# Margin of Safety by Graham and How Uncertainty Plays a Role

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This is a guest post by an old school value resident that goes by the username Somrh, value investor and math wiz. Check out his blog for more info.

### Let's Discuss Margin of Safety and Uncertainty

A topic that comes up frequently, and one that I think is not well understood, is the concept of "**margin of safety**" in value investing. The idea goes back to Benjamin Graham. But before we do that I want to take a detour through the notion of uncertainty.

### Are You Certain About Uncertainty?

There are a few different concepts associated with uncertainty and a few of them have investing applications. I'm going to focus on measurement uncertainty which is often used in physics. I will focus on it as it pertains to measurement precision and I think this is a pretty straight forward way to discuss uncertainty and lead it into margin of safety.

I'm going to offer the following definition of precision:

> *Precision is the range or distribution of values obtained by repeated measurement of the same attribute.*

So if I'm going to measure the length of a table and I have a tape measure and I ask 100 people (who are competent in using a tape measure), they are not all going to get the exact same measurement. There will be a distribution of measurements. The range or distribution of these measurements tells how precise we can get.

If the range is small, we say it is more precise; if the range is larger, we say it is less precise.

While a tape measure may have marks on it that are spaced at 1/16″, that does not necessarily mean that everyone will agree to within 1/16″. If 100 people measured the table they might be 1/16″ or 1/8″ or maybe even 3/16″ disagreement over what the value is. But all the individuals will agree that their measurement falls within a specified range of values.

That's precision!

Suppose our 100 people measured the table and the measurements obtained (and we'll do this in decimal format for convenience) were between 59.8 and 60.2 inches. There are different ways to define uncertainty.

One way is to take the whole range. For our example, the uncertainty would be 0.4 inches (60.2-59.8).

Another way is to take the range from the middle value (or half the above value) which would be 0.2. In other words, the length of the table is 60.0″ +/- 0.2″.

A third alternative would be to calculate the standard deviation of all of the measurements. This would be compared with the mean. (It's frequently assumed that the values follow a normal distribution but let's leave those issues aside).

Now it's frequently the case that you have to perform some calculations with your measurements. For example, we can measure the length and the width of the table to determine the surface area. But how precise is our measurement (calculation) of the surface area? Well, it can only be as precise as the measurements that went into the calculation.

Let's consider our table again and let's assume that's roughly a square table and that both sides were measured had were 60″x60″ (+/- 0.2″ on each side). So what's the surface area?

Well, 60″x60″ = 3600 sq in, right?

But realistically it's possible that's only 59.8″ on both sides (or 60.2″ on both sides) in which case the range of possible surface area is: 3576.04″ to 3624.04″.

There are ways to mathematically quantify this (often involving differential equations) but we don't need any of that. The point is that any uncertainty you get in a measurement needs to carry over in any calculations you perform with that measurement.

And for those of you who recall spending time in science class with significant figures ("sig figs"), this has a lot to do with that.

### What Does This Have to Do With Margin of Safety?

So what does all of this business about uncertainty have to do with *margin of safety*? Well, before we go there here's an overview of the concept.

In Chapter 11 of The Intelligent Investor, Benjamin Graham lays out what is often referred to as his "intrinsic value" formula. It intends to use this as a rough model for valuing a growth stock. The formula presented is as follows:

$V=E\times(8.5+2\times G)$

where *V* is the value, *E* is the current (or normalized) earnings and *G* is the expected growth rate for the next 7 to 10 years.

Shortly after he introduces the concept of **margin of safety**.

> *What the valuer actually does in these cases is to introduce a margin of safety into his calculations – somewhat as an engineer does in his specifications for a structure. On this basis the purchases would realize his assigned objective (in 1963, a future overall return of 7½% per annum) even if the growth rate actually realized proved substantially less than that projected in the formula. Of course, then, if the rate were actually realized the investor would be sure to enjoy a handsome additional return.*

So what's this about?

The idea is that you're going to plug into some numbers in the above formula (for earnings and growth) and it's going to spit out a value. Suppose you plug in $1 for earnings and 8% for growth:

$V=\$1\times(8.5+2\times8)=\$24.50$

The idea is to buy at a price lower than $24.50. That way if the growth rate ends up being less than your projected 8%, no harm is done. If it turns out to be 8% then you'll get an excellent rate of return.

But this all ties in quite nicely with our discussion of *uncertainty* above. How precise is our "measurement" of earning or growth?

In our scenario, we assumed that *the* growth rate was 8%. Realistically, we can't be that precise. Perhaps when we "measure" the future growth rate, it's actually 8% +/- 1%. In that case what's the value?

$V=\$1\times(8.5+2\times8\pm1)=\$24.50\pm\$2)$

So if we were very confident that the growth rate would be somewhere between 7-9%, we would need to buy at $22.50 to have an adequate *margin of safety*.

Unfortunately, in the real world we're not that precise. In fact, we don't *measure* a growth rate at all!

But I think this is roughly what Graham actually had in mind with regard to his concept of margin of safety.

Furthermore, Graham's emphasis on the balance sheet (and in particular, the current assets) is testament to this. While future earnings growth may quite uncertain, the value of the company's cash on hand, its account receivables and the like are far more precisely known. As Greenwald notes in Value Investing: From Graham to Buffett and Beyond:

> *Starting at the top of the balance sheet has another advantage. As we work down the asset list from cash at the top, whose value is unambiguous, to various intangible assets like goodwill, whose value is often highly problematic, we are made naturally aware of the decreasing reliability of the stated values. Graham himself preferred to rely totally on current assets that could be realized within a year and whose accounting values did not vary far from the actual cash that could be obtained by selling them. From these current assets he subtracted all the firm's liabilities to arrive at his famous net-net working capital figure for the value of the company.*

This exhibits Graham's emphasis on the importance of uncertainty in valuation.

## Some Quick Summary Points

1. Valuation is not a terribly precise endeavor. We don't even take measurements (like one does in physics). We do what I like to call the "number outta the ass trick" (it always smells).
2. Buying at a margin of safety gives you some wiggle room in case your estimates turn out to be off.
3. The amount of margin of safety you need depends upon how certain (or uncertain) your valuation is. Some trades are more precise arbitrage trades in which little to no margin is needed. On the other end of the spectrum are speculative, high growth opportunities. Valuing these are very *sensitive* to your initial assumptions. So a higher margin of safety would be required.

Original source: Margin of Safety