Bus5-140 Section 09

AMAZON.COM, INC. SALE FORECAST 2019

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Background

Amazon.com is the largest e-commerce company in the world to date. Amazon was originally founded by Jeff Bezos in 1994. The company started off as an online bookstore and later started adding other features like music, video games, electronics, and clothing (Schneider). Amazon quickly started expanding and Bezos started realizing that online shopping was the way to the future. As of now, Amazon does not only sell clothes or books, but they have recently came out with all-new line up of Echo devices, over 20 new Fire TV products, AmazonFresh has expanded to various parts of the states, and have announced new Alexa smart home features (Amazon). With all these new features and products, it's no surprise why customers love Amazon. One of Amazon's top competitors is Walmart. Unlike like Amazon, Walmart dominates physical space. Although Walmart has physical stores and pharmacies, it does not compare to Amazon. Customers love the fast shipping, member programs, and the variety of things you can find on the website. In 2017, by adding all four quarters together Amazon made an income of about $178 billion and in 2018 they made $232 billion. With this trend, I expect Amazon to increase in revenue in the future with the successful new features and products, Amazon will remain dominating online (Appendix C).

Seasonality and Trend

Seasonality is a short term that has fairly regular variations related to the calendar or time throughout the day. It also refers to predictable changes that occur over a one-year period in a business or an economy that is based on the seasons. In this case, it also refers to commercial seasons as well. Seasonality can also be used to help analyze stocks and economic trends. We can use seasonality because it has an effect in most product categories which allows us to study and figure out how to take advantage of it. Companies like Amazon will have sales that will increase during a specific season and will decrease after the season, causing a trend that will move upward and downward giving it the name "seasonality". A trend is a long-term upward or downward movement in the data. In this case, it includes the population shifts and changing income. In addition to the pattern of gradual change in a condition, output, or process, or the

tendency of a series of data points to move in a specific direction over time that is depicted through a line or curve on a graph. Amazon holds a continued revolution in retail and an essential role in the shift to cloud computing. Overall, Amazon continues to test and learn that strategy with delivery service options, selling merch, groceries, etc are are the key to selling everything else causing a trend that will go on and on (Table A1).

Forecasts

Forecasting is an indispensable component of daily business decisions, which helps management with planning and production for the corporation's future activities. Prediction of demands and trends become necessary, and helps top managers deal with seasonality, sudden change in demand, mobilize discounts to compete with competition, strikes and major fluctuations of the economy. Besides helping to deal with these problems, forecasting helps create an overview about future sale and the more executives know about the prediction the better strategy and plan they come up with for the future. The element of uncertainty is present in every business and that pose a reasonable amount of risk therefore analyzing historical data, consumer behavior provides a window to the near accurate results that help in the entire process of supply chain management. Forecasting is used in all industries, the techniques are not limited to companies like Amazon, but used in accounting and finance firms to understand cost estimates and profit projections. Marketing, Operations and Design departments also rely on the data to market, plan, and design, in addition to Human Resources uses forecasting to plan the hiring and layoff activities (Table A1).

Seasonalized Forecasts

The process starts with collecting data, it can be qualitative and quantitative. Both of these mechanisms are important and have a basic comprehension of customer needs. A successful business which generates a positive cash flow invests in both methods to see the future demands of a product. Qualitative methods focus on observation, customer interviews and purchase behavior. This data has been current and relevant. Qualitative forecasts are not based on numbers, but on a subjective approach, these methods are also useful and provide value to the

business. This technique can be useful when there isn't any prior data to use if the company is introducing a new product or design. Other subjective approaches are executive opinions, salesforce opinions and consumer surveys. One of the qualitative methods is the Delphi method which is used for technological forecasting, observing the impact on people of the changing technology. It is a method of circulating series of questions a group of people that are knowledgeable, so the results or responses are relevant. The responses are kept anonymous, which promotes honesty. The information from the last result is used for developing questions for the next group. The quantitative methods provide concrete measurable data. There are various methods used for quantitative forecasting.

A Time Series is a time ordered sequence of observations taken at regular intervals, can be data collected daily, hourly, weekly, monthly or annually. This technique works on the assumption that future values of the series can be estimated from the past values. This data can be plotted, and visualization helps with a better understanding of patterns which can show trends, seasonal variations and cycles. We also account for the random and irregular variations as well. The following definitions explain the terms that are used in forecasting methods which are used in this project and as well as in any successful business. Trend- A very important concept to observe, is a long term upward and downward shifts are an indicator for changes in population, demographics, income and any cultural changes.

Seasonality - This is a short-term, but regular variations seen at certain times or days or months in a year showing a spike or dip seasonally in business, for example the sales upward spike during the Christmas season and downward dip after the season, hence giving it the name "seasonality".

Cycles- Variations that look like waves and change with economic, political or even agricultural conditions.

Irregular variations - These variations seen due to unusual circumstances that are not indicative of normal behavior, can be seen when there is a shift in weather conditions or drastic change on product or service.

