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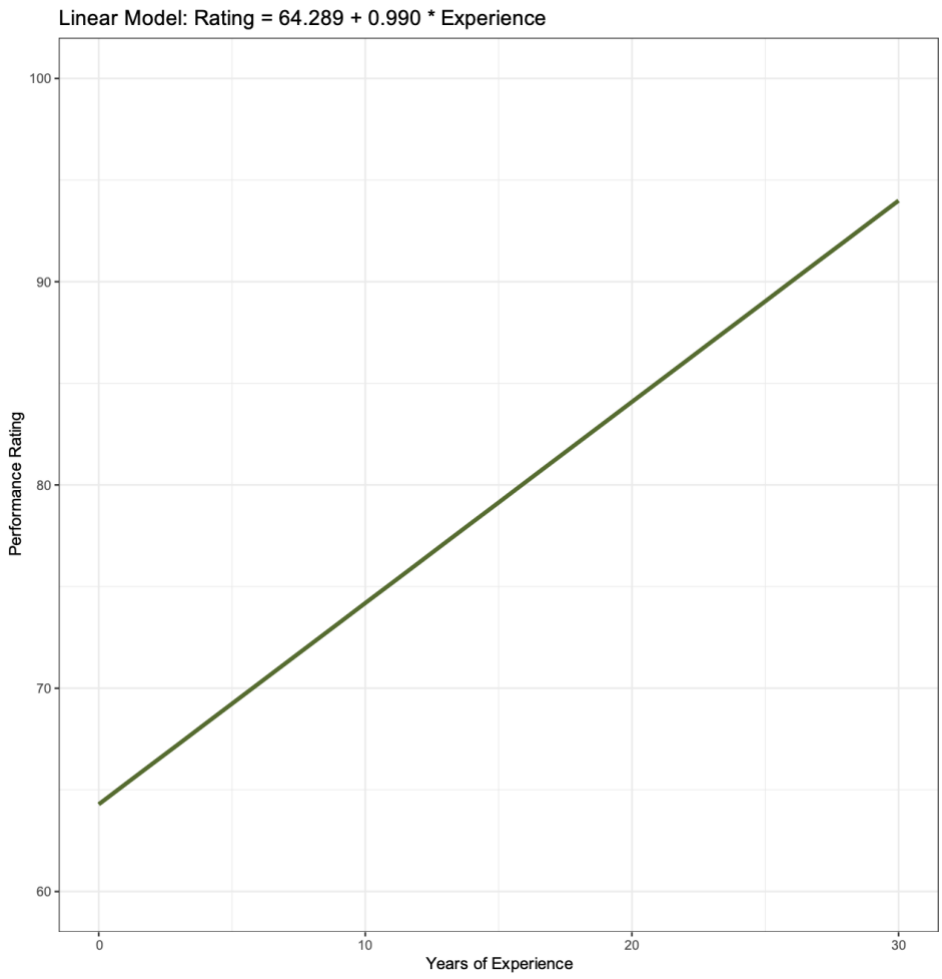
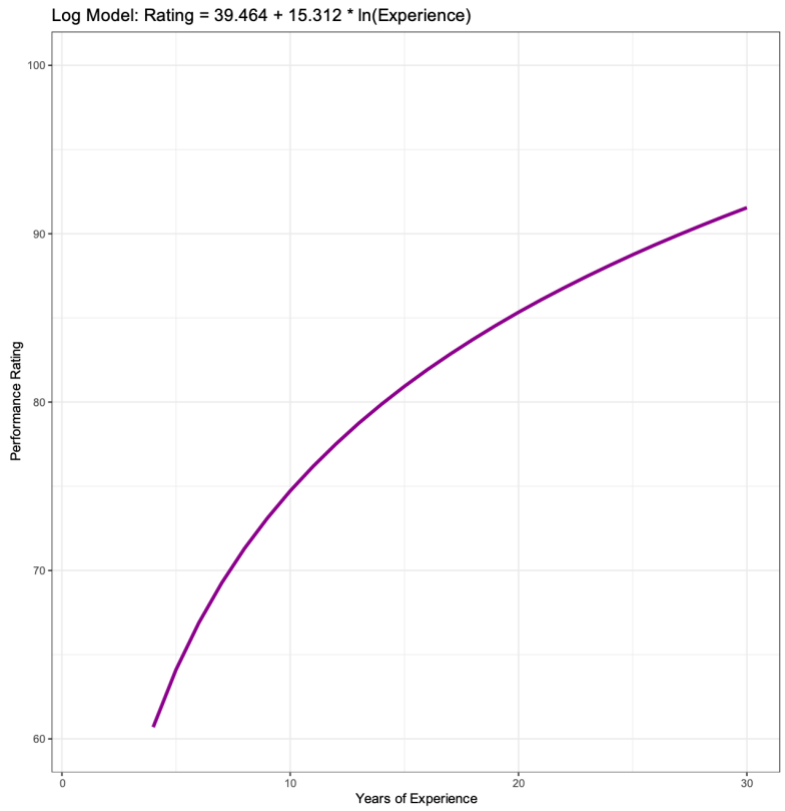
HW0317

