



## Tech regulation: trying to jam a power law back into a bell curve won't work

What's happened over the last 40 years as the Industrial Age shifted to the Information Age? With the invention of PCs beginning in the late 70s, the economy began its monumental shift from the Industrial Age to the Information Age. This shift transferred value from asset-based companies and employees to information- and data-based companies, which generally were able to produce more surplus profits (capital) per worker. These companies required less of this surplus capital to invest in their own businesses, which resulted in an abundance of capital in the economy – much of which, especially in this century, has gone into share repurchases. **The result of the Information Age has been unbelievable prosperity mixed with 30-40 years of income stagnation for most individuals and growing economic inequality.** This inequality, in turn, has fueled social unrest as seen in recent elections and social media discourse. For more context on this evolution over the last few decades of economic history, there is a great [40 minute video from Eric Beinhocker](#) (and Eric's book, [The Origin of Wealth](#), is very good as well).

### What's a power law and why are they taking over the economy?

The Information Age has allowed for unprecedented collection and parsing of data and global information exchange, creating an environment ideal for the emergence of platforms and networks. **Networks and platforms follow power law math – a power law is a mathematical relationship where the frequency of some event varies as a power, or exponent, of some characteristic of that event.** For example, the number of earthquakes is inversely proportional to some power of their size – the bigger the quake, the fewer we experience (thankfully!). This is in sharp contrast to a Gaussian distribution – otherwise known as a bell curve or normal distribution. In a normal distribution, most outcomes are distributed within a few standard deviations of the average (like the height of a group of people – most are close to the average with a few outliers on both sides). Most humans conceive of outcomes as normally distributed, and most of formal economics and market theory rest on this erroneous assumption. The reality is that everything we experience is part of a complex adaptive system, which means that things interact in unpredictable ways with emergent properties that are difficult, if not impossible, to predict. (All of this is covered in more detail in the [opening chapter of our paper Complexity Investing](#).) Many of the impacts we see today from rising global temperatures are examples of power law math dominating in the complex adaptive system that is earth's ecosystem – a very small increase in temperature might cause a hundredfold increase in death of plants or species.

**As we shifted from the Industrial Age to the Information Age, we believe the creation and importance of power laws in the economy has dramatically accelerated.** Information was

the key ingredient that created Google, Amazon, Facebook, Netflix and other big Internet platforms. A small increase in data from what search results people click on fuels a major improvement in Google's algorithm. A modest increase in the number of people watching a show on Netflix precipitates a big shift in where Netflix allocates money to produce new content. A small increase in personal information collected by Facebook drives huge returns for buyers of ads on their platform. These are all examples of power law economics, in which the business grows as a multiple of the data it collects, which fuels more data collection and growth. Each of these companies was created by and benefited from power law math – consolidating large share in a new or existing market – by leveraging the power of data.

Instead of a handful of strong competitors, like we saw in each industry during the Industrial Age, we ended up with one or maybe two dominant, winning platforms. For a real-time example, look at what is happening today in transportation. In the 1900s, there were a dozen strong car makers – Ford, GM, Toyota, BMW, etc. While those companies still exist today, you can see the formation of a data- and information-driven power law being created: companies like Tesla are using software and data to gain share in the short term, but, in the long term, you could theorize a new transportation network emerges that uses data, software, and technology to provide rides on demand, replacing a large portion of individual car ownership. Obviously, in the US, companies like Lyft, Uber, and Alphabet's Waymo are in a battle to become the new platform of US transportation. As these platforms gain more data, they become more efficient, which drives more usage. Further, as self-driving cars obtain more data, they become exponentially better at navigating roads.

In the current global economy, information is naturally creating monopolies due to the influence of power law math on both platforms and network effects. We would emphasize the importance of the word global here – the Industrial Age economy was largely regional, but, fueled by the global base of smart phone and Internet users, informational network effects are allowing winning platforms to expand to an even grander scale. **Thus, the effects of power laws are multiplied, with winners taking an increasingly large share of an ever expanding market.**

Much like a biological organism, these big platforms evolve within a complex adaptive system. Winners emerge as the result of natural selection operating against a set of fitness functions – the platforms that gain a data advantage are more likely to get more data, creating a virtuous circle (or flywheel effect) that is hard to stop or reverse. AI and machine learning will be a further accelerant on this power law inferno as algorithms and decision making become informed by data, which creates better products and services, which drives more usage and creates more data, etc.

