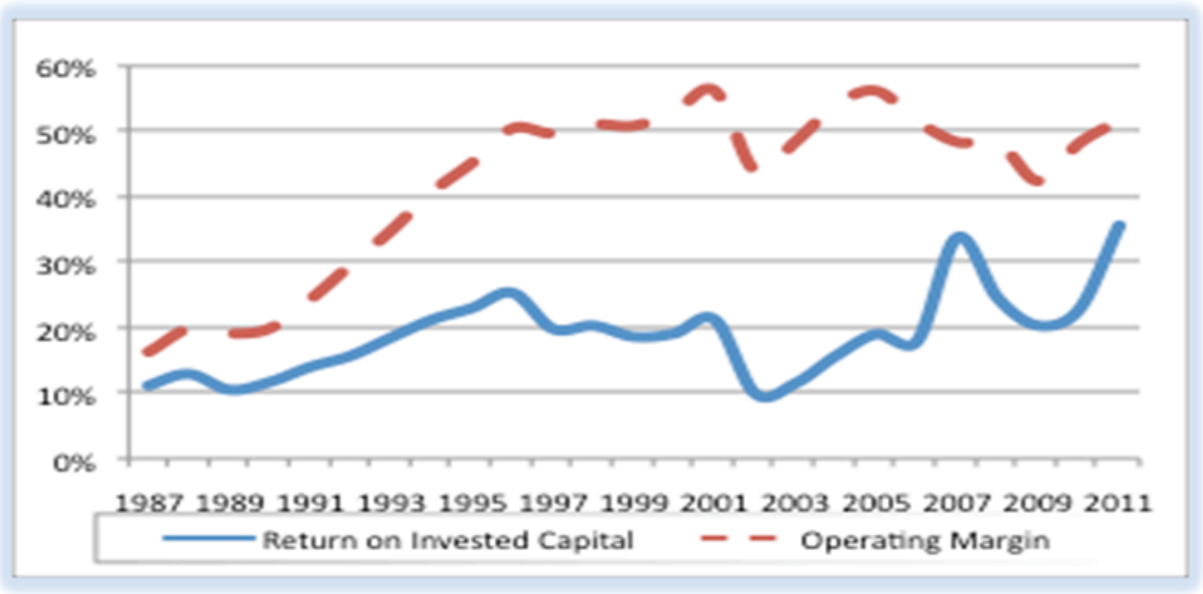
A Case Study in Franchise Analysis: Linear Technology

This article will take a look at the Linear Technology franchise. It will try to identify the source of the franchise and discuss the issues around the sustainability of that franchise. (As an aside the article will also touch on the investment banking analyst community and their non-existent attempt to cover these issues in their research reports or ask about them on quarterly conference calls.)

Before we look at the Linear Technology franchise here is some background information on the company taken from their 10-K:

Linear Technology Corporation, (together with its consolidated subsidiaries, "Linear Technology" or the "Company") a member of the S&P 500, has been designing, manufacturing and marketing a broad line of high performance analog integrated circuits for major companies worldwide for three decades. The Company's products provide an essential bridge between the analog world and the digital electronics used in industrial, communications, networking, automotive, computer, medical, instrumentation, military, aerospace, and consumer end-markets. Linear Technology produces power management, data conversion, signal conditioning, RF and interface ICs, and µModule subsystems. Applications for Linear Technology's high performance circuits include telecommunications, cellular telephones, networking products, tablet, notebook and desktop computers; computer peripherals, video/multimedia, industrial instrumentation, security monitoring devices, high-end consumer products such as digital cameras and global positioning systems, complex medical devices, automotive electronics, factory automation, process control, military, space and other harsh environment systems. The Company is a Delaware corporation; it was originally organized and incorporated in California in 1981. The Company competes primarily on the basis of performance, functional value, quality, reliability and service.

