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HOW TO UNDERSTAND AND MANAGE VUL VOLATILITY

BY DEVIN LaPLANT & BRENDAN COSTELLO

In a persistently low interest rate environment, the clearest path to earning higher returns is to take on more equity risk. This can pose a challenge to life insurance policyowners because many of the products are fixed insurance products that are fundamentally reliant on fixed income yields. Even Indexed Universal Life relies on yield from the life insurer's general account portfolio in order to support the hedging programs that provide exposure to the movements of the external index. The reality is that there is only one way to take equity risk and realize the expected investment returns within a life insurance product — Variable Universal Life (VUL).

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KEY TAKEAWAYS

When looking at long-term outcomes for Variable Universal Life (VUL), the sequence of returns matters as much as market volatility; recurring premium payments can help manage sequence of return risk.

Risk of policy lapse is increased by illustrating rates of return at, or close to, historical norms; illustrating both a lower rate of return than anticipated and stronger policy funding can cushion a policy from a string of bad returns and help keep it in force.

Attractive equity returns during the 1990s brought VUL into prominence. At its peak in the year 2000, Variable products made up the majority of permanent insurance sales in the life insurance industry,[1] but several years of poor equity performance and, in some cases, overly optimistic illustrations, tamped down enthusiasm for the product.

In light of the current low interest rate economic environment, we think it's time to reevaluate VUL and revisit some fundamental questions about the real and perceived risks. What are the actual risks, and how can they be mitigated? More specifically, how can VUL performance be managed by understanding the impact of three key risks: sequence of returns, short-to-mid-term equity market volatility and long-term equity market volatility?

[1] https://insurancenewsnet.com/innarticle/variable-universal-life-back-in-the-game

SEQUENCE OF RETURN RISK

First, we're trying to answer a simple question — what happens when you put a volatile asset inside of VUL? Does the product structure mute or amplify volatility?

Let's start with a simple setup. We're going to use a vanilla VUL product on a 55-year-old Preferred Male with a $1 million death benefit.[2] Assuming a 6% gross illustrated rate with 0.5% in annual investment management fees, the single-pay premium to keep the policy in-force for life would be $245,042. Using this premium solve, we compare various three-year sequences of returns repeated over the life of the product to see what happens to the policy account values over time. All of these return sequences have the same 6% geometric return as the level illustrated rate.

$245,042 Single Premium 3 Year Sequence of Returns

	Sequence 1 (baseline)	Sequence 2	Sequence 3	Sequence 4	Sequence 5	Sequence 6	Sequence 7	Sequence 8	Sequence 9
Year 1	6.00%	15.00%	–1.37%	30.00%	–12.75%	60.00%	–25.56%	100.00%	–40.45%
Year 2		5.00%	5.00%	5.00%	5.00%	0.00%	0.00%	0.00%	0.00%
Year 3		–1.37%	15.00%	–12.75%	30.00%	–25.56%	60.00%	–40.45%	100.00%
Lapse Age			Age 96		Age 93		Age 89		Age 85
Age 121 CSV	10,000	4,407,082		5,937,373		7,763,504		10,218,785	

These scenarios imply that volatility alone doesn't doom the policy. As the volatility of the scenarios increases, the potential performance of the policy actually *increases* (see the large account value in the highly volatile sequence 8), but the potential downside increases as well (e.g., sequence 9). **What matters is the actual sequence of the returns, not volatility in and of itself.**

Sequence of returns in life insurance is important because policy charges are being deducted monthly from the policy's cash value. Volatility can either increase cash value accounts so that gains are available to pay policy charges or reduce them so that there are losses when funds are used to pay policy charges, leaving fewer investable assets to capture a hoped-for recovery in the equity markets. This means that the specific timing of the returns has a long-term impact on performance.

Single premium scenarios are particularly prone to sequence of return risk because they involve a single inflow (premium) and annual outflows (charges). However, if you pair a level annual inflow from premium with the annual outflow from policy charges, sequence of return risk should be greatly reduced. Take a look at what happens using a level premium and the same sequence of return scenarios. Using the same assumptions as the prior example, the level pay premium is $16,142.

