GILDER GAGNON HOWE & CO.

Fourth Quarter 2017

The value of a network is proportional to the square of the number of users
--Metcalf's law

February 18, 2017

Dear Client,

During the fourth quarter of 2017, our average margin and cash accounts gained 4.5% and 4.8% while our average retirement account gained 5.1%. During the quarter, both the S&P 500 and the Nasdaq gained 6.6%.

At the end of the fourth quarter our average margin and cash accounts were up 45.4% and 37.9% for the year while our average retirement account was up 30.7%. As of the end of the year the S&P had gained 21.8% while the Nasdaq had gained 29.7%. Please remember that these numbers are averages; the performance of your account differed. The calculation of index performance includes the reinvestment of dividends.

Two new positions in the quarter are Stitchfix (+54%) and Casa Systems (+17%). Stitchfix is an online clothing subscription service that sends customers boxes of clothing tailored to their taste and size. We were impressed by the vision of the founder Katrina Lake and how she and her team built a profitable billion dollar business raising less than 50mm of venture capital. Stitchfix uses machine learning to predict what items a customer will like, changing how customers buy clothing. We are also excited about Stichfix's opportunity to improve the apparel business for brands that they buy from. The department stores and boutiques with which Stitchfix competes don't do a good job predicting demand for a brand's products, resulting in substantial discounting at the end of a season that often results in brands selling items for less than manufacturing cost. With Stitchfix's subscription model, they can make a more accurate prediction of demand. We think that over time, this will allow new designers to get introduced to customers with less risk than the current retail model, easily justifying Stitchfix margins.

Another new position is Casa systems. Casa makes networking infrastructure for cable operators. Like Arista Networks that we did well with last year, Casa is helping customers replace custom chips from Cisco and Arris with sophisticated software-defined networking running on commodity parts from Intel and Cavium. Like Arista in the datacenter, we think Casa's business model is disruptive--not just because they have lower costs but because their software-first technology enables them to be faster and more flexible at developing new features than their competitors, often beating Cisco and Arris to market by years. We think that cable and wireless operators will increasingly choose Casa's next-generation system to keep up with increased demand as consumers increasingly move to IP services, with everyone watching their own Netflix stream instead of tuning into a single broadcast.

Sequans Communications (-39%) has been a recent disappointment. Sequans is the leading provider of chips for a new cellular wireless standard called Cat-M LTE. Two years ago at the

Consumer Electronics Show in Las Vegas, the CTO of AT&T Wireless explained to us that he was building a Cat-M network capable of supporting a billion connected devices. He was excited about Cat-M LTE because while the simpler Cat-M standard isn't fast enough to support streaming video, the modems use so little power that they can run for years. They also cost 5 to 10$ each compared to 20$ for a traditional modem, and because they use so much less wireless capacity, carriers were planning to charge less than 10$ a year for each connected device.

We remain excited about Sequeans' opportunity to sell Cat-M modems. However, their sales of legacy products unexpectedly declined in the second half of 2017 with sales down 10% YoY in December as their existing business selling modems for things like the Verizon Jet Packs contracted faster than the nascent Cat-M LTE business could grow. Considering the potential size of the market for their Cat-M chips, we've decided to stick with it.

Cryptocurrencies and the blockchains that power them are an area that we've been spending time researching. The blockchain technology that powers Bitcoin has captured the imagination of technologists, economists, and investors. A recent scan of IBM's twitter feed showed one in ten of IBM's posts include the tag #blockchain. Blockchain is also popular among smaller companies such as Eastman Kodak which is launching a blockchain-based service for image rights and Overstock.com which is working on blockchain-based projects for security lending and recording real estate titles.

Blockchain uses cryptography and a complex set of economic incentives to build systems without a central authority (in Bitcoin's case, no bank). With a cryptocurrency such as Bitcoin, this enables extralegal payments and a digital store of value that can't be seized by a government. If you are engaged in an illegal activity, the advantages of decentralization are clear. A more nuanced advantage of decentralization is that it enforced transparency. Even if the blockchain algorithm is running on a central server, the algorithm forces transparency and prevents records from being changed once they are saved.

However, the extra work to keep all of the nodes in a decentralized network on the same page makes it inefficient. The entire bitcoin network with its hundreds of thousands of computers can process tens of transactions per second while a simple database on our $1,100 MacBook laptop can handle 9,000 transactions per second. Another downside to decentralization is that without a central authority to make decisions, as the number of users on a network grows, it becomes difficult to improve the network or make changes to prevent. Examples of this is email and SMS messages. Email was failing under the weight of spam messages before Gmail essentially re-centralized the previously decentralized system and there was no innovation in SMS messages before iMessage and WhatsApp replaced the decentralized SMS message system with a centralized system.

As we've attended conferences and spoken with Overstock and the blockchain group at National Financial (the custodian of your GGHC account), over and over again the experts have pointed out that it's a fantasy to think that you can decentralize ownership rights for something that exists in the real world under government jurisdiction. For example, the only person whose opinion matters about the title to your house is the court -- a central authority -- because they're the ones who have the power to order an eviction. Instead, what these blockchain experts have pointed to is that by using the blockchain to enforce transparency, it becomes easier for

disparate economic entities, like companies in a supply chain, to gain comfort that their participation in the arrangement won't be used to wield economic power against them.

Alex Rampel at the VC firm Andreessen Horowitz recently described why investing in blockchain-based companies is difficult. He pointed out that the hype around the blockchain is far ahead of use cases. While there are likely significant problems that will probably be solved using blockchain, the level of discussion in the popular press and investment markets about blockchain is extraordinary given that the use cases still aren't well defined.

However, hype is valuable marketing. So what if IBM's blockchain-based solution to manage global shipping manifests would be technically superior if it used a normal database! If the hype of blockchain gets IBM in the door and the enforced transparency that comes with running the solution on a blockchain rather than using a normal database removes enough worry from the participants to close the deal, then what matters is that the project is solving real problems for real people.

So far we have two blockchain-based investments. After speaking with Overstock.com's blockchain group we were very impressed with their honesty about the limits of blockchain technology and think that they have a strong opportunity to take advantage of the heightened interest in blockchain to create solutions that solve important problems. Our other blockchain investment is our short of Western Union. Much of what Western Union does is to deal with the financial regulations around the movement of money and we think that Bitcoin borderless currency enables anyone to compete with Western Union's money transfer service.

We're excited to continue investing in networks like blockchain and the infrastructure that enables them, Casa and Sequans, because as Metcalf pointed out, the value of the network to the next person to join increases as the network gets larger.

Thanks for your continued support,

Alex Derbes

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