

Assignment #5 (G2)

Employee Retention

Group Assignment

Please read Harvard Case No. 9-602-096 “Store24(A): Managing Employee Retention”.

Please use the companion dataset (Store24Data.csv) to answer the following questions:

In the Store24 dataset, you will find the store performance and employee characteristics for the chain of “Store24” convenience stores. In particular, you have information on Sales (fiscal year sales), Profit (fiscal year profit), MTenure (average manager tenure in months, that is, how long they have been with the store), and CTenure (average crew tenure in months). The file also contains data on Store24’s most important site location factors: Comp (number of competitors per 10,000 people in a ½ mile radius), Pop (population within a ½ mile radius), Visibility (5-point rating on visibility, 5 is highest), PedCount (5-point rating on pedestrian foot traffic, 5 is highest), Hours24 (dummy for being open 24 hours a day), and Res (dummy for being in a residential area rather than industrial). The focus of the problem set is on understanding the role of manager and crew tenure (experience) on store level financial performance. As always, the analysis must be completed in Python. Please turn in only a pdf file that includes your code and answers.

- a. As we are interested in financial performance, we will analyze the role of manager and crew tenure on store level ‘Profit’ (as opposed to ‘Sales’). Run a multiple linear regression of Profit on the eight explanatory variables listed above (i.e., everything but Sales). What is the interpretation of the coefficient on MTenure? Is it significant at the 1% level?
- b. What is the interpretation of the coefficient on CTenure? Is it significant at the 1% level?
- c. Doucette remarked ““For example, our most recent store manager bonus plan provides a quarterly bonus of 3% of the manager's salary for increasing average crew tenure by 1.38 months during the quarter. It would be great if we could use this data to get some estimate of the actual financial impact of a 1.38-month increase in crew tenure.”

Based on the regression analysis in (a), what would your answer be to Doucette’s remark? How would you guide Doucette in determining whether the most recent store manager bonus plan was a successful one?

Hint: You will need to assess the cost and benefit to the firm. Since the exact cost to the firm may not be known, you may have to make some assumptions about the cost or consider various cost levels.

- d. What is the interpretation (in words) of the coefficient estimate on Hours24?
- e. Based on the regression analysis in (a), construct a 95% confidence interval for the impact of population (Pop) on profit. What, in words, is the interpretation of this interval?

- f. What is the role of the site location factors in this analysis? What is the expected relationship between performance and each of the site location factors? What happens when you drop all the site location factors from the model? What does this tell you? Comparing the model in (a) and the model without any site location factors, why should (or shouldn't) the site location factors be included in the analysis?
- g. The Harvard Case reads "Jenkins understood that Hart was essentially saying that the *relationship between tenure and financial performance might vary with the level of tenure*. She recalled that this meant there could be a nonlinear relationship between tenure and financial performance"

Why do you think Jenkins suspects a nonlinear relationship between tenure and financial performance? What is the economic logic (in words)?

Can you incorporate this nonlinear relationship into the model? In other words, can you construct one single model in which (i) the relationship between financial performance and manager tenure varies with the level of manager tenure and also (ii) the relationship between financial performance and crew tenure varies with the level of crew tenure? (so consider building one single model that incorporates both criteria). Based on your answer from (f), decide whether you also want to include the site location factors in this model. What do you find?

- h. Can you use the results (estimates) from (g) to find the point at which an extra month of manager tenure leads to lower profit? If yes, please do so. If not, explain why you cannot. Hint: Write down the profit function with respect to manager tenure. You can treat other factors as constants or ignore them from the profit function. Then optimize this profit function with respect to manager tenure (remember PS3 #2(b)?)