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Awards Before and After the Nobel Prize: A Matthew Effect and/or a Ticket to one's own Funeral?

Working Paper No. 2013-09

Awards Before and After the Nobel Prize: A Matthew Effect and/or a Ticket to one's own Funeral?

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This study explores whether awards breed further awards and what happens after a researcher receives the Nobel Prize. We therefore collected data on all the 1901 to 1980 Nobel laureates in physics, chemistry and medicine or physiology, looking at the number of awards received each year for 50 years before and after obtaining the Nobel Prize. The results indicate an increasing rate of awards before the Nobel Prize, reaching the summit precisely in the year of the Nobel Prize. After this pinnacle year, awards drop sharply. Such a result is also confirmed when looking at the three different disciplines separately and when conducting a random-effects negative binomial regression model. Moreover, Nobel laureates in medicine or physiology generate more awards shortly before and after the Nobel Prize while laureates in Chemistry attract more awards as time progresses.

Keywords: Nobel prize, Nobel laureates, Matthew effect, awards, recognition

JEL Code: M52, J33, Z13

1. Introduction

Frey (2006: 377) remarks that “[i]f an alien were to look at the social life of people here on earth, it would be stunned by the enormous number of awards in the form of orders, medals, decorations, prizes, titles, and other honours. It would be hard pressed to find any area of society in which awards are not used”. Universities and the academic environment in general

have developed an extensive system of awards (Frey and Neckermann 2009). Recognition of scientific achievements through the conferral of awards has a long tradition dating back to the 18th century (Zuckerman 1992). The Copley Medal awarded for outstanding achievements in the physical and biological sciences was first awarded in 1731. It is the oldest and most prestigious award of the Royal Society awarded to well-known scientists including notable recipients such as Charles Darwin or Michael Faraday¹. The Nobel Prize is considered the ultimate accolade in science (Merton, 1968), and even the American director and comedian Woody Allen (despite consistently refusing to attend the Academy Award ceremonies when nominated for his films) admitted that he would show up for a Nobel Prize: ““A Nobel prize would be different”, Allen observed, “apart from everything else... it carries an interesting amount of cash”” (Zuckerman 1992: 219). Frey and Osterloh (2010, p. 871) note that the “incentive system for scholars has to match their main motivation factors. Prizes and titles are better suited for that purpose than citation metrics. Honorary doctorates, different kinds of professorships and fellowships (from assistant to distinguished), membership of scientific academies and honours such as the Fields Medal or Nobel prizes are great motivation even for those who do not actually win such a prize. The money attached to such rewards is a bonus, but less important than the reputation of the award-giving institution.” Economists have described the reward system as a non-market-based incentive system to produce the public good of knowledge. It compensates individuals through achievements in jobs where monitoring effort is difficult (Stephan 2012).

Merton (1968) has pointed out a ‘Matthew effect’ in the academic reward system. It “consists of the accruing of greater increments of recognition for particular scientific contributions to scientists of considerable repute and the withholding of such recognition from scientists who have not yet made their mark. Nobel laureates provide presumptive evidence of the effect, since they testify to its occurrence, not as victims – which might make their testimony suspect – but as unwitting beneficiaries” (p. 159). Thus, awards breed further awards. Discussing interviews conducted among Nobel laureates Merton (1968) highlights one comment: “The world is peculiar in this matter of how it gives credit. It tends to give the credit to [already] famous people” (p. 2). Nobel laureate Herbert Simon also once remarked that “after a while the criterion for getting an honor is to have been awarded a lot of other honors” (Klahr 2004: 440). Zuckerman (1996) stresses that “laureates become prime candidates for other honours, since association with the Nobel prize, as we have noted, seems to enhance the prestige of other awards and the standing of the organizations that confer them. Choosing laureates has advantages; those responsible for selecting recipients obviously

¹ See <http://royalsociety.org/awards/copley-medal/>.

do not wish to make mistakes and so they protect themselves by giving awards where the Nobel has already committed itself” (p. 237).