Question 4

a.



b.



As ln with 0 is not defined. Therefore, artists with 0 experience cannot be estimated.

c.

In Model 1, the effect of experience (EXPER) on the rating is given by its coefficient, 0.990. This value remains the same no matter how many years of experience an artist has.

1. If an artist has 10 years of experience, the marginal effect is 0.990.
2. If an artist has 20 years of experience, the marginal effect is still 0.990.

d.

Under Model 2, the incremental effect of experience decreases as years of experience increase. In other words, each additional year of experience adds less to the rating for artists who are already more experienced.

e.

To determine which model aligns more closely with the data, we compare their R2R^2R2 values:

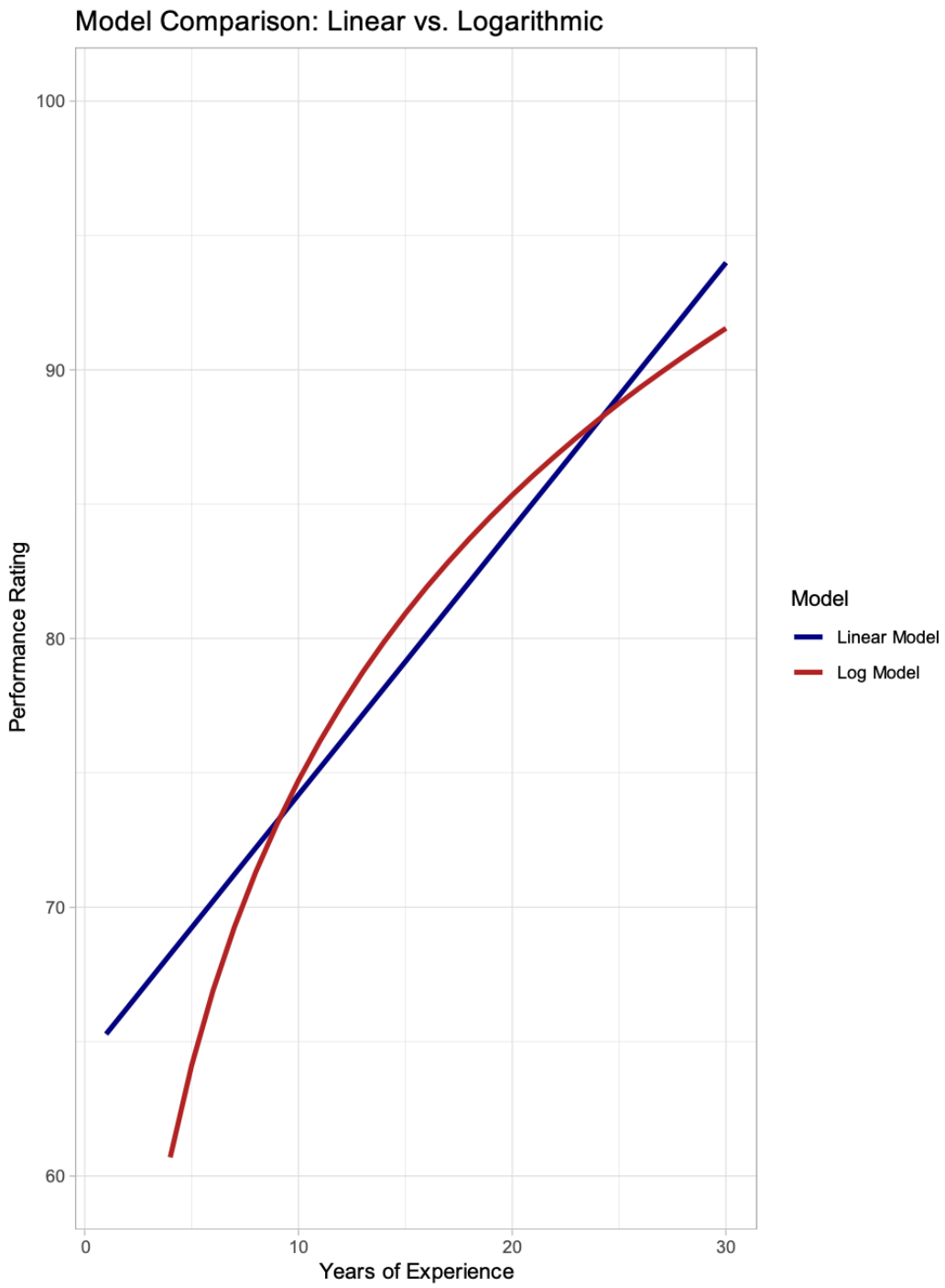
- Model 1 (using all observations): R^2=0.3793
- Model 1 (only artists with experience): R^2=0.4858
- Model 2: R^2=0.6414

