

Lesson 15-1 – Decision Trees

Economic Decision Trees

- A decision tree is a logical structure of a problem in terms of the sequence of decisions and outcomes of chance events
- When decisions depend on the outcomes of random events, the analysis process forces decision makers to anticipate what those outcomes might be.
 - This analysis is suited to decisions and events that have a natural sequence in time or space.
- Decision Trees can be created for complex decision making:
 - Symbols:
 - Decision Node
 - Chance Node
 - Outcome Node

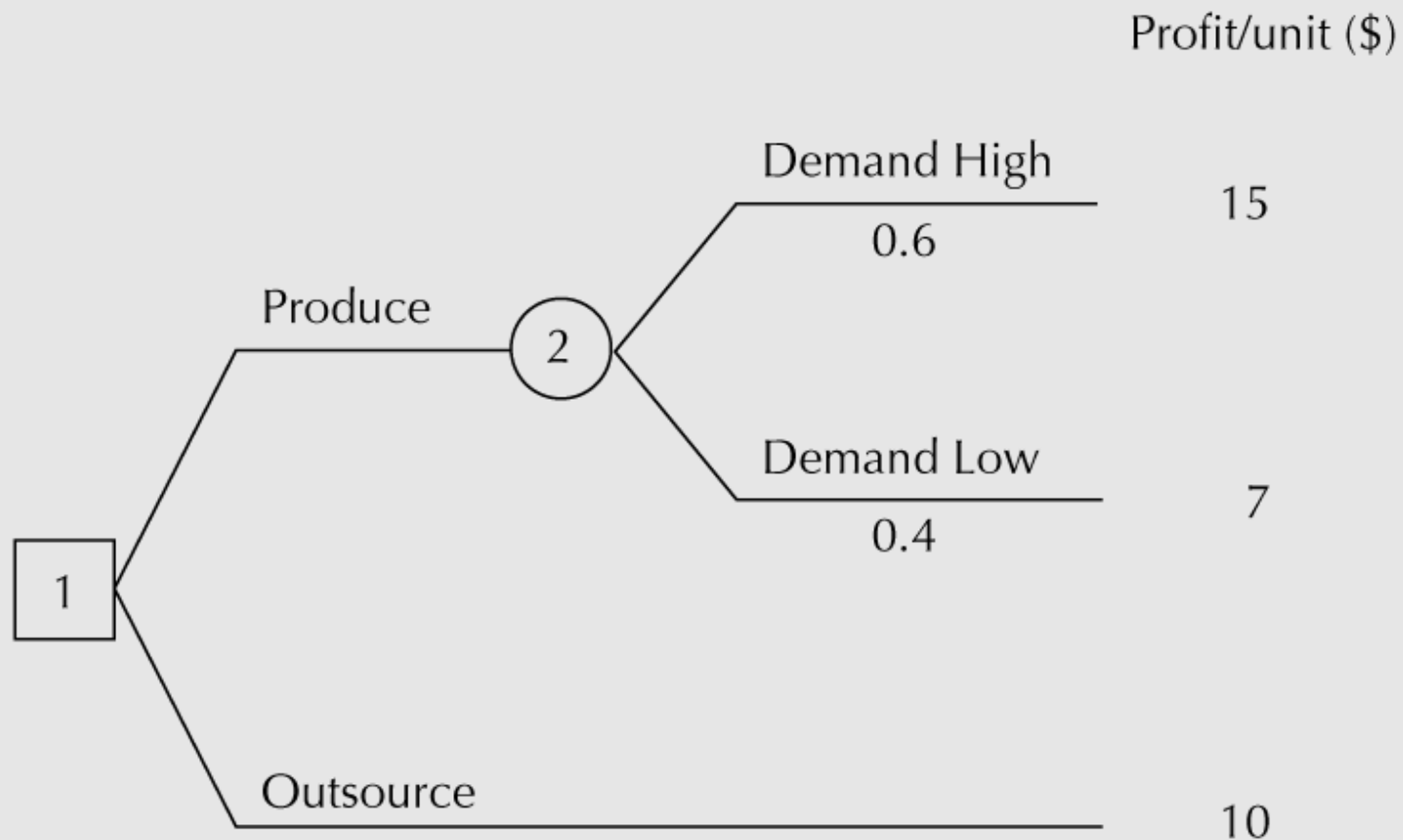


Decision Tree Example

- Edwin Electronics (EE) has a factory for assembling TVs. EE outsources the TV screen to a supplier, but are considering bringing screen production in-house.
- Uncertainty in demand for the company's TVs has an important bearing on the decision.
 - If the future demand is low, outsourcing seems to be the reasonable option in order to save production costs.
 - On the other hand, if the demand is high, it may be worthwhile to produce the screens on-site due to economies of scale.
- EE's engineers represented their decision in a graphical manner with a decision tree.