Zuckerman (1996) differentiates between additional and multiplicative effects when discussing the accumulation of advantage over time. The additive model suggests that people who begin generating advantages keep benefiting, receiving resources and rewards irrespective of their performance. The multiplicative model involves accumulating more of the factors required to increase achievements, allowing recipients to move farther and farther out in front. Recognition can be transformed into resources for further work. Good work leads to an increase in esteem of their colleagues which attracts more recognition, leading to a Matthew Effect in the distribution of honorific awards: “those who already have them are most likely to receive new ones” (p. 63). It could also be that experiencing success may increase the taste for further success, motivating scientists to work harder (Stephan 2012).

On the other hand, a famous quote of Tom Eliot, Nobel laureate in literature, indicates that Eliot saw the recognition more as an epitaph than an award: “The Nobel Prize is a ticket to one’s own funeral. No one has ever done anything after he got it” (Meyers 2007: 221). This would suggest Faustian aspiration has come to an end: “If ever I to the moment shall say: Beautiful moment, do not pass away! Then you may forge your chains to bind me”. Once a scientist becomes a Nobel laureate they may be less concerned about subsequent honors or awards (Zuckerman 1996). Recognition can be a strong driving force as illustrated by economics Nobel laureate Paul Samuelson (2004: 60): “Scientists are as avaricious and competitive as Smithian businessmen. The coin they seek is not apples, nuts, and yachts; nor is it the coin itself, or power as that term is ordinarily used. Scholars seek fame. The fame they see, as I noted in my 1961 American Economic Association presidential address, is fame with their peers—the other scientists whom they respect and whose respect they strive for. The sociologist Robert K. Merton has documented what I call this dirty little secret in his book *The Sociology of Science*. I am no exception. Abraham Lincoln’s law partner and biographer William Herndon observed that there was always a little clock of ambition ticking in the bosom of honest and whimsical Abe. No celebrity as a *Newsweek* columnist, no millions of clever-begotten speculative gains, no power as the Svengali or Rasputin to the prince and president could count as a pennyweight in my balance of worth against the prospect of recognition for having contributed to the empire of science”. Merton (1973: 341) cites Selye’s comments on such recognition: “Why is everybody so anxious to deny that he works for recognition?... All the scientists I know sufficiently well to judge (and I include myself in this group) are extremely anxious to have their work recognized and approved by others. Is it not below the dignity of an objective scientific mind to permit such a distortion of his true motives? Besides, what is there to be ashamed of?”.

Zuckerman (1996) also reports that laureates are more hesitant to publish work that might be judged as weak, seemingly responding to an increased personal standard and perceived standard expected from others. She cites a physicist who points out: “After you’ve done something good and received such high recognition for it, it’s hard to publish anything without feeling it’s below the stature you’ve gained. It becomes very hard to do anything that you might call pedestrian, and a good many people just quit. At the present time, it’s difficult for me to keep going because of all of this extraneous honor” (p. 229). This suggests it would be interesting to explore what happens before and after a Nobel Prize.

2. Method

2.1 Data collection

We collected data on all the 1901 to 2000 Nobel laureates in physics, chemistry and medicine or physiology, looking at the number of awards received each year for 45 years before and 48 years after obtaining the Nobel Prize. The data is derived from Kurian’s (2002) *The Nobel Scientists: A Biographical Encyclopedia*, a volume that provides very detailed information of other major awards² obtained by the Nobel laureates. For example, the encyclopedia lists Albert Einstein’s Nobel Prize in Physics in 1921 “[f]or his services to Theoretical Physics, and especially for his discovery of the law of the photoelectric effect” (Kurian 2002: 141), as well as the following awards: Barnard Medal, Columbia University (1920), Copley Medal, Royal Society (1925), Gold Medal, Royal Astronomical Society (1926), Max Planck Medal (1929), Franklin Medal, Franklin Institute (1935). However, his honorary doctorates from the University of Rostock (1919), Princeton University (1921), University of Madrid (1923), ETH (Eidgenössische Technische Hochschule), Zurich (1930), Oxford University (1931) and Harvard University (1935) are not included. An alternative approach in compiling data for this study would be to directly collect the detailed Curriculum Vitae CVs. However, not only is it difficult to obtain this information for a time span of almost 100 years, there is also a problem regarding consistency in listing the awards. Some scientists do not list all their awards on their CVs. Zuckerman (1996, p. 238) reports that after receiving the prize, around a fourth of the laureates trim their listings in biographical dictionaries (e.g., *American Men and Women of Science*). For example, Linus Pauling omitted his multiple honorary degrees and some local prizes. George von Békèsy and Joshua Lederberg even decided not to list their Nobel prizes.