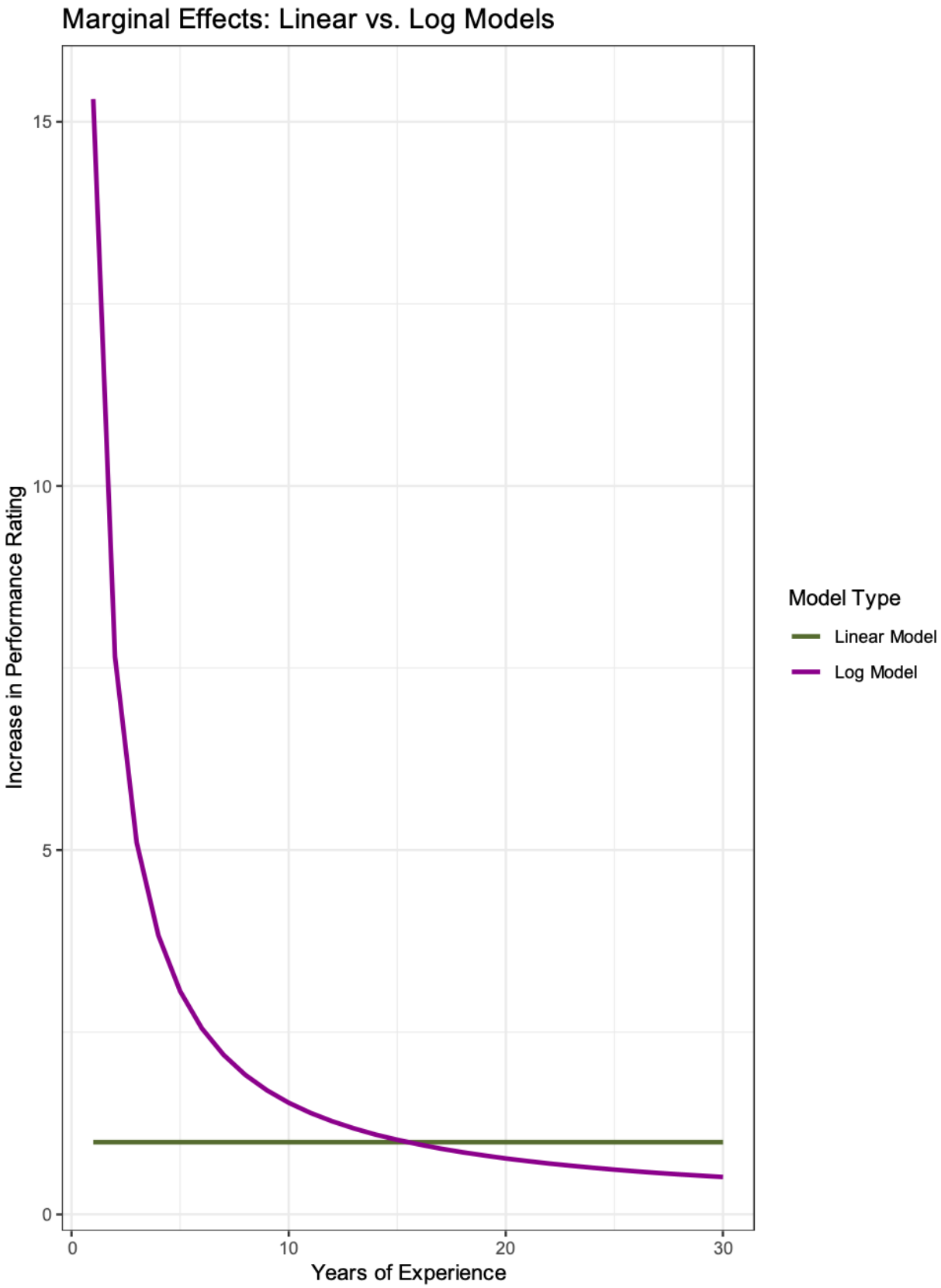
Model 2's R^2 is the highest at 0.6414, meaning it explains around 64% of the variance in performance ratings, compared to roughly 38–49% for Model 1. This indicates that Model 2 better reflects the observed data.

f.
From an economic standpoint, Model 2—which uses a logarithmic form—is more convincing for several reasons:

1. **Diminishing returns:** In most fields, the advantage gained from additional experience tends to taper off over time. Model 2 captures this concept by using a log function, whereas Model 1 implies the same return at every experience level.
2. **Learning curve:** People typically show rapid improvement in the early stages of their career, followed by a leveling off. Model 2 correctly indicates faster gains for those with less experience, which gradually slow down as experience increases.
3. **Skill development:** Many technical skills grow quickly at first, but reaching mastery takes significantly longer. A logarithmic pattern in Model 2 aligns better with this reality.
4. **Statistical support:** Model 2's higher R2R^2R2 corroborates the economic theory that the link between experience and performance is non-linear.
5. **Ceiling effect:** Since performance ratings have a fixed upper limit (e.g., 100 points), a model that grows too large (like a purely linear one) becomes unrealistic at high experience levels. Model 1 might predict values exceeding 100 for someone with more than 36 years of experience, which is impossible.

Overall, Model 2 not only provides a stronger statistical fit but also aligns with well-established economic principles regarding human capital growth and the shape of learning curves—making it the more suitable choice.


Model Comparison: Linear vs. Logarithmic
Performance Rating
100
90
80
70
60
0
10
20
30
Years of Experience
Model
Linear Model
Log Model


Marginal Effects: Linear vs. Log Models
Increase in Performance Rating
15
10
5
0
0
10
20
30
Years of Experience
Model Type
Linear Model
Log Model