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# An Analysis of GRAT “Immunization”

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*Editors’ Synopsis: This article examines a strategy of replacement by the grantor of equity investments with bonds in a grantor retained annuity trust (“GRAT”), referred to in the article as “immunization.” On the basis of Monte Carlo modeling described in the appendix to the article, the authors conclude that systematic immunization and re-GRAT-ing of assets produces a superior result.*

## I. Introduction

A Grantor Retained Annuity Trust (“GRAT”) can be an extremely effective wealth transfer technique, but monitoring a GRAT’s progress can be stressful.<sup>1</sup> If a GRAT’s assets fall in value and the GRAT appears likely to fail, a client may understandably feel that he has wasted time and effort. Conversely, if a GRAT’s assets have greatly appreciated early in its term, the client may be on tenterhooks, hoping that the gains do not evaporate.

To take advantage of changes in the value of a GRAT’s assets, estate planning professionals often consider “immunizing” the GRAT. For example, if the GRAT’s assets have greatly appreciated, the professional may recommend that the grantor replace the assets with less volatile assets to “lock in” any outperformance and ensure the GRAT’s success.<sup>2</sup>

This immunization strategy raises a host of questions: When does immunization make sense? Is it possible to quantify the amount by which the assets’ return must surpass the 7520 rate to merit immunizing the GRAT? If immunization is desirable with a single

GRAT, is it even more attractive in a “rolling GRAT” strategy?<sup>3</sup> For insight into these issues, we conducted research using a Monte Carlo model that simulates 10,000 plausible future paths of returns for various asset classes and inflation, and produces a probability distribution of outcomes.<sup>4</sup> The model also simulates 10,000 plausible paths for the Section 7520 rate.<sup>5</sup>

Our research led to these conclusions:

- (1) Immunizing can significantly increase the amount of wealth transferred through GRATs if it is done as part of a rolling two-year GRAT strategy in which the grantor systematically immunizes and “re-GRATs” the immunized assets, regardless of whether any GRAT outperforms or underperforms the 7520 rate in its first year.
- (2) Immunizing without “re-GRATing” in a rolling two-year GRAT strategy is generally undesirable and will almost certainly reduce the amount of wealth transferred to the remaindermen.

## II. The Basics: Why Immunize and When?

We analyzed the simplest case first. Consider a pair of two-year GRATs: one that is “in-the-money” (that is, has outperformed the 7520 rate) after its first year, and one that is “out-of-the-money” after its first year. Each is “zeroed-out” and is established with \$10 million when the 7520 rate is 5%.<sup>6</sup> Each is invested in a portfolio of globally diversified stocks and makes level annuity payments.<sup>7</sup>

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\* Copyright 2008 by the authors. All rights reserved. David L. Weinreb is a director and Gregory D. Singer is the director of research in the Wealth Management Group of Bernstein Global Wealth Management. The authors and their employer do not provide tax, legal or accounting advice. The strategies described herein are hypothetical cases based on financial modeling.

<sup>1</sup> A grantor retained annuity trust (“GRAT”) refers to a trust in which the grantor retains a qualified annuity interest within the meaning of Treas. Reg. § 25.2702-3.

<sup>2</sup> Assuming the grantor is treated as the owner of the entire GRAT for income tax purposes under the “grantor trust” rules (see I.R.C. §§ 671-677), the grantor can exchange assets with the GRAT with no federal income tax consequences. Alternatively, the trustee can “immunize” the GRAT by selling its volatile assets (e.g., publicly-traded equities) to a third party in exchange for less volatile assets (e.g., cash or bonds). A sale to a third party, however, may

result in the realization of capital gains.

<sup>3</sup> “Rolling GRATs” refers to a strategy in which a client uses the annuity payment he receives each year from a GRAT to fund a new GRAT. In this article, a “short-term GRAT” refers to a GRAT that has a two-year term.

<sup>4</sup> For a more complete explanation of the Monte Carlo model used in this article, see the appendix.