Random variations - Residual variations that are all accounted for and can be seen in the visual plot of the data.

Naive Forecasting decides on a future projection based on the data from the last period. It does not make an adjustment to any seasonal variations or cyclical trends. It is the simplest of all the forecasting methods. Advantage of using this is the zero-cost aspect and it is quick to prepare. But has a big disadvantage with accuracy. The Forecasts need to work on a model that predicts near accurate data and this technique however acceptable is lacking for a complex model. Historical data gathered is processed by other techniques like Moving averages, weighted moving averages and exponential averages.

Moving Averages - this is a classic method of time series that is widely used to estimate the trend-cycle. Unlike naive forecast, this technique uses a number of recent actual data. We can choose the number for moving average, for example it can be three period MA3 or five period MA5. Important to remember to have fewer data points for it to be responsive. Again, this method is easy to compute, and the only disadvantage is that all points are weighted equally and it will be slow to respond if any change occurs. We use moving weighted average, which is similar to the moving average, but most recent value gets assigned with the higher weight, this is better than the moving average. The next technique is the Exponential smoothing, which is a step up from weighted moving average, it is considered more sophisticated than the weighted moving average. This is based on previous forecast with added percentage of error. That is: Next forecast=Previous forecast+ (Actual -Previous forecast) or $Ft=F(t-1) + (A(t-1) -F(t-1))$ Where $=$ smoothing constant (percentage), $0 \leq a \leq 1$.

Low values are used when the underlying average tends to be stable; higher values are used when the underlying average is susceptible to change. To predict Amazon forecast, we use two different values of which are 0.7 and 0.2. However, exponential smoothing with a = 0.7 is more efficient because with a = 0.7 the error between the actual sale and the forecast is smaller than exponential smoothing with a = 0.2.

We also use techniques for Trend, comprehending a trend if it is linear or not. Linear trend equation used to develop forecasts when trend is present, followed by the form Ft = a +bt, where b the slope of the line and a is the value of Ft at t= 0. Besides a linear trend equation, there is another technique to help define linear trend which is Trend Adjusted Exponential Smoothing, also called double smoothing. A variation of simple exponential smoothing can be used when a time series has a linear trend characteristic, this is because we add a smoothed factor and a trend factor. This has an ability to adjust to changes in a trend (Table A1).

Best forecast by MAD

Mean absolute deviation (MAD) is the average of the absolute value or the difference between actual values and their average value and uses the calculation of demand variability. Since the MAD is an error measure, smaller MADs produce better smoothing of the data. Therefore, the best forecast is the MAD of linear square. The MAD of moving average for Amazon is 3926.35; the MAD of weight moving average for Amazon is 4066.71; the MAD of exponential smoothing for Amazon are 3690.22 and 10429.15; the MAD of linear square for Amazon is 1786.59; the MAD of TAF for Amazon is 1637.29 (Table A2).

Recommended Forecast

The observation and quantitative analysis of the plotted forecast illustrated the easiest forecast to use is linear trend based on the upward data points and trend line that shows a steady increasing rate for Amazon over the time period. The analyzed data are non-random and are distributed normally around the trend line therefore, the assumption that the projected forecast will continue to increase in the future.

Conclusion

As a company that surfs on a customer driven culture, it continues to dominate the ecommerce industry presently and in the coming future. It continues to grow along with their forward thinking business model and growth strategy. They are also constantly retaining and gaining new

customers as they keep up with their fame on delivery service. With delivery kept low, speedy delivery and great customer service, maintaining customer satisfaction wasn't a far off goal. Their service doesn't stop there. As the years pass and new products being produced all around the world, they are able to bring in new and old product lines and keeping up with the trends of society. These aspects awarded them with growth in annual profits, year after year. In conclusion, shown in our forecast results, there is a clear upward trend on Amazon sales and will continue to grow as there aren't many companies we can compare to the scale of Amazon.

