

Business Valuation: Estimating Fair Value of Companies on the Example of Adobe Systems Inc. (\$ADBE)

"Nowadays people know the price of everything and the value of nothing." Oscar Wilde, 1891

In the following term paper, I want to introduce my reader to the valuation of companies and their business. The paper consists of several chapters. First, I explain what value is, where it can be used and why is it important to value companies. I also write about potential danger resulting from forgetting to value value. Next, I describe *Discounted Cash Flow* (DCF) model, which is one of many ways to estimate true value of the firm. Through explaining DCF, I am going to perform and later analyse my own valuation of *Adobe Systems Inc*.

1. Introduction to the valuation

As Koller et al. (2010) write in their book, the value is a "defining dimension of measurement in a market economy" – it measures the performance of companies. When an investor invests in a firm, he has an expectation that when he sells his stake, the value of his investment had grown "by a sufficient amount" to compensate his costs and risks, thus earning him a decent return, i.e. the performance of the firm he invested in has increased.

There are five types of value: the book, break-up, liquidation, fundamental and lastly the market value [FTPress13]. About the fundamental value, I am going to write in the fourth chapter. For now, let me just summarize the remaining four of them. The book value refers to the accounting value – the value reported in the balance sheet. The break-up value "refers to the amount that could be realized if a company were split into saleable units that could be disposed of in a negotiated transaction" [FTPress13]. A recent example would be Hewlett-Packard business split, which had been analysed extensively by Aswath Damodaran [Admm14]. The next type of value is the liquidation one, which should be only used if "liquidation is likely at the end of the forecast period" [Koller10, p. 229]. It refers to "a distress sale" – i.e. such value is always lower than the book or break-up one due to the quick sale of all assets at a discount price [FTPress13]. The last value I want to mention here is the market value – simplified it is created on the public exchanges and market capitalization (share price multiple number of shares outstanding) is mostly used as its benchmark.

Valuation of a company (sometimes part of due diligence process) is done when two companies merge or one acquires another one (M&A). Additionally, it is used on every day basis for purposes of (potential) shareholders to known the right price for firm's stock – to either sell or buy it. Moreover, Fernandez (2013) lists initial public offering (IPO) and strategic planning (e.g. selling, merging etc.) among reasons why there is a need for knowing what the company is worth. He also concludes that there are 4 key factors affecting value. It is the growth, the risk, the return (e.g. ROI/ROIC) and the interest rates. On growth, Koller et al.

(2010, p. 81) write that firm "creates value only when [company's] new customers, projects, or acquisitions generate ROIC [return on invested capital] greater than the costs of capital". Yet, acquiring new customers or creating new projects is always very hard and the risk associated with that may be very high. Thus, it may lead to value conservation or even destruction.

2. An example of value destruction

One can think that the value is just important for shareholders on the capital markets, who buy and sell company's stocks and bonds. However, the opposite is true as it is essential for all stakeholders – governments, communities and citizens. The reason being is that when a company is maximising its value (in the longer term), it also creates jobs and improves environment, e.g. by stimulating local economy. Although executives would always rather prefer creating long-term sustainable revenue growth, having higher ROIC and "preserving value for decades ahead", the equity markets ("the street") favourite(s) higher earnings per share (EPS) with dividends or share buy-backs. These are all quarter-to-quarter operations, which do not create long-term value. They may be just used "as a tactic for avoiding value destruction" [Koller10, p. 29]. Thus, governments try (and they should!) support businesses to have a sustainable value in the longer term, instead of just focusing on the short term.

A balance between meeting earnings forecasts and creating long-term value must exist in the minds of all executives. Yet there still seems to be an opinion (and Graham et al. 2005 proved that by surveying 400 CFOs) that meeting analyst's short-term earnings forecasts is more important for companies than investing on "potentially value-creating activities" such as R&D [Koller10, p. 13]. Therefore, executives often pass up opportunities to introduce new and (r)evolutionary products. This goes also for mergers and acquisitions, where the idea is founded on the premise that by combining two firms it brings synergies, improves earnings and consequently increases EPS for shareholders. However, such deals "are equally like to create or destroy value" [Koller10, p. 13].

Nevertheless, sometimes companies do not create value for their shareholders, but rather destroy it. In the last several decades, we could observe great examples of destroying value affecting the whole world. Take the recent financial crisis in 2008-2009, triggered by the spike in the interest rates and subsequent defaulting on mortgages. The story is widely known.

