



The level of Active Members over time is a function of the Joining inflow relative to the Leaving outflow. The rate at which new members join is the sum of New Members from Advertising and New Members from Word of Mouth. New Members from Advertising is equal to the Advertising Budget divided by the Customer Acquisition Cost.

Now, let's assign numerical values to the Advertising Budget and CAC variables to see what happens to the level of Active Members over time. For instance, let's set the Advertising Budget at a constant \$500 per month and the Customer Acquisition Cost at a steady \$100 per member. An Advertising Budget of \$500 per month divided by a Customer Acquisition Cost of \$100 per member equals five new members per month due to advertising.

New Members from Advertising plus New Members from Word of Mouth equals a Joining rate of five members per month. Because the Leaving rate is zero members per month, the level of Active Members grows from zero to 300 over the course of 60 months. You can see the accumulation more clearly by moving the timeline slider back and forth. Not surprisingly, if we double the Advertising Budget to \$1,000 per month, the accumulated number of Active Members after 60 months likewise doubles to 600 members.

When using the model to explore relationships, it can become tedious to edit values. Fortunately, there is a better way.

Let's create a dashboard named "Active Members." We'll populate it with chart and input widgets to allow us to focus on the relationship between the Active Members stock and the Advertising Budget and Customer Acquisition Cost variables.

The chart in the dashboard is just an enlarged version of the mini-chart reflected in the Active Members stock. It shows the number of active members on the y-axis as a function of time, shown in months on the x-axis.

By moving the input sliders back and forth, we can see how changes to the Advertising Budget and CAC variables change the level of Active Members over time. Again, if we increase the Advertising Budget from \$500 per month to \$1,000 per month, we see that the number of Active Members at the end of month 60 increases from 300 to 600. Alternatively, if we reduce the Customer Acquisition Cost from \$100 per member to \$50 per member, we see the same increase in Active Members at the end of month 60 from 300 to 600.

The equivalence of a doubling of the Advertising Budget and the halving of the Customer Acquisition Cost is obvious. That said, buying more advertising is straightforward and easy. Figuring out how to improve the effectiveness of your advertising in order to reduce your Customer Acquisition Cost is hard.

The point is, both are points of leverage. Visual modeling helps us see points of leverage that we might otherwise neglect.

To recap, to increase the level of Active Members over time, the Joining rate must exceed the Leaving rate. To increase the Joining rate, you must increase the rate at which new members join because of advertising or from word of mouth. To increase the rate at which new members join because of advertising, you must either increase your Advertising Budget or find ways to reduce your Customer Acquisition Cost.

We created a dashboard to allow us to more easily explore the effect of changes to the Advertising Budget and CAC variables on the number of Active Members over time. The relationship is linear: the results of advertising tend to be proportional to what you put into it.

Next, we'll explore the non-linear effect of word of mouth on membership.