Expert Opinion and Compensation: Evidence from a Musical Competition

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A large and increasing fraction of modern economic decisions is made by "experts," who are richly compensated for their efforts. Physicians, financial analysts, academic committees, wine gurus, and Olympic juries are all expected to make objective decisions as well as rankings that have a large influence on economic outcomes.

A key question raised by this increasingly important method of decision-making is whether experts' opinions reflect true quality or fundamentals, or whether they influence economic outcomes independently of their value as a signal of quality. Unfortunately, in most situations, it is difficult or even impossible to separate the two roles.

In this paper, we study the effect of the ranking by experts in an important musical competition (the Queen Elizabeth piano competition) on the subsequent market success of participants. It turns out that a critical determinant of success in the competition is the order in which musicians perform, although in an effort to guarantee fairness, this order is assigned randomly.

Our main finding is that the order of appearance affects *both* the judges' ranking and economic outcome. This implies that arbitrary changes in rankings, independent of true quality, may have a significant influence on economic success.

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The demand for expert opinion seems thus to reflect far more than a desire for objective information alone. This is a finding that is similar to the one by Orley Ashenfelter and Gregory Jones (2000) on the relationship between experts' ratings of wines and their prices.

The setup of the paper is as follows. Section I gives the main characteristics of the Queen Elizabeth musical competition for piano. In Section II we describe the indicators of success that we were able to construct. Section III introduces the model and explains why instrumental variables have to be used to estimate the true causal effect of ranking on success. Estimation results of Section IV show that the ranking generated by the judges does help musicians in their career. Section V concludes.

I. The Queen Elizabeth Competition

The Queen Elizabeth musical competition is the best-known international competition for piano (and violin) organized in Belgium and is considered among the best and most demanding in the world. David Oistrakh won the first violin competition in 1937, and Emil Guilels the first one for piano in 1938. Arturo Benedetti Michelangeli was also one of the 12 laureates in 1938. The list of past winners includes the following illustrious recipients: Leonid Kogan (in 1951), Leon Fleisher (1952), Vladimir Ashkenazy (1956), Malcolm Frager (1960), Eugene Moguilevsky (1964), and Valery Afanassiev (1972). Many others, for example Lazare Berman (in 1956), Guidon Kremer (1967), and Emmanuel Ax (1972), though not ranked first, became very famous. The competition requires the candidates to perform chamber music as well as a concerto (of their choice) with a full orchestra. The most unusual characteristic is that the finalists are given a single week to study a contemporary concerto composed for the competition, and thus completely unknown to them. This concerto is played by all 12 finalists.

Each competition, organized every four years, attracts some 85 pianists from many countries.[1] Members of the board of examination (the jury, for short) are selected from world celebrities—teachers and interpreters.

A first selection is made on the basis of the curriculum, without performance. The order of appearance of those who are admitted is drawn at random before the competition starts and remains unchanged during the three further stages. The first stage ends with a selection of 24 musicians who participate in the second stage. This number is further reduced to 12 for the third stage in which each finalist receives the score of the unknown concerto exactly seven days before he or she appears. At a rate of two per evening, candidates perform the unknown concerto, one piece as soloists and a concerto of their own choice. In the last two stages, members of the jury grade candidates after every day of performance. Marks are given without any discussion between the judges and cannot be changed after having been turned in.[2]

II. Data and Success Indicators

The sample consists of the 12 finalists in 11 piano competitions held between 1952 and 1991.[3] For each of the 132 musicians, we collected some individual observable characteristics as well as indicators of success.

The characteristics consist of sex, nationality, age at the moment of the competition, time elapsed between the competition and the date at which the success indicator is observed, order of performance, and final rank (one to 12). Appendix Table A1 gives more information on the characteristics: 26 percent of the finalists are female; Russians, Americans and Belgians comprise almost 50 percent of the competitors; average age at the time of the competition is 24.5 years. One musician only participated twice to the finals.