<sup>5</sup> See I.R.C. § 7520.

<sup>6</sup> A “zeroed out” GRAT refers to a GRAT required to make annuity payments the value of which, as determined under I.R.C. § 7520, equals the value of the property that the grantor transfers to the GRAT.

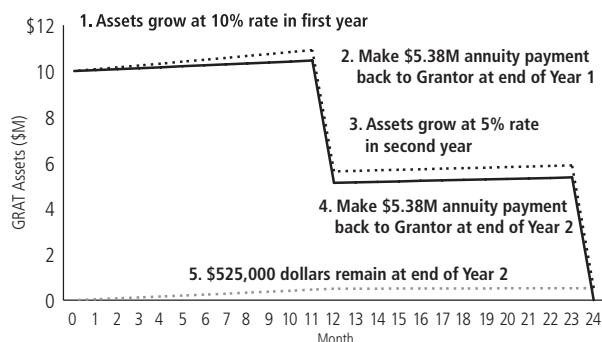
<sup>7</sup> For purposes of this article, all GRATs invested in stocks have an allocation of 35% in U.S. value stocks, 35% in U.S. growth stocks, 25% in developed international stocks, and 5% in emerging markets stocks.

As Display 1(a) shows, the in-the-money GRAT has risen 10% in the first year and has therefore experienced a \$1 million gain. If the assets produce a return in the second year equal to the 7520 rate (i.e., 5%), about \$525,000 will pass to the remaindermen. In Display 1(b) the value of the assets in the out-of-the-money GRAT has fallen 5% in the first year to \$9.5 million. This means that after the first annuity payment, the out-of-the-money GRAT's assets would have to gain more than 30% in the second year for the GRAT to succeed.

The out-of-the-money GRAT clearly needs to remain in equities to have the possibility of strong enough returns to transfer wealth after the second year. But what is the appropriate investment strategy for the in-the-money GRAT? Should the grantor swap less volatile assets for the GRAT's equities to "lock in" the GRAT's outperformance?

**Display 1(a)**

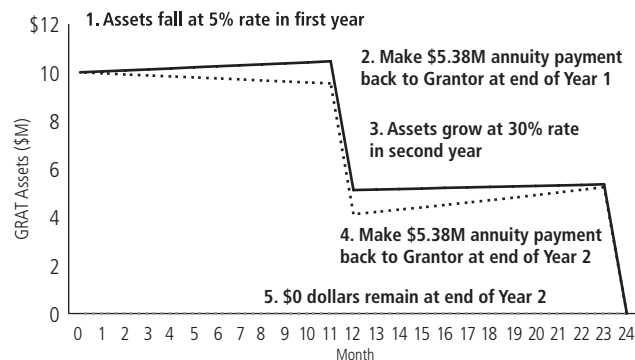
The "In-the-Money" GRAT:  
Assets Grow 10% in the First Year, and then 5% in the Second Year



GRAT funded with \$10 million, with an initial 7520 rate of 5.0%, and level annuities. Invested in a globally diversified portfolio of 35% U.S. value stocks, 35% U.S. growth stocks, 25% developed international stocks, and 5% emerging markets stocks.

**Display 1(b)**

The "Out-of-the-Money" GRAT:  
Assets Fall 5% in Year 1, Need to Rise 30% in Year 2 to Break Even

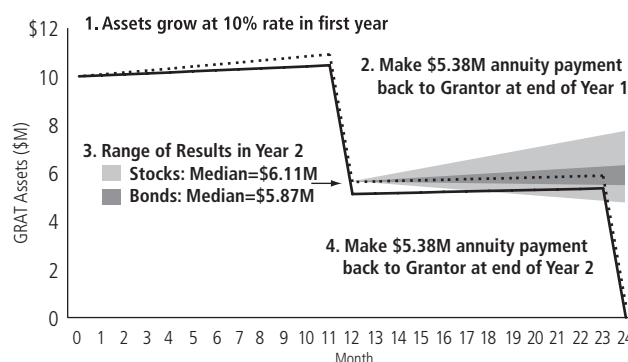


GRAT funded with \$10 million, with an initial 7520 rate of 5.0%, and level annuities. Invested in a globally diversified portfolio of 35% U.S. value stocks, 35% U.S. growth stocks, 25% developed international stocks, and 5% emerging markets stocks.