References

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Appendix A

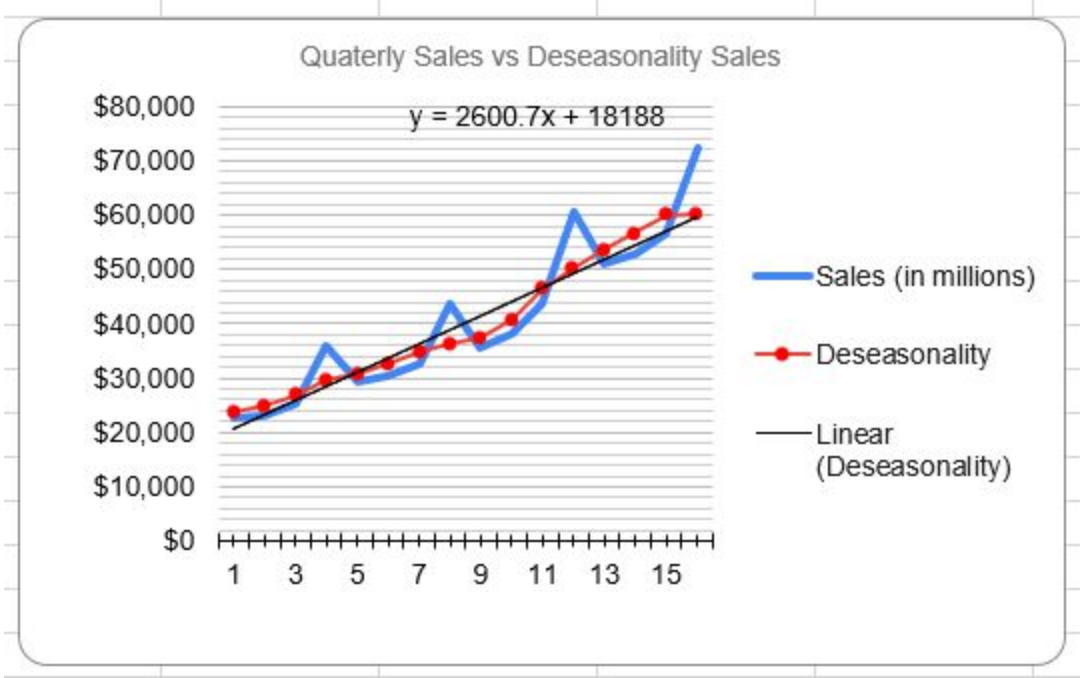
Table A1: Spreadsheet

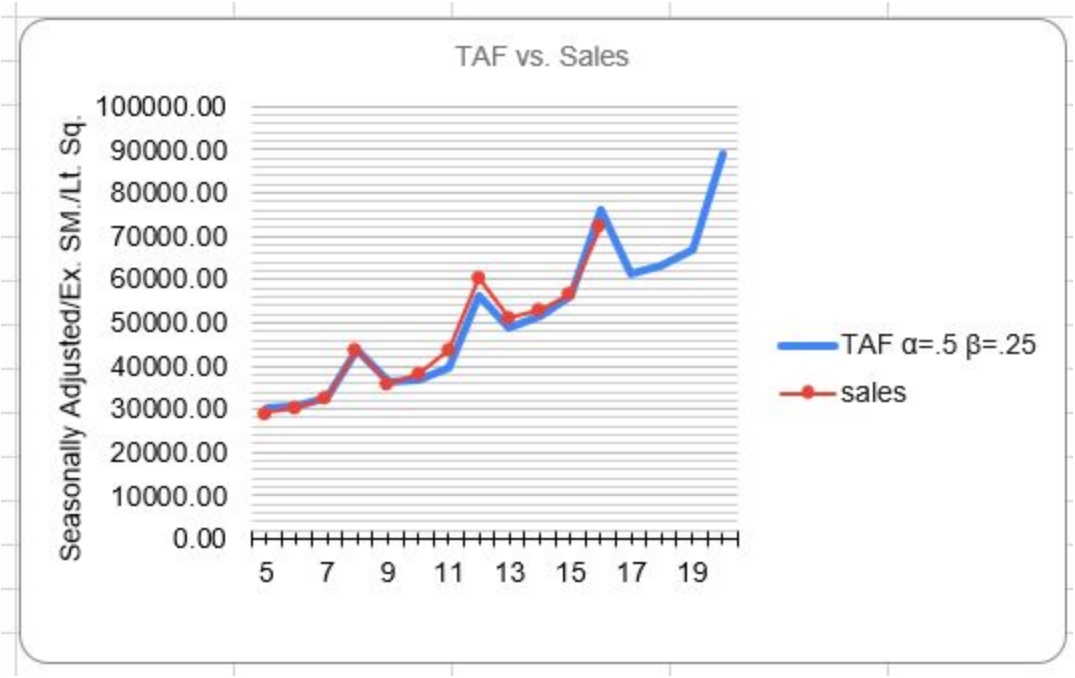
H	Moving Average	2 periods	
u	Weight Moving	5,3,1	
y	Exp. Smoothing	0.7	0.2
n	TAF	0.6	0.2