First, banks lent money to all kinds of different people (even to those without a solid credit rating – in the spirit of *American Dream* and due to Mr. Greenspan's¹ artificially low interest rates at the beginning of this century) to buy homes – illiquid assets. Then, banks sliced and dices subprime mortgages and packaged them into high-risk long-term securities, called collateralized debt/mortgage obligations – CDO/CMO. These have been sold to whoever willing to buy them, meaning that the initial risk of the bank could be easily passed further to other investors. It was assumed that "securitizing risky home loans made the loans valuable because it reduced the risk of the assets" [Koller10, p. 7]. This violated every common sense, since when homeowners paid their payment it went through a complex chain of parties (e.g. banks, insurance firms, special purpose entities etc.), who took many transactional fees and other costs associated with it. Thus, the whole transaction didn't reduce any risk of lending money to people, even if rating agencies put their "AAA++++" on people's mortgages. In contrary, it was later impossible to know who was holding which risk at a particular moment.

¹ Alan Greenspan is former chair of the US Federal Reserve from 1987 until 2006. https://en.wikipedia.org/wiki/Alan Greenspan

Because many "banks used (...) short term debt [e.g. as investors to buy those securities themselves] to fund their illiquid long term assets", it has "increased the risk of holding their equity" in the worst-case scenario [Koller10, p. 8]. As soon as the market turned against and homeowners couldn't pay their payments, suddenly everybody saw that investors had (I) illiquid assets which in general took longer to sell (and here nobody even wanted to buy them) and (II) large amount of short-term debt, which had to be repaid sometime in the very near future. Consequently, some institutions collapsed (e.g. Lehman Brothers), others got funding from the US federal government, which bailed them out (e.g. AIG).

Authors of the book write that there have been at least six financial crisis in the past 30 years, when "companies and banks were financing illiquid assets with short-term debt" (Koller et al., 2010). Up until now, they conclude, it seems we have not learned from such mistakes.

3. Creation and conservation of value

Now, let me go back from financial markets to the value creation process and say how companies create value for their stakeholders. They do that by "by investing capital (...) to generate future cash flow at rates of return exceeding the cost of capital" [Koller10, p. 17]. If company has well-defined competitive advantage and it "increases (...) revenues and deploy[s] more capital at attractive rates of return" it creates its value faster [p. 4]. Aspects that create long-term value are many including innovative and high-quality products, brand recognition and cost & capital efficiency.

The opposite of creating value is known as conservation of value – "anything which doesn't increase cash flows doesn't create value" – meaning that value becomes unchanged [Koller10, p. 26]. Authors further write that the stock market is very well aware of conservation of value, therefore "executives should focus on increasing cash flows rather than finding gimmicks that merely redistribute value among investors or make reported results look better", e.g. through financial engineering. To summarize it, "the stock market isn't easily fooled when companies undertake actions to increase reported accounting profit without increasing cash flows" [p. 28].

However, how can we see if a company creates value? And how do we decide to invest in one company and not in the other? To answer these kind of questions, we need to calculate firm's fundamental value and in this paper I will introduce my reader a discounted cash flow method on the example of **Adobe Systems Inc.** (ticker \$ADBE on NASDAQ).

4. Way One: Discounted Cash Flow (WACC & RIOC) in the case of \$ADBE

In principle, there are many ways how can we value companies. As already described in the first chapter, there are methods based entirely on the balance sheet (e.g. book/liquidation value). Other use income statement (e.g. for establishing valuation multiples – price-to-earnings ratio, EV/EBITA etc.), investment options or cash flow discounting (DCF).

In this chapter, I am going to write about the last one — also called fundamental value — which is based on firm's economic & business fundamentals [Fenand13, p. 4]. Basically, this method seeks to "determine the company's value by estimation the cash flows it will generate in the future and then discounting them at a discount rate [that] matches to the [cash] flow's risk" [Fenand13, p. 17]. This method is frequently used because it is relying "solely on the flow of cash in and out of the company, rather than on accounting-based earnings", which may not reflect its true value [Koller10, p. 103].

Unfortunately, there are several approaches based on different cash flows. Fernandez (2013) lists three of them which are (I) free cash flow (FCF) using WACC as a discount rate, (II) equity

cash flow (ECF) using cost of equity as a discount rate and lastly debt cash flow using cost of debt [Fernan13]. In all 3 cases, methods when applied correctly should lead to same results, however the ECF is "difficult to apply, since matching equity cash flows with the correct cost of equity is particularly challenging (...)" [Koller10, p. 104].

