

to the tail of the recurrence time distribution, i.e. to p^k .

More directly, the vector of steady state probabilities u_k can be derived from the following two conditions:

$$u_k = pu_{k-1}$$

$$u_0 = qu_0 + qu_1 + qu_2 + \dots$$

(1)

The first condition ensures the invariance of the steady state; the second ensures that entries to and exits from the income population balance.

It follows that

$$u_k = p^k u_0$$

(2) (1)

$$u_0 = 1 - p \quad p < 1$$

The result is, of course, identical with the distribution of the spent waiting time derived above.