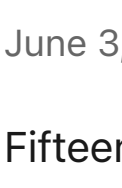


# The Two Laws Of Startup Physics

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Fifteen years into my venture capital career, I've come to believe there are two undeniable laws of startup physics:

Capital compounds both positive and negative formulas.

All positive formulas compound at diminishing rates of return.

## 1. Capital compounds positive and negative formulas

We are fond of saying, "Capital has no insights." It doesn't have the answers to your problems and can actually only fund two things for a startup:

- A) Experimentation - which rarely is expensive.
- B) Scale - which compounds whatever is already happening at the startup, whether compounding toward greater intrinsic value or compounding the startup's value to zero.

Capital can scale intrinsic value rapidly if you have an engine that allows it to turn \$1 into \$5 of value. If it has an engine that turns \$5 into \$1 (or even \$1 into \$0.99), capital will ultimately compound the negative value formula to zero.

## 2. All positive systems compound at diminishing rates of return

Sooner or later, the return on each dollar invested will shift to negative. If you're unaware of the point at which compounding goes into the red, you start compounding negative value.

Paradoxically, the desire for growth often prematurely drives startups into negative compounding, ultimately leading to failure.

In my experience, startups that internalize these rules have done incredibly well.

Failure to respect the rules of startup physics - capital compounds good and bad, and all positive compounding eventually diminishes - has been the cause of just about every startup failure I've seen that can't, simplistically, be written off as "no one wanted the product."

## The positive compounding formula

Experiment with small amounts of capital until a formula is found that generates a surplus of intrinsic value on each dollar invested. Then, and only then, should you deploy capital in an attempt to scale that specific formula.

While this may sound obvious, most startups, out of ambition, attempt to skip directly to the scale phase without fully developing a formula that consistently produces positive value.

Startups that don't have a working economic engine may be able to raise round after round of capital, even at massive valuations, but will almost always compound to zero over time. It's nearly impossible to fix a negative formula startup with an abundance of capital.

## Defining intrinsic value

While the easiest way to evaluate a positive value formula is directly financial (we invest \$1 and generate \$3 back), often intrinsic value is created and isn't clearly financial at the start.

This type of intrinsic value presents real complexity because it is difficult to quantify and can be easily rationalized as positive value, even if the compounding of it is actually negative.

Certainly, many companies create intrinsic value ahead of measurable economics. Still, it can be dangerous to believe you can spend millions with no source of true validation - and venture capital is a poor source of validation.

For example, having a vast proprietary data set may have value, but not nearly as much as hoped. Likewise, building a massive IP portfolio may be valuable, but not when compared to the \$100M invested to create it.

The signals a startup needs to validate its thesis will vary and are not solely financial, but the key point is that founders should seek out validation in the most inexpensive form possible.

Some of these experiments will focus on the product, others on the market, but overall, startups should test their assumptions against an unforgiving reality. Without finding a way to test reality, scaling is perilous.

Although a founder's confidence in an idea may initially be intuitive, they should balance it with proof of high confidence in ROI for the sake of all stakeholders.

## How diminishing rates of return work in practice

When startups attempt to grow, they invest in levers they hope will sustain their positive value formula.

These levers inevitably perform at a diminishing rate.

New value drivers must be found through experimentation.

Here are some examples I've witnessed, many times over, of how well-intended scale-up starts to diminish in performance:

### 🔔 Adding marginal new features

Each feature's value is usually less than the previous features, but each addition creates more complexity in engineering overhead, marketing, and customer service.

### 🏠 Pursuing low-performance customers

Customers that fall outside your ICP (Ideal Customer Profile) will be slower to convert, more sensitive about pricing, and churn at higher rates. Thus, they will have lower returns than your core ICP customers.

### 🔧 "Investing" in marketing

High-performance channels saturate rapidly, forcing spend in more expensive and less well-optimized alternatives. The low-hanging marketing fruit is quickly exhausted, but the relentless desire for growth drives toward negative value marketing spend.

### 📈 "Scaling up" sales

Newer sales hires will typically perform less well because they have little experience with the company and product, stretch the marketing-generated leads, get less focused training, etc. Also, when startups scale sales quickly, they are rarely as disciplined about hiring. Therefore, the average sales rep tends to diminish in performance as the company scales.

### 👤 Customer success missteps

Customer service will be less efficient as the product scope and customer profile expands. The same challenge in scaling sales talent is true here - lower performers are more accepted the faster the company is growing.

