

You have a 24-hour window to submit this exam starting when you download it. You may consult any materials you wish in completing this exam with the exception that you may not discuss the questions with anyone during the exam window. Each question (1 and 2) is equally weighted subject to your choice in the question 3. Good luck.

1. Mattress Mack (Jim McIngvale) owns Gallery Furniture in Houston, TX. When the Houston Astros (aka the cheatiest team in professional sports) made the 2022 World Series against the Philadelphia Phillies (aka everybody's favorite team other than the Eagles), Mack ran a promotion where anyone buying a Tempur-Pedic, Stearns & Foster, or Sealy mattress sleep set with a price of \$3,000 or greater would have his purchase price refunded if the Astros won the World Series (which they did four games to two; most likely they cheated). In media accounts (of which there were many as the promotion received nationwide coverage from sports and news publications alike), Mack claimed that \$70 million in covered (i.e., priced > \$3,000) sleep sets were sold during the promotion. Mack also gained significant media attention for winning \$75 million (net of the cost of the bets) in various wagers he made betting on the Astros to win the World Series. Assume that Mack and his customers are risk averse. Further assume that they get no consumption value from betting (i.e., they don't enjoy betting and instead merely consider any bets in purely financial terms). Assume that the betting markets are efficient (i.e., they provide betting odds that reflect the best available information regarding which team will win the World Series). Lastly, assume that Mack and his customers are all Astros fans (i.e., they get intrinsic utility if the Astros win the world series/lose intrinsic utility if the Astros are defeated).
 - a. Describe how one might value Mack's "investment" of the World Series promotion coupled with the World Series bet. I don't want you to actually perform the valuation, but, rather, to provide an intuitive framework and discuss what factors/parameters you would use to carry out the valuation within that framework.

The "benefit" of the mattress promotion is the profit on the incremental sleep sets sold (i.e., additional sleep sets sold that would not have been sold had the promotion not been run) which presumably is something less than the \$70 Million amount Mack stated (i.e., his \$70M number was probably total sales revenue in the relevant period, not profits and not profits above the no-promotion sales counterfactual). On top of this, as indicated by the nationwide media coverage, there is likely a more generic promotional effect that has some value (even after the World Series, some people might be more likely to buy products at Mack's store than they otherwise would have absent the promotion and attendant exposure) though in valuing this, it is not clear how much nationwide coverage is worth since it is very unlikely someone from, say, Philadelphia will order a sleep set from a Houston store, but the extra promotion probably does lead to additional sales beyond those in the promotion. The generic promotion benefit occurs regardless of the outcome of the World Series (so multiply that portion of the benefit by 1). If the Astros lose the World Series with probability $(1-p)$, multiply the value of the incremental profits by $(1-p)$ to provide an expected benefit measure. Additionally, Mack gets the (admittedly short-term) benefit of additional cash flows in the

amount of the incremental profits between the time of the sale and the time he reimburses the customer, so multiply that cash flow value by p . Lastly, Mack gets the \$75M winnings with probability p . The “cost” of the promotion is the cost of the covered sleep sets (i.e., the wholesale price he pays and associated transactions costs) multiplied by the likelihood the Astros will win the series (p) and the cost incurred to make the wager with probability 1. These are primary pieces of the valuation. Of course, one might add some other subtleties (such as there will be some fraction of people who fail to request their refund, perhaps the bookmakers don’t pay their bet, taxes on the gambling winnings and the profits from the incremental sleep set sales, as well as tax write-offs from gambling losses and reimbursements) and one might engage in some discounting (pay for bet at time t but only collect at time $> t$, get sales at time t but only reimburse at time $> t$, etc), though the short duration of the promotion likely makes discounting of less importance.

- b. Comment on the pros and cons of an alternative investment in which Mack would refund customer purchases in the event of a Phillies win (and a corresponding bet that the Phillies would win).

Since Mac and his customers are assumed to be Astros fans who get intrinsic value out of an Astros win, the promotion is sort of like loading up on risk (in the good state of the world where the Astros win, the customers get the joy of the win plus the free mattress) whereas the alternative promotion proposed in 1.b is a form of diversification (remember we only care about money to the extent it provides utility and so, in our standard model, a reimbursement can offset the hurt from your team losing and your team winning can offset the hurt from having to pay for your mattress). Under such a “model,” we might expect more people to be induced to buy sleep sets under the 1.b proposal. For Mack, the original promotion, if we assume he’s an Astros fan, already has a bit of this diversification value (and so the alternative posed in 1.b undoes those diversification benefits), though for Mack, he is hedging his risk anyway with the offsetting bet. All that said, for real world Houston area mattress customers who might not be as financially “sophisticated” as our blackboard models presume, Mack might be seen as a bit of a traitor if word got out that he bet on the Phillies to win, leading to a loss of goodwill and subsequent sales, with we would need to take into account.

- c. Mack also engaged in this promotion and bet combo when the Astros won the 2017 World Series. Discuss how this fact might affect your valuation in 1.a above.

