



Global journal of Economics and Business Administration
(ISSN:2475-6350)



Brief valuation of Systems, Applications & Products (SAP) corporation

Yibin Liu, Andrew Gleeson, Ciaran Dowling, Julian Rene Graef

ABSTRACT

SAP is one of the largest players in the commercial software sector. Following our analysis of SAP's history and capital structure, it is evident that the company has been able to sustain a stable growth for the past 15 years, whilst also maintaining a stable dividend payout. Barring 2015, SAP's WACC has fallen year on year over the observed period, maximising shareholder value and equity prices. Its conservative financing policy, with a greater emphasis on equity financing than debt may on the one side foreclose potential growth acceleration, yet also indicates a long-sighted managerial conservatism that is focused on long-term value creation rather than short-term growth. One danger of conservative policies is the potential stalling of further growth. However, new partnerships such as the newly announced enlargement of SAP's cooperation with Microsoft in the sphere of cloud services point in the right direction towards further growth in a highly saturated sector.

Keywords: valuation of Systems, Applications & Products

*Correspondence to Author:

Yibin Liu

How to cite this article:

Yibin Liu, Andrew Gleeson, Ciaran Dowling, Julian Rene Graef. Brief valuation of Systems, Applications & Products (SAP) corporation. Global journal of Economics and Business Administration, 2018, 3: 7.

 **eSciPub**
eSciPub LLC, Houston, TX USA.
Website: <http://escipub.com/>

1. Profile

SAP (Systems, Applications & Products), is a German multinational software corporation founded in 1972 and headquartered in Walldorf. According to Forbes (2017), SAP is the third largest software and programming firm behind Microsoft and Oracle. SAP's software solutions aid global enterprise in facilitating a seamless information flow within, and between, all business functions – accounting and finance, operations and manufacturing, human resources and education, research and development, marketing and sales. It initially was built as a private partnership under the German Civil Code by five IBM engineers. Nowadays, the company has become a flagship brand in the field of enterprise application software, involved in making enterprise software to assist firms and individuals in managing business operations and customer relations in 25 different industries with 60,000 staff across 190 countries.

1.1 Products

In the first half of 2017, SAP gained €1,781 million in revenue from selling software licenses, and obtained €1,837 million in revenue from selling cloud services. Compared to the same period in 2016, the revenue from products has increased 8% and 31% respectively. Based on the market demand, SAP classify their software and software-related service and selling it by product combinations:

- ERP (enterprise resource planning) and Digital Core. These simplify the business processes and improve business productivity by cloud ERP solution.
- Procurement and Networks. Which manage procurement processes from suppliers to

customers.

- Analytics. To find a company's capacity, to build a proper analysis system and to provide strategies for a dynamic future.
- Cloud and Data Platforms & Customer Engagement and Commerce. Making it efficient to communicate and strengthen the connection between companies and their clients with timely reaction to market changes.
- IoT and Digital Supply Chain. Creating responsive supply networks and linking useful resources inside and outside the company.

In addition, SAP offers digital products for human resource management and finance.

1.2 Financial history

SAP's total revenue has been continuously increasing since the year 2000. In June 2017, the company earned €11,067 million, an increase of 11% compared with same period in 2016 (€9,967 million). Profit (after tax) ascended 15% between 2017(€2,006 million) and 2016 (€1,742 million).

Profitability: From 2000 to 2017, SAP's gross return has been positively stable. Interestingly, the company dramatically had negative return on assets with increasing assets value in many years. The gross margin grew by approx. €10 million from 2000 to 2016, from €60.54 million to €70.16 million.

Revenue by regions: The biggest market for SAP is in APJ (Asia Pacific Japan), where the company earned €1031.462 million and created 52% of total revenue in 2000. Until June 2017, they explored market in EMEA (Europe, Middle East and Africa), and focused stronger on the Americas market than before. The revenue from EMEA and the Americas market both contributed approx 42% of total revenue.

Figure 1. SAP Total Revenue(€millions) by Regions (2000)

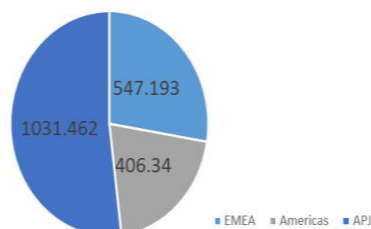
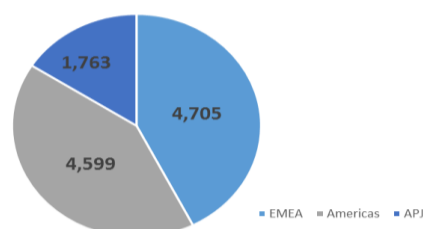
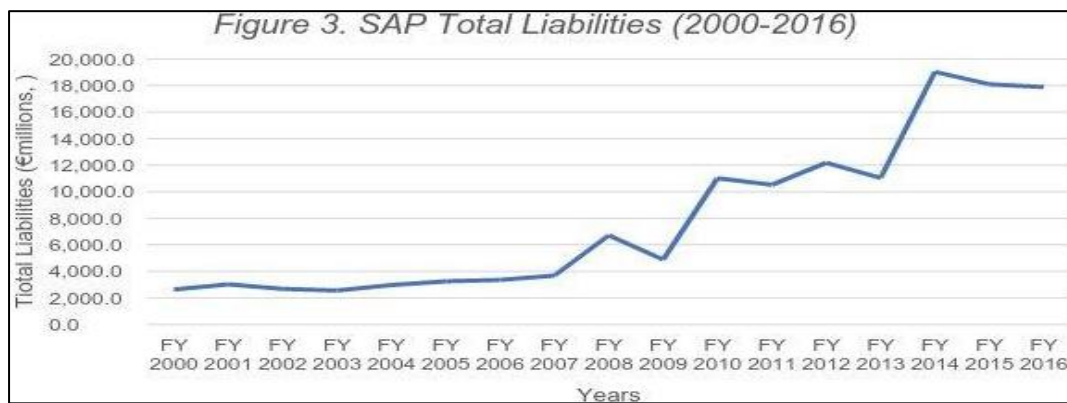