### 👤 Putting faith in the mythical person month

At a certain point, executives will get into empire-building mode and attempt to add people to accelerate a particular initiative. This extra headcount consumes resources and results in less productivity.

### 👤 Exec focus

Leadership focus is a finite resource that will be spread thinly through expansion. Every system you expand will perform less well, and lower-performing employees will need more assistance. In short, scale dilutes the C-Suite's attention from key priorities. Startups need to invest in all these areas to grow, but how founders make that investment can be the difference between success and failure.

## Why are these rules so hard to follow?

### 👤 Capital creates inertia

The faster you spend capital, the harder it is to stop. As startups scale, stopping a dollar of spending is harder than deciding to spend it in the first place.

### 🔍 Capital demands acceleration

Admitting mistakes is hard. It is painful to go from doubling your sales force in one year to stopping it or even cutting it the next. It's easier to hope that problems will resolve themselves with time - but they usually don't.

### 👤 It's easy to rationalize diminishing returns

Founders launch companies because they believe in their vision. VCs invest because they want extraordinary results. Diminishing returns are easy to ignore and truth becomes harder and harder to engage.

### 👤 Vanity metrics are an alluring mirage

Founders cling to the metrics they can control, even if they aren't correlated with the startup's ultimate goal. The appearance of growth, regardless of the cost, can drive a founder to ignore the laws of startup physics.

### 👤 Marginal activities get overvalued

It's easy to imagine that you're creating future value that more than makes up for present losses, e.g., believing that your "data" will drive a significant revenue stream, without a clear idea of who will value it, how, and when.

### 📊 Rates of return can diminish rapidly

Founders and VCs are frequently surprised by how quickly a marketing channel can go negative or how expensive acquiring the wrong customers can become for the business over time.

### 📊 The bill comes due suddenly

A startup can compound negative value for months (even years), but the scale of the loss may only become apparent at an inflection point, typically when trying to raise capital - particularly when the capital markets have tightened.

## VCs own much of the blame

Startups often fail to follow these laws of startup physics because the support of VCs becomes a gravity well. Most startups can't rapidly pivot to profitability, so they have to ensure they can raise another round of funding.

Growth is the primary currency of the venture industry. VCs will upsell a startup's growth to future investors and take a markup on their books. Markups help VCs raise money for their funds and grow their capital base over time. Most VCs want growth so badly that they've come to demand it regardless of the cost. This obsession is a short-term optimization with huge long-term implications for the startup, its founders, employees, and, ultimately, investors.

Investors value their startups based on how much money they raise and at what price, rather than thinking clearly about intrinsic value, which has only loose correlation to private valuations.

Entrepreneurs respond to this market demand by spending poorly on activities they know drive vanity metrics that aren't sustainable to ensure their revenue continues to grow to meet their short-term goal of raising more money.

Many VCs don't want to spend time engaging these laws of startup physics because they don't align with the short-term VC incentive structure. Investors often lack the patience and incentives to make wise long-term decisions.

## A cautionary case study

Pressure from investors often leads founders to make simplistic assumptions. For example, VCs will tell a founder with \$8M in revenue that they need to get to at least \$20M in revenue in the next 24 months to close the next round. The startup triples its spending on engineering, sales, marketing, and customer service. If you check back in a year later, revenue will most often be up, but closer to \$12M. Sales haven't grown proportionately to the spend, but the startup has less runway and needs to impress the VCs, so they increase the investment in their broken model in a last-ditch effort to hit the magical revenue target.

Even if they successfully manage to do so, the pressure only gets higher! The new VCs want to see continued growth, so more resources are fed into inefficient systems, compounding negative long-term value. The only viable strategy is to make hard choices - constantly.

So, how do founders forestall the nuclear meltdown that arises from misapplied startup physics?

Don't consume your capital in response to the conventional wisdom propagated by VCs, whose incentives detract from long-term intrinsic value creation. Instead, focus on low-cost experiments until you discover how to create positive value formulas that justify increased spending. Focus on learning fast, not burning fast. Regarding products, this might mean tying resource requests to improved NPS scores. In sales, be exacting with KPI expectations around the performance of reps. In marketing, strip emotion out of spend and create an ROI-driven framework.

Discipline is critical; when something stops working, you must stop scaling. Immediately. Startups have blown millions of dollars in a quarter because founders mistakenly believed that a diminishing rate of performance was temporary.