$16,142 Annual Premium to Age 121 Sequence of Returns

	Sequence 1 (baseline)	Sequence 2	Sequence 3	Sequence 4	Sequence 5	Sequence 6	Sequence 7	Sequence 8	Sequence 9
Year 1	6.00%	15.00%	–1.37%	30.00%	–12.75%	60.00%	–25.56%	100.00%	–40.45%
Year 2		5.00%	5.00%	5.00%	5.00%	0.00%	0.00%	0.00%	0.00%
Year 3		–1.37%	15.00%	–12.75%	30.00%	–25.56%	60.00%	–40.45%	100.00%
Lapse Age			Age 108		Age 107		Age 107		Age 109
Age 121 CSV	10,000	2,653,777		3,371,451		4,115,793		4,960,473	

[2] Policy assumptions: Male, 55, Preferred risk class; $1 million of Death Benefit. Policy structure: 5% premium load in all years; $120 annual policy fee; $2,500 per thousand charge for 10 years; no M&E or interest bonus; 0.5% fund fees. For cost of insurance slope, see appendix A at end.

As before, different return sequences can cause the policy to lapse early or exceed its goal. Note that the outcomes are less extreme in the level pay scenario than the single pay. **When it comes to handling sequence of return risk in VUL, generally the most effective tool at your client's disposal is also the easiest to implement — recurring premium payments.** The outcome of a single-premium VUL policy is completely at the mercy of equity returns and is exposed to sequence of return risk, volatility risk and average return risk. Similar to dollar cost averaging, paying level premiums for life reduces sequence of return risk because the policy is experiencing constant inflows from premium paired with constant outflows from policy charges. Under a level premium scenario, the worst-case scenario is a policy lapse very near to the original goal and well beyond life expectancy.

EQUITY VOLATILITY RISK

Of course, the real world does not produce repeatable annual returns. Rather, real world annual returns are generally volatile and can significantly deviate from the expected return for many years.

SHORT-TO-MID-TERM VOLATILITY

Studying the historical S&P 500 Total Returns going back to 1950 demonstrates the short-to-mid-term implications of volatility on VUL performance.

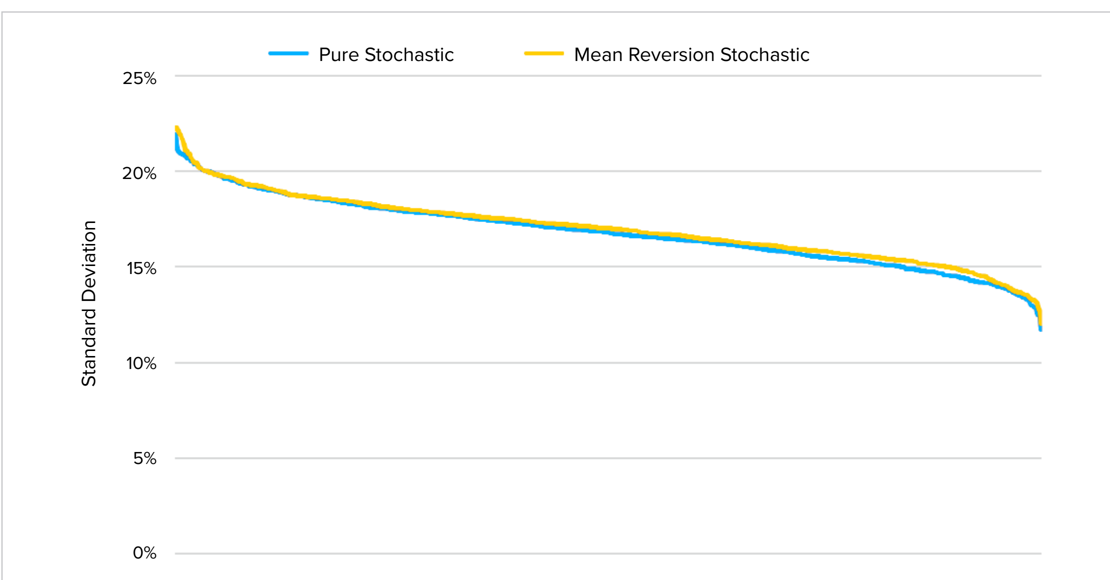
Our model breaks these historical returns into percentiles and then randomly pulls from these percentiles to assemble them into return streams that have the same characteristics as the S&P 500 Total Return, but do not replicate the exact history of the S&P 500. These predictions of potential future returns have been calibrated to a geometric average of 6%, in line with conservative illustration assumptions and matching the rate of return we assumed in creating premium solves. Keep in mind that historical S&P 500 Total Returns have averaged more than 12% since 1950, so a 6% return is intentionally very conservative.