We modeled the effect of future capital markets scenarios on the in-the-money GRAT, comparing the potential outcomes of a decision to stay the course with stocks or to immunize with bonds. Display 2 shows the results. The shaded areas of Display 2 show the range of potential value of the GRAT's assets before a second annuity payment is made. The top edge of each shaded area shows the top 10th percentile of outcomes from our modeling—in other words, outcomes so good that they occur only 10% of the time. The bottom edge shows the 90th percentile, which are outcomes so poor that 90% of results are at this level or better.

**Display 2**

The "In-the-Money" GRAT: Year 2 Range of Results



GRAT funded with \$10 million, with an initial 7520 rate of 5.0%, and level annuities. Invested in a globally diversified portfolio of 35% U.S. value stocks, 35% U.S. growth stocks, 25% developed international stocks, and 5% emerging markets stocks. Bonds are represented by a diversified portfolio of U.S. intermediate-term municipal bonds.

In the median case, if the GRAT continues to be invested entirely in equities, it will grow in value to \$6.11 million, versus \$5.87 million if the equities were immunized with bonds. After the second-year annuity is paid back to the grantor, the GRAT that remains in equities will deliver about \$240,000 more to the remaindermen than the immunized GRAT. But it also runs a greater risk. The GRAT that remains in equities will succeed only 75% of the time (note that in Display 2, part of the stocks' range of results falls below the 7520 break-even line). Switching to bonds takes much of this risk off the table. If a switch to bonds is made, the probability that the GRAT will succeed increases to 95%.

### III. Quantifying the Value of Immunization

For a broader perspective, we examined the likelihood and magnitude of success of a zeroed-out, two-year GRAT depending on the magnitude of the first year's return. Again, we compared the results of

### Display 3

#### 2-Year GRAT Outcomes: Remaining in Stocks vs. Immunizing with Bonds

Returns - Year 1 (Relative to 7520 Rate)	% Trials	% Success		Wealth Transferred (Median) (\$ Millions)		Wealth Transferred (90th Percentile) (\$ Millions)		Wealth Transferred (10th Percentile) (\$ Millions)	
		Stocks/ Stocks	Stocks/ Bonds	Stocks/ Stocks	Stocks/ Bonds	Stocks/ Stocks	Stocks/ Bonds	Stocks/ Stocks	Stocks/ Bonds
< -20%	8%	0%	0%	0.0	0.0	0.0	0.0	0.0	0.0
-20% to -10%	13%	8%	0%	0.0	0.0	0.0	0.0	0.0	0.0
-10% to 0%	19%	38%	7%	0.0	0.0	0.0	0.0	1.0	0.0
0% to 5%	10%	70%	73%	0.5	0.2	0.0	0.0	2.0	0.6
5% to 10%	10%	83%	99%	1.0	0.7	0.0	0.3	2.7	1.1
10% to 20%	16%	95%	100%	1.8	1.4	0.3	0.9	3.7	2.1
20% to 30%	11%	99%	100%	2.7	2.4	1.0	1.8	4.8	3.1
> 30%	13%	100%	100%	4.6	4.1	2.3	3.0	8.0	6.1
<b>Totals</b>	<b>100%</b>	<b>62%</b>	<b>58%</b>	<b>0.7</b>	<b>0.4</b>	<b>0.0</b>	<b>0.0</b>	<b>4.3</b>	<b>3.3</b>

GRAT is funded with \$10 million, with a 7520 rate of 4.2%, and level annuities. The asset allocation of equity portfolios is 35% in U.S. value stocks, 35% in U.S. growth stocks, 25% in developed international stocks, and 5% in emerging markets stocks. Bonds are represented by a diversified portfolio of U.S. intermediate-term municipal bonds.

