Investment is good for charitable donations

Imagine beginning with a given amount of disposable money, k. You could donate the full amount immediately, or instead you could invest it for the sake of a greater donation in the long run.

There are many ways one could invest and subsequently donate, but here we will explore the following strategy: increase the asset each year by a multiplier m, and donate a small fraction q at the end of each year, retaining the complementary fraction p.

How long does it take for this strategy to cumulatively donate the initial amount k? And how long does it take to surpass k every year? First we need to describe the growth of the donations and asset.

The asset after one year before donation will be the initial amount k multiplied by the growth factor m. We multiply km by p to find the amount after donation. After n years it will be $a_n = k(mp)^n$.

To simplify, we can let a constant $x = mp$. So $a_n = kx^n$.

The donation after the nth year is a_n multiplied by q, so $d_n = kqx^n$. We can again simplify: let a constant $w = kq$, so $d_n = wx^n$.

$$a_n = kx^n = k(mp)^n$$

$$d_n = wx^n = kq(mp)^n$$

$$s_n = \sum_{i=1}^{n} wx^i$$

The final equation with s_n describes the sum of all donations after n years. We can now ask how many years it will take s_n and d_n to exceed k. We will let q = 1%, meaning that we will donate 1% of the asset after each year and retain 99%. The growth factor m will vary.

Growth	$s_n > k$	$d_n > k$
5%	41	119
7%	33	80
10%	26	55
15%	20	36
20%	17	27
25%	15	22
30%	13	19

We can ask further, how many years will it take for the sum of donations s_n to exceed two, five, ten, twenty, thirty, forty, or fifty times as much as the initial investment?

Growth	$s_n > k$	$s_n > 2k$	$s_n > 5k$	$s_n > 10k$	$s_n > 20k$	$s_n > 30k$	$s_n > 40k$	$s_n > 50k$
5%	41	56	78	95	113	123	130	136
7%	33	44	59	71	83	90	95	98
10%	26	34	44	52	60	65	68	71
15%	20	25	32	38	43	46	48	50
20%	17	21	26	30	34	36	38	39
25%	15	18	22	25	28	30	32	33
30%	13	16	19	22	25	26	27	28

For example, if you're able to achieve 10% annualized growth, you can donate ten times the initial investment k after 52 years, and a total of $50k$ after only 19 more years. In addition, at these two respective time points you've grown your asset to more than $84k$ and $425k$. The accelerating nature of this process is evident regardless of how quickly you can grow the asset.

There are many variations on this theme. You could delay donations for some time while investing. You could alter q, or you could alter variables not explicit in these equations, such as how frequently donations occur. Regardless of the other variables, increasing m is of course always better.

Among variables under complete individual control, the most important is arguably q. Minimizing it optimizes in the long term, both in terms of cumulative donations and capacity to donate at any given time. Increasing q optimizes in the short term (the most extreme option being donating all money immediately). If one wishes to maximize the money donated by a given date, the optimal strategy is to invest and donate nothing until the target date.

This presents a dilemma: given an intention to make the largest charitable donations possible, the best action to take at any given time is to donate nothing and accrue as much wealth as possible. But there are a number of countervailing variables, such as the gradually improving state of the world (suggesting that charitable donations could be less useful as time passes) and diminished control of how one's assets are used after death (including a risk of total loss).

Regardless of how one might weight each of these points, observing the effects of compound interest is hopefully a compelling argument for the non-selfish benefits of investing money before donating. For much more on this idea, click here for a link to a podcast and the associated work by Phil Trammell.