Most commonly used is the free cash flow, which I am also going to describe here [Dcf06]. FCF means that I am going to use a DCF model, which discounts "future income stream at the weighted average cost of capital (WACC)". Let me begin with WACC.

WACC is the "rate of return that investors expect to earn from investing in the company (...)" [Koller10, p. 40]. This is just a definition, without having a broader perspective at the term. Let me now say that assets of the company are financed either by (issuing a new) debt or by equity (e.g. stock, cash flow) [Invs12]. The above term says "how much interest the company has to pay for every dollar it finances [debt and equity]" [Invs12, Inveans15]. The WACC rate can calculated as follows [Invs12, Koller10 p. 236]:

$$WACC = \frac{D}{V}k_d(1 - T_m) + \frac{E}{V}k_e \text{ where}$$
 (1)

 $\frac{D}{v}$ is the value of company's debt (the weight in %)

 $\frac{E}{V}$ is the value of company's equity (the weight in %)

 k_{d} is the cost of debt in %; k_{e} is the cost of equity in %

T_m is the marginal income tax rate in % ("corporate tax rate")

The calculation of this rate is everything but not easy, as the reader will see on the next page, because there are many independent variables which could (but should not and will not) be taken arbitrary, e.g. based on the experience of the analyst or comparable firms. We can even show a tree to visualize steps required to calculate WACC, see figure 1. In basic terms, the rate tells us what both shareholders and debtholder can expect to get. For example, if debtholders want to get 20% of return and shareholders 50%, then the investment of our company in new products needs to return (50+20)/2 = 35% a year, on average. Thus, our WACC rate would be 35% [Invs12].

WACC is used very frequently by analysts, because it can tell whether investors (e.g. banks) should invest in a firm so that it will generate value (i.e. return) for them. For example, if the company returns 40% and its WACC rate is 35%, then "for every dollar the company invests into capital, the company is creating" 5 cents of value [Invs12]. However, if the company's return is just 25%, then for every invested dollar, the company is destroying its value by 10 cents.

Let me know introduce **our company Adobe Systems**². This computer software company offers applications, which are dominant in the "creative" market (e.g. tools for video editing, designers etc.) and are used every day by millions of businesses and individuals for already more than 30 years. The company faces almost no direct completion and includes "brands" such as *PDF*, *Flash Player* or *Photoshop*. In addition to these so-called "Digital Media" business

² All necessary data will be taken from the company's financial statements hosted at https://www.google.com/finance?cid=4112; http://www.adobe.com/investor-relations.html; http://ycharts.com/companies/ADBE/

offering (all part of "Creative Cloud" – a subscription based service), it has also "Digital Marketing" segment, which in turn is used by marketers for *Analytics*, *Targeting* and *Social*³.

We already know what WACC means and how it can be calculated. Thus, let me now show you Adobe's WACC rate and compare it with its return on invested capital (RIOC) [Gf14]. First, we need to value company's debt and equity.

$$\frac{E}{V} = \frac{E}{D^4 + E} = \frac{36.03}{36.03 + 1.514}$$
 (in Billion USD) = 0.959674% for equity (2)

$$\frac{D}{V} = \frac{D}{D+E} = \frac{1.514}{36.03 + 1.514} \text{ (in Billion USD)} = 0.040326\% \text{ for debt}$$
 (3)

Once we have both weights for equity and debt, we need to get corresponding costs. To calculate the first one, we will use *Capital Assets Pricing Model*. Koller (2010, p. 237) write that "cost of equity is determined by three factors: the risk-free rate of return, the market wide risk premium (...) and a risk adjustment that reflects each company's riskiness relative to the average company". CAPM "adjusts (...) company-specific risk through the uses of beta, which measures a stock's co-movement with the market and represents the extent to which a stock may diversify the investor's portfolio", giving us [Koller10 p. 237]:

Cost of equity⁵ = risk_{free}rate + firm's beta * market primium

$$= 2.58 + 1.24 * 5.75 = 9.71 \approx 0.0971\% (k_e)$$
 (4)