“staying the course” with stocks versus immunizing with bonds at the beginning of the second year.

Display 3 shows the range of results given a \$10 million two-year, zeroed-out GRAT in two scenarios. In the first scenario, the GRAT is invested in stocks for its entire term (stocks/stocks). In the second scenario, the GRAT is “immunized” with bonds at the beginning of its second year (stocks/bonds). The circled figures show that if the GRAT remains in stocks in both years, it succeeds 62% of the time and transfers about \$700,000 to the remaindermen in the median case.

The left hand column of Display 3 shows the percentage by which the GRAT’s returns exceed (or trail) the 7520 rate at the end of the first year. For example, if the assets deliver a total return in the first year 5-10% greater than the 7520 rate, the likelihood of success rises to 83%, and the median wealth transfer increases to \$1 million. If the grantor locks in that gain at the end of the first year by immunizing the GRAT with bonds, the likelihood of success rises to 99%, but the median wealth transfer is only \$700,000.

Accordingly, when viewed in isolation, the decision whether to immunize a single GRAT is a classic

investment trade-off between risk and return. Stated otherwise, how much risk is the grantor willing to take for potentially larger gains in the second year, versus locking in the current gain?

If the grantor has a very specific wealth transfer objective, immunization may make sense. For example, in the above illustration, where the assets deliver a total return in the first year 5-10% greater than the 7520 rate, a client should seriously consider immunizing if his primary goal is to transfer at least \$300,000 to the remaindermen. Doing so will provide a 90% probability of achieving that goal, as shown in the 90th percentile, stocks/bonds column.

However, few individuals using GRATs have such a specific wealth transfer objective in mind and such a short time horizon. More often, the client’s goal is simply to maximize wealth transfer over a period of time. In this case, the potential appeal of immunization changes.

#### IV. Does Immunization Make Sense in a Rolling GRAT Strategy?

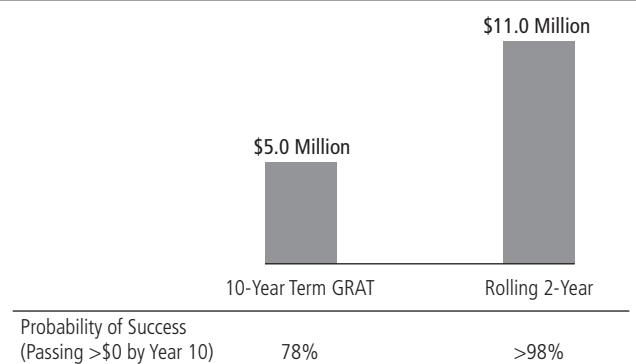
Previous research by our firm has shown that to transfer volatile assets, such as publicly traded stocks, a series of short-term, zeroed-out rolling GRATs greatly improves the likelihood and magnitude of wealth transfer versus a single long-term GRAT.<sup>8</sup> As Display 4

<sup>8</sup> See David L. Weinreb and Gregory D. Singer, *Rolling Short-term GRATs Are (Almost) Always Best*, 147 No. 8 TRUSTS & ESTATES 18 (August 2008)

shows, the median wealth transferred by committing \$10 million of globally diversified equities to a series of rolling two-year GRATs for ten years is \$11.0 million, compared to just \$5.0 million for a 10-year term GRAT. (We assume that in the rolling strategy, assets remaining in any successful GRAT are reinvested in globally diversified equities and held in an intentionally defective grantor trust (IDGT) to grow tax-free.) Further, the rolling GRAT strategy has a greater than 98% probability of transferring at least some wealth, compared to a 78% probability for the 10-year term GRAT. Given the superiority of the rolling two-year GRAT strategy, we used rolling two-year GRATs for the rest of our analysis of immunization.