Success indicators consist of presence of LPs and CDs in record catalogues, and opinions obtained from music critics. Earnings would, of course, have been a much better choice, but are impossible to collect. Our indicators give no credit to musicians who have devoted their career to teaching or to other activities, which may well be better paid than performing. Our contention, however, is that competitions are essentially aimed at selecting good performers.

Presence in Catalogues.—This indicator takes into account the presence of records in three different catalogues:[4]

(a) The catalogue of a Belgian public listening library from which over 110,000 different classical records can be borrowed.[5] Given that the competition takes place in Belgium, the library owns most LPs and CDs recorded by the finalists, including old ones which are no longer sold, and probably some with very small sales.

(b) Records listed in the British *Gramophone Classical Catalogue* (1997 edition) and in the French catalogue *Diapason* (1995 edition), which represent international success. Their drawback is that they do not provide records that are either out of print, or no longer sold because there is no demand. The *Gramophone Classical Catalogue* is recognized as one of the best lists of records on sale.

The success indicator based on these three catalogues takes four values ranging from 0 (not present in any of the three) to 3 (present in all three).

Ratings by Belgian Music Critics.—The critics were asked to rank each participant on a scale between 0 and 4 (unknown to excep-

[1] These are averages between 1951 and 1983; see Charles Philippon (1985, Appendix 12) for details. Among the 1,800 candidates (violin and piano) between 1951 and 1993, 223 were U.S. citizens, 130 Belgians, 87 came from France, 67 from Japan, 59 from the Soviet Union, 50 from Great Britain, etc. Philippon (1985, Appendix 12) quotes more than 50 countries of origin.

[2] For further detailed information on the working of the competition, see Pierre Delhasse (1985) and Philippon (1985).

[3] Rules were changed after the 1991 competition. Though there are still 12 musicians selected for the third stage, only the first six are ranked.

[4] Table A2 gives information on the frequency distribution of musicians in the three catalogues.

[5] There may be some double counting if older vinyl LPs have been remastered and published as CDs.

tional). This information was collected in 1998, using a written survey sent to 25 critics, of which 11 answered. Twelve finalists got no marks at all, while 24 among the 132 were given more than 25.[6]

III. Success, Ranking and Order of Appearance

A. *Estimating the Effect of Ranking on Success*

We use the following simple model to relate success s_i^* (a latent variable) to the judges' final rankings[7] r_i and to the quality q_i of musician i:

$$s_i^* = \gamma_0' + \gamma_1' r_i + \gamma_2' q_i + u_i'.$$

The γ' are the parameters of interest and u_i' is an independently and identically distributed (i.i.d.) error term. If $E(r_i, u_i') = E(q_i, u_i') = 0$, both γ_1' and γ_2' can be estimated consistently by OLS. However, since q_i is unobserved, we are led to estimate

$$s_i^* = \gamma_0 + \gamma_1 r_i + u_i, \tag{1}$$

where $u_i = u_i' + \gamma_2' q_i$. Since r_i is likely to be correlated with q_i, $E(r_i, u_i) \neq 0$ and an ordinary least-squares (OLS) estimated γ_1 will be a biased and inconsistent estimator of the causal effect of ranking on success.

However, if one can find a vector $\mathbf{z}_i$ of instrumental variables that are uncorrelated with unobserved quality (and hence with the error term u_i), but correlated with ranking r_i, one can estimate the parameters of

$$r_i = \beta_0 + \beta_1 \mathbf{z}_i + v_i, \tag{2}$$

as well as a reduced-form success equation

$$s_i^* = \alpha_0 + \alpha_1 \mathbf{z}_i + w_i \tag{3}$$

where the error term w_i includes the effect of unobserved quality. Now the parameters of (3) will be unbiased since $E(\mathbf{z}_i, q_i) = E(\mathbf{z}_i, w_i) = 0$. If there is only one instrument (so that z_i and β_1 are scalars), the unbiased effect of ranking on success can be assessed as $\hat{\gamma}_1 = \hat{\alpha}_1 / \hat{\beta}_1$.

