# Production Possibilities and Efficiency

Given a set of finite resources and a state of technology, the alternative sets of yawls and xebecs that can be produced are shown in Figure 1. Any production alternative that lies on or "inside" the Production Possibilities function (PPF) is feasible. Those alternatives or combinations that lie outside the PPF are not possible given the current level of inputs and technology. A series of output combinations have been identified and labeled A through M. A firm or agents within an economy can shift production from one alternative or output combination to another by altering the allocation of land (R), labour (L) or capital (K) from one production process to another.
The production alternatives labeled in Figure 1 are shown in Table 1.

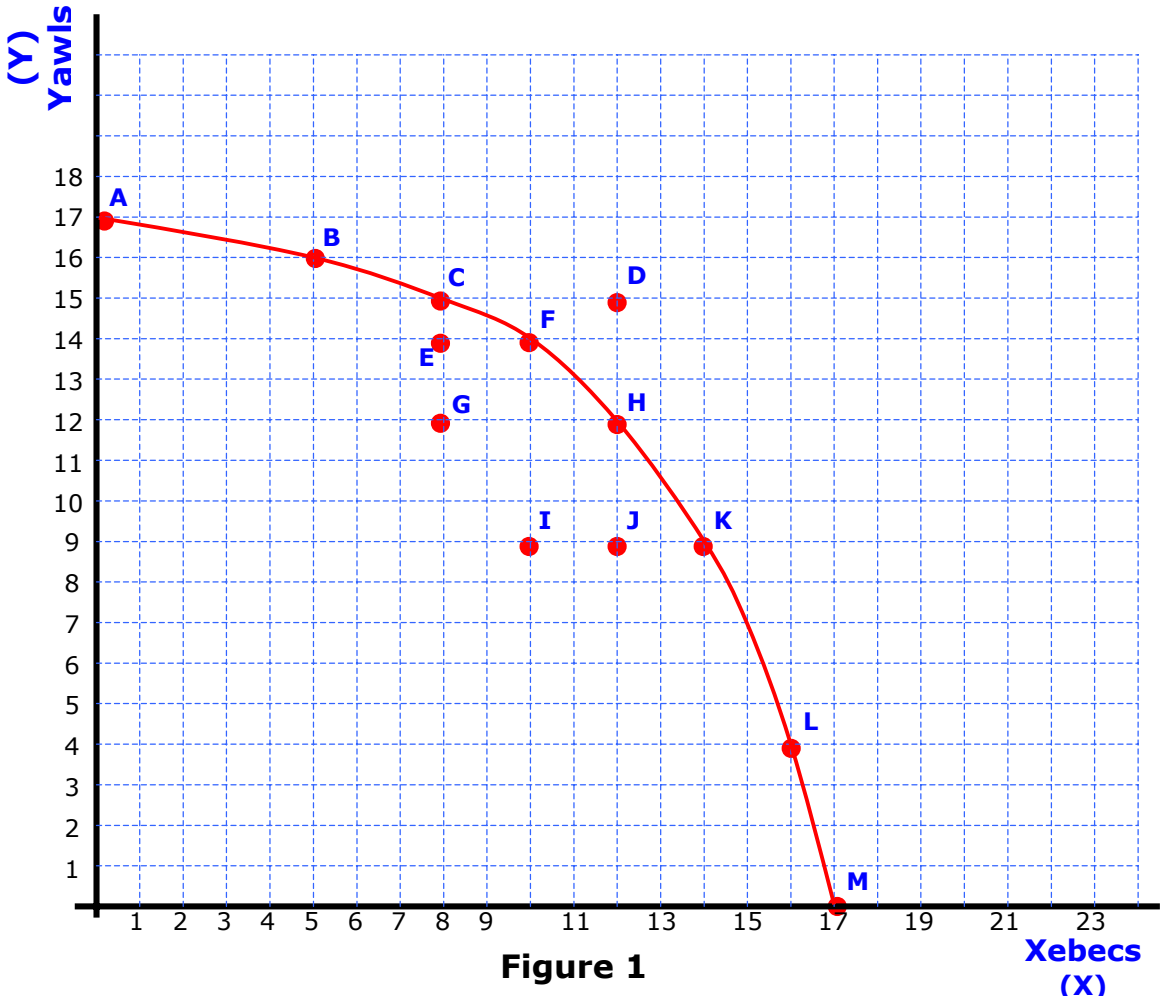


**Figure 1**

## Questions:

1. Which alternative(s) are not possible? ***Output combination D lies outside the PPF.***
2. Which alternatives are "technically inefficient" ***Any output combination identified by a point "inside" the PPG is technically inefficient.***
3. If you were producing alternative G ($Q_X$ = 8, $Q_Y$ =13) and the price of Xebecs ($P_X$) was $3 and the price of Yawls ($P_Y$) was $1, How could you reallocate the inputs to increase the value of the output? ***The value at G is $36, any output combination that lies in the area identified by GHC must have a value that is greater than $36. There are other alternatives that may have a greater value depending on relative price.***

4. If you reallocated inputs to produce at alternative E, What is the marginal benefit? The marginal cost?***MB = $2 (2 units of Y @$1 each), MC = 0(There is no sacrifice of X to produce more Y)***
5. If you reallocated inputs to produce at alternative J, what are the marginal benefits? The marginal costs? ***MB = $12 (4 units of X @ $3 each), MC= $3 (3 units of Y @ $1 each), Net gain is $9 (the value at G = $36, while the value at J is $45)***
6. Is alternative J "efficient?" ***No But it is worth more than the output at point G.***
7. When the price of Xebecs ($P_X$) is $3 and the price of Yawls ($P_Y$) is $1, what alternative or output combination (that is identified by a letter) will maximize the value of the output? ***The output at point L is the maximum valued output combination identified.***

   Output at L
   $Q_X$ = 16 @ $3 each → $48
   $Q_Y$ = 4 @ $1 each → $ 4
   $52

8. If the price of Xebecs ($P_X$) were $2 and the price of Yawls ($P_Y$) were $.90 which alternative would have the greatest value? ***Output at point K (Qx= 14, Qy = 9, value of output is $36.10)***
9. If the price of Yawls ($P_Y$) increased to $2 (and the Price of Xebecs, $P_X$ remained at $2), what output combination would maximize the value of the output? (Notice that the inputs would be allocated to their "highest valued" use.) ***The output combinations at F and H both have a value of $48. If the PPF is "bowed out," the maximum value will occur at an output level between F and H on the PPF.***

Excel Table

## Table 1 - Prices and PPF

| Alternative | Xebecs ($Q_X$) | Value of $Q_X$ | Yawls ($Q_Y$) | Value of $Q_Y$ | Value of Alternative |
|---|---|---|---|---|---|
| A | 0 | | 17 | | |
| B | 5 | | 16 | | |
| C | 8 | | 15 | | |
| D | Not Possible | | | | |
| E | 8 | | 14 | | |
| F | 10 | | 14 | | |
| G | 8 | | 12 | | |
| H | 12 | | 12 | | |
| I | 10 | | 9 | | |
| J | 12 | | 9 | | |
| K | 14 | | 9 | | |
| L | 16 | | 4 | | |
| M | 17 | | 0 | | |
| | $P_X$ = | | $P_Y$ = | | |