#### Display 4

Ten-Year GRAT vs. Rolling Short-term GRAT Strategy:  
Median Wealth in IDGT



Both GRAT strategies are funded with \$10 million in a globally diversified portfolio of stocks, with an initial 7520 rate of 4.2%, and level annuities. The asset allocation of the stock portfolios is 35% in U.S. value stocks, 35% in U.S. growth stocks, 25% in developed international stocks, and 5% in emerging markets stocks. In the rolling GRAT strategy, all wealth to beneficiaries is re-invested and held in an IDGT.

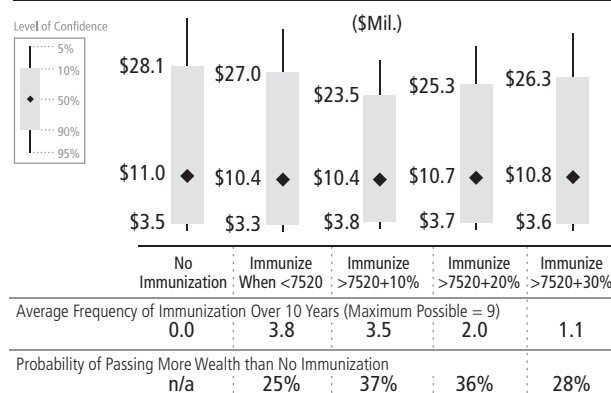
Suppose an individual wants to maximize the amount of wealth removed from his estate over the next ten years and decides to commit \$10 million of globally diversified equities to a series of rolling two-year GRATs. He also has sufficient intermediate-duration municipal bonds available to exchange for the assets in a GRAT.<sup>9</sup>

We examined the effect of systematically immunizing the GRATs in a rolling GRAT strategy. Specifically, we modeled a strategy under which the grantor substitutes bonds for each GRAT's equities at the end

of the first year of each GRAT's term, depending on the return of the equities during that year. The results are set forth in Display 5 as "box and whisker" charts, which display the range of results arrayed by probability. The bottom of the box represents the 90th percentile (meaning 90% of the outcomes are at this level or better); the top of the box represents the 10th percentile (meaning only 10% of the outcomes are at this level or better); the point inside the box represents the median; and the top and bottom whiskers represent the 10th to 5th percentile and the 90th to 95th percentile, respectively.

#### Display 5 – Cumulative Wealth Transferred

Effect of Immunizing After Year One:  
Cumulative Wealth in IDGT



Assumes the GRATs are funded with \$10 million, with an initial 7520 rate of 4.2%, and level annuities. The GRATs are invested in a globally diversified portfolio of equities. All wealth to beneficiaries is re-invested and held in an IDGT. The asset allocation of equity portfolios is 35% in U.S. value stocks, 35% in U.S. growth stocks, 25% in developed international stocks, and 5% in emerging markets stocks. To immunize, the equities are replaced by a diversified portfolio of U.S. intermediate-term municipal bonds.

Not surprisingly, performance suffers if we immunize when the return of a GRAT's equities in the first year is lower than the 7520 rate. The median outcome declines by almost \$600,000, the downside falls by about \$200,000, and the strategy fails to transfer more wealth about 75% of the time compared to simply not immunizing. The reason is simple: because bonds are less volatile than equities, there are fewer instances where a strong second year overcomes a weak first year.

More surprisingly, however, systematically immunizing each in-the-money GRAT with bonds is *also*

<sup>9</sup> If the grantor does not have cash or bonds to exchange for the GRAT's assets, he might consider immunizing a GRAT by purchasing its assets in exchange for a promissory note. Portions of the note would be forgiven as the annuity payments come due. See

Carlyn S. McCaffrey, *The Care and Feeding of GRATs*, 39 U. MIAMI INST. EST. PLAN., Chapter 7 (2005); RICHARD B. COVEY, PRACTICAL DRAFTING 5639 (April 1999).

likely to reduce the amount of wealth transferred at the end of ten years. For example, immunizing each GRAT that has outperformed the 7520 rate by at least 10% at the end of year one results in greater wealth transfer only about 37% of the time, and transfers about \$600,000 less to the remaindermen in the median case. Immunization does provide some downside protection—transferring about \$300,000 more to the remaindermen at the bottom decile of performance. Higher immunization hurdles—immunizing only when a GRAT’s first year performance has surpassed the 7520 rate by 20% or 30% or more—show better results. But this is primarily because there are fewer instances in which immunization occurs. Overall, the outcomes created by all of the immunization strategies are worse than never immunizing.