## Four approaches that work:

### 💡 You can't skip the experiment stage

There is an industry incentive structure that encourages you to skip many experiment stages. You want and need things to work, so you'll bet everything on them working. This approach is a dangerous, slippery slope.

### 👤 Experiments should be small

Experiments don't require huge budgets. Consider ways to gather data with a single person and small dollars. If you get promising data, invest more, and repeat until you have confidence that you can turn \$1 into \$1+ at scale.

### 👤 Only run a few experiments at a time

Signals in the data from your business should inform your hypothesis. Focus on a few ideas where you have high confidence, not every cool idea. Serialize your experiments to give them the full focus/quality execution they deserve.

### ❓ Ask better questions

Would you rather grow your topline by 20% and burn a little? Or grow it by 30% but burn a ton of cash? The answer to this question is critical, but startups and their VCs often fail to consider it.

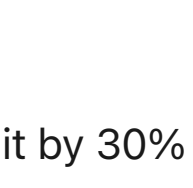
If you lack confidence in the ROI of your investments, the best thing to do is pause and experiment with a new thesis - as inexpensively as possible. A pause might negatively impact your relationship with investors and your team. However, to win you must ensure your team invests capital wisely to create long-term intrinsic value. It is better to slow things down and reorient towards sustainable growth instead of pursuing an agenda that relies more on luck than logic.

Capital has no insights! To win, one must respect the laws of startup physics.


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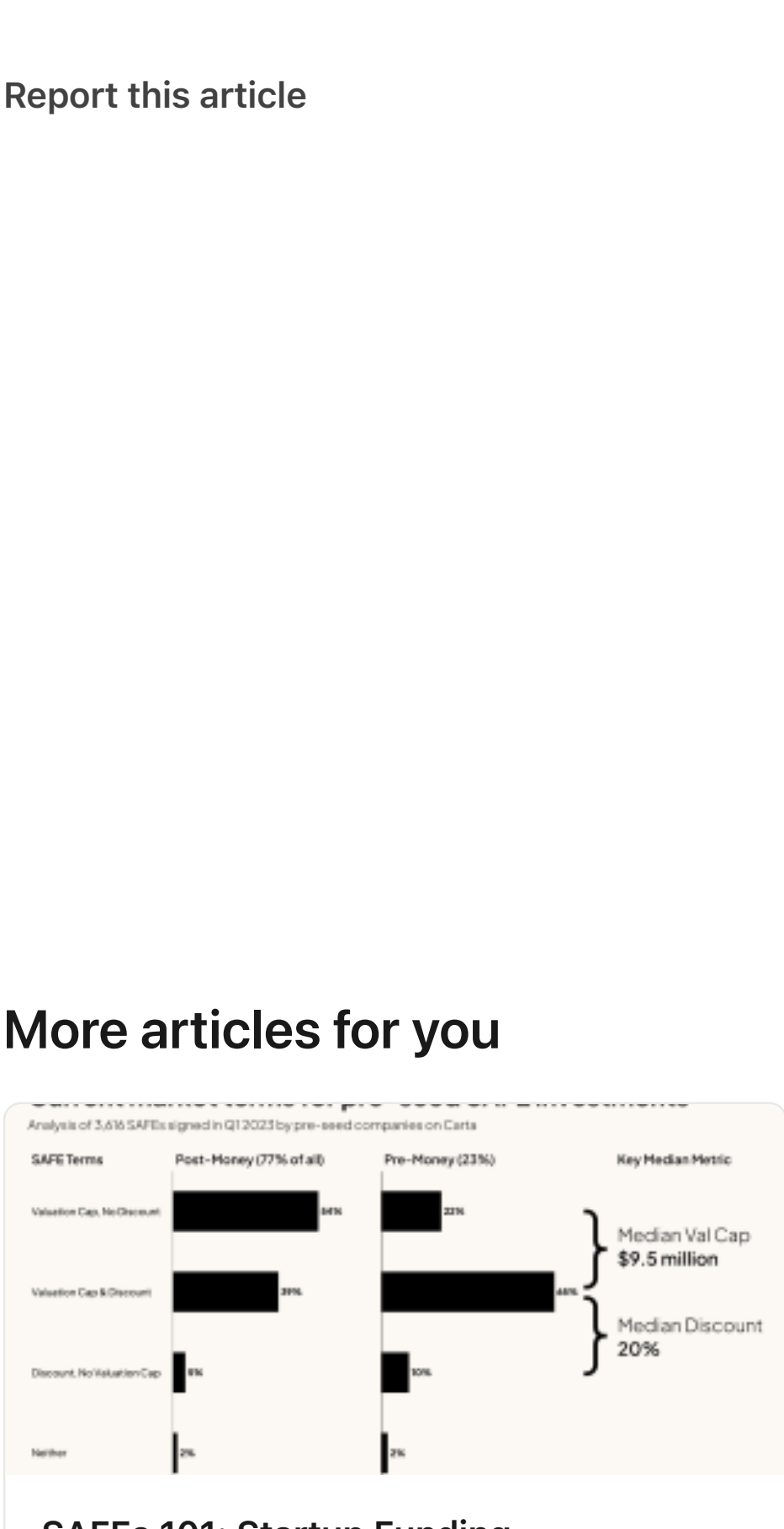