Many of the consumers who might be enticed to buy a sleep set based on an Astros related promotion might have already been moved to buy sleep sets in 2017 and so might have no need for new sleep sets a mere 5 years later, which would lower the estimate of the incremental sales and resulting profits included in the benefits above. Perhaps more subtly, since the Astros have continued to be good since 2017, really sophisticated customers might have anticipated another world series run (and Mattress Mack promotion which, indeed, materialized in 2019 and 2021 as well), delaying their purchases of sleep sets until such a run materialized, which would potentially just shift their sleep set purchases time-wise rather than making them truly incremental purchases induced by the promotion. In such a case, some of these “waiters” might break down and buy a sleep set from Mack anyway if he were not to offer the 2022 promotion. On the other hand, putting the previous considerations aside, the earlier promotion could give Mack some sense of how many extra sleep sets he will sell during the current promotion which reduces the uncertainty of his valuation to some extent.

2. The Walt Disney Company (ticker: DIS) is a well-known entertainment conglomerate with a market capitalization of \$170 billion. In late February 2020, Disney CEO Bob Iger stepped down

from that role, surprising most people at the firm (since he had nearly two years remaining on his contract) though as reported by the Los Angeles Times, “Disney’s CEO succession plan was the subject of speculation for years,” given that Iger was in his late 60s. Bob Chapek was named Iger’s replacement and had previously been one of three Disney executives who had been rumored to be in the running for the position (though compared to the well-known Iger, Chapek held a low profile among investors). On the four days after the announcement of Iger’s replacement by Chapek, Disney’s share price declined by 4 percent on each of those days for a cumulative loss of more than 15 percent (the contemporaneous returns for the S&P 500 on those days were -3.4%, -3.0%, -0.4%, and -4.4% for a cumulative 11% loss). After a run of bad publicity regarding branding that some considered inconsistent with Disney’s traditional family entertainment reputation (among other issues), Chapek was removed from the CEO position on November 20, 2022 and was replaced by Iger who said, “I’m going to be back for two years and then I’m going to find a successor for real this time.” On the trading day after this weekend announcement, Disney shares appreciated by 6 percent with the S&P 500 experiencing a 0.4 percent loss that day. If you ran regressions of the Disney returns on a market return variable for the 100 trading days prior to each of these CEO change announcements, you would get the following outputs:

Period	Constant Term	Coefficient on Market Return	Standard Deviation of Abnormal Returns
100 Days Before Feb. 24, 2020	0.00	0.84	0.01
100 Days Before Nov. 20, 2022	0.00	1.13	0.01

- a. Based on the information provided, discuss the value of Iger and Chapek to the Walt Disney Company (explain your rationale and state any assumptions required to support your discussion).

Upon Iger’s retirement/Chapek’s appointment, there was a 15% Disney loss when historical relationships would imply a counterfactual (i.e., no Iger retirement) return of $0.84 \times (-0.11) = -9\%$ which on a market capitalization of \$170B is a loss (relative to expected loss) of about \$10 billion. Assuming nothing else was happening in this period relevant for Disney’s valuation, this might provide a market estimate of the relative net present value of Iger running Disney over the relevant time period as compared to Chapek. However, it is not possible to rule out the possibility that the market was actually valuing Chapek relative to some other CEO who traders assumed would be named imminently. However, the second change helps increase our confidence in the Chapek/Iger relative comparison since Disney appreciated by 6% when the counterfactual prediction was $1.13 \times (-0.004) = 0.45\%$ for a differential (relative to expectation) gain of more than 6.5% (so about the same relative impact in the other direction from the earlier CEO change). The primary assumptions involved in this analysis are that nothing else material with respect to Disney was going on at the same time as these CEO changes (beyond normal market variation) and that the market was reacting to these particular personnel changes (as opposed to, say, reacting to the changes by updating their uncertainty regarding the company in general in various ways).

- b. The regressions provided above only account/adjust for variation in the overall market. If one were worried that Disney price fluctuations are sensitive to changes

in the entertainment industry, discuss the pros and cons of including an industry-specific index in the regressions for the purposes of isolating the effects of an event like a CEO change.

Industry controls help us rule out omitted industry developments affecting the firm coincidentally with the CEO change that would otherwise lead to biased estimates of the event effect. However, because firm performance might be dependent on the interactions of firms in the industry (i.e., competition), inclusion of such variables might inappropriately “control” for some of the market-expected treatment effects (e.g., imagine that Iger is really good at identifying valuable projects before industry competitors; once he retires, the market might expect those competitors to get more such projects in which case it is the event that is actually “causing” the industry comparators to increase in value rather than some exogenous change in the industry).

- c. If the estimated standard deviations provided above were an order of magnitude larger (i.e., 0.10 instead of 0.01) how would that change any of your analysis in 1.a?

As presented, the estimated treatment effects (Iger retiring and Iger being reappointed) are statistically significant (i.e., effects are unlikely to have arisen by mere chance), whereas they would not be if the standard deviations were an order of magnitude higher. In the latter case, it is more likely that any observed stock price changes are the result of chance/random fluctuations. In that case, it is much harder to draw any conclusions about the market’s relative valuation of Iger and Chapek.

3. Choose one of the questions above (1 or 2) to count double (i.e., the points from the question you choose will be multiplied by 2 while the points from the question you don’t choose will be multiplied by 1) or choose to have each question count equally (i.e., the points from each question will be multiplied by 1.5). Make your choice clear, or I will make the least advantageous choice for you (i.e., double whichever question you do worse on).