The reason for these results is that, as discussed above, immunizing after a strong first year helps to protect gains in that year, but it also forgoes the opportunity to maximize improvement on those gains in year two. As part of a long-term rolling GRAT strategy, keeping the stocks in the GRATs *at all times* increases the likelihood and magnitude of the wealth transfer. Thus, as part of a rolling GRAT strategy, *immunizing alone* is likely to decrease wealth transfer over time.

## V. The Effect of Immunizing and “Re-GRAT-ing”

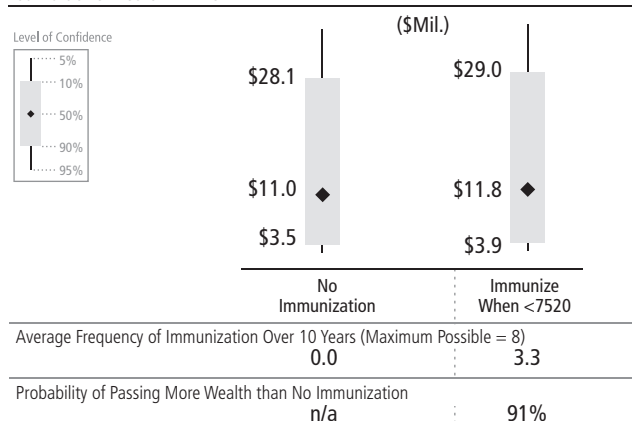
As illustrated above, wealth transfer will suffer from immunizing out-of-the-money GRATs. But what if a grantor takes the equities from an out-of-the-money GRAT and transfers them to a new GRAT in the hope that the new GRAT will have a better chance at success? As shown previously in Display 3, if a two-year GRAT invested in equities for its entire term delivers a return between 20% to 10% below the 7520 rate in its first year, it has only an 8% chance of succeeding after the end of the first year. If, however, the equities are contributed to a new GRAT, the new GRAT will have a 62% chance of succeeding.

Display 6 shows the results if a grantor commits \$10 million of globally-diversified equities to a ten-

year rolling GRAT strategy, immunizes each GRAT that is out-of-the-money at the end of its first year, and transfers the equities to the next two-year GRAT in the rolling strategy.<sup>10</sup> As expected, this strategy is highly likely to improve the results. The strategy passes an additional \$800,000 to the remaindermen in the median case, and increases the wealth transfer 91% of the time.<sup>11</sup>

### Display 6

Immunizing When Out of the Money and Re-GRATing:  
Cumulative Wealth in IDGT



Assumes the GRATs are funded with \$10 million, with an initial 7520 rate of 4.2%, and level annuities. The GRATs are invested in a globally diversified portfolio of equities. All wealth to beneficiaries is re-invested and held in an IDGT. The asset allocation of equity portfolios is 35% in U.S. value stocks, 35% in U.S. growth stocks, 25% in developed international stocks, and 5% in emerging markets stocks. To immunize, the equities are replaced by a diversified portfolio of U.S. intermediate-term municipal bonds.

Now consider a strategy in which the grantor immunizes each *in-the-money* GRAT and “re-GRATs” its equities. Recall that, as discussed above, immunizing alone as part of rolling GRAT strategy is likely to decrease the wealth transferred to the remaindermen. As Display 7 shows, however, systematically immunizing the in-the-money GRATs and re-GRATing the equities is likely to *increase* the wealth transferred.