Step 1: Create a decision tree

Figure 12.4 Decision Tree for Edwin Electronics



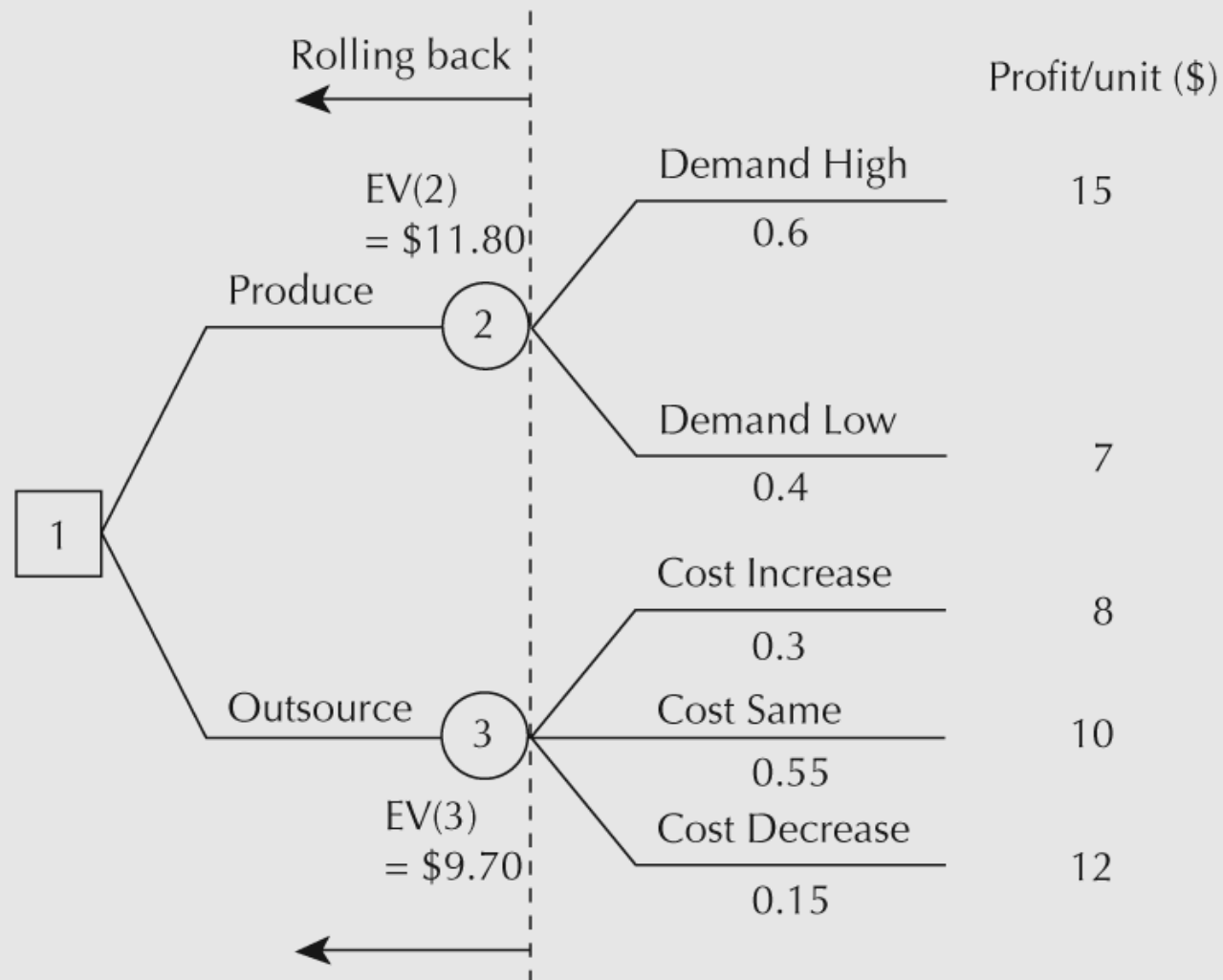
Step 2: Roll Back

Rollback: moving from right to left on the tree:

- At each chance node, compute the expected value (EV) of the possible outcomes.
- At each decision node, select the option with the best expected value. This becomes the value associated with the decision node. Mark option(s) not selected with a double-slash (//) on the corresponding branch.
- Continue until the left-most node is reached

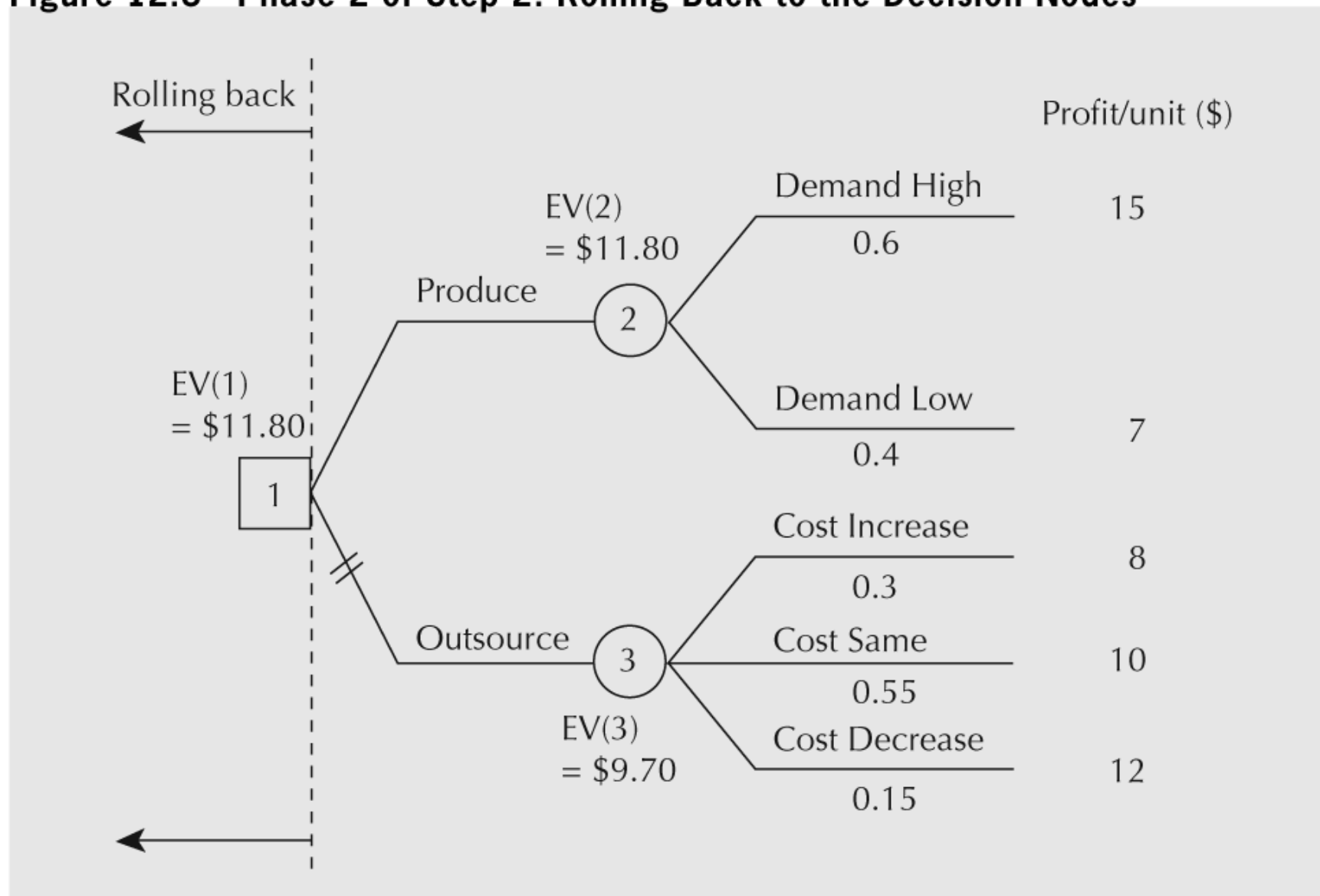
Phase 1 of Step 2: Rolling Back

Figure 12.7 Phase 1 of Step 2: Rolling Back to the Chance Nodes



Phase 2 of Step 2: Rolling Back

Figure 12.8 Phase 2 of Step 2: Rolling Back to the Decision Nodes



Step 3: Completed Analysis

Figure 12.9 Completed Analysis for EE's Modified Decision Tree 2

The expected value associated with the final node is the expected value of the overall decision