B. *The Determinants of Ranking*

From previous research it appears that the ranking of the finalists is affected by the way the musical competition is organized. Renato Flôres and Ginsburgh (1996) find that those musicians who appear in the beginning of the competition have a lower probability of being ranked in the top group, whereas those who perform during the fifth day have a better chance. Herbert Glejser and Bruno Heyndels (2001) find that those who perform later in the week or later on a given evening (recall that two musicians compete every evening) obtain a better rank. They also point out that men are better ranked than women.

To investigate the relationship between rankings and order of appearance, we estimate the following equation by OLS:[8]

$$r_i = \beta_0 + \beta_1 first_i + \beta_2\, female_i + \beta_3 late_i + v_i \tag{4}$$

where r_i is the final ranking of pianist i, *first*, *female*, and *late* are three dummy variables; *first* is equal to one if i was first to perform in a given competition (and 0 otherwise); *female* is equal to one if the pianist is female (and 0 otherwise); and *late* is equal to one if i was second to play in a particular evening (and 0 otherwise). The β are parameters and v_i is an error term assumed to be i.i.d. The parameter estimates appear in Table 1 and show that those who perform

[6] It would obviously have been preferable to base such results on a sample of international music critics. We felt that it would have been very difficult, both to select the critics, and get their reactions on a large number of musicians about whom most know probably very little. We thought that Belgian music critics should feel more involved in the results of the survey than their foreign colleagues and, therefore, more prone to answer. They are probably also better informed, since the competition is held in Belgium.

[7] To make interpretation of the parameters easier, the winner gets rank 12, the second gets rank 11, etc. This implies that a "good" ranking coincides with a high-rank number.

[8] As an alternative to the OLS estimate we also ran an ordered probit with 12 values, which generated the following estimates: $\beta_1 = -0.91$ (2.9), $\beta_2 = -0.55$ (2.7), and $\beta_3 = 0.32$ (1.6), showing that the results are qualitatively similar to those obtained with OLS. We also estimated an equation using the order of appearance, but this led to poor results. With the exception of the first day (with a negative spike) and the fifth day (with a positive one), the average ranks per day are not very different, and show no trend.

TABLE 1—EFFECT OF ORDER OF APPEARANCE ON JUDGES' RANKINGS

	Equation (a)	Equation (b)
first	−2.958	−3.421
	(3.1)	(4.8)
female	−1.856	—
	(2.9)	
late	1.130	—
	(1.9)	
$\bar{R}^2$	0.128	0.068

Notes: Intercepts are not reported. *t*-values, based on heteroskedastic-consistent standard errors, are given between brackets under each coefficient.

during the first evening have a rank that is almost three positions lower than that of other candidates ($\beta_1 = -2.96$). Female finalists are ranked almost two positions below males ($\beta_2 = -1.86$).[9] Finally, those who perform second during an evening gain one position with respect to those who perform early in the evening ($\beta_3 = 1.13$). Table 1 also shows the results obtained with *first* as unique explanatory variable, so that we can compute the unbiased effect of ranking on success.[10]

Though random in itself,[11] the order of appearance affects the final ranking. So, whereas the randomization of this order tries to introduce *ex ante* fairness, it results in *ex post* unfairness. Since order is not correlated with quality or with any observable characteristic of performers, it can be used to identify the nature and effect of ranking on success. One can wonder why order of appearance exercises this role. One of the reasons may be that the "unknown" concerto is new not only to those who compete, but also to the judges who, though they can of course read the score, never had a chance to *listen* to it before the first day's performance. Though they are used to reading and listening to new scores, there may be some habit formation as the competition unwinds, with the effect of being more severe during the first days of the competition, as well as for the first musician to perform during the evening. The learning process may also play a role in the global evaluation by a judge so that, starting with higher expectations and more strict rules, she will progressively adapt them to the reality of the actual performances.

The consequence is that the ranking is not only determined by the musical ability of the pianists, but also by the peculiarities of the ranking procedure. The unexpected result of this randomized "experiment" makes it possible to investigate the relationship between ranking and success using order of appearance as an instrument.