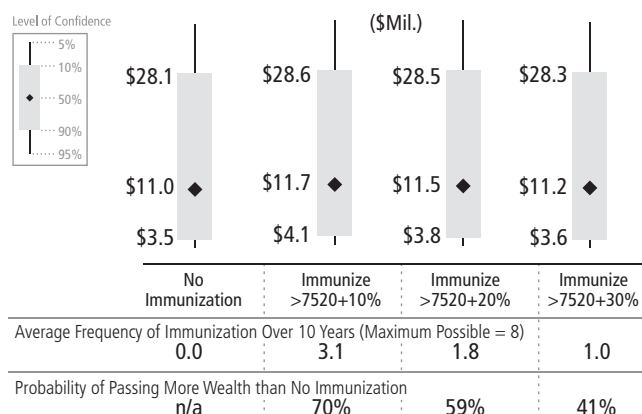
<sup>10</sup> In our analysis, the strategy of immunizing and re-GRATing in a rolling GRAT strategy consists of a grantor “swapping” intermediate-duration municipal bonds for the GRAT’s equities, and then transferring those equities to the next GRAT. The bonds and the interest thereon are returned to the grantor via the annuity payments, and only the balance of those payments is transferred to the new GRAT. In effect, the grantor is merely “loaning” bonds to

the immunized GRATs for a year at a time. Accordingly, the ultimate value of the grantor’s individually-owned assets is not affected by the re-GRATing.

<sup>11</sup> For our analysis of all immunizing and re-GRATing strategies, the final GRAT of the rolling GRAT series is never immunized.

## Display 7

### Immunizing When In the Money and ReGRATING: Cumulative Wealth in IDGT

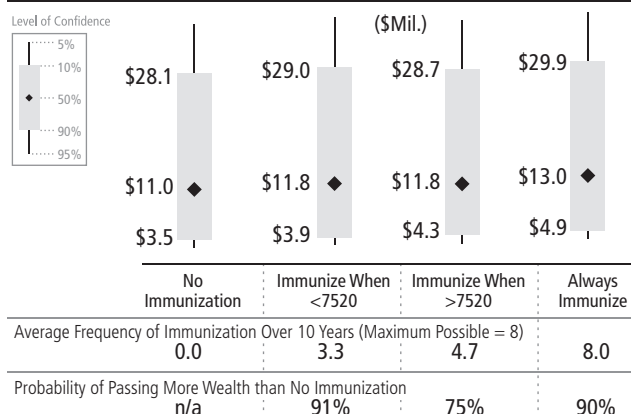


Assumes the GRATs are funded with \$10 million, with an initial 7520 rate of 4.2%, and level annuities. The GRATs are invested in a globally diversified portfolio of equities. All wealth to beneficiaries is re-invested and held in an IDGT. The asset allocation of equity portfolios is 35% in U.S. value stocks, 35% in U.S. growth stocks, 25% in developed international stocks, and 5% in emerging markets stocks. To immunize, the equities are replaced by a diversified portfolio of U.S. intermediate-term municipal bonds.

Further, the lower the threshold for immunization, the greater the wealth transferred. This leads to the conclusion, as shown in Display 8, that *always immunizing and re-GRATING* at the end of the first year is superior to (1) immunizing and re-GRATING only out-of-the-money GRATs, (2) immunizing and re-GRATING only in-the-money GRATs, and (3) not immunizing at all. Adopting this strategy has material benefits—a 90% likelihood of transferring more wealth with a median benefit of \$2 million.<sup>12</sup>

## Display 8

### Systematically Immunizing and Re-GRATING: Cumulative Wealth in IDGT



Assumes the GRATs are funded with \$10 million, with an initial 7520 rate of 4.2%, and level annuities. The GRATs are invested in a globally diversified portfolio of equities. All wealth to beneficiaries is re-invested and held in an IDGT. The asset allocation of equity portfolios is 35% in U.S. value stocks, 35% in U.S. growth stocks, 25% in developed international stocks, and 5% in emerging markets stocks. To immunize, the equities are replaced by a diversified portfolio of U.S. intermediate-term municipal bonds.