Quarters	Quarter	Sales (in millions)	MA4	MA2	Index	Deseasonality	Mov. Ave	5,3,1 Wt.Av	Ex. SM.α=.7	Ex. SM.α=.2	Lt. Sq.	TAF α=.6,β=.2	S	T
Q1	1	$22,717				23871.16			23871.16	23871.16	20788.62			
Q2	2	$23,185				24870.41			23871.16	23871.16	23389.37			
Q3	3	$25,358	26,751.75	27,553.13	0.92	26887.51	24370.79		24570.64	24071.01	25990.11			
Q4	4	$35,747	28,354.50	29,256.88	1.22	29663.44	25878.96	25880.00	26192.45	24634.31	28590.86	29663.44	29663.44	1930.76
Q1	5	$29,128	30,159.25	31,078.75	0.94	30607.88	28275.48	28205.57	28622.14	25640.14	31191.61	31594.20	31002.41	1930.76
Q2	6	$30,404	31,998.25	32,997.50	0.92	32614.19	30135.66	29879.69	30012.16	26633.69	33792.36	32933.17	32741.78	1812.40
Q3	7	$32,714	33,996.75	34,820.00	0.94	34687.21	31611.04	31617.56	31833.58	27829.79	36393.10	34554.18	34634.00	1774.12
Q4	8	$43,741	35,643.25	36,587.13	1.20	36296.99	33650.70	33542.94	33831.12	29201.27	38993.85	36408.12	36341.44	1790.09
Q1	9	$35,714	37,531.00	38,909.75	0.92	37528.49	35492.10	35351.19	35557.23	30620.41	41594.60	38131.53	37769.71	1776.75
Q2	10	$37,955	40,288.50	42,377.50	0.90	40714.10	36912.74	36802.29	36937.11	32002.03	44195.34	39546.46	40247.05	1704.39
Q3	11	$43,744	44,466.50	46,382.50	0.94	46382.50	39121.30	39161.44	39581.01	33744.45	46796.09	41951.43	44610.07	1844.50
Q4	12	$60,453	48,298.50	50,164.88	1.21	50164.88	43548.30	43509.26	44342.05	36272.06	49396.84	46454.58	48680.76	2376.23
Q1	13	$51,042	52,031.25	53,635.25	0.95	53635.25	48273.69	47854.00	48418.03	39050.62	51997.59	51056.99	52603.95	2821.47
Q2	14	$52,886	55,239.25	56,730.50	0.93	56730.50	51900.06	51672.60	52070.08	41967.55	54598.33	55425.41	56208.47	3130.86
Q3	15	$56,576	58,221.75			59988.49	55182.88	54969.24	55332.38	44920.14	57199.08	59339.32	59728.82	3287.47
Q4	16	$72,383				60064.58	58359.49	58196.58	58591.65	47933.81	59799.83	63016.29	61245.27	3365.37
Q1	17						60026.53	59668.76	59622.70	50359.96	62400.57	64610.63	64610.63	3011.16
Q2	18						60045.56	59836.23	59622.70	50359.96	65001.32	67621.80	67621.80	3011.16
Q3	19						60036.05	59805.78	59622.70	50359.96	67602.07	70632.96	70632.96	3011.16
Q4	20						60040.80	59800.70	59622.70	50359.96	70202.82	73644.13	73644.13	3011.16

	Least Squares Calculations (LINEST)		
slope	2600.747133	18187.87347	intercept
se(slope)	121.3158057	1173.068012	se(intercept)
r sqre	0.970437965	2236.952928	se(y)
F	459.5803833	14	df
ss Reg.	2299721120	70055417.62	ss Resid

				Seasonally Adjusted							MAD	MAD		
				Wt Mov	Ex. SM.			TAF		Wt.Mv	Exp. SM.	Exp. SM.		TAF
Quarters	Periods	sales	Mov. Av.	5,3,1	(α=.7)	(α=.2)	Lt. Sq.	α=.5 β=.25	Mov. Ave	3,2,1	(α=.7)	(α=.2)	Lt.Sq.	α=.6 β=.2
Q1	1	22717.00			22717.00	22717.00	19783.50							
Q2	2	23185.00			22253.47	22253.47	21804.32							
Q3	3	25358.00	22984.44		23172.92	22701.72	24511.65							
Q4	4	35747.00	31186.38	31187.63	31564.16	29686.47	34454.45	35747.00						
Q1	5	29128.00	26908.36	26841.84	27238.27	24400.44	29683.50	30066.62	2219.64	2286.16	1889.73	4727.56	555.50	938.62
Q2	6	30404.00	28093.43	27854.81	27978.30	24828.78	31502.32	30701.36	2310.57	2549.19	2425.70	5575.22	1098.32	297.36
Q3	7	32714.00	29812.82	29818.97	30022.71	26246.67	34322.86	32588.54	2901.18	2895.03	2691.29	6467.33	1608.86	125.46
Q4	8	43741.00	40551.99	40422.14	40769.41	35190.05	46990.95	43874.92	3189.01	3318.86	2971.59	8550.95	3249.95	133.92
Q1	9	35714.00	33776.06	33641.97	33838.04	29139.93	39583.51	36287.88	1937.94	2072.03	1875.96	6574.07	3869.51	573.88
Q2	10	37955.00	34411.25	34308.28	34433.97	29833.32	41200.32	36866.48	3543.75	3646.72	3521.03	8121.68	3245.32	1088.52
Q3	11	43744.00	36895.86	36933.72	37329.41	31824.87	44134.06	39565.00	6848.14	6810.28	6414.59	11919.13	390.06	4179.00
Q4	12	60453.00	52479.46	52432.41	53436.00	43710.96	59527.45	55981.77	7973.54	8020.59	7017.00	16742.04	925.55	4471.23
Q1	13	51042.00	45939.67	45540.27	46077.03	37162.53	49483.52	48588.40	5102.33	5501.73	4964.97	13879.47	1558.48	2453.60
Q2	14	52886.00	48382.91	48170.86	48541.41	39123.50	50898.33	51669.36	4503.09	4715.14	4344.59	13762.50	1987.67	1216.64
Q3	15	56576.00	52043.76	51842.27	52184.76	42364.82	53945.27	55963.77	4532.24	4733.73	4391.24	14211.18	2630.73	612.23
Q4	16	72383.00	70328.22	70131.89	70607.99	57764.37	72063.95	75940.06	2054.78	2251.11	1775.01	14618.63	319.05	3557.06
Q1	17		57124.27	56783.79	56739.96	47925.07	59383.52	61486.73	3926.35	4066.71	3690.22	10429.15	1786.59	1637.29 MAD
Q2	18		55976.40	55781.26	55582.20	46947.18	60596.33	63039.22						
Q3	19		56620.85	56403.69	56231.02	47495.20	63756.48	66614.96						
Q4	20		72354.34	72065.00	71850.50	60688.10	84600.45	88747.52						