IV. Does Ranking Affect Success?

Success s_i^* is a latent variable, and we use instead $s_{1,i}$ and $s_{2,i}$ the two success indicators described in Section II. The contingency tables illustrated in Table 2 show that both success indicators (*Catalogues* and *Critics*) are very strongly associated with *first*. Given this strong association, we estimate the following reduced form equations by OLS:

$$s_{j,i} = \alpha_{j0} + \alpha_{j1} first_i, \tag{5}$$

for $j = 1, 2$, and find $\hat{\alpha}_{11} = -0.603$ and $\hat{\alpha}_{21} = -7.942$, with *t*-statistics equal to 1.7 and 3.6, respectively. Now we can assess γ_1, the pure effect of the judges' ranking on success by calculating the ratio $\hat{\alpha}_{j1}/\hat{\beta}_1$ ($\hat{\beta}_1$ is given in the second column of Table 1) and find $\hat{\gamma}_1 = 0.176$

[9] Glejser and Heyndels (2001) suggest that this result is a consequence of the previous stage of the competition which they consider as more women-friendly since there is no concerto to perform. Therefore, more women are selected for the finals than should be, and their ranking in this last stage is, on average, worse than that of men. See, however, Claudia Goldin and Cecilia Rouse (2000), who find that female musicians are more likely to be hired if the hiring committee is not aware of the gender of the musician (blind auditions).

[10] We also examined the relationship between ranking and order of appearance using 2×2 contingency tables. We split the sample in two ways, by distinguishing between those who performed *first* and all others, and those who performed *late* and early in the evening. These variables are crossed with high (7 to 12) and low (1 to 6) ranks. The resulting χ^2 values are equal to 8.0 and 7.8 and both are significant at the 0.5-percent probability level, pointing to nonindependence.

[11] To test for randomness of the order of appearance, we first ran a linear regression of the order on the observable characteristics of performers (a sex dummy, four nationality dummies—Belgium, U.S.S.R., United States, and Japan, representing over 50 percent of participants—and age). None of the coefficients was significantly different from zero at the 20-percent probability level; $\bar{R}^2 = 0.02$. We also ran some 2×2 contingency-table tests to check whether sex, age (younger than 27, 27 and more), nationality (U.S.S.R., United States) were independent of *first* and of *late*. All the resulting χ^2 statistics were much smaller than the critical 1.64 value at the 20-percent probability level.

TABLE 2—ASSOCIATION BETWEEN ORDER OF APPEARANCE AND SUCCESS

	First candidate to perform	All other
Presence in catalogues		
None	5	24
One	0	33
Two	6	20
Three	0	44
χ^2 statistic (3 degrees of freedom)	17.4	
Ratings by critics		
Rating < average (13.64)	10	62
Rating > average	1	59
χ^2 statistic (1 degree of freedom)	6.4	

Note: The critical values of the χ^2 statistic are 7.82 and 3.84 for 3 degrees and 1 degree of freedom, respectively.

TABLE 3—EFFECT OF RANKING ON SUCCESS

	Presence in catalogues	Ratings by critics
Simultaneous estimation of equations (1)–(2)		
TSLS (one instrument)	0.176	2.321
	(1.8)	(3.0)
TSLS	0.188	2.350
	(2.5)	(3.5)
LIML	0.189	2.416
	(2.5)	(3.1)
Other†	0.186	2.620
	(3.3)	(3.1)
ρ	−0.360	−0.301
	(1.6)	(1.4)
LR test ($\rho = 0$)	2.40	1.72
Estimation of equation (1)		
OLS	0.092	1.475
	(3.2)	(5.4)
Other†	0.097	1.644
	(3.3)	(5.5)

Notes: Intercepts are not reported. *t*-values, based on heteroskedastic-consistent standard errors, are given between brackets under each coefficient. The critical value for the LR test is 3.84 at the 5-percent probability level.