Short-to-mid-term volatility can be hard to examine when combined with long-term volatility. To eliminate this long-term noise, we're going to employ **mean reversion stochastic modeling**. After the 10th policy year, using this methodology, we make an adjustment to the random selection. If the geometric mean so far is above 6%, then the random selection pulls from the lower-returning part of the S&P 500 annual returns. If the geometric mean so far is below 6%, then the random selection pulls from the higher returning part.

Over a long duration, this methodology ensures that the geometric average converges to something very close to 6% by age 121 and performs exactly as advertised, but with **similar volatility** to the pure stochastic pull. To see how this works, take a look at a comparison of the standard deviation of returns for both models over 65 years across 1,000 return scenarios.

The mean reversion model is a way of looking *only* at short-to-mid-term volatility in order to mirror the long-term return which always gets back to near 6%.

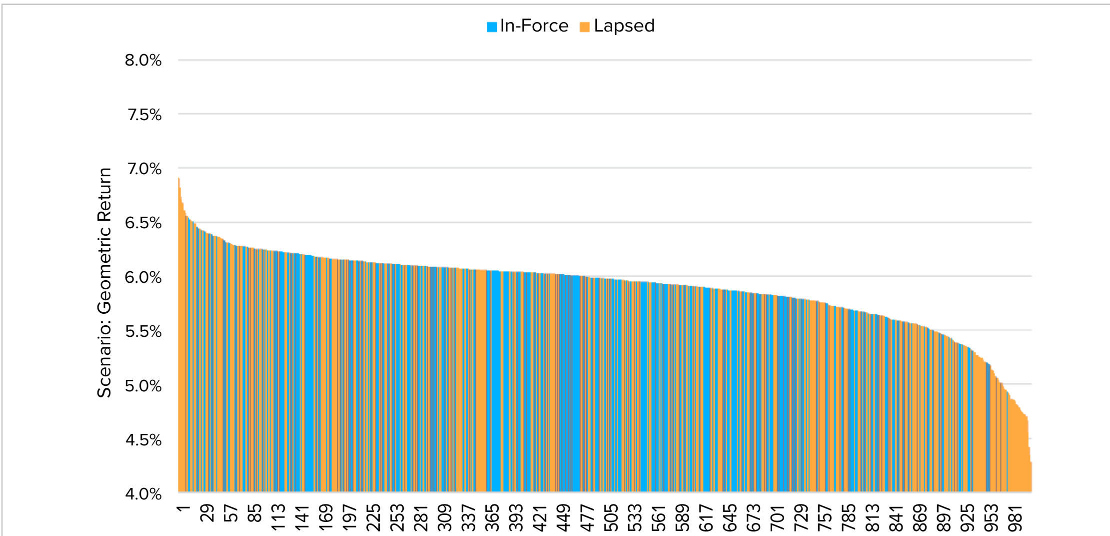
Standard Deviation of Returns for 1,000 Scenarios Over 65 Years



MEAN REVERSION ANALYSIS RESULTS

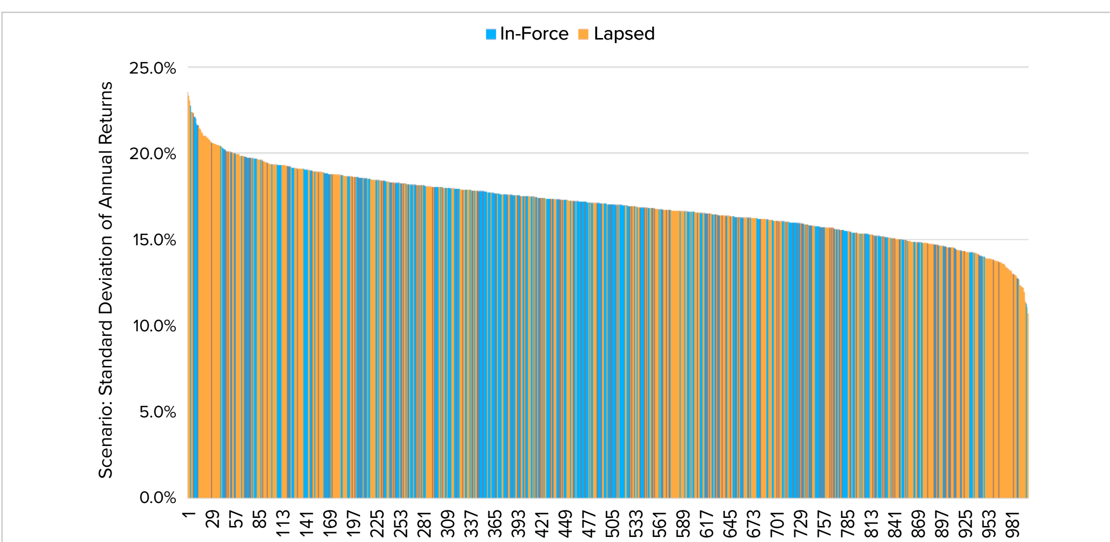
For this analysis, we'll use the $16,142 level annual premium that produces $10,000 of account value at age 121 based on a level 6% rate for life. We've already determined that using an annual premium significantly reduces pure sequence of return risk, which allows us to use this mean reversion stochastic analysis to get perspective on what happens to a VUL with short- and mid-term volatility. The chart below shows the result of 1,000 mean reversion scenarios ranked by the geometric return and color coded by the result. The scenarios in orange lapsed, and the scenarios in blue remained in-force.