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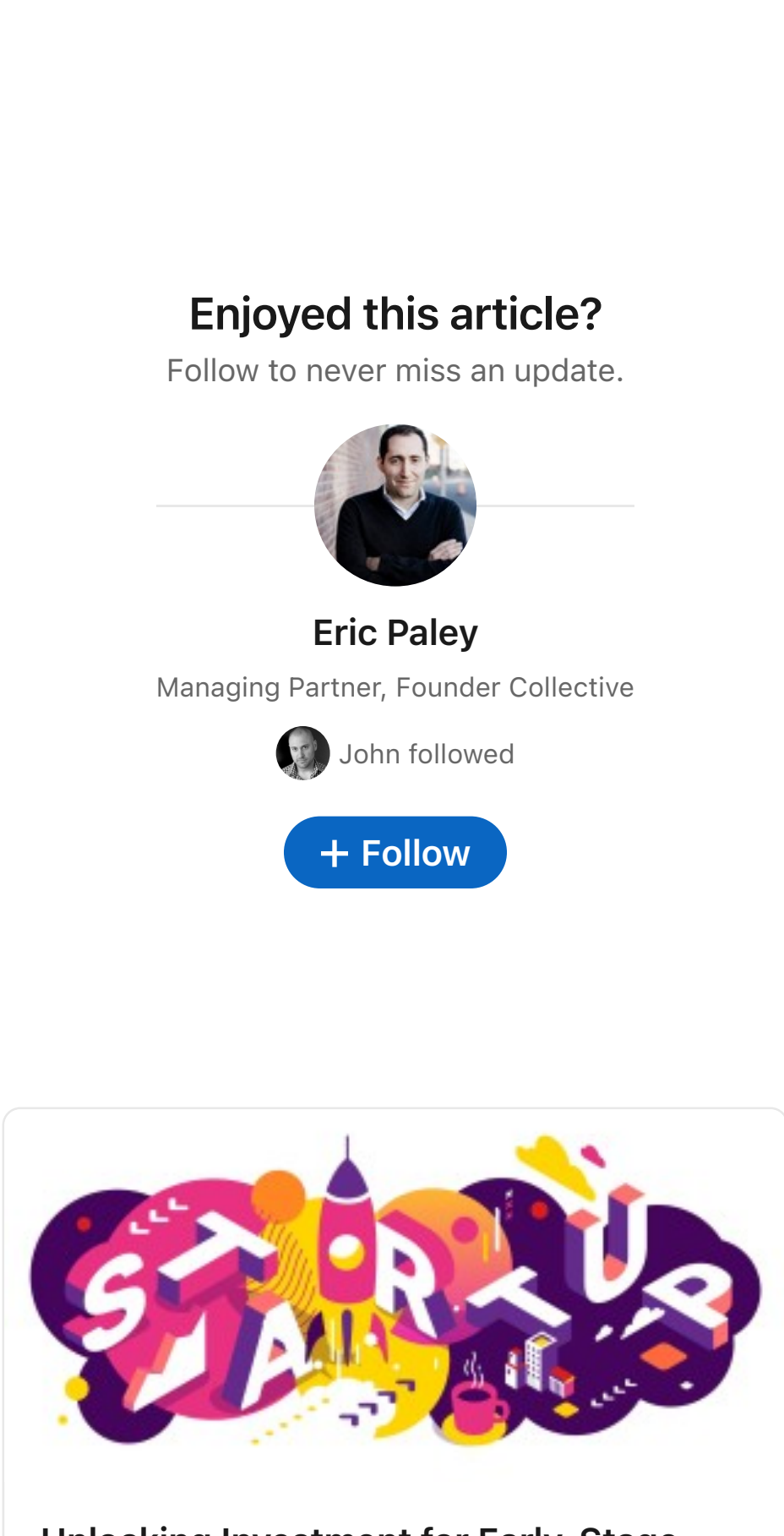