† Ordered probit for presence in catalogues and Tobit for ratings by critics.

for the *Catalogues* indicator and $\hat{\gamma}_1 = 2.321$ for the *Critics* indicator. This shows that the pure effect of ranking on success is larger than when OLS are used (see the lower part of Table 3).

The same parameter estimates can be obtained by running a classical instrumental variables estimation, using two-stage least squares, with only *first* as instrument. The results are shown in Table 3. Using *late* and *female* as additional instruments does change the relevant parameters only marginally. However, the instruments can be considered as weak, since they are only mildly correlated with ranking ($\bar{R}^2 = 0.128$), possibly biasing the coefficient. Therefore we also use a limited information maximum likelihood (LIML) estimator[12] and this leads to similar results.

Since the *Catalogues* indicator takes integer values from 0 to 3 (see Appendix Table A3), it seems preferable to estimate (1) as an ordered probit equation, specified as follows:

$$s_{1,i} = 0 \text{ if } s_i^* \leq 0,$$

$$s_{1,i} = 1 \text{ if } 0 < s_i^* \leq \mu_1,$$

$$s_{1,i} = 2 \text{ if } \mu_1 < s_i^* \leq \mu_2,$$

$$s_{1,i} = 3 \text{ if } \mu_2 < s_i^*,$$

where the threshold parameters μ_1 and μ_2 are estimated jointly with the other parameters of the model.

The *Critics* indicator is closer to being continuous, but since it contains many zero values (see Appendix Table A2), we estimate (1) as a Tobit equation:

$$s_{2,i} = 0 \text{ if } s_i^* \leq 0,$$

$$s_{2,i} = s_{2,i} \text{ if } s_i^* > 0.$$

Equations (1) and (2) have then to be estimated through maximum-likelihood methods, the results of which are also given in Table 3 (under "Other"). If (unobserved) quality influences both ranking and success then the correlation between the errors u_i and v_i of equations (1) and (2) should be positive. The coefficients of interest are again positive, significantly different from zero, and do not differ much from the TSLS and LIML estimates. The correlation between the errors, ρ, is negative, suggesting that ability as determined by the judges through the ranking may not correspond with the preferences of critics and of those who buy records. This is also the reason why

[12] The bias of the TSLS estimator is proportional to the degree of overidentification. The bias will be approximately zero if the number of instruments is equal to the number of endogenous variables. See Joshua Angrist and Alan Krueger (2001, p. 79).

instrumental variable estimation produces larger coefficients than OLS. Note however that a likelihood ratio test indicates that one cannot reject the hypothesis $H_0 : \rho = 0$.[13]

The various results presented in the upper part of Table 3 show that ranking has a positive effect on both success indicators, irrespective of which estimator is used. This indicates that better ranking seems to lead to more success. It is worth noting that the parameters obtained by OLS (lower part of the table) and by maximum likelihood methods are very close. The linear approximation in the OLS equation does not affect the results very much.

We also investigated whether characteristics other than ranking possibly contribute to success. We find that gender, age at the time of the finals, nationality, and year of the competition (which measures the time elapsed between the competition and the time at which success is measured) have no significant effect.[14]

[13] Appendix Table A4 provides some sensitivity results for separate success indicators. We added equations in which the success indicators are the number of records in the *Belgian Listening Library* and in the *Gramophone* and *Diapason* catalogues. Though these two indicators are strongly correlated ($r = 0.828$), the first gives a "national" view, the other one is more "international." They are both less correlated with ratings by critics ($r = 0.698$ and 0.630). Given that now we deal with the number of records, we had to take out one outlying observation (Vladimir Ashkenazy has 224 records in the Belgian and 209 in the two other catalogues). The results obtained are consistent with the previous ones.

[14] It is of course quite surprising that the last variable has no effect, since this implies that if "fame" comes along after the competition, it comes very quickly.

V. Conclusions

Musicians who are successful in the Queen Elizabeth competition seem to be rewarded by subsequent success. However, this could be so because those who are better ranked in the competition are better musicians anyway, and success in the competition adds nothing. From an analytical point of view the question is whether rankings made by judges have an effect that is independent from inherent musical ability.

