Case Study 1: Mr. Jaeger's Vineyard[i]

Introduction

At his vineyard, Mr. Jaeger had the following decision to make: There is an upcoming rainstorm, should he harvest his grapes immediately, or leave them? A strong storm would ruin the grapes. A light rain however might result in the forming of a tasteful mold, botrytis cinerea. Such wine tastes luscious and sweet and is highly valued by connoisseurs.

Mr. Jaeger's Decision Problem

From experience there was a fifty-fifty chance that the upcoming rainstorm would be heavy, or that there would just be light rain. In the case of light rain, botrytis forms with a 50% chance. If botrytis does not form, Mr. Jaeger leaves the grapes to ripen more fully. With luck, the grapes would reach 25% sugar, resulting in a wine selling at $14. Even with less favorable weather, the sugar levels would probably increase to 20%, yielding a lighter wine selling at $12. Mr. Jaeger thought these probabilities were equally likely. Moreover, while waiting for sugar levels to rise, the acidity levels must also be monitored. When the acidity drops below 0.7%, the grapes must be harvested whatever the sugar level. If this happened, the wine would be priced at only about $10. Mr. Jaeger felt that this event only had a 20% probability.

When strong storm would strike, part of the crop would be lost. However, the part of the crop that could be harvested would also absorb much of the rainwater. Mr. Jaeger estimated that the final result would be about a 10% increase in berry juice with extremely low fruit concentration, however. This would yield a very thin wine that would sell wholesale for $8 per bottle only, about $2 less than could be earned by harvesting the not-quite-ripe grapes immediately and eliminating the risk. Mr. Jaeger estimated the damage to the wineries reputation from bottling and marketing an inferior wine would cost $100,000 in advertising to mitigate. If they harvested the grapes now, they would obtain 1,000 cases (a case contains 12 bottles of wine). The winery always had the option of not bottling a wine that was not up to standards. They could sell the wine in bulk, or they could sell the grapes directly. These options would bring only half as much revenue at about an equivalent of $4 per bottle, but would at least avoid damaging the winery's reputation.

The price of the wine with botrytis was still uncertain, wholesale prices could be as high as $40 in 1 out of 4 occasions and as low as $24 with the same probability. In 1 out of 2 occasions there had been a medium price of $28. Unfortunately, the botrytis also caused a 30% reduction in total juice. The higher price was therefore partly offset by a reduction in quantity. The production costs of the winery were about the same for each of the possible styles of wine and were negligible relative to the wholesale price.

Questions

1. What are the main elements of Mr. Jaeger's decision problem?
   a. What are the decisions Mr. Jaeger needs to make about the Riesling harvest? (Do not suggest which decision he should take, just list all of his options.)
   b. What are the uncertainties Mr. Jaeger is facing concerning the Riesling harvest?
2. How much revenue does Freemark Abbey obtain from its Riesling grapes if Mr. Jaeger decides to have them harvested before the storm?
3. How would you come to a decision whether to harvest the Riesling grapes right away or to wait for the storm (given risk-neutrality)?
4. What is the maximum expected monetary value Mr. Jaeger can achieve?
5. What is the maximum price Mr. Jaeger should be willing to pay for a perfect weather forecast that tells him with certainty if light or heavy rain with hail will develop?

The SuperDoppler

Mr. Jaeger also has the option to rent a Hightech weather detector for $4,000 per use. It provides a very accurate local forecast that might be extremely valuable, as the heavy rain is mostly only a local phenomenon. The machine, however, is not entirely reliable; 8 out of 10 times it predicted the heavy rain that occurred. For light rain, it has proven to be a bit more accurate, i.e. in 9 out of 10 times that there was an effective light rain, it actually predicted it. Mr. Jaeger is wondering if the rental might be worth a try.

6. What is the maximum price Mr. Jaeger should be willing to rent the SuperDoppler? Would you advise him to rent it at the price given in the case?

Mr. Harvey Borz of Borz's Direct Mail Mold Spores

The trade magazine WineToday had also recently run an article about Mr. Harvey Borz of Borz's Direct Mail Mold Spores. Harvey sells botrytis spores and guarantees that if you use his spores and it rains lightly, botrytis mold will develop. One application would be enough to treat Freemark Abbey's Riesling grapes and would cost $40,000. Mr. Jaeger must pay the $40,000 upfront (before the storm).

7. Should Mr. Jaeger buy the spores for the suggested price?
8. Add the offer to the risk profiles. How can the risk be compared to the earlier state (without the helping spores)?

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[i] This case is a short version of a case prepared by Bert de Reyck and Zeger Degraeve at the London Business School, building on an earlier version developed at the Harvard Business School. It is based on an existing problem situation and is used as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.