Lapse rate of 1,000 Scenarios Based on Geometric Returns



Despite the fact that virtually all of the scenarios fall within just a few basis points of 6%, a full 55% of them lapse prior to age 121 with an average lapse age of 90. Clearly, short- and mid-term volatility has an impact on the ability for a minimally funded VUL product to maintain coverage, but why? One supposition might be that the scenarios with higher volatility lapsed, but the data shows that the standard deviation of returns in the lapsed scenarios averaged 17.09% and 16.99% in the in-force scenarios. The difference isn't big enough to explain the lapse behavior and, visually, it's clear that lapse behavior doesn't correlate to volatility. Take a look at the same chart as above but this time using standard deviation of annual returns rather than the scenario geometric return over the 65-year observation period.

Lapse rate of 1,000 Scenarios Based on Standard Deviation of Annual Returns



Why, then, do 55% of them lapse? The answer is that there simply isn't enough margin for error. The $16,142 premium produces an account value that just barely lasts until age 121 at a constant 6% rate. Any adverse sequence of return or deviation from the mean return for the short-to-mid-term means that the policy is in an irrevocable decline even if the sequence rights itself or the mean return moves back up to 6% over time. **These policies just weren't funded with enough margin for error to recover from a string of bad returns.**

The solution, in most cases, is to fund the policy using a premium based on a lower long-term return even though the expectation for actual long-term return hasn't changed. In the original scenario, the premium solve was based on the same 6% that was underpinning the mean reversion stochastic generator. By lowering the rate for the premium solve, we can dramatically increase the likelihood that the policy will be able to ride out short-to-mid-term volatility.

The Inverse Movement of Illustrated Rates and Persistency

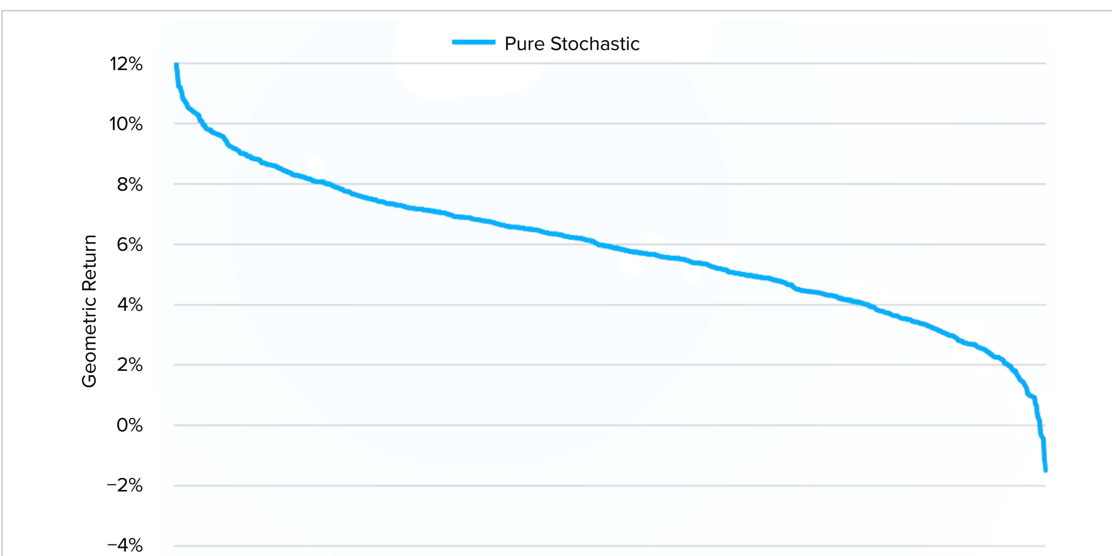
Level Illustrated Rate	Level Annual Premium Solve	Percent of Scenarios In-Force
6.00%	$16,142	45.0%
5.75%	$16,606	68.0%
5.50%	$17,092	81.0%
5.25%	$17,601	91.7%
5.00%	$18,133	97.8%