Figure 2. SAP Total Revenue (€millions) by Regions (June 2017)



Financial Liabilities: The total liabilities liabilities (€19,031 million) was six times the increased rapidly after 2009, at peak time (2014) liabilities in 2000 (€2,631.2 million).



Based on the facts above, SAP retains substantial revenue annually and explores markets around the world.

2. Capital Structure Analysis

2.1 Debt Capitalisation

In analysing SAP's capital structure there are a number of macroeconomic factors in addition to industry-specific considerations. The organisation appears to have an aversion to

debt relative to other corporations abroad—perhaps indicative of SAP's German foundations. At present the company holds an “A2” and “A” long-term credit rating on new debt issuances from both Moody's and Standard & Poor respectively. It's worth noting here that the company appears to have recently used interest rate swaps to transfer a segment of its outstanding obligations from a fixed rate to a variable plan.

Debt Issuance					
Instrument	Issue date	Maturity	Volume (in million)	Issue currency	Coupon
Eurobond 2 - 2012	Nov. 13, 2012	Nov. 13, 2019	750	EUR	2.125% (fix)
Eurobond 1 - 2014	Nov. 20, 2014	Nov. 20, 2018	750	EUR	3m Euribor + 30bps (var.)
Eurobond 2 - 2014	Nov. 20, 2014	Feb. 20, 2023	1,000	EUR	1.125% (fix)
Eurobond 3 - 2014	Nov. 20, 2014	Feb. 22, 2027	1,000	EUR	1.750% (fix)
Eurobond 2 - 2015	Apr. 1, 2015	Apr. 1, 2020	650	EUR	3m Euribor + 30 bps (var.)
Eurobond 3 - 2015	Apr. 1, 2015	Apr. 1, 2025	600	EUR	1.000% (fix)
Eurobond - 2016 (privately placed)	Aug. 23, 2016	Aug. 23, 2018	400	EUR	3m Euribor + 30 bps (var.)
Total outstanding Eurobonds			5,150	EUR	

*Figures derived from SAP.de

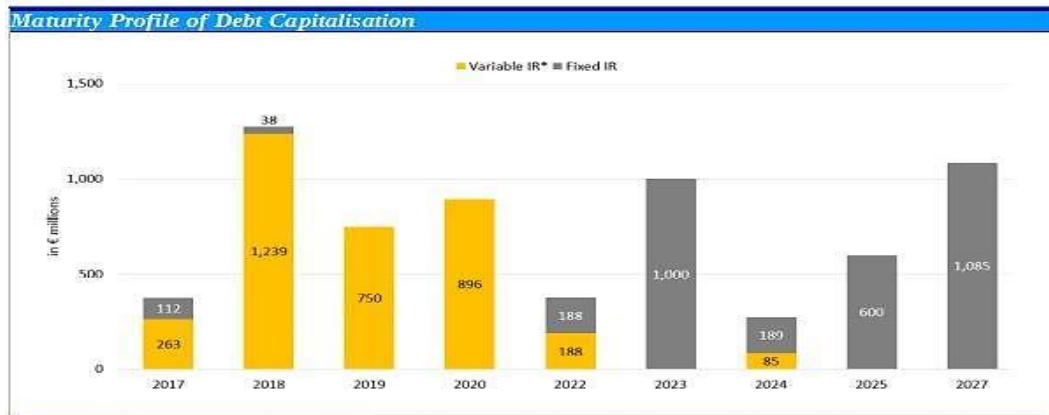
As displayed below, SAP is not as highly leveraged as many of its peers. Instead, in the recent quarterly report to shareholders, the company reiterated its commitment to conservatism with regards to debt. It is committed to protect the company's high equity ratio, which it maintains is one of its primary financial principles - equity investors cover a greater portion of SAP's assets than debt.

Oracle, by contrast, is an organisation that utilised more deb than SAP to finance its activities. SAP could possibly expand its revenue potential if it was prepared to increase its debt capacity. If earnings from that debt outweighed the interest paid, (stated below) it could deliver value to shareholders.

In terms of leverage, an analysis of market peers demonstrates how Microsoft, along with

Oracle, have seemed to utilise prolonged low interest rates to increase leverage over the preceding three year period (MSFT leverage ratio stood at 54% and ORCL at 52% as of June and May 2017 respectively). Alternatively,

AP chose to deleverage its balance sheet in that time, moving from 31% to 16% (the result of an increased free cash flow of 12%), though it has issued more debt since.



