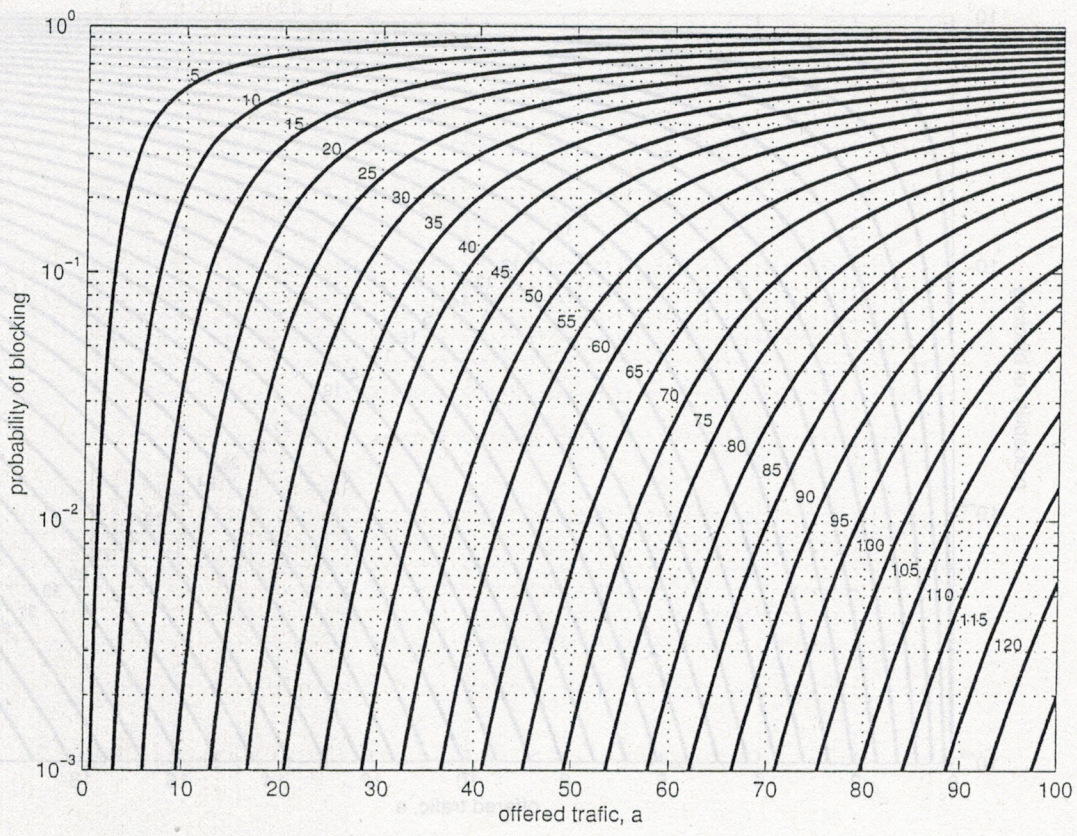

Figure 10.5: Erlang B curves.

The 30 trunk system is thus more efficient. This explains why it is cheaper to call the U.S.A. than Italy.

2. **Example** $M/M/m/n$. This example is from the Exam paper in 2002-3.

   A call centre employs thirty operators selling tickets for a major sporting event. The call centre has sixty lines in total. When all operators are active new calls are placed in a queue for the first available operator. The call centre is to be modelled as an $M/M/m/n$ queue, *i.e.* a queue in which there are m servers and a maximum state of n.

   (a) Draw a state diagram representing the queueing system.

   Answer

Figure 10.6: State diagram for $M/M/m/n$ queue.

   (b) Write down the detailed balance equations for the two cases where the queue state $k < m$ and when $m \leq k < n$.