We find that the order and timing of appearance at the competition are good predictors of the final ranking. Since these are randomly set before the competition starts, they cannot affect later success. Because of this, order and timing are unique instrumental variables for the final ranking, which we consistently find to have a significant impact on later success, irrespective of the finalists' true quality. Pianists with high scores are more likely to see their work recorded later on. It is also worth pointing out that the opinion of music critics is more influenced by the ranking than by the quality of the performers. This is not necessarily surprising, since there are many musicians who may have been good during the competition, but have vanished afterwards, leaving the critics recollections unaffected.

The conclusion that it pays to do well in the competition is strongly supported by the data. However, the fact that judges' rankings are affected by order and timing of appearance in a competition needs to be stressed, and sheds some doubt on their ability to cast fully objective judgments.

Data Appendix

Table A1—Characteristics of the Data Set

Variable	Mean	Minimum	Maximum	Standard deviation
Musicians				
Female	0.26	0	1	0.44
Age	24.53	16	31	3.51
Russian	0.16	0	1	0.37
American	0.23	0	1	0.42
Belgian	0.08	0	1	0.28
Success indicators				
Number of records (BLL)	10.85	0	224	22.96
Number of records (GCC + D)	6.48	0	209	19.72
Presence in catalogues	1.64	0	3	1.16
Ratings by critics	13.64	0	48	12.05

Note: BLL: Belgian listening library; GCC: *Gramophone Classical Catalogue;* D: *Diapason Catalogue.*

Table A2—Frequency Distribution of Success Indicators

Number of records or ratings*	Number of pianists		
	BLL	GCC + D	Critics
0	30	62	12
1	19	15	11
2	11	7	10
3	11	6	6
4	4	6	4
5	4	2	5
6	5	2	6
7	1	4	1
8	3	2	1
9	2	0	5
10	2	3	3
11	4	0	4
12	3	0	3
13	1	2	1
14	2	1	2
15	1	2	3
16	1	2	5
17	3	1	2
18	2	3	5
19	1	0	4
20	1	0	2
21	2	3	2
22	1	0	1
23	1	0	4
24	1	2	6
25	0	1	0
>25	16	6	24
Total	132	132	132

* BLL, GCC + D: number of records in BLL, GCC, and D catalogues; Critics: ratings by music critics.

Table A3—Presence or Absence in Catalogues

Presence in catalogue			Number of pianists
BLL	GCC	D	
No catalogue			
0	0	0	29
One catalogue only			
1	0	0	33
0	1	0	0
0	0	1	0
Two catalogues only			
1	1	0	17
1	0	1	8
0	1	1	1
All three catalogues			
1	1	1	44

Note: BLL: Belgian listening library; GCC: *Gramophone Classical Catalogue;* D: *Diapason Catalogue.*

TABLE A4—EFFECT OF RANKING ON SUCCESS; RESULTS ON DISAGGREGATED INDICATORS
(excluding one outlying observation)

	Belgian listening library	*Gramophone* and *Diapason*	Presence in catalogues	Ratings by critics
Estimation of equation (*1*)				
Tobit	1.024	0.552	—	1.545
	(2.4)	(1.5)		(5.3)
Ordered probit	—	—	0.093	—
			(3.2)	
Simultaneous estimation of equations (*1*)–(*2*)				
Other†	3.437	1.610	0.185	2.546
	(2.8)	(1.7)	(3.3)	(3.2)
ρ	−0.502	−0.283	−0.364	−0.312
	(3.1)	(1.3)	(1.6)	(1.5)
LR test ($\rho = 0$)	5.68	1.36	2.48	1.92

Notes: Intercepts are not reported. *t*-values, based on heteroskedastic-consistent standard errors, are given between brackets under each coefficient. The critical value for the LR test is 3.84 at the 5-percent probability level.

† Ordered probit for presence in catalogues and Tobit for other indicators.

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