	>0.99	#	0.63	#
Prior	No Employer Relationship	-	-	17	14	18	13
	Employer Relationship	-	-	10	20	20	10
	P-value	-	-	0.09		0.49	
Core GPA	3.80 or Lower	6	25	9	16	15	10
	3.81 or Higher	1	36	18	18	23	13
	P-Value	0.04*	#	0.28		0.76	
PharmDGPA	3.80 or Lower	7	47	18	29	29	18
	3.81 or Higher	0	14	9	5	9	5
	P-Value	0.33	#	0.09		0.86	
Population	Less than 100,000	-	-	17	21	21	17
	100,000 or More	-	-	10	13	17	6
	P-Value	-	-	0.92		0.15	

Notes: * indicates statistical significance at a 5 percent level or better

# indicates the use of a Fisher exact test due to low expected cell counts; all other tests are chi-square tests of independence

Table 4: Cross-Tabulation Results between Practice Setting and Labor Market Success

Variable	Category Descriptor	Position		Salary		Signing Bonus	
		Not Employed	Employed	Less than $100,000	$100,000 or More	None	Bonus
Chain	Other Settings	-	-	25	6	20	11
	Chain Community Setting	-	-	2	28	18	12
	P-Value	-	-	<0.01*		0.72	
Hosp	Other Settings	-	-	8	30	24	14
	Hospital Setting	-	-	19	4	14	9
	P-Value	-	-	<0.01*		0.86	
Indep	Other Settings	-	-	22	32	33	21
	Independent Community Setting	-	-	5	2	5	2
	P-Value	-	-	0.22	#	0.70	#

Notes: * indicates statistical significance at a 5 percent level or better

# indicates the use of a Fisher exact test due to low expected cell counts; all other tests are chi-square tests of independence

Table 5: Cross-Tabulation Results between Student Characteristics and Practice Setting

Variable	Category Descriptor	Chain		Hosp		Indep	
		Other Settings	Chain Community	Other Settings	Hospital Setting	Other Settings	Independent Community
	24 or Younger	24	21	28	17	39	6
Age 25	25 or Older	3	7	7	3	10	0
	P-value	0.30	#	0.73	#	0.58	#
	Female	20	16	21	15	31	5
Gender	Male	11	14	17	8	23	2
	P-value	0.37		0.44		0.69	#
	No Bachelor Degree	28	29	36	21	51	6
Degree	Bachelor Degree	3	1	2	2	3	1
	P-value	0.61	#	0.63	#	0.39	#
	No Employer Relationshi	17	14	17	14	28	3
Prior	Employer Relationship	14	16	21	9	26	4
	P-value	0.52		0.22		0.71	#
	3.80 or Lower	9	16	19	6	23	2
Core GPA	3.81 or Higher	22	14	19	17	31	5
	P-Value	0.05*		0.07		0.69	#
	3.80 or Lower	21	26	33	14	41	6
PharmDGPA	3.81 or Higher	10	4	5	9	13	1
	P-Value	0.08		0.02*		>0.99	#
	Less than 100,000	23	15	22	16	31	7
Population	100,000 or More	8	15	16	7	23	0
	P-Value	0.05*		0.36		0.04*	#

Notes: * indicates statistical significance at a 5 percent level or better

# indicates the use of a Fisher exact test due to low expected cell counts; all other tests are chi-square tests of independence