Power laws create prosperity but also fuel concerns of inequality and stifling innovation

There is a lot of fear, not all unfounded, that the big Internet platforms are a growing problem. Popular reaction today in the US and Europe is to regulate, and potentially [break up, the power law winners](#) like Google, Facebook, Amazon, etc. **However, trying to break apart an emergent power law would run the same risks as interfering with a biological ecosystem**

(e.g., species collapse as a result of removing pollinators or introducing an invasive species, or unprecedented wildfires caused by global warming) – it's damn hard, if not impossible, without disastrous consequences. The thing about emergent behavior is it's unpredictable – we can't really predict what might happen, but our instinct is that, **whereas breaking apart an Industrial Age company has a predictable range of outcomes, when you break apart an Information Age company, the range of potential outcomes is orders of magnitude greater.** Included in that range could be a significant setback to innovation and human progress. We think the long-term benefits of these platforms to the well being of humanity, and the planet as a whole, will far exceed their costs. In our opinion, an attempt to break up a scale-driven advantage would be a step backward.

While the popular focus is on the negatives, let's not forget the millions of jobs and new businesses enabled by iOS, Android, Amazon Web Services, etc. Importantly, information and transparency will continue to shine a bright light on the problems brought by Industrial Age policies and companies, and that information will continue to feed and create new, disruptive business models across the economy. Information is lifting everyone, on average, but also clearly creating large pockets of inequality along the way. Instead of trying to repress power-law-fueled winners, we would be much better off trying to moderately flatten power law functions on the margin to trim some of the inequality they have engendered. **Taking what naturally wants to be a power law and trying to squeeze it back into a bell curve is likely to cause huge negative ramifications and unwind the significant prosperity the Information Age has brought.**

Breaking up an information-based business is very different than breaking up a hard asset-based company

A lot of [analogies are being made to the breakup of the railroads, Standard Oil](#) or Ma Bell.

These were all commodity- or infrastructure-based businesses. Information-based businesses are a different beast – they are much more akin to biological systems: network-effect-driven platforms with power law economics. This is in contrast to an asset-based or commodity-based business that may have economies of scale, but is unlikely to feature true power law or exponential scale benefits to its users. You could break up Standard Oil into 34 regional companies or AT&T into 7 regions (plus the original AT&T for long distance) and still have oil and phone service. In contrast, if you break apart an information- or data-driven, network effect platform, it's highly likely it would no longer provide the same benefits to users. And, perhaps more importantly, **breaking up an information-based platform would cause it to fall dangerously behind in AI and machine learning, effectively ceding control of the next wave of innovation to another country like China.** By the very nature of power laws and their ability to compound returns, if you fall behind in AI today, there is a high degree of probability you never catch up to the advances of other companies or countries that pull ahead of you.

Democratize data access without destroying the benefits of power law driven innovation

In the past, we have seen one scale platform create another – Standard Oil enabled the automobile for example. What seems different about the information-based platforms as

opposed to asset-based ones is their ownership of the data – this allows them to create the next platform exclusively themselves if they don't allow fair access to that data. It should be possible to constructively balance power law winners, while assuring innovation continues, by opening up their pools of collected data for others to build businesses off of. We could argue this is already the actual business model of Google, Amazon, Apple, Facebook, and Netflix today – their data allow entrepreneurs, artists, advertisers, and product manufacturers to grow their own businesses – but, it could certainly be protected and institutionalized better.