*Information derived from SAP.de

Debt-to-capital ratios

	2014	2015	2016
Microsoft	20%	31%	42%
Oracle	34%	46%	48%
SAP	31%	23%	16%

*INFORMATION DERIVED FROM YCHARTS

Capital Structure Ratio Analysis (Peer Comparison)		
	SAP	ORCL
Debt-to-Equity	0.29	0.95
Debt-to-Assets	18.23	42.6
Debt-to-Capital	0.23	0.50
Interest Coverage	19.27%	7.38%

*Information derived from SAP.de & Oracle.com

From Miller & Modigliani (1958) and Ross (1977) to more recent academics, the issue of whether an optimal capital structure even exists has been the focus of much empirical research. It is important to note that while a capital mix that leans more aggressively on leverage than SAP's may be in a position to increase shareholder value through a reduction in

corporate taxation, managerial efficiency incentives and in its role as an anti-takeover strategy, empirical research on the liberal utilization of debt shows us that firms with such balance sheets are disproportionately impacted through loss of market share over the long term (Opler et al, 1997).

2.2 Equity Capitalisation



*INFORMATION DERIVED FROM YAHOO FINANCE AND MORNINGSTAR

With a common stock carry value of 1.23 billion, total shareholder equity rests around 24 billion with 22 billion in retained earnings and 2 billion of additional paid in capital. At 7.6, SAP's weighted-average cost of capital is a significant factor in creating value for shareholders. The WACC that we have calculated below will

become the basis for our discounted cash flow and dividend policy analysis below. A detailed examination of SAP's shareholder wealth creation is discussed in the following sections.

2.3 Weighted Average Cost of Capital

Finding tax rate:

	2012	2013	2014	2015	2016
Income Before Tax	3824000	4396000	4355000	3991000	4863000
Tax Expenses	100100	1071000	1075000	935000	1229000
Inc. Contin. Ops	2823000	3325000	3280000	3056000	3634000
Effective Tax	26.2	24.4	24.6	23.4	25.3
5y Avg. Tax Rate =	24.8				

9.0	Risk-Premium (9.354 – 0.355) (rm-rf)
0.355	Risk-free rate (derived from German 10Y Bond)
0.860	beta

*Information derived from Bloomberg

So, the Capital Asset Pricing Model (CAPM) is:

$$E(R_i) = R_f + \beta_i[E(R_M) - R_f]$$

$$8.09\% = .355 + .86(9.0)$$

WACC		
Tax Rate		24.8%
Rf	0.36	
Rm	9.35	
Beta	0.86	
Cost of Equity (Re)		8.09% (CAPM) Re = 0.355 + 0.860(9)
Total Debt	7100	
Interest Exp.	222	
Income Tax	53.3	
Cost of Debt (Rd)		2.38
Share Price	97.1	
Outstanding Shares	1.23	
Market Cap		119.35
BVPS	19.84	
Book Value	24.37	
MVA		94.98
MVA + Debt		102.1
We (94.98/102.1)		.93026 (93%)
Wd (7.1/102.1)		.0695 (7%)

*INFORMATION DERIVED FROM BLOOMBERG

$$WACC = 7.6 = (2.38\% \times 7.0\%) + (8.09\% \times 93.0\%) = 0.1666\% + 7.52\%.$$

3. Valuation

3.1 Relative Valuation

Our set of eight comparable companies was designed to include SAP's largest and closest competitors, such as Oracle and Microsoft. The companies were selected on a basis of having similar product portfolios and/or being direct

competitors of SAP.

Selection of Multiples

Price multiples, such as P/E, P/B and P/FCF can be useful valuation tools, as they provide a quick overview of the expected market value relative to a firm's peers. We used forward looking data, as these have been shown to be

more accurate in predicting value than historical data (Goedhart, Koller & Wessels, 2005).

The P/E multiple is widely used as a key valuation indicator, yet has several drawbacks, as earnings reporting is subject to management decisions, and earnings can be zero or even negative. The P/B and P/FCF values are more stable measures than P/E, as book value and cash flow are more difficult to manipulate than earnings.

Furthermore, a set of enterprise-value based multiples, including EV/EBITDA and EV/Revenue, was selected. Enterprise value includes both debt and equity and can therefore help to mitigate effects of changes in capital structure, which have a strong influence on P/E (Goedhart, Koller & Wessels, 2005). Median values were utilised as a comparison benchmark in the analyses below, as the median tends to be less affected by outliers than the arithmetic mean.

Data Analysis

Comparable Multiples: Price Multiples						
	P/E		P/B		P/FCF	
	FY1	FY2	FY1	FY2	FY1	FY2
SAP SE	23.43	21.67	4.30	4.00	31.70	27.10
CA Inc.	13.29	12.80	2.20	2.10	12.90	12.60
Dassault Systemes SA	34.86	31.52	5.50	5.00	39.20	32.30
IBM	11.00	10.91	6.70	6.10	11.50	11.70
Intuit Inc	30.86	27.56	20.90	16.90	25.20	22.90
Microsoft Corp	24.55	22.13	6.50	5.60	19.50	17.50
Oracle	16.62	15.40	3.40	3.10	15.00	14.30
Sage Group	23.94	21.86	7.60	6.70	23.70	22.00
Synopsys Inc	27.24	25.27	3.80	3.20	23.50	22.60
Median	23.94	21.86	5.50	5.00	23.50	22.00
SAP SE	23.43	21.67	4.30	4.00	31.70	27.10
Implied Values	99.37	98.10	124.39	121.56	72.09	78.95
SAP Current Share Price	97.25	97.25	97.25	97.25	97.25	97.25
Overvalued?	No	No	No	No	Yes	Yes
Implied Price	99.08					
Implied Upside	1.88%					

Data source: Bloomberg

Weighing the implied share prices derived from the P/E, P/B and P/FCF analyses equally, the resulting implied share price is 99.08 EUR,

which is 1.88% higher than the actual share price.