² Excluding, e.g., honorary doctorates.

2.2 Statistical analysis

The first part of the statistical analysis is descriptive in nature, exploring the number of major awards obtained by the Nobel Prize winners before and after the Nobel Prize. Next, we analyze the relative share of awards among the different disciplines. As the number of Nobel Prize winners can vary between fields from year to year we explore the number of awards per number of Nobel Prize winners within a field. For this measure of relative share we use a five year moving average window (smoothing). The descriptive analysis will then guide us to conduct a multivariate analysis. We estimate the time effect before and after the Nobel Prize and the differences between fields by modeling the award count of Nobel laureates using a random-effects negative binomial regression model to take into account the individual heterogeneity of the Nobelists. Unlike the Poisson regression model, this model is designed to explicitly handle over-dispersion that we observe in our data. It should be noted that yearly individual observations are dropped once a Nobel laureate passes away. For example, Ferdinand Frederick Henri Moissan received the Nobel Prize in 1906 and died in 1907. In this case only one year after the Nobel Prize is recorded. The career starting point is the year of the highest education.

3. Results

Fig. 1 shows an increasing rate of awards before the Nobel Prize, reaching the summit precisely in the year of the Nobel Prize. After this pinnacle year, awards drop sharply. These results therefore suggest that success breeds success only up to the point of reaching the Nobel Prize, the highest supreme symbol of accomplishment in science. The substantial decrease after that indicates “negative externalities” due to obtaining the Nobel Prize. A Matthew effect is no longer visible.

In the next step, we explore the relative difference between fields. For this, we focus on the share of awards (number of awards in a particular year divided by number of laureates in that field). In addition, it should be noted that the share is only calculated based on laureates that are still alive at the year of investigation. Fig. 2 reports that the Nobel year is the peak year for all the fields. It is also interesting to note that in the periods just before and after the Nobel Prize, recipients from physiology and medicine are generating, in relative terms, more awards than those in the two other fields. That changes as we observe an increase of awards for Chemistry at a later stage. This result is driven by researchers who received the Nobel Prize relatively early in their career or who were able to live a long time after the Nobel Prize.