To calculate cost of debt, we will take Adobe's interest expense and divide it by its total debt, again giving us [Averk15, Koller10 p. 198]:

$$k_d = \frac{\text{interest expense}^6}{\text{total debt}} = \frac{59.73}{1514} \text{ (in Millions USD)} = 0.039452\%$$
 (5)

Lastly, Adobe's effective tax rate is 25.7%⁷. Finally, all of them (2,3,4,5) will get us to our **WACC** rate for Adobe Systems which stands at 9.4%. (6)

WACC =
$$0.040326 * 0.039452(1 - 0.257) + 0.959674 * 0.0971 = 0.094366 \approx 9.4%$$

To interpret WACC rate, one also needs to see and understand what the return on invested capital is. ROIC is the "return the company's earns on each dollar invested in the business" [Koller10, p. 40]. Once again, the calculation is complicated and a tree can be drawn, see figure 2.

Generally, NOP(L)AT is divided by the net invested capital. The first one represents "the profits generated from the company's core operations [i.e. in case of \$ADBE selling the software] after subtracting the income taxes related to the core operations" [p. 40]. The later one refers to "amount the business has invested in its core operations". Both of them give us a sense "of how well a company is using its money to generate returns" [Rioc03]. For Adobe, return on invested capital stands at 3.7%.

³ https://www.adobe.com/solutions/digital-marketing.html; https://www.adobe.com/solutions/digital-marketing.html; https://creative.adobe.com/plans

⁴ Book value of debt is taken as of FY2014.

⁵ Risk-free rate is according to 30 years US governments bonds; market premium taken from http://pages.stern.nyu.edu/~adamodar/New Home Page/datafile/ctryprem.html for the US

⁶ Taken from http://www.wikinvest.com/stock/Adobe Systems %28ADBE%29/Data/Interest Expense

⁷ http://ycharts.com/companies/ADBE/effective tax rate

$$\begin{array}{l} \textbf{ROIC} = \frac{\text{NOPLAT}}{\text{Invested Capital}} = \frac{\text{Net Operating Profit-(Less) Adjusted Taxes}}{(\text{Total}) \, \text{Invested Capital}} \, \text{in \%} = \\ \frac{306.50}{8290} \, \left(\text{in Million USD} \right) = 0.037\% \end{aligned} \tag{7}$$

To summarize now, Adobe's WACC rate is 9.4% and its ROIC is 3.7%. This means that for every dollar the company invests, it is destroying its value by almost 6 cents, meaning that the firm "must pay its investors (...) \$0.057 in return" [Inveans15]. Thus, as its growths, the return to stakeholders does not match up to the cost of capital. Based solely on these two measurements, we can conclude that the investment in the company would not pay off – at least in the longer-term having both indicators constant.

One should also note that this calculation would slightly vary by each analyst doing it. However, my results show me that it is in line with others [Gf14,⁹]. Now that we understand what WACC and ROIC means and how it can be calculated, let us go back to the DCF model and explain it further.

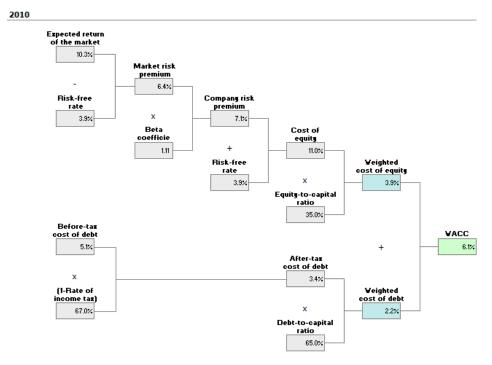


Figure 2 shows how can WACC be calculated and what other values are required [fig1].

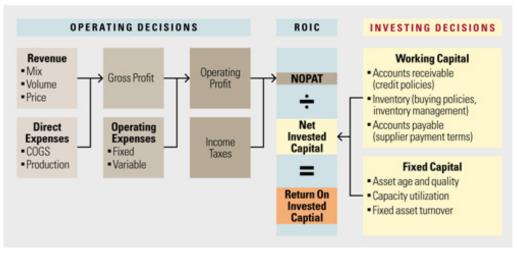


Figure 1 shows how can RIOC be calculated, in relationship with NOPAT and Invested Capital [fig2].