EV/EBITDA Model			
	Low (-1 S.D.)	Base	High (+1 S.D.)
EV/EBITDA	11.44	16.58	21.72
EV	79632.99	115396.80	151160.61
Minority Interest	0	0	0
Net Debt	(7,100)	(7,100)	(7,100)
Equity Value	72532.99	108296.80	144060.61
No. Shares	1228.50	1228.50	1228.50
Per Share Value	59.04	88.15	117.27
Potential Upside	-39.29%	-9.35%	20.58%

Data source: Bloomberg

The EV/EBITDA model, on the other hand, implies a share price around 88.15 EUR, implying that SAP's stock is overvalued by 9% relative to its peers based on its EBITDA. In order to analyse the derived implied prices

further, SAP's ratios across three time periods (last twelve months, forecasted current FY, and forecasted next FY) were compared to the median of its peer group:

	Current Values (LTM)					FY1					FY2				
	Enterprise Value (Currency Adjusted, M)	Current Shares Outstanding (M)	BEst EPS	EV / Revenue	EV / EBITDA	EV / Revenue	EV / EBITDA	P/E	P/B	P/FCF	EV / Revenue	EV / EBITDA	P/E	P/B	P/FCF
SAP SE	121548.90	1228.50	1.50	4.94	16.58	5.20	16.60	23.43	4.30	31.70	4.90	15.52	21.67	4.00	27.10
CA Inc.	11417.61	418.54	0.51	3.38	9.75	3.20	8.90	13.29	2.20	12.90	3.20	8.51	12.80	2.10	12.60
Dassault Systemes SA	22017.01	260.49	0.82	6.27	22.00	6.90	19.30	34.86	5.50	39.20	6.4	17.67	31.52	5.00	32.30
IBM	146532.41	925.79	4.33	2.15	10.21	2.20	9.10	11.00	6.70	11.50	2.20	8.71	10.91	6.10	11.70
Intuit Inc	33063.77	255.65	0.28	7.32	23.53	6.90	18.20	30.86	20.90	25.20	6.30	16.44	27.56	16.90	22.90
Microsoft Corp	493982.22	7714.59	0.73	5.55	15.10	5.50	13.90	24.55	6.50	19.50	5.1	12.34	22.13	5.60	17.50
Oracle	160384.22	4173.05	0.58	5.13	12.25	4.80	10.20	16.62	3.40	15.00	4.70	9.64	15.40	3.10	14.30
Sage Group	10542.49	1081.24		4.99	17.77	5.00	16.80	23.94	7.60	23.70	4.60	15.41	21.86	6.70	22.00
Synopsys Inc	10540.92	150.25	0.49	4.00	17.24	4.50	16.90	27.24	3.80	23.50	4.30	16.93	25.27	3.20	22.60
High	493982.22	7714.59	4.33	7.32	23.53	6.90	19.30	34.86	20.90	39.20	6.40	17.67	31.52	16.90	32.30
Low	10540.92	150.25	0.28	2.15	9.75	2.20	8.90	11.00	2.20	11.50	2.20	8.51	10.91	2.10	11.70
Median	33063.77	925.79	0.66	4.99	16.58	5.00	16.60	23.94	5.50	23.50	4.70	15.41	21.86	5.00	22.00
Mean	112225.51	1800.90	1.16	4.86	16.05	4.91	14.43	22.87	6.77	22.47	4.63	13.46	21.01	5.86	20.33
SAP SE	121548.90	1228.50	1.50	4.94	16.58	5.20	16.60	23.43	4.30	31.70	4.90	15.52	21.67	4.00	27.10
SAP SE vs. Median			-1.00%	0.00%	4.00%	0.00%	-2.13%	-21.82%	34.89%	4.26%	0.71%	-0.87%	-20.00%	23.18%	
SAP SE vs. Mean			1.67%	3.32%	5.88%	15.01%	2.47%	-36.45%	41.10%	5.76%	15.28%	3.13%	-31.69%	33.28%	

Data source: Bloomberg

SAP's predicted multiples are on average 0.2% higher than the median value of its competitors. that SAP appears to be fairly valued relative to its closest peers.

Judging from this overview, it can be concluded

3.2 Discounted Cash Flow Analysis Forecasting Free Cash Flows:

	2016	2017	2018	2019	2020	2021
<u>Growth % 4.2</u>						
<u>5y (YoY) Average</u>						
Revenue	22.06	22.99	23.96	24.97	26	27.1
EBIT	5.16	5.38	5.6	5.84	6.08	6.34
*(1-t)	3.87	4.04	4.2	4.38	4.56	4.76
Dep.	1.27	1.36	1.45	1.56	1.66	1.78
CAPEX	1	1.04	1.08	1.13	1.18	1.23
ΔWC	0.42	0.44	0.46	0.48	0.51	0.54
FCF	3.72	3.92	4.11	4.33	4.53	4.77

*INFORMATION DERIVED FROM MARKETWATCH & YCHARTS (ΔWC 5y avg. of 5.1%; Dep. 5y avg. of 6.9%)

$$\sum_{n=1}^{\infty} \frac{FCF_n}{(1+WACC)^n}$$

$$17.36 = \frac{3.92}{(1.076)^1} + \frac{4.11}{(1.076)^2} + \frac{4.33}{(1.076)^3} + \frac{4.53}{(1.076)^4} + \frac{4.77}{(1.076)^5}$$

Finding the Terminal Value and discounting it back:

Growth Beyond Forecast %	4.1	Equity Value	
Perpetuity Method:	$4.77(1 + 0.04)$	PV of Free Cash Flows	17.36
Terminal Value = $FCF_n \times (1 + g) \div (r - g)$	0.076 - 0.04	PV of Terminal Value	95.5
	t = 137.8	Total Equity Value	112.86
Present Terminal Value = 95.5 =>	$\frac{137.8}{(1.076)^5}$	Less Debt (01/10/17)	17.06
		Net Asset Value	95.86

As of 1 /11/17, shares outstanding rested at 1.23B with a price of \$97.1. We determined a Figure \approx \$77.9 (95.86B/1.23B), leading us to believe that SAP was overvalued based on the DCF.