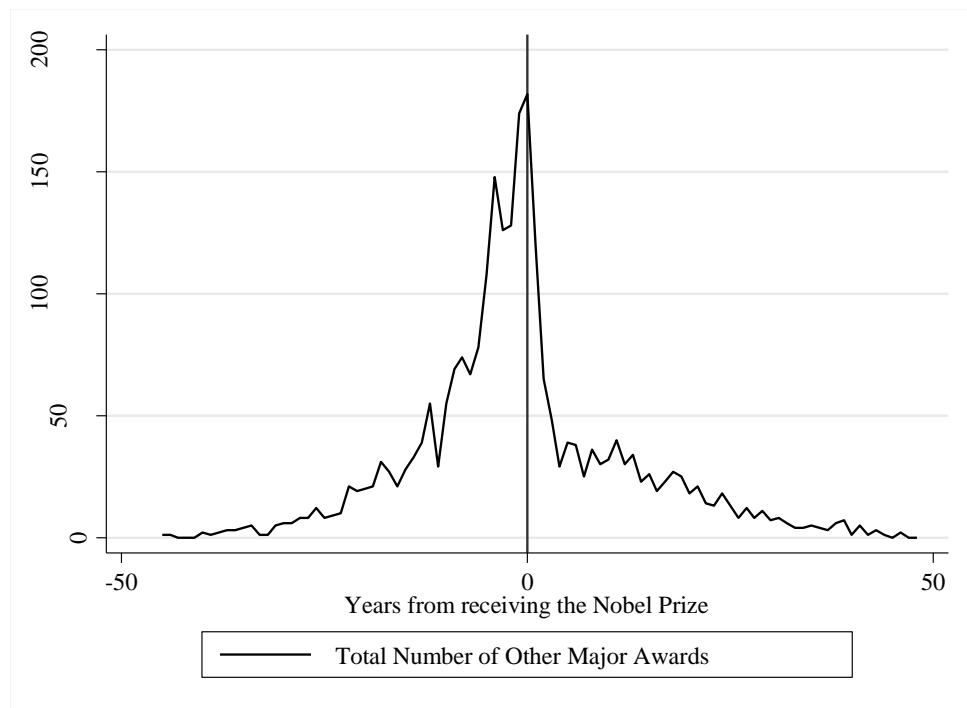


Figure 1. Number of major awards before and after the Nobel Prize

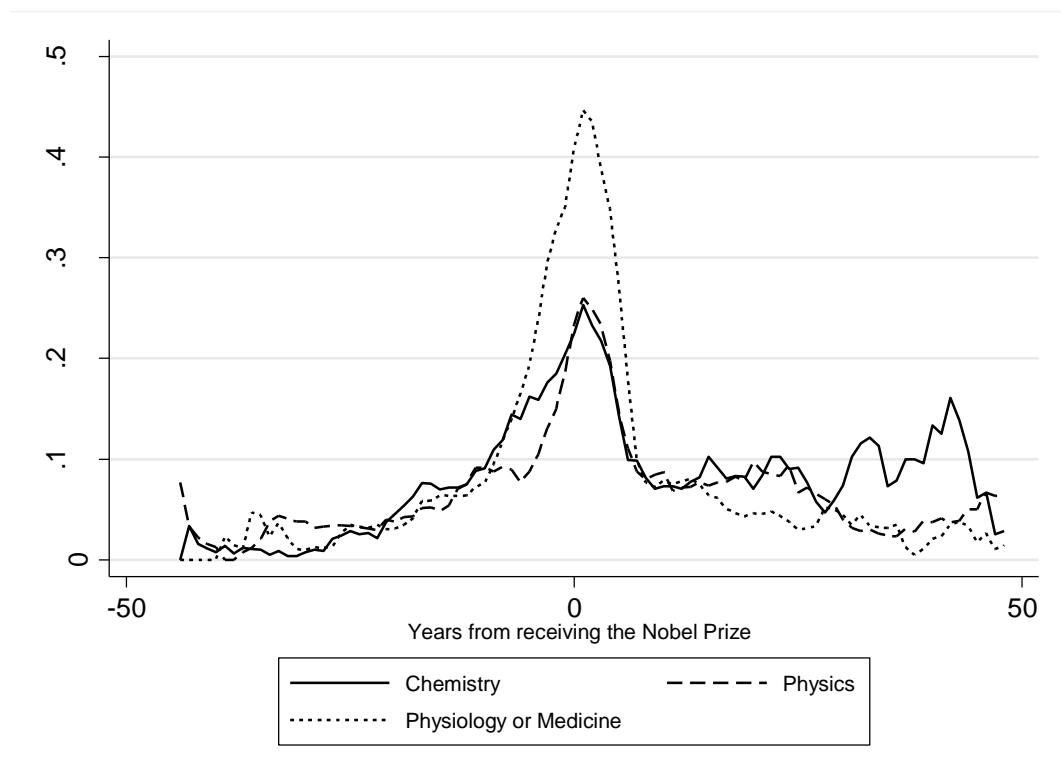


Figure 2. Share of major awards within different field

Table 1. Results of random effects Negative Binomial regression models

Dependent Variable: Number of other Major Awards	Five years before and after Nobel Prize (1)			Six years and more after the Nobel Prize (2)			Beginning of the career till six years before the Nobel Prize (3)		
	Coef.	z	Marg.	Coef.	z	Marg.	Coef.	z	Marg.
<i>Awards Year 5 before the Nobel Prize</i>	-0.506***	-3.79	-0.115						
<i>Awards Year 4 before the Nobel Prize</i>	-0.178	-1.47	-0.040						
<i>Awards Year 3 before the Nobel Prize</i>	-0.348***	-2.74	-0.079						
<i>Awards Year 2 before the Nobel Prize</i>	-0.322**	-2.56	-0.073						
<i>Awards Year 3 before the Nobel Prize</i>	-0.027	-0.23	-0.006						
Awards Year of the Nobel Prize	reference	group							
<i>Awards Year 1 after the Nobel Prize</i>	-0.427***	-3.29	-0.097						
<i>Awards Year 2 after the Nobel Prize</i>	-0.956***	-6.26	-0.218						
<i>Awards Year 3 after the Nobel Prize</i>	-1.276***	-7.41	-0.290						
<i>Awards Year 4 after the Nobel Prize</i>	-1.799***	-8.38	-0.409						
<i>Awards Year 5 after the Nobel Prize</i>	-1.541***	-7.91	-0.351						
Physics	-0.464***	-3.90	-0.106	0.252	1.48	0.016	-0.110	-0.79	-0.008
Chemistry	-0.493***	-3.91	-0.112	0.489***	2.77	0.031	0.011	0.08	0.001
Physiology or Medicine				reference	group			reference	group
<i>N</i>	5109			8899			10903		
<i>Prob.>chi²</i>	0.000			0.021			0.650		

Notes: Marg.: Marginal effects in italics. The symbols *, **, *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 1 presents the regression results. The results support the shape of the descriptive plots. Specification (1) reports results five years before and after the Nobel Prize with the Nobel Prize years as the reference group. Looking at the marginal effects we observe that the decrease in awards after the Nobel Prize is larger than the increase of awards before the Nobel Prize. Compared to the Nobel Prize year, a Nobelist receives ceteris paribus in Year 4 (post Nobel Prize) 0.41 less awards, while