5. Discounted Cash Flow

Definition of Fernandez (2013) says that the model "determine[s] the company's [present] value by estimation the cash flows it will generate in the future (...)". The general formula for DCF is $Value = \frac{CF_1}{1+k} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} ... + \frac{CF_n}{(1+k)^n}$ where CF_i is the cash flow generated by the company in year *i* and *k* being a discount WACC rate for the cash flows' risk. What we get is the V or the "residual value of the company in the year n" [Fenand13, p. 17]. Having said that I will try to forecast 5 years of the firm's FCF from the financial year 2014, i.e. starting January 2015.

Calculating firm's future free cash flow is however is so complicated that banks are employing brightest minds in the industry for doing that. Only skilled analysts having superior access to companies and having access to data and managers can forecast future cash flow (FCF), which will be correct and reliable. In my case due to such complexity and required knowledge of valuation concept in general, I am going to assume that Adobe's annual free cash flow will grow constantly at 20% per year (which it also did in the last decade).

After I have estimated Adobe's future cash flow, I need to calculate present value of that FCF. Here I discount each year's FCF with my WACC rate with a goal to express them in today's value. The reason being is that the cash flow today has a different value than in the future due to exposure to the risk and uncertainty. Therefore, the investor must be compensated for this risk. Thus, future value of cash flow will lower than todays. Our present value of FCF is calculated using formula [Morn15]:

Present
$$CF_{value, year i} = \frac{Projected Cash Flow in year i}{(1 + discount rate)^{year i}}$$
 (8)

For our WACC rate, I assume that Adobe is going to decrease it by 5% on early basis from today's actual value. Thus being just 7.2% by year 2020. My calculation of the present value of cash flow for the next five years is around **8.4 Billion USD**.

Year	Forecasted Cash Flow (at 20 % growth		NOP(L)AT (at 15 % growth)		WACC (less 5% yearly)	Present Value of FCF		
			\$	708 953 124,66				
2020	\$	2 834 569 728,00	\$	616 480 977,97	0,07274	\$	1 860 079 259,21	
2019	\$	2 362 141 440,00	\$	536 070 415,63	0,07656	\$	1 633 456 094,21	
2018	\$	1 968 451 200,00	\$	466 148 187,50	0,08059	\$	1 443 695 660,93	
2017	\$	1 640 376 000,00	\$	405 346 250,00	0,08484	\$	1 284 849 741,42	
2016	\$	1 366 980 000,00	\$	352 475 000,00	0,08930	\$	1 152 038 925,09	
2015	\$	1 139 150 000,00	\$	306 500 000,00	0,09400	\$	1 041 270 566,73	
					\overline{x} = 0.083	Σ =	8 415 390 247,59	

The next step requires me to compute a continuing value. This is very important because it allows me later to get a future perspective of Adobe by estimating its value of operations [Koller10, p. 112]. This is calculated as:

Value of Operations = Present value of FCF
$$during$$
 forecast period +

Present value of FCF $after$ forecast period (9)

To calculate the above mentioned continuing value (which is based after last forecasted NOP(L)AT period) I use formula shown by Koller et al. (2010, p. 113), which gives me **21.1**Billion USD. Thus, I estimate Adobe's present value of cash flow to be **29.5** Billion USD in total. In addition to this, I will use an adjustment factor because of "discounting in full year increments understates the appropriate discount factor" [Koller10, p. 106ff.]. Here I use 5% of a

total sum, which should be appropriate giving me a total of **31.05 Billion USD** – this is my value of operations for Adobe.

Next, we should also add non-operation assets, which "are not essential to the ongoing operations of a business, but may still generate income or provide a return on investment" [Noa03]. Such assets are counted towards Adobe's enterprise value (EV) and it reports long-term investments being at 80.44 Million USD. From the EV, which now stands still at 31.13 Billion of USD, we need to subtract the (present book) "value of debt and other nonequity claims", e.g. operating leases [Koller10, p. 107]. In our case, value of debt and leases⁸ stands at 603 Million USD resulting in the equity value of Adobe being at 30.5 Billion USD.

Finally, to get our price per share, we now divide equity value by number of outstanding shares (498 Mil.). As a result of my calculation, it shows that a fair value of Adobe Systems Inc. lies about 61\$ per share, having its equity value of **30.5 Billion USD**. As of 12th of February 2015, Adobe's stock is currently traded at 74.59\$, which would have two conclusions.