4. Dividend Policy

4.1 What was paid out

Figure A: Dividends Paid Out

Year	Dividend Paid out in \$	Dividend Paid out in Euro
2012	\$1.11	0.85
2013	\$1.37	1
2014	\$1.22	1.1
2015	\$1.30	1.15
2016	\$1.33	1.25

Data Source: Bloomberg

Above in figure A, the breakdown of dividends paid each year compared to number of ordinary shares can be seen in both currencies relative to the exchange rate. SAP as a German company payout dividends in both US Dollar and Euro, with most of their shareholders coming from the United States. SAP has had no preferred dividend/stock for the last 15 years and continues to not have none as of the end of 2016. In the 2016 fiscal year, SAP investors were paid an annual dividend of \$1.31 per share with a yield of 1.52%. In the most up to date data, dividends payable increased to \$1.48. Considering an Earnings Per Share (EPS) of \$3.65, SAP produced a payout ratio of 40.55%. Investors have been in receivership of

a dividend every year since the stock was first floated in 1988. The Company's dividend policy is to return at least 35% of profit after tax to shareholders every year which we can see above is maintained in the current financial year. Given a recent change in capital allocation requirements in June 2013, management has committed to a repurchase programme that will see €120m shares bought back before June 3, 2018. Figure C, highlights peer returns diagrammatically. As we can see from this, Sap gives out a very competitive dividend in relation to its industry leading peers and more than double that of its main competitor Oracle.

Figure B: Dividend Yield %

	2013	2014	2015	2016	2017
Year-end Yield %	1.27	1.98	1.54	1.52	TBD
Ex-Dividend Date	MAY 31	MAY 22	MAY 18	MAY 10	MAY 11
Declaration Date	MAY 7	APR 8	JUN 4	MAY 16	JUN 4
Record Date	JUN 4	MAY 21	MAY 20	MAY 12	MAY 15
Payable Date	JUN 12	MAY 29	MAY 29	MAY 20	MAY 22
Dividend Payable	\$ 1.11	\$ 1.38	\$ 1.22	\$ 1.31	\$ 1.33

*INFORMATION DERIVED FROM MORNINGSTAR

Figure C: Dividends comparison with other major companies in industry (Data Source: YCharts)

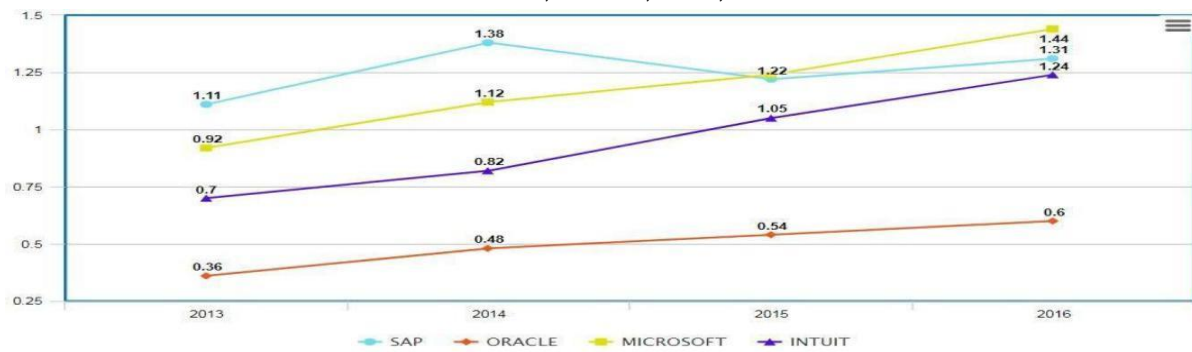


Figure D: Average Yields

	Average 5y Yields %
IBM	2.76
MICROSOFT	2.55
ORACLE	1.29
INTUIT	1.07
SAP	1.53

*INFORMATION DERIVED FROM YCHARTS

4.2 What it could have paid out

The breakdown of the calculation for the FCFE of SAP can be seen in figure E. Four out of the last five years the value of the FCFE has been greater than the dividends paid (Figure D). This number shows that SAP could have afforded to pay out more in dividends for these four years,

as it had left over cash in each of these years. SAP made no repurchases of shares in 2016, but stands to repurchase almost 93,000,000 shares by June 3 2018 as part of an agreement made at their AGM in 2013.

Figure E: FCFE (Free Cashflow to Equity) for SAP

Years	2012	2013	2014	2015	2016
Cash from Operations	4629	3636	3499	3832	3822
Capital expenditures/prop added	-1001	-636	-737	-566	-541
Disposal of Fixed assets	63	68	46	55	39
Proceeds from repayments of borrowings	-1357	-2104	5441	-625	1064
Preferred equity and hybrid capital	0	0	0	0	0
PD01(preferred equity and hybrid capital)	0	0	0	0	0
Preferred Dividends	0	0	0	0	0
FCFE	2334	964	8249	2696	4384

Data Source: Bloomberg

Figure F: FCFE (Free Cashflow to Equity) > Dividends

Years	FCFE- From Bloomberg	Dividends	FCFE-Dividends
2012	4384	1,310	3074
2013	2696	1,013	1683
2014	8249	1,194	7055

2015	964	1316	-352
2016	2334	1,378	956

Data Source: Bloomberg

The positive figures for return on equity and return on capital, as seen in figures G and H respectively, signify that the managers within the company can be trusted with one's cash. As they are constantly making significant returns

with what they acquire the firm is showing that it selects its projects very well and continues to do so over time.