## VI. Conclusion

The strategies described above are hypothetical cases based on financial modeling; however, our research makes a compelling case that systematically immunizing and re-GRATING assets can add significantly to the magnitude and likelihood of wealth transferred by a rolling GRAT strategy.

<sup>12</sup> For purposes of this analysis, each GRAT makes its annuity payment on the anniversary of the date on which the GRAT is established. Although Treas. Reg. sec. 25.2702-3(b)(4) permits an annuity payable based on the anniversary date of the creation of the GRAT to be paid up to 105 days after the anniversary date, such a delay would reduce the frequency with which the GRAT assets are “re-GRATED” and, therefore, the effectiveness of the rolling GRAT strategy.

<sup>13</sup> Another potential way to simulate the economic equivalent of a series of rolling one-year GRATs is to establish a series of “front-loaded” two-year GRATs, i.e., to structure the GRATs with decreasing annuity payments so that the first annuity payment returns almost all of the GRAT’s assets to the grantor, and the second annuity payment is just sufficient to zero out the GRAT. See, Henry F. Lee, *Zero-Out GRATs and GRUTs – Can Still More Be Done?*, TAX ANALYSTS PRACTICE ARTICLES (May 15, 2007).

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## Appendix

For the analyses in this article, we used a “Monte Carlo” simulation of the capital markets. A Monte Carlo simulation is a statistical technique that uses randomly generated inputs from probability distributions to model a real-world process. The idea is that, although no one can precisely predict the future annual returns of a class of marketable securities, we can project potential likely outcomes and hence determine how *likely* it is that a particular range of outcomes will occur.

Our model differs somewhat from a standard Monte Carlo model. A standard Monte Carlo model typically creates possible future paths of return by randomly drawing on historical returns. For example, one path of returns for the S&P 500 might be the index’s return in 1952, 1974, 1989, 1958, etc. Careful study of the capital markets, however, reveals several deficiencies in this technique. First, markets follow a temporal logic. So, for example, bond yields have ranged between 2% and 18%. But starting at today’s 4% yield, reaching either of those extremes over the next year is unlikely. This is because yields move in small, slow steps. Second, there are linkages across markets due to underlying, common forces such as inflation, which is priced into all bonds and stocks, or credit risk, which connects junk bond and equity prices. Third, a model should take into account certain economic and accounting “truths.” For example, rising yields must cause bond prices to fall, and falling company profits must weigh on the stock price (all else being equal). Finally, although history is a valuable guide, it does not contain all future possibilities, e.g.,

who could have predicted the emergence of growth stocks in the 1960s, or small stocks post-1974, or the late 1990s Internet bubble?

Accordingly, we use a Monte Carlo model designed to generate more plausible capital market projections. First, rather than drawing market outcomes for each future year from a static distribution—like the 2% to 18% range for bond yields—our model uses equations that capture how each year’s yields influence the next. Randomness still plays a role, albeit a more limited one. For example, starting with a 4% yield, the next year’s values may range from 3.25% to 5%. Yields can eventually reach 18%, but only after a sequence of intermediate increases. Second, we explicitly incorporate the linkages across markets, by modeling the underlying fundamental and economic forces (e.g., inflation, yields, credit spreads and valuation levers) rather than the stock and bond asset classes directly. We then apply accounting formulas or regression equations to determine the implied stock and bond returns. In this way, we maintain the temporal, economic, and inner logic of the markets.

We used the simulated capital market outcomes generated by this model to generate the range of wealth transferred under each strategy discussed in this article. The analyses typically focus on the 10th, 50th, and 90th percentiles of ending wealth as representative degrees of confidence for the client in question. The 50th percentile, or the median outcome, captures the central tendency of the markets and hence of the strategy. Between the 10th and 90th percentiles lie the most likely set of outcomes, spanning good to poor markets. Outcomes outside of this range are considered outliers—within the realm of possibility, but rather unlikely.