AI and machine learning is going to accentuate the scale advantages of the power law winners. Additionally, AI has an added risk of further eliminating the value of workers. Much like we saw a shift from Industrial Age worker's value and compensation toward corporate balance sheets in the Information Age, AI could further shift capital from humans to Information Age corporations. This will fuel further inequality and make the power law winners appear even more dominant (even if they are concurrently still raising prosperity for all on average). One proposed solution to this situation is our framework for [broadening the definition of fiduciary duty](#) – creating win-win outcomes and driving more value for employees, customers, and partners. This type of non-zero sum (NZS) thinking and fair access to data could allow power laws to naturally progress while decreasing the negative inequalities associated with them and assuring innovation. **We don't know what the right answer is with respect to the growing power of Internet platforms, but we think they should be treated more like biological systems than the traditional asset-based monopolies that governments have broken up in the past.**

#### What's an investor to do?

It's very possible that breaking up some of these companies would perversely cause greater stock price value than leaving them as is. Facebook could be more valuable separated into three different companies – Instagram, WhatsApp and the original Facebook platform. Amazon separated from Amazon Web Services might also create more value. Perhaps YouTube would be more valuable on its own. But, when you start separating services that are synergistic, like Google Search and Maps, or Amazon Prime and Amazon e-commerce, or iOS and the App Store, then we think you start to destroy not only shareholder value but consumer value and societal progress. Breaking apart services that can accelerate power laws and network effects is likely to stifle innovation and leave us all worse off as citizens. **I'd recommend taking a Bayesian approach to stock analysis here, and continue to carefully monitor potential scenarios and evidence that supports one direction over another as objectively as possible. If we go back to where we started this essay – there's been 40 years of economic stagnation and growing inequality – that's likely to result in some form of regulation or change in the status quo.**

One framework you can use to do [Bayesian](#) analysis is for Internet platform stocks is the *Utility-Communication-Media* matrix. There are 3 types of consumer facing network effect platforms. **Internet utilities create the highest value - Google Search and Amazon Prime are the best examples** - these are products designed for you to spend the least amount of time possible and get the best outcome. For example a web search should immediately give you an

answer to a question - and this phenomena accelerates with conversational voice assistants. And, think about Amazon's Prime ecommerce business - you want to quickly find the product and have it delivered as fast as possible. Data driven utilities are highly monetizable with advertising and fees, and nearly impossible to breakdown once their network effects are established.

Now, contrast that to a communication platform like email, text messaging, video or voice chat. These types of businesses are specific types of communication utilities designed for one on one or small group private communications. Communications platforms in the past have largely been monetized by infrastructure companies like AT&T, Vodafone etc. **It's awkward and ultimately a limited business to put ads into communications platforms** - you just don't want a pizza ad in the middle of texting your significant other, and you certainly don't want your private communications mined for advertising. Facebook started out as a communication platform, but that was not monetizable, so it evolved into a media platform with newsfeed and advertising revenues. Facebook is now trying to [pivot back](#) into a communication utility. Some communications platforms are able to charge money for the product, but that is more common in the enterprise market than the consumer market. Snapchat is also an example of a largely private communication platform that we would argue is finding it difficult to monetize at a high enough rate to survive. Communication platforms are useful, but not necessarily valuable to investors in some cases.

Lastly we have media platforms. The best examples of network effect, data driven media platforms are Netflix, YouTube, Facebook, Instagram etc. **Media platforms are highly monetizable but also tend to be a little more competitive with fickle consumer tastes.** If you think about the rise and fall of media platforms over the last couple of decades there are more examples of failures than successes - Yahoo, AOL, MSN, MySpace, etc. Some media platforms rely on user generated content such as Instagram, Facebook, YouTube, and Twitch while others like Hulu and Netflix have extremely high hurdles in recurring content spending in order to engage and keep users.

Some platforms don't fit neatly into this framework. Twitter, for example, appears to be a communication and media company, but you could argue it has characteristics that more closely describe it as a high value utility for its core users. In China you see platforms blur across categories like Tencent's WeChat which has elements of all three type of platforms - this combination can create an extreme amount of value for users and the company.

**This *Utility-Communication-Media* matrix is relevant when thinking about regulation because ultimately consumer value combined with an analysis of the negative and positive externalities of a platform will play a large role in how a platform should be regulated.** The more value provided to a greater number of constituents is likely to result in less regulation. However, if a platform has relatively fungible value to its users or has negative consequences to use, it will be easier to regulate with less consumer backlash. In other words, **to the extent the data created and used by a platform is maximizing value for users and**

**society, there is going to be fewer reasons to regulate that platform.** There are many other ways to look at the rising risk of regulation, but the takeaway is to be very mindful of the unpredictable ways the regulatory front could go in the coming years - **the range of outcomes has widened.**

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