TAF vs. Sales
Seasonally Adjusted/Ex. SM./Lt. Sq.
100000.00
90000.00
80000.00
70000.00
60000.00
50000.00
40000.00
30000.00
20000.00
10000.00
0.00
5
7
9
11
13
15
17
19
TAF α=.5 β=.25
sales


Lt. Sq. vs. Sales
Seasonally Adjusted/Ex. SM./Lt. Sq.
90000.00
80000.00
70000.00
60000.00
50000.00
40000.00
30000.00
20000.00
10000.00
0.00
1
3
5
7
9
11
13
15
17
19
Lt. Sq.
sales

Table A2: Spreadsheet Formula

Quarters	Quarter	Sales (in millions)	MA4	MA2	Index	Deseasonality	Mov. Ave	5,3,1 Wt.Av	Ex. SM.α=.7	Ex. SM.α=.2	Lt. Sq.	TAF α=.6,β=.2	$	T
Q1	1	22717				=D7/quarter1index			=H7	=H7	=D$30+C$30*C7			
Q2	2	23185				=D8/quarter2index			=K7+0.7*(H7-K7)	=L7+0.2*(H7-L7)	=D$30+C$30*C8			
Q3	3	25358	=(D7+D8+D9+D10)/4	=(E9+E10)/2	=D9/F9	=D9/quarter3index	=(H7+H8)/2		=K8+0.7*(H8-K8)	=L8+0.2*(H8-L8)	=D$30+C$30*C9			
Q4	4	35747	=(D8+D9+D10+D11)/4	=(E10+E11)/2	=D10/F10	=D10/quarter4index	=(H8+H9)/2	=(5*H9+3*H8+1*H7)/(5+3+1)	=K9+0.7*(H9-K9)	=L9+0.2*(H9-L9)	=D$30+C$30*C10	=H10	=N10+0.6*(H10-N10)	=(H10-H7)/3
Q1	5	29128	=(D9+D10+D11+D12)/4	=(E11+E12)/2	=D11/F11	=D11/quarter1index	=(H9+H10)/2	=(5*H10+3*H9+1*H8)/(5+3+1)	=K10+0.7*(H10-K10)	=L10+0.2*(H10-L10)	=D$30+C$30*C11	=O10+P10	=N11+0.6*(H11-N11)	=P10+0.2*(N11-N10-P10)
Q2	6	30404	=(D10+D11+D12+D13)/4	=(E12+E13)/2	=D12/F12	=D12/quarter2index	=(H10+H11)/2	=(5*H11+3*H10+1*H9)/(5+3+1)	=K11+0.7*(H11-K11)	=L11+0.2*(H11-L11)	=D$30+C$30*C12	=O11+P11	=N12+0.6*(H12-N12)	=P11+0.2*(N12-N11-P11)
Q3	7	32714	=(D11+D12+D13+D14)/4	=(E13+E14)/2	=D13/F13	=D13/quarter3index	=(H11+H12)/2	=(5*H12+3*H11+1*H10)/(5+3+1)	=K12+0.7*(H12-K12)	=L12+0.2*(H12-L12)	=D$30+C$30*C13	=O12+P12	=N13+0.6*(H13-N13)	=P12+0.2*(N13-N12-P12)
Q4	8	43741	=(D12+D13+D14+D15)/4	=(E14+E15)/2	=D14/F14	=D14/quarter4index	=(H12+H13)/2	=(5*H13+3*H12+1*H11)/(5+3+1)	=K13+0.7*(H13-K13)	=L13+0.2*(H13-L13)	=D$30+C$30*C14	=O13+P13	=N14+0.6*(H14-N14)	=P13+0.2*(N14-N13-P13)
Q1	9	35714	=(D13+D14+D15+D16)/4	=(E15+E16)/2	=D15/F15	=D15/quarter1index	=(H13+H14)/2	=(5*H14+3*H13+1*H12)/(5+3+1)	=K14+0.7*(H14-K14)	=L14+0.2*(H14-L14)	=D$30+C$30*C15	=O14+P14	=N15+0.6*(H15-N15)	=P14+0.2*(N15-N14-P14)
Q2	10	37955	=(D14+D15+D16+D17)/4	=(E16+E17)/2	=D16/F16	=D16/quarter2index	=(H14+H15)/2	=(5*H15+3*H14+1*H13)/(5+3+1)	=K15+0.7*(H15-K15)	=L15+0.2*(H15-L15)	=D$30+C$30*C16	=O15+P15	=N16+0.6*(H16-N16)	=P15+0.2*(N16-N15-P15)