Figure G: ROE (Return on Equity) to Cost of Equity

Years	ROE	Cost of Equity	ROE-COE
2012	23.75	9.880	13.874
2013	24.96	9.470	15.491
2014	22.409	9.180	13.229
2015	18.797	8.170	10.627
2016	16.713	7.330	9.383

Data Source: Bloomberg

Figure H: ROC (Return on Capital) to WACC (Weighted average cost of Capital)

Years	ROC (Return on Capital)	WACC	ROC- WACC
2012	16.07	9.29	6.78
2013	17.34	9.02	8.32
2014	13.14	7.96	5.18
2015	10.14	7.48	2.66
2016	11.31	6.79	4.52

Data Source: Bloomberg

Overall Opinion: As SAP continues to give out a reasonable dividend and use the cash that they are holding onto in an efficient manner, shareholders should be happy to let SAP's managers continue as they have done previously.

5. Conclusion

SAP is one of the largest players in the commercial software sector. Following our analysis of SAP's history and capital structure, it is evident that the company has been able to sustain a stable growth for the past 15 years, whilst also maintaining a stable dividend payout.

Barring 2015, SAP's WACC has fallen year on year over the observed period, maximising shareholder value and equity prices. Its conservative financing policy, with a greater emphasis on equity financing than debt may on the one side foreclose potential growth acceleration, yet also indicates a long-sighted managerial conservatism that is focused on long-term value creation rather than short-term growth. One danger of conservative policies is the potential stalling of further growth. However, new partnerships such as the newly announced enlargement of SAP's cooperation with Microsoft in the sphere of cloud services point in the right direction towards further growth in a highly saturated sector.

References

- 1 Bloomberg L.P. (2017) . SAP Relative Valuations 14/11/2017. Retrieved November 14, 2017 from Bloomberg Terminal.
- 2 Forbes. (2017). The World's Biggest Public Companies: 2017 Ranking. Retrieved from https://www.forbes.com/global2000/list/#header:position_industry:Software%20%26%20Programming
- 3 Goedhart, M., Koller, T. & Wessels, D. (2005). The right role for multiples in valuation. McKinsey & Company Strategy & Corporate Finance.
- 4 Retrieved from <https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/the-right-role-for-multiples-in-valuation>
- 5 Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. The American economic review, 48(3), 261-297.
- 6 Ross, S. A. (1977). The determination of financial structure: the incentive-signalling approach. The bell journal of economics, 23-40.
- 7 N.A. (2017, November 15). SAP Stock report. Retrieved from Morningstar Investment Research Database.
- 8 Opler, T. C., Saron, M., & Titman, S. (1997). Designing capital structure to create shareholder value. Journal of Applied Corporate Finance, 10(1), 21-32.
- 9 of Applied Corporate Finance, 10(1), 21-32.
- 10 SAP. (2016). SAP Annual Report 2016.
- 11 Retrieved from: <https://www.sap.com/docs/download/investors/2016/sap-2016-annual-report-form-20f.pdf>
- 12 Ycharts (2017). Dividends comparison with other major companies in industry 10/11/17.
- 13 Retrieved from <https://ycharts.com/>



Appendix

EXCEL Calculations

WACC_DCF

Tax Rate						
	2012	2013	2014	2015	2016	
Income Before t	3824000	4396000	4355000	3991000	4863000	
Tax Exp.	100100	1071000	1075000	935000	1229000	
Income Contin. Ops	2823000	3325000	3280000	3056000	3634000	
Effective tax	26.2	24.4	24.6	23.4	25.3	
5y Avg. Tax Rate =	24.8					
Cost of Equity (Re)			Cost of Debt (Rd)			
Rm	9.354		Total Debt	7100		
Rf	0.355		Interest Exp	222		
Premium	8.999		Income Tax	53.3		
beta	0.86					
CAPM =	8.09		Rd =	2.38		
WACC						
Share Price	97.1					
Outstanding Shares	1.23					
Market Cap		119.35				
BVPS	19.84					
Book Value	24.37					
MVA		94.98				
MVA + Debt		102.1				
We		0.93026				
Wd		0.0695				
WACC =		7.6				
DCF						
	2016	2017	2018	2019	2020	2021
Revenue	22.06	22.99	23.96	24.97	26	27.1
EBIT	5.16	5.38	5.6	5.84	6.08	6.34
(1-t)	3.87	4.04	4.2	4.38	4.56	4.76
Dep.	1.27	1.36	1.45	1.56	1.66	1.78
CAPEX	1	1.04	1.08	1.13	1.18	1.23
WC (ch.)	0.42	0.44	0.46	0.48	0.51	0.54
FCF	3.72	3.92	4.11	4.33	4.53	4.77
FCF PV		3.64	3.55	3.47	3.38	3.31
Sum of PV FCF =	17.36					
Terminal Value						
Year 5	4.77					
Growth Rate	0.04					
WACC	0.076					
Terminal Value =	137.8					
Terminal PV =	95.5					
Value	112.86					
Debt	17.06					
NAV =	95.86					
Per Share Value	77.9					
Current Share Price	97.1	>	77.9	Over		