The proof that this company has a franchise can be seen in the numbers. The company listed in 1986 so the following chart is a complete history of returns and margins as a public company. There are not that many companies in the world generating these types of returns or margins. Over the last 25 years to have achieved a Return on Invested Capital of at least 10% and as high as 35.6% and an operating margin of at least 16% and as high as 56.2% is clear evidence that this company has a franchise. (As a comparison some of the better-known "franchise" stocks like Coca Cola, Proctor & Gamble, Johnson & Johnson and Kraft all have operating margins below 30%).



One would guess that if it were easy for competitors to compete away profits they would have done so at some stage in the last twenty years. So how has Linear Technology achieved this franchise? The company also attempts to answer this question in their 10-K.

Importance of Individual Design Contribution*. The Company believes that the creativity of individual design engineers is of particular importance in the linear integrated circuit industry. The design of a linear integrated circuit generally involves greater variety and less repetition of integrated circuit elements than digital design. In addition, the interaction of linear integrated circuit elements is complex, and the exact placement of these elements in the integrated circuit is critical to the circuit's precision and performance. Computer-aided engineering and design tools for linear integrated circuits are not as accurate in modeling circuits as those tools used for designing digital circuits. As a result, the contributions of a relatively small number of individual design engineers are generally of greater importance in the design of linear integrated circuits than in the design of digital circuits.*

It is generally accepted that designers are an essential resource in this industry. The skills required by these designers are difficult to learn and mastered by few. In other words design engineers have to be creative people. In fact many commentators go as far as calling it an art as much as it is a science. One well-known designer Jim Williams worked at Linear Technology for over thirty years and wrote a book entitled *The Art and Science of Analog Design*. When Jim Williams died earlier this year, EDN, an industry magazine, wrote an article that included the following: *"Jim helped set the standard for analog engineers the world over. The whole world will miss his technical brilliance".*[1]

The ongoing profits of Linear suggest that they have a large number of these technically brilliant design engineers and also suggest that they have retained them over a thirty-year period. This however does not answer the question as to why they go to Linear in the first place and why they stay there rather than being enticed away to work somewhere else. This is why it is interesting to look at the history of Linear.

The original founders of Linear worked together at another company, National Semiconductor. In 1981 they left to form Linear. When the above-mentioned Jim Williams was asked how National Semiconductor could let the whole Linear Tech crowd walk out of the building and start a new company Jim explained that "*National, like most companies, was pursuing the big 'G' – Growth. Back when Linear Tech spun off of National, digital was the 20 billion dollar market and analog was one or two billion*". Jim said he could understand how National would pursue the growth and try for a slice of that big digital market.

Once Linear was established they found themselves in the privileged position of being able to offer other talented designers the opportunity to work with the best talent in the world. This appears to have become a virtuous circle because once they had the best they could attract the best. Many young designers appear to have Linear at the top of their list of places to join.

One can only speculate as to why Jim Williams never left. Perhaps it is down to the stability of the management team? (In fact one of the founders, Bob Swanson, is still the Executive Chairman at age 72). Perhaps it is down to the creative freedom that each designer has been allowed? Perhaps it is down to share options? All one can say is that something must be right because the financial results achieved so far have been impressive.

There are some things that there is no need to speculate about because they are disclosed in the 10-K filings. Here are a few interesting numbers relating to designers:

Year	Designers + engineering Employees	Designers	R&D Spend $m	R&D % of Revenue
1995	270		24	9
1996	320	150	31	8.2
1997	372	170	35	9.3
1998	448	195	46	9.5
1999	509	240	55	10.8
2000	578	268	78	11.1
2001	670	312	103	10.5
2002	681	336	80	15.6
2003	689	344	91	15.1
2004	752	390	104	13
2005	833	445	131	12.5
2006	950	514	161	14.7
2007	1022	?	184	17
2008	1106	?	197	16.8
2009	1023	?	185	19.2
2010	1047	?	199	17
2011	1129	?	226	15.3

From the above one can see that over the years the number of designers has grown and therefore Linear appears to remain in a good position to keep on growing organically. Of course what it cannot do is tell us the ability level of the people recruited.