in Year 5 prior to the Nobel Prize, the difference is only 0.12 awards. We also observe that Nobel laureates in the area of Physiology or Medicine generate more other major awards than Nobelists in the area of Physics and Chemistry. In specification (2) we look only at the period six years and more after the Nobel Prize. In this period, however, Chemistry laureates surpass Physiology or Medicine. Moreover, when looking at specification (3) we can see that there are no significant field

differences in the career of the Nobel laureate up to six years before the Nobel Prize. The difference between Physics and Chemistry is also not statistically significant.

4. Discussion

We find that a Matthew effect only works up to the point of receiving the Nobel Prize. After the Nobel Prize the number of awards substantially decreases (more than the increase beforehand). This result does not support Zuckerman (1996)'s point that laureates become prime candidates for honors, because the Nobel prize: 1) increases the standing of a researcher and therefore also the prestige of the other awards given to laureates, and 2) reduces the risk of making mistakes in the selection of awardees. However, it could be that our results are driven by the fact that we have focused only on other major awards. The inclusion of other awards such as honorary doctorates may change the results. Future research could try to differentiate between major and minor awards.

Perhaps the Academy has an incentive to avoid premature judgments when awarding the prize long after researchers obtained academic fame. Moreover, once a scientist has climbed to the summit of scientific achievements other award providers may have a lower incentive to offer such a personality a further award that could only live a shadowy existence next to the Nobel Prize. Zuckerman (1996) also suggests that "some organizations actively resist the tendency to have their evaluations in effect preempted by the academies in Stockholm. Thus, a member of a university committee on honorary degrees remarked to me that his colleagues refused to follow along after the Nobel" (p. 34).

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