

## On customer lifetime value

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Customer lifetime value is an important concept in segmenting, selecting, and retaining customers, and in customer management in general. The topic is the focus of increasing research, as customer databases grow in size and the facilities for analysing and mining these databases grow. Customer lifetime value describes the likely return on a customer over the course of their relationship with the company, and a key use of the concept is in guiding the decisions on what actions to take with each customer. Clearly, different actions alter the expected lifetime value in different ways. Formal models of lifetime value can be very useful because they allow one to choose good actions, in the sense that they lead to increased customer lifetime value.

Some customer value models are very elaborate, and use a decision tree structure, associating costs and revenues with each branch. One key component of all such models is a process of monitoring each customer's behaviour, and intervening to take an appropriate action at some time. We examine a special case of this, in which each customer is reviewed at time  $r_1$ , with the relationship being terminated by the company if the customer's value at time  $r_1$  is below some value  $v_1$ , and is otherwise continued for a second phase (e.g. the account is renewed, another card is offered, etc.). The model allows for the possibilities that the customer might themselves terminate the relationship at any time, and might decline the offered second phase; that different customers have different intrinsic values; and that both income and cost are random processes. Given this model, we find optimal values of the review time,  $r_1$ , and the decision threshold  $v_1$ , so as to maximise overall customer value. A real example is given.