Q3	11	43744	=(D15+D16+D17+D18)/4	=(E17+E18)/2	=D17/F17	=D17/quarter3index	=(H15+H16)/2	=(5*H16+3*H15+1*H14)/(5+3+1)	=K16+0.7*(H16-K16)	=L16+0.2*(H16-L16)	=D$30+C$30*C17	=O16+P16	=N17+0.6*(H17-N17)	=P16+0.2*(N17-N16-P16)
Q4	12	60453	=(D16+D17+D18+D19)/4	=(E18+E19)/2	=D18/F18	=D18/quarter4index	=(H16+H17)/2	=(5*H17+3*H16+1*H15)/(5+3+1)	=K17+0.7*(H17-K17)	=L17+0.2*(H17-L17)	=D$30+C$30*C18	=O17+P17	=N18+0.6*(H18-N18)	=P17+0.2*(N18-N17-P17)
Q1	13	51042	=(D17+D18+D19+D20)/4	=(E19+E20)/2	=D19/F19	=D19/quarter1index	=(H17+H18)/2	=(5*H18+3*H17+1*H16)/(5+3+1)	=K18+0.7*(H18-K18)	=L18+0.2*(H18-L18)	=D$30+C$30*C19	=O18+P18	=N19+0.6*(H19-N19)	=P18+0.2*(N19-N18-P18)
Q2	14	52886	=(D18+D19+D20+D21)/4	=(E20+E21)/2	=D20/F20	=D20/quarter2index	=(H18+H19)/2	=(5*H19+3*H18+1*H17)/(5+3+1)	=K19+0.7*(H19-K19)	=L19+0.2*(H19-L19)	=D$30+C$30*C20	=O19+P19	=N20+0.6*(H20-N20)	=P19+0.2*(N20-N19-P19)
Q3	15	56576	=(D19+D20+D21+D22)/4			=D21/quarter3index	=(H19+H20)/2	=(5*H20+3*H19+1*H18)/(5+3+1)	=K20+0.7*(H20-K20)	=L20+0.2*(H20-L20)	=D$30+C$30*C21	=O20+P20	=N21+0.6*(H21-N21)	=P20+0.2*(N21-N20-P20)
Q4	16	72383				=D22/quarter4index	=(H20+H21)/2	=(5*H21+3*H20+1*H19)/(5+3+1)	=K21+0.7*(H21-K21)	=L21+0.2*(H21-L21)	=D$30+C$30*C22	=O21+P21	=N22+0.6*(H22-N22)	=P21+0.2*(N22-N21-P21)
Q1	17						=(H21+H22)/2	=(5*H22+3*H21+1*H20)/(5+3+1)	=K22+0.7*(H22-K22)	=L22+0.2*(H22-L22)	=D$30+C$30*C23	=O22+P22	=N23+0.6*(N23-N23)	=P22+0.2*(N23-N22-P22)
Q2	18						=(H22+I23)/2	=(5*I23+3*H22+1*H21)/(5+3+1)	=K23+0.7*(K23-K23)	=L23+0.2*(L23-L23)	=D$30+C$30*C24	=O23+P23	=N24+0.6*(N24-N24)	=P23+0.2*(N24-N23-P23)
Q3	19						=(I23+I24)/2	=(5*I24+3*I23+1*H22)/(5+3+1)	=K24+0.7*(K24-K24)	=L24+0.2*(L24-L24)	=D$30+C$30*C25	=O24+P24	=N25+0.6*(N25-N25)	=P24+0.2*(N25-N24-P24)
Q4	20						=(I24+I25)/2	=(5*I25+3*I24+1*I23)/(5+3+1)	=K25+0.7*(K25-K25)	=L25+0.2*(L25-L25)	=D$30+C$30*C26	=O25+P25	=N26+0.6*(N26-N26)	=P25+0.2*(N26-N25-P25)

		Least Square		
	slope	=LINEST(H7:I	=LINEST(H7:H22	intercept
	se(slope)	=LINEST(H7:I	=LINEST(H7:H22	se(intercept)
	r sqre	=LINEST(H7:I	=LINEST(H7:H22	se(y)
	F	=LINEST(H7:I	=LINEST(H7:H22	df
	ss Reg.	=LINEST(H7:I	=LINEST(H7:H22	ss Resid