Either I made a mistake having my share price below at what market sees as the correct price or the company is simply overvalued based on my (non-professional) estimates. By looking at such estimated share price, another important part of the job of bank analyst is namely to publish recommendation, either to sell, buy or hold the stock. Looking at some analyses of Adobe done by (semi-)professionals, I can conclude that their price targets lie in the range of 70\$ to 90\$9. In the figure 3, one can observe how has Adobe's stock price, FCF and NOP(L)AT has developed from 2004 until June 2015. Let me now further investigate my results company's (future) value.

A few years ago, Adobe made a very bold move. Being one of "old-classical software companies", it has decided to shift its whole software offering from a perpetual licencing model to a cloud-based subscription one – in a sense becoming software as a service firm (SAAS). Prior this new model, the company was selling its products like Photoshop on standalone basis. The user bought a specific edition of a (one) product which he could and would use forever. If the new release has been published, the company would offer him e.g. 20% off by upgrading. If he wanted some other applications too, he would need to pay their full price. With the new SAAS model – the Creative Cloud – Adobe now offers over 12 different application and a bunch of services for a monthly or yearly subscription, starting already at 12\$ per month³.

At the begging of this transition in 2011, the company has faced multiple obstacles. The largest was the fact that nobody before has announced and really shifted their complete software applications to the cloud ¹⁰. Not only journalists were very much sceptical that customers would renew software products on yearly basis, but also the whole *Wall Street* didn't really had neither understanding nor (at that time) expertise in evaluation of this step. Not coincidently a share was trading in the range between 25\$ and 35\$ between 2010 and 2012. Unfortunately, at that time Adobe also suffered from bad marketing of their flagship product *Flash* (e.g. when in April 2010 Steve Jobs released his (in-)famous essay on that product). All of that contributed to the problems in the financial statements, most notable earnings.

⁸ Based on Adobe's own reporting; http://ycharts.com/companies/ADBE/curr debt and cap lease obl annual

⁹ http://seekingalpha.com/symbol/ADBE/focus

¹⁰ Adobe's move is equivalent to shifting Microsoft's Windows OS to the subscription model based on features user needs to use (e.g. for "Enterprise features" user would pay additionally 10\$ per month).

However, the management has recognized a potential problem very early and shifting its model to SAAS was one of its key decisions. As customers have embraced that and started to subscribe to the different plans, their number quickly rose to present 3.5 Million individual and team subscriptions, worldwide. The revenue from such customers now makes hooping 66% of total revenues¹¹. Moreover, *Wall Street* started to have comparable companies in the "classical" SAAS space (e.g. SalesForce, WorkDay etc. of which Adobe become at the forefront in different statistics). All of that has quickly contributed to the rise of its stock price. As one can also observe from figure 3, the free cash flow has also risen, slowly however.

Having said all of that, I do not believe that the range between 60\$ and 90\$ per share as an unrealistic. I see Adobe's current value not being overvalued, even though my own calculation shows noticeably different value around 60\$ per share. Consequently, Adobe's value is justified based on my understanding of its business and future predictions. Moreover, although the company doesn't pay dividends to its shareholders, in recent years, it has introduced share buybacks. This, as we already know doesn't create any value, merely supports conservation of value. Yet, this also shows that the management does recognize company's long-term value proposition and is signalling that to the equity market [Sharerep]. Being also a marketing company it sees a huge addressable market that further contributes to the higher stock price.

On the other hand, the company is now not less (probably even more) vulnerable to situations such as the global recession or declining number of users, and subsequently subscribers. This could significantly affect its future prosperity, together with oversaturation in the "creative" market by trends such as "mobile" and competition in very specific jobs (e.g. web development or photo editing etc.).



Figure 3 shows free cash flow growth, NOPAT and stock price from 2004 until 2015.

6. Conclusion

To conclude this semester paper, I want to say that valuation of companies is very complex subject matter, which requires deep understanding of many aspects. Although I thought that it would not be hard to evaluate Adobe based on my understanding of its business, at the end it proved to be hard to shows correct realistic calculations and interpret them correctly. My Excel file, which I have been using for this paper can be obtained here¹².

¹¹ http://wwwimages.adobe.com/content/dam/Adobe/en/investor-relations/PDFs/ADBE-Investor-Presentation-January-2015.pdf

¹² http://1drv.ms/1aQ7DTy

Disclosure: The author's choice of this company was not arbitral because of personal interest, good knowledge of its business and market environment. However, the author does not have any relationship with the company and its stock (or at least it is not known to him).

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