In 2007 the company stopped disclosing the number of designers and only disclosed the total number of design and engineering employees in total. They also stopped disclosing their locations. It is not clear why this was done. Here is an example of what was disclosed before 2007 (taken from the 2003 10-K):

As of June 29, 2003, the Company had 689 employees involved in research, development and engineering related functions of which 344 employees are engaged in new product design. The Company had 217 employees engaged in new product design at its Milpitas headquarters as well as 14 employees at its Singapore design center, 50 employees at its Boston design center, 23 employees at its Colorado design center, 14 employees at its New Hampshire design center, 8 employees at its Raleigh design center, 8 employees at its Santa Barbara design center and 10 at its Burlington design center which opened in fiscal 2002. At the beginning of fiscal 2004, the Company opened a design center in Grass Valley, California.
For the fiscal years 2003, 2002, and 2001, the Company spent approximately $91.4 million, $79.8 million and $102.5 million, respectively, on research and development. The increase in research and development expenses in 2003 over 2002 was primarily due to an increase in labor expenses caused by increases to profit sharing, fewer shutdowns and an increase in headcount. Headcount in R&D personnel increased to 689 in fiscal 2003 from 681 in fiscal 2002.

Here is an example of the level of information that has been disclosed since 2007 (taken from the 2011 10-K):

As of July 3, 2011, the Company had 1,129 employees involved in research, development and engineering related functions, as compared to 1,047 employees at the end of fiscal year 2010. The Company has remote design centers throughout the United States, Singapore and Germany as part of the Company's strategy of obtaining and retaining analog engineering design talent. For fiscal years 2011, 2010 and 2009, the Company spent approximately $226.5 million, $199.0 million and $185.8 million, respectively, on R&D. The increase in R&D expenses in fiscal year 2011 over fiscal year 2010 was primarily due to an increase in employee compensation and profit sharing costs.

This information appears quite limited. Surely it would be useful to know how many designers retire or leave each year. Surely it would be nice to know the years of experience of those leaving. It would also be nice to learn about new designers recruited. Without this information it is hard to get a full picture of what is generally accepted to be the most important competitive strength of the company.

Chief Executive Lothar Maier, in an interview with Forbes magazine[2], gave a sense of what these design engineers actually do: *"What Linear does, and what Linear does very well, is we make unique analog products. We don't make copies of other people's products. All of our products are proprietary products. We have over 7,500 different products. And they're all unique. And what we do is we try to anticipate what our customer needs are. Our design*

engineers in the company spend a significant part of their time travelling the world meeting with our customers – not the purchasing side of the customers, but the engineers within the customer base. And by talking to the engineers, they'll share with our engineers what their technical challenges are. Generally speaking, we make no products based on what the customer tells us, because when the customer tells us something they tell the same thing to all of our competitors. What our engineers do is they take the customer's input and then try to anticipate what the customer is going to need two, three, maybe even four years in the future. And those are the types of products that we make. And those are the types of products that really are the basis of the Linear financial success story."

Having access to the engineers within the customer base must be a significant barrier to entry and a cornerstone of their franchise. Given the importance of designers, one would think that this would be a core feature of research reports written by investment banking analysts. One would also think that those analysts would ask some questions on this topic during their quarterly conference calls with management. Unfortunately analysts do not seem to focus in on this issue. One can listen to the calls on the Linear Technology website or read a transcript on Seekingalpha.com and discover that questions tend to concentrate on short-term issues such as expected demand. As an example, here are a couple of questions from the quarter end June 11 call taken from Seekingalpha.com:

- *I was wondering if you could tell us what the turns requirement is to reach the midpoint of your guidance this quarter. I understand it was in the low-50s for the last quarter, correct?*
- *I was wondering if you could also talk a little bit about what do you see as revenue drivers in the September quarter. What you see might be – might show some strengths as well as what might show some weakness?*
- *I just want to go back to your comment on the guidance of 6% to 8%. Are you assuming that in that guide that linearity picks up throughout the quarter, as you talked about kind of in your prepared comments?*
- *Beyond the next quarter, how do we think about operating expense spending, say over the next year? Is it more tied to revenues? And I guess, as part of that, what does your design win picture suggest for growth over the next year?*

These questions are typical of the type of questions asked every quarter but every now and again there can be a question that is more long term in nature. As an example in the past there have been some questions about whether Linear can continue to grow as fast as the overall market given their stated ambition of continuing to maintain margins, the suggestion being that the competitors willing to accept lower margins will be able to grow faster. These questions have been the closest there has been to looking at long-term prospects for the company. In general, however, with the questions tending to be short term in nature, this appears to confirm the suspicion that analysts continue to concentrate on trying to predict the next quarterly earnings.