	Current Values (LTM)					FY1					FY2					Blended Forward		
	Enterprise Value (Currency Adjusted, M)	Current Shares Outstanding (M)	BEst EPS	EV / Revenue	EV / EBITDA	EV / Revenue	EV / EBITDA	P/E	P/B	P/FCF	EV / Revenue	EV / EBITDA	P/E	P/B	P/FCF	EV / Revenue	EV / EBITDA	BF P/FCF
SAP SE	121548.90	1228.50	1.50	4.94	16.58	5.20	16.60	23.43	4.30	31.70	4.90	15.52	21.67	4.00	27.10	4.90	15.60	27.50
CA Inc.	11417.61	418.54	0.51	3.38	9.75	3.20	8.90	13.29	2.20	12.90	3.20	8.51	12.80	2.10	12.60	3.20	8.60	12.70
Dassault Systemes SA	22017.01	260.49	0.82	6.27	22.00	6.90	19.30	34.86	5.50	39.20	6.4	17.67	31.52	5.00	32.30	6.4	17.8	32.90
IBM	146532.41	925.79	4.33	2.15	10.21	2.20	9.10	11.00	6.70	11.50	2.20	8.71	10.91	6.10	11.70	2.20	8.70	11.70
Intuit Inc	33063.77	255.65	0.28	7.32	23.53	6.90	18.20	30.86	20.90	25.20	6.30	16.44	27.56	16.90	22.90	6.70	17.60	24.40
Microsoft Corp	493982.22	7714.59	0.73	5.55	15.10	5.50	13.90	24.55	6.50	19.50	5.1	12.34	22.13	5.60	17.50	5.4	13.20	18.70
Oracle	160384.22	4173.05	0.58	5.13	12.25	4.80	10.20	16.62	3.40	15.00	4.70	9.64	15.40	3.10	14.30	4.70	9.90	14.60
Sage Group	10542.49	1081.24	4.99	17.77	5.00	16.80	23.94	7.60	23.70	23.70	4.60	15.41	21.86	6.70	22.00	4.90	16.60	13.40
Synopsys Inc	10540.92	150.25	0.49	4.00	17.24	4.50	16.90	27.24	3.80	23.50	4.30	16.93	25.27	3.20	22.60	4.50	16.20	22.60
High	493982.22	7714.59	4.33	7.32	23.53	6.90	19.30	34.86	20.90	39.20	6.40	17.67	31.52	16.90	32.30	6.70	17.80	32.90
Low	10540.92	150.25	0.28	2.15	9.75	2.20	8.90	11.00	2.20	11.50	2.20	8.51	10.91	2.10	11.70	2.20	8.60	11.70
Median	33063.77	925.79	0.66	4.99	16.58	5.00	16.60	23.94	5.50	23.50	4.70	15.41	21.86	5.00	22.00	4.90	15.60	18.70
Mean	112225.51	1800.90	1.16	4.86	16.05	4.91	14.43	22.87	6.77	22.47	4.63	13.46	21.01	5.86	20.33	4.77	13.80	19.83
SAP SE	121548.90	1228.50	1.50	4.94	16.58	5.20	16.60	23.43	4.30	31.70	4.90	15.52	21.67	4.00	27.10	4.90	15.60	27.50
SAP SE vs. Median			-1.00%	0.00%	4.00%	0.00%	-2.13%	-21.82%	34.89%	4.26%	0.71%	-0.87%	-20.00%	23.18%		0.00%	0.00%	47.06%
SAP SE vs. Mean			1.67%	3.32%	5.88%	15.01%	2.47%	-36.45%	41.10%	5.76%	15.28%	3.13%	-31.69%	33.28%		2.80%	13.04%	38.66%

Comparable Multiples: Price Multiples							
	P/E		P/B		P/FCF		
	FY1	FY2	FY1	FY2	FY1	FY2	
SAP SE	23.43	21.67	4.30	4.00	31.70	27.10	
CA Inc.	13.29	12.80	2.20	2.10	12.90	12.60	
Dassault Systemes SA	34.86	31.52	5.50	5.00	39.20	32.30	
IBM	11.00	10.91	6.70	6.10	11.50	11.70	
Intuit Inc	30.86	27.56	20.90	16.90	25.20	22.90	
Microsoft Corp	24.55	22.13	6.50	5.60	19.50	17.50	
Oracle	16.62	15.40	3.40	3.10	15.00	14.30	
Sage Group	23.94	21.86	7.60	6.70	23.70	22.00	
Synopsys Inc	27.24	25.27	3.80	3.20	23.50	22.60	
Median	23.94	21.86	5.50	5.00	23.50	22.00	
SAP SE	23.43	21.67	4.30	4.00	31.70	27.10	
Implied Values	99.37	98.10	124.39	121.56	72.09	78.95	
SAP Current Share Price	97.25	97.25	97.25	97.25	97.25	97.25	
Overvalued?	No	No	No	No	Yes	Yes	
Implied Price	99.08						
Implied Upside	1.88%						

EV/EBITDA Model			
	Low (-1 S.D.)	Base	High (+1 S.D.)
EV/EBITDA	11.44	16.58	21.72
EV	79632.99	115396.80	151160.61
Minority Interest	0	0	0
Net Debt	(7,100)	(7,100)	(7,100)
Equity Value	72532.99	108296.80	144060.61
No. Shares	1228.50	1228.50	1228.50
Per Share Value	59.04	88.15	117.27
Potential Upside	-39.29%	-9.35%	20.58%