As a simple rule of thumb, illustrating VUL at 1% lower than the actual expected return generally mitigates the effects of short- and mid-term volatility on policy lapse, at least based on how we've chosen to model equity returns and the mean reversion stochastic methodology. But it makes sense intuitively, too. There's more margin for error with more premium being paid into the policy. If you want insurance against equity market volatility, what do you have to do? Pay a higher premium.

LONG-TERM RETURN VOLATILITY RISK

The long-term average returns for a particular policy may be entirely different than expected. Think about it this way — if a random number generator produces returns that average to 6%, it is absolutely possible to have a 50-year period where the average annual return is 3%. Take another look at the graph used previously that showed the stochastic returns over 65 years by pulling purely random numbers from the S&P 500 Total Return distribution calibrated to produce, on average, 6% long-term returns.

Geometric Returns for 1,000 Scenarios Over 65 Years



The average across all of the scenarios is exactly 6%, but there are scenarios that result in geometric returns less than 0% and other scenarios that are nearly 12% over the 65-year observational period. That is an absolutely enormous range of returns from a return generator that always averages 6%. To put this in layman's terms, you can be right about the long-term average over, say, a thousand years but completely wrong about what will happen over the next 10, 20, 30 or even 65 years. This is a real risk for VUL. Up until this point, we've only considered the scenario where the long-run geometric return moves back to 6%. But what happens if we don't put on that constraint and we run the risk that returns could deviate from 6% for very long periods of time — potentially even the entire life of the contract?

Using the table to the right, we can see that looking at pure stochastic returns with a 6% average results in a 53% lapse rate using a solved premium based on a 6% illustrated rate, but we also know that we can't predict future equity returns with any precision. The real question, then, is what happens if the actual long-term equity geometric average is higher or lower than 6%? The table compares the likelihood of the policy remaining in force if the actual long-term equity average ranges from 11% to 3% and the average age of policy lapse if a lapse occurs.

Performance at 6% Illustrated Rate to Solve for Premium

		SUCCESS RATE	AVERAGE LAPSE AGE
ACTUAL AVERAGE EQUITY PERFORMANCE	11%	96%	83
	10%	91%	84
	9%	85%	83
	8%	72%	83
	7%	61%	83
	6%	47%	82
	5%	36%	82
	4%	25%	80
	3%	12%	80

CONSERVATIVE FUNDING MAKES A DIFFERENCE

The previous table makes a compelling argument that if you're going to fund the policy based on a 6% illustrated rate, then you'd better be pretty certain that the actual equity performance will be significantly stronger than 6% in order to ensure that the policy remains in force. If you want to be 96% sure that the policy remains in force, then you'd want to fund the policy at 6% even though you're assuming an 11% long-term average equity return. A policyowner may also achieve the same objective by funding the policy with additional premium, allowing for a more liberal return assumption. Of course, what matters is understanding the client's performance objectives, designing a policy to meet them and setting their expectations accordingly.

Percent of Scenarios that Meet or Exceed Performance Objective

		ILLUSTRATED RATE TO SOLVE FOR PREMIUM								
		11%	10%	9%	8%	7%	6%	5%	4%	3%
AVERAGE EQUITY PERFORMANCE	11%	50%	62%	75%	84%	92%	96%	98%	99%	100%
	10%	35%	48%	61%	74%	83%	91%	95%	98%	99%
	9%	25%	37%	49%	64%	75%	85%	93%	93%	98%
	8%	16%	25%	36%	50%	65%	72%	83%	92%	97%
	7%	8%	14%	23%	37%	50%	61%	74%	84%	91%
	6%	3%	8%	16%	26%	35%	47%	62%	73%	85%
	5%	2%	4%	8%	14%	22%	36%	48%	64%	73%
	4%	1%	2%	4%	7%	11%	25%	35%	46%	60%
	3%	0%	0%	2%	3%	6%	12%	19%	32%	48%

It's fair to say equating the illustrated rate to the actual equity return performance expectation is a 50/50 proposition to keep the policy in force. **If you want to push the percentage of success towards 90%, then the client should use an illustrated rate that is 3%-4% lower than the illustrated rate.** This level of conservatism protects against both short-to-mid-term and long-term volatility.