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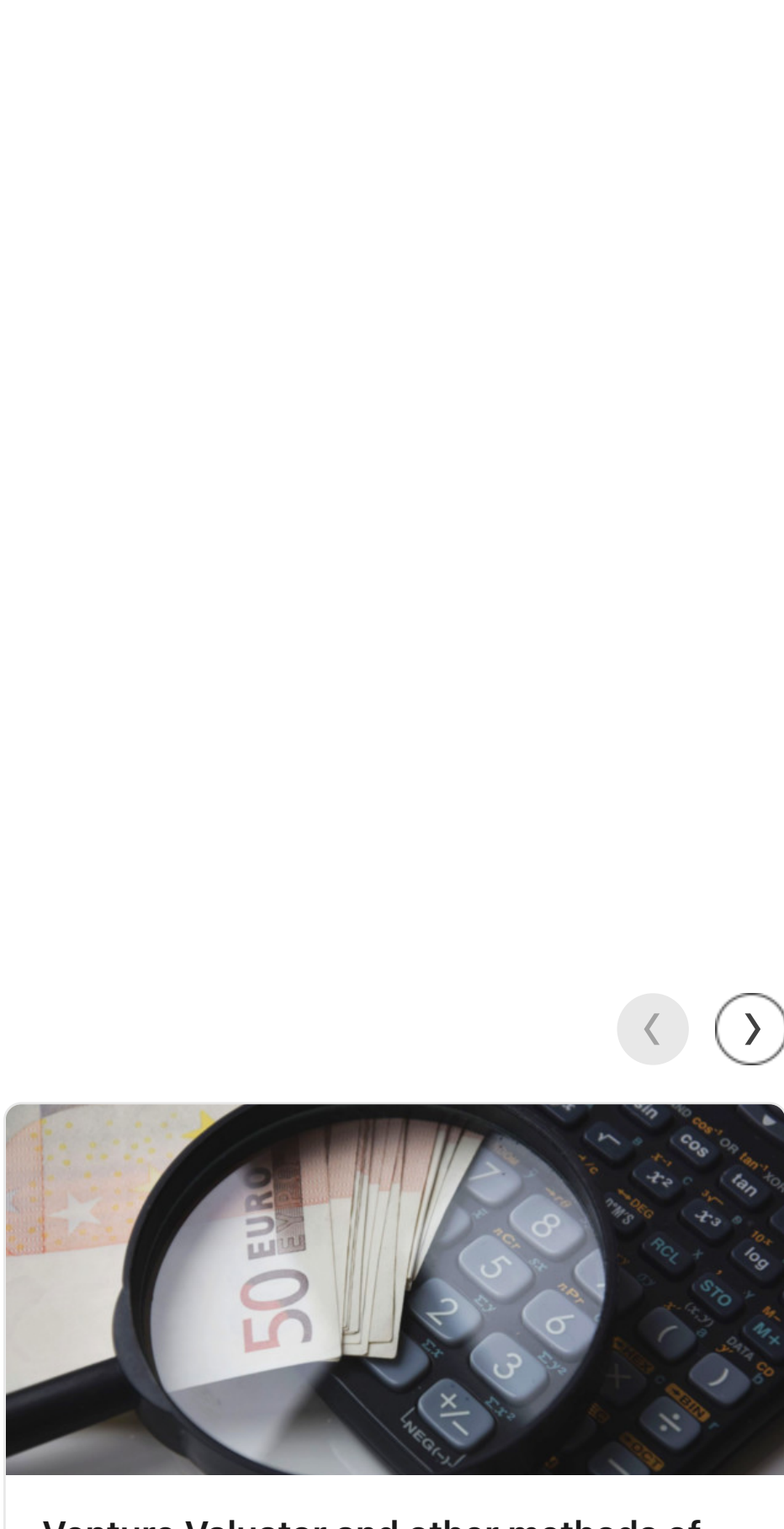
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