Company:	SAP
Share Price:	97.25
EBITDA	6,960

Company Name	EV/EBITDA
SAP SE	16.58
CA Inc.	9.75
Dassault Systemes SA	22.00
IBM	10.21
Intuit Inc	23.53
Microsoft Corp	15.10
Oracle	12.25
Sage Group	17.77
Synopsys Inc	17.24
Median	16.17
Standard Deviation	5.14

Years	FCFE	Dividends paid	cost of equity	ROE	ROC (Rate-of-Change)	WACC
2012		4,384.0	-1,310.0	83.732	23.754	48.568
2013		2,696.0	-1,013.0	-22.670	24.961	2.669
2014		8,249.0	-1,194.0	17.869	22.409	-6.500
2015		964.0	-1,316.0	10.219	18.797	25.953
2016		2,334.0	-1,378.0	4.713	16.713	12.851

In Millions of EUR except Per Share

last price

Years	cost of equity	ROE
2012	9.000	23.75
2013	-22.670	24.96
2014	17.869	22.409
2015	10.219	18.797
2016	4.713	16.713

Years	ROE	cost of equity	ROE-COE
2012	23.75	9.880	13.874
2013	24.96	9.470	15.491
2014	22.409	9.180	13.229
2015	18.797	8.170	10.627
2016	16.713	7.330	9.383

Years	ROC (Return on Capital)	WACC	ROC- WACC
2012	16.07	9.29	6.78
2013	17.34	9.02	8.32
2014	13.14	7.96	5.18
2015	10.14	7.48	2.66
2016	11.31	6.79	4.52

Years	WACC	ROC (Rate-of-Change)
2012	9.29	48.568
2013	9.02	2.669
2014	7.96	-6.500
2015	7.48	25.953
2016	6.79	12.851

Year	Dividend Paid out in \$	Dividend Paid out in Euro
2012	\$1.11	0.85
2013	\$1.37	1
2014	\$1.22	1.1
2015	\$1.30	1.15
2016	\$1.33	1.25

Dividend Payout ratio
46.74
35.9
40.09
44.97
41.09

Equity Repurchase

Euro value	Ordinary shares
2012	1,310
2013	1,013
2014	1,194
2015	1316
2016	1,378

Formula of free cash flow to equity

Cash from Operations + Capital Expenditures/Prop Add + Disposal of Fixed Assets + Proceeds from Repayments Of Borrowings + Preferred Equity and Hybrid Capital) – PD01 (Preferred Equity and Hybrid Capital) – Preferred Dividends

Years	FCFE	cash from operations	capital expenditures/Prop Add	disposal of fixed assets	proceeds from repayments of borrowings	preferred equity and Hybrid Capital	PD01(preferred equity and Hybrid Capital)	preferred dividends
2012	4384	3822	-541	39	1064	0	0	0
2013	2696	3832	-566	55	-625	0	0	0
2014	8249	3499	-737	46	5441	0	0	0
2015	964	3636	-636	68	-2104	0	0	0
2016	2334	4629	-1001	63	-1357	0	0	0

Figure: Relative Data of FCFE formula

Source: Bloomberg

Net Income	(Capital expenditure-Depreciation)	Change in Non-cash Working Capital	preferred Dividends	Principle repaid	New Debt Borrowings	FCFE	FCFE- From Bloomberg	Dividends
2012							4384	1,310
2013							2696	1,013
2014							8249	1,194
2015	3,638	-653	182	0	3852	0.0	964	1316
2016							2334	1,378

ROE(Return on Equity)	Cost of Equity
2012	23.75
2013	24.96
2014	22.41
2015	18.80
2016	16.71

ROC(Return on Capital)	WACC
2012	
2013	
2014	
2015	
2016	10.88

Capital expenditure	Depreciation	Total
2012		
2013		
2014		
2015	636	1289
2016		-653

Years	FCFE- From Bloomberg	Dividends	FCFE:Dividends
2012	4384	1,310	3074
2013	2696	1,013	1683
2014	8249	1,194	7055
2015	964	1316	-352
2016	2334	1,378	956

FCFE Workings

	2012	2013	2014	2015	2016
Net Income					4,629
Depreciation and Amortisation					1268
Capital Expenditures					1,001
Change in Non-cash Working Capital					42
Preferred Dividend					0
Principle Repaid					
New Debt Issued					

Years	cash from operations	capital expenditures /Prop Add	disposal of fixed assets	proceeds from repayments of borrowings	preferred equity and Hybrid Capital	PD01(preferred equity and Hybrid Capital)	preferred dividends	FCFE
2012	3822	-541	39	1064	0	0	0	4384
2013	3832	-566	55	-625	0	0	0	2696
2014	3499	-737	46	5441	0	0	0	8249
2015	3636	-636	68	-2104	0	0	0	964
2016	4629	-1001	63	-1357	0	0	0	2334

Years	FCFE	cash from operations	capital expenditures/Prop Add	disposal of fixed assets	proceeds from repayments of borrowings	preferred equity and Hybrid Capital	PD01(preferred equity and Hybrid Capital)	preferred dividends
2012	4384	3822	-541	39	1064	0	0	0
2013	2696	3832	-566	55	-625	0	0	0
2014	8249	3499	-737	46	5441	0	0	0
2015	964	3636	-636	68	-2104	0	0	0
2016	2334	4629	-1001	63	-1357	0	0	0

Source: Bloomberg