					Seasonally Adjuste				TAF			MAD	MAD		
					Wt Mov	Ex. SM.					Wt.Mv	Exp. SM.	Exp. SM.		TAF
	Quarters	Periods	sales	Mov. Av.	5,3,1	(α=.7)	(α=.2)	Lt. Sq.	α=.5 β=.25	Mov. Ave	3,2,1	(α=.7)	(α=.2)	Lt.Sq.	α=.6 β=.2
2015	Q1	1	=D7			=K7*quarter	=L7*quarter1index	=M7*quarter1ind							
	Q2	2	=D8			=K8*quarter	=L8*quarter2index	=M8*quarter2ind							
	Q3	3	=D9	=I9*quarter3index		=K9*quarter	=L9*quarter3index	=M9*quarter3ind							
	Q4	4	=D10	=I10*quarter4index	=J10*quarter4ind	=K10*quarte	=L10*quarter4index	=M10*quarter4ini	=N10*quarter4index						
2016	Q1	5	=D11	=I11*quarter1index	=J11*quarter1ind	=K11*quarte	=L11*quarter1index	=M11*quarter1in	=N11*quarter1index	=ABS($D43-E43)	=ABS($D43-F43)	=ABS($D43-G43)	=ABS($D43-H4	=ABS($D43-I43)	=ABS($D43-J43)
	Q2	6	=D12	=I12*quarter2index	=J12*quarter2ind	=K12*quarte	=L12*quarter2index	=M12*quarter2in	=N12*quarter2index	=ABS($D44-E44)	=ABS($D44-F44)	=ABS($D44-G44)	=ABS($D44-H4	=ABS($D44-I44)	=ABS($D44-J44)
	Q3	7	=D13	=I13*quarter3index	=J13*quarter3ind	=K13*quarte	=L13*quarter3index	=M13*quarter3in	=N13*quarter3index	=ABS($D45-E45)	=ABS($D45-F45)	=ABS($D45-G45)	=ABS($D45-H4	=ABS($D45-I45)	=ABS($D45-J45)
	Q4	8	=D14	=I14*quarter4index	=J14*quarter4ind	=K14*quarte	=L14*quarter4index	=M14*quarter4ini	=N14*quarter4index	=ABS($D46-E46)	=ABS($D46-F46)	=ABS($D46-G46)	=ABS($D46-H4	=ABS($D46-I46)	=ABS($D46-J46)
2017	Q1	9	=D15	=I15*quarter1index	=J15*quarter1ind	=K15*quarte	=L15*quarter1index	=M15*quarter1in	=N15*quarter1index	=ABS($D47-E47)	=ABS($D47-F47)	=ABS($D47-G47)	=ABS($D47-H4	=ABS($D47-I47)	=ABS($D47-J47)
	Q2	10	=D16	=I16*quarter2index	=J16*quarter2ind	=K16*quarte	=L16*quarter2index	=M16*quarter2in	=N16*quarter2index	=ABS($D48-E48)	=ABS($D48-F48)	=ABS($D48-G48)	=ABS($D48-H4	=ABS($D48-I48)	=ABS($D48-J48)
	Q3	11	=D17	=I17*quarter3index	=J17*quarter3ind	=K17*quarte	=L17*quarter3index	=M17*quarter3in	=N17*quarter3index	=ABS($D49-E49)	=ABS($D49-F49)	=ABS($D49-G49)	=ABS($D49-H4	=ABS($D49-I49)	=ABS($D49-J49)
	Q4	12	=D18	=I18*quarter4index	=J18*quarter4ind	=K18*quarte	=L18*quarter4index	=M18*quarter4ini	=N18*quarter4index	=ABS($D50-E50)	=ABS($D50-F50)	=ABS($D50-G50)	=ABS($D50-H5	=ABS($D50-I50)	=ABS($D50-I50)
2018	Q1	13	=D19	=I19*quarter1index	=J19*quarter1ind	=K19*quarte	=L19*quarter1index	=M19*quarter1in	=N19*quarter1index	=ABS($D51-E51)	=ABS($D51-F51)	=ABS($D51-G51)	=ABS($D51-H5	=ABS($D51-I51)	=ABS($D51-I51)
	Q2	14	=D20	=I20*quarter2index	=J20*quarter2ind	=K20*quarte	=L20*quarter2index	=M20*quarter2in	=N20*quarter2index	=ABS($D52-E52)	=ABS($D52-F52)	=ABS($D52-G52)	=ABS($D52-H5	=ABS($D52-I52)	=ABS($D52-I52)
	Q3	15	=D21	=I21*quarter3index	=J21*quarter3ind	=K21*quarte	=L21*quarter3index	=M21*quarter3in	=N21*quarter3index	=ABS($D53-E53)	=ABS($D53-F53)	=ABS($D53-G53)	=ABS($D53-H5	=ABS($D53-I53)	=ABS($D53-I53)
	Q4	16	=D22	=I22*quarter4index	=J22*quarter4ind	=K22*quarte	=L22*quarter4index	=M22*quarter4ini	=N22*quarter4index	=ABS($D54-E54)	=ABS($D54-F54)	=ABS($D54-G54)	=ABS($D54-H5	=ABS($D54-I54)	=ABS($D54-J54)
2019	Q1	17		=I23*quarter1index	=J23*quarter1ind	=K23*quarte	=L23*quarter1index	=M23*quarter1in	=N23*quarter1index	=SUM(K43:K54)/12	=SUM(L43:L54)/12	=SUM(M43:M54)/12	=SUM(N43:N54	=SUM(O43:O54)/12	=SUM(P43:P54)/12
	Q2	18		=I24*quarter2index	=J24*quarter2ind	=K24*quarte	=L24*quarter2index	=M24*quarter2in	=N24*quarter2index						
	Q3	19		=I25*quarter3index	=J25*quarter3ind	=K25*quarte	=L25*quarter3index	=M25*quarter3in	=N25*quarter3index						
	Q4	20		=I26*quarter4index	=J26*quarter4ind	=K26*quarte	=L26*quarter4index	=M26*quarter4ini	=N26*quarter4index						