MANAGING VUL PERFORMANCE EXPECTATIONS

There are two ways to manage client expectations over how a VUL insurance policy will perform. The first method, proposed above, is to fund and illustrate the contract conservatively, lowering the probability of poor outcomes and future client disappointment if the policy doesn't perform as hoped.

The second method is to apply a combination of active management and strong premium support by using an illustrated rate equal to the expected equity returns and to very actively manage both the product and the client in order to keep the contract on the right path. If returns are lackluster, then the client would need to consider whether or not to fund the policy to make up for the deficit.

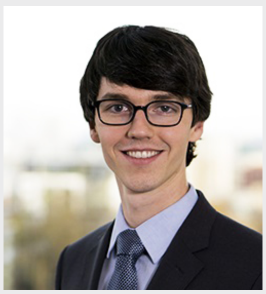
Either way, by setting client expectations, there should be few uncomfortable conversations as long as the client stays the course, pays premium on time and doesn't overreact to equity market volatility. Over time, the client and advisor will be able to gauge actual performance versus expectations and make adjustments to the strategy. In some situations, the client may decide to be even more conservative and fund at even higher levels in light of changing market conditions. In other situations, the client may decide that the likelihood of a poor event has been offset by strong performance and can reduce funding.

A PATHWAY FOR CLIENT SUCCESS

The risk mitigation strategies and rules of thumb we've outlined can meaningfully increase the likelihood of success and smooth out the inevitable market bumps. It's important that client expectations are managed as part of this comprehensive approach to including VUL in a client's insurance portfolio. In particular, clients should understand that:

- Recurring payments are a safe way to manage sequence of return risk.
- Lowering the illustrated rate to calculate the premium solve can dramatically increase the likelihood that the policy will be able to ride out short- and mid-term volatility.
  - An illustrated rate that is 1% lower than expected long-term return can manage the majority of short-term volatility concerns.
  - An illustrated rate that is 3%-4% lower than the expected long-term return can be an effective means of reducing the risk of lapse and/or client disappointment.
- Ongoing policy management is a core component of client success.

Devin LaPlant is Vice President of Product at M Financial Group. Devin is a Fellow in the Society of Actuaries and a Member of the American Academy of Actuaries.



Brendan Costello is Director of Product at M Financial Group. Brendan is a Fellow in the Society of Actuaries and a Member of the American Academy of Actuaries.

APPENDIX A
COST OF INSURANCE ASSUMPTIONS

1	0.27%	24	2.34%	47	23.05%
2	0.29%	25	2.64%	48	24.20%
3	0.32%	26	2.96%	49	25.40%
4	0.35%	27	3.33%	50	26.67%
5	0.38%	28	3.74%	51	28.01%
6	0.41%	29	4.19%	52	33.33%
7	0.45%	30	4.69%	53	37.66%
8	0.49%	31	5.25%	54	42.58%
9	0.53%	32	5.94%	55	48.16%
10	0.58%	33	6.71%	56	52.01%
11	0.64%	34	7.56%	57	52.01%
12	0.69%	35	8.50%	58	52.01%
13	0.77%	36	9.52%	59	52.01%
14	0.86%	37	10.62%	60	52.01%
15	0.96%	38	11.80%	61	52.01%
16	1.07%	39	13.08%	62	52.01%
17	1.18%	40	14.45%	63	52.01%
18	1.29%	41	15.92%	64	52.01%
19	1.40%	42	16.92%	65	52.01%
20	1.53%	43	17.94%		
21	1.67%	44	19.00%		
22	1.86%	45	20.09%		
23	2.07%	46	21.21%		

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M Financial Group | 1125 NW Couch Street, Suite 900 | Portland, OR 97209 | 503.238.1813 | fax 503.238.1815 | **mfin.com**