We now come on to look at the most important question: Is the Linear franchise sustainable? An instinctive reaction might be to think that a business where the assets walk out the door every evening is a business where the risk of something going wrong is high.

Let's therefore look at this issue in more detail.

Earlier on I mentioned that the management team has been incredibly stable. Bob Swanson the executive Chairman is now 72, while Paul Coghlan the Chief Financial Officer is 66. Changing a winning team obviously involves risks and management changes are inevitable in the coming years. Lothar Maier the 56 year old Chief Executive and the other members of the board will have to make a couple of important decisions. Naturally enough there is always the chance that a mistake will be made. Linear was originally formed because management at National Semiconductor did not retain the team that included Bob Swanson, but 30 years of keeping a good team together suggests that a few hundred designers in multiple design centres are unlikely to all walk out at the same time.

Over the years a number of members of the design team have retired. The following was sourced from Wikipedia:
Linear Technology was founded in September 1981 by four employees that had resigned from National Semiconductor in July of that year. The founders were: Robert (Bob) Swanson, Brian Hollins, Brent Welling, and Robert (Bob) Dobkin. The brilliant analog designers George Erdi and Robert (Bob) Widlar were the first two employees, followed by the most talented of the group, Carl Nelson. Dobkin and Swanson are still at Linear Technology; Hollins, Welling, Erdi and Nelson retired. Bob Widlar died several years ago.

None of the names mentioned above joined competitors. They stayed until they retired. This appears to confirm the idea that designers like to stay at Linear.

Linear also appears to have thrived even after the retirement of some of their designers. They have added more designers and increased the money spent on them. This is no guarantee of long-term success but it would appear reasonable to assume that the franchise is sustainable for the short-term. They give the impression that this is a technology company run by techies and as long as it stays that way it could retain a franchise. The long-term is a far more difficult question. Nobody can say just how long the current situation will last. It is possible that the franchise could get even stronger but it would be unusual for a value investor to assume that. The assets may walk out the door every evening but for thirty years they have always come back the following working day. There does not appear to be any evidence that this will change but all one can do is look at any new evidence that comes along and reach one's own conclusion.

One might or might not be surprised to learn that there is one famous value investing company that appears to believe that the Linear Technology franchise will last long enough for them to make a decent return. That company is First Eagle where Bruce Greenwald is a senior adviser. They own it in their Global Fund as well as their US Value Fund and they currently own 3.2% of the company. It would be great to know their thinking. Do they think the franchise is sustainable or do they think the franchise will be eroded over time? All we can tell is that they think there is a big enough margin of safety between the share price and the intrinsic value. Only time will tell if they are right but for sure there will be an interesting few years ahead watching how this franchise progresses.

In conclusion, this article is intended to highlight the difficult work involved in analysing the

source and sustainability of a franchise through the case study of Linear Technology. As Bruce Greenwald would say: *Spotting franchises is a difficult skill – one that takes time and work to master.*[3]

(Disclosure: The author of this article is a shareholder in Linear Technology)

The Value Investment Institute, November 2011

[1] http://www.edn.com/article/518496-Analog_guru_Jim_Williams_dies_after_stroke.php
[2] http://www.forbes.com/2010/08/19/linear-lothar-maier-intelligent-technology-analog.html
[3] Bruce Greenwald, Judd Kahn, Paul Sonkin, Michael VanBiema – Value Investing from Graham to Buffett and Beyond. Page 85. Wiley Finance 2001.