Appendix B

Amazon's Income Statement in Three Years 2016, 2017 and 2018

AMAZON.COM, INC.

CONSOLIDATED STATEMENTS OF OPERATIONS

(in millions, except per share data)

	Year Ended December 31,		
	2016	2017	2018
Net product sales	$ 94,665	$ 118,573	$ 141,915
Net service sales	41,322	59,293	90,972
Total net sales	135,987	177,866	232,887
Operating expenses:			
Cost of sales	88,265	111,934	139,156
Fulfillment	17,619	25,249	34,027
Marketing	7,233	10,069	13,814
Technology and content	16,085	22,620	28,837
General and administrative	2,432	3,674	4,336
Other operating expense, net	167	214	296
Total operating expenses	131,801	173,760	220,466
Operating income	4,186	4,106	12,421
Interest income	100	202	440
Interest expense	(484)	(848)	(1,417)
Other income (expense), net	90	346	(183)
Total non-operating income (expense)	(294)	(300)	(1,160)
Income before income taxes	3,892	3,806	11,261
Provision for income taxes	(1,425)	(769)	(1,197)
Equity-method investment activity, net of tax	(96)	(4)	9
Net income	$ 2,371	$ 3,033	$ 10,073
Basic earnings per share	$ 5.01	$ 6.32	$ 20.68
Diluted earnings per share	$ 4.90	$ 6.15	$ 20.14
Weighted-average shares used in computation of earnings per share:			
Basic	474	480	487
Diluted	484	493	500

Appendix C

Net Sales in Quarters in Four Years 2015, 2016, 2017 and 2018

	Year Ended December 31, 2015 (1)			
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Net sales	$ 22,717	$ 23,185	$ 25,358	$ 35,747
Operating income	255	464	406	1,108
Income before income taxes	21	362	247	938
Provision for income taxes	(71)	(266)	(161)	(453)
Net income (loss)	(57)	92	79	482
Basic earnings per share	(0.12)	0.20	0.17	1.03
Diluted earnings per share	(0.12)	0.19	0.17	1.00
Shares used in computation of earnings per share:				
Basic	465	467	468	470
Diluted	465	476	478	481

	Year Ended December 31, 2016 (1)			
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Net sales	$ 29,128	$ 30,404	$ 32,714	$ 43,741
Operating income	1,071	1,285	575	1,255
Income before income taxes	1,056	1,179	491	1,166
Provision for income taxes	(475)	(307)	(229)	(414)
Net income (loss)	513	857	252	749
Basic earnings per share	1.09	1.81	0.53	1.57
Diluted earnings per share	1.07	1.78	0.52	1.54
Shares used in computation of earnings per share:				
Basic	471	473	474	476
Diluted	481	483	485	486

Amazon's income statement from Amazon.com, Inc. (2017). 2016 10-K form.

	Year Ended December 31, 2017 (1)			
	First Quarter	Second Quarter	Third Quarter (2)	Fourth Quarter (2)
Net sales	$ 35,714	$ 37,955	$ 43,744	$ 60,453
Operating income	1,005	628	347	2,127
Income before income taxes	953	666	316	1,872
Provision for income taxes	(229)	(467)	(58)	(16)
Net income	724	197	256	1,856
Basic earnings per share	1.52	0.41	0.53	3.85
Diluted earnings per share	1.48	0.40	0.52	3.75
Shares used in computation of earnings per share:				
Basic	477	479	481	483
Diluted	490	492	494	496

	Year Ended December 31, 2018 (1)			
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Net sales	$ 51,042	$ 52,886	$ 56,576	$ 72,383
Operating income	1,927	2,983	3,724	3,786
Income before income taxes	1,916	2,605	3,390	3,350
Provision for income taxes	(287)	(74)	(508)	(327)
Net income	1,629	2,534	2,883	3,027
Basic earnings per share	3.36	5.21	5.91	6.18
Diluted earnings per share	3.27	5.07	5.75	6.04
Shares used in computation of earnings per share:				
Basic	484	486	488	490
Diluted	498	500	501	501

Amazon's income statement from Amazon.com, Inc. (2019). 2018 10-K form.