

Forecasting an income statement and balance sheet: a case exercise for beginners

Hsin-hui I. H. Whited
Colorado State University – Pueblo

Hailu Regassa,
Colorado State University – Pueblo

Abstract

This hypothetical finance case requires students to use various ratios and assumptions to forecast an income statement and balance sheet. The stock price for the company and new issues of common stock are then projected based on these statements.

Keywords: Income statement, Balance Sheet, Forecasting Stock Price, P/E Ratio, Teaching Case.



TARGETED STUDENTS OF THIS CASE

This case allows instructors to introduce a simple forecasting technique for a stock price, this introduction coming right after students have an elementary understanding of the relationship between income statements and balance sheets. Since the required understanding of accounting is quite basic for solving this case, the targeted students of this case are beginners in finance. The most appropriate course to adopt this case will be Principles of Finance. This case demonstrates how to forecast an income statement and balance sheet. In addition, by employing the P/E ratio and a confidence interval, this case also displays how to project a stock price based on the forecasted income statement and balance sheet.

ABC PLUMBING CORPORATION

ABC Plumbing (ABC), an Atlanta-based corporation, has been installing plumbing systems in residential construction sites for an extended number of years. All through these years, the ABC did not implement an integrated short- and long-term financial plan to guide its operations and assess potential bottlenecks. To begin with, Ann Smith, the newly hired CFO, is keenly interested to mobilize all departments and resources to come up with a well coordinated financial forecast for this coming year. She believes that the experience gained from annual short-term forecast will help her implement a much thought out long-term financial planning in the upcoming year.

Smith figured out that revenue for the current year is \$3 billion, and the marketing department projects a 10% increase in sales for next year. Some estimates of selected ratios and the balance sheet and income statement for the current year are given in Table 1 and 2, respectively. Smith was also informed that the company is currently operating at full capacity, but is not quite sure about it. Armed with the accounting data made available to her, Smith initiated a meeting with the CEO and other top executives to discuss her plans to implement an annual financial forecast for the following year. They all expressed their desire to get this plan completed and agreed to cooperate with her. Together, they were able to review these ratios and compare them with industry standards. They all agreed that significant step must be taken to improve the financial performance of the firm in coming year. Smith made it clear to everyone in the meeting that lack of coordination and integrated financial plans may trigger a potential takeover of the firm whereby they could all lose their jobs.

As a recent graduate from a business school, suppose you are recently hired as Smith's assistant to help her develop financial forecast for the upcoming year. Smith asks you to begin your task by first obtaining updated information from the various departments regarding production, inventory, receivable, and payables. Through your inquiry, you are able to gather the following valuable information from the department managers and the CFO:

- (a) Due to the recent change in credit terms granted to clients, ABC's current level of average collection period or Days' Sales Outstanding (DSO) will be reduced to 35 in line with the industry average of 32.41. By offering discount incentives to encourage prompt payment and through favorable credit terms the receivables manager expects to meet this targeted goal.
- (b) A relatively new inventory management system that rearranged the orderly flow of plumbing parts has begun to yield positive improvement. This efficiency gain is expected to increase inventory turnover to 6 times annually.
- (c) Most ABC's construction workers belong to the labor union and their wages are contractually pegged to COLA (Cost-Of-Living-Adjustment). The recent deflation resulting from the current recession has produced a negative COLA figure. This will take effect when its workers sign ABC's new wage contracts at the beginning of the year. According to payables manager, this reduction of wages is estimated to yield a lower operating costs-to-sales ratio of 90% for the coming year.
- (d) ABC has a good credit in the past. With prevailing interest rates currently at a historically low level, Smith has decided to redeem ABC's high-rate bonds issued six years ago with a new low rate. This will reduce ABC's interest-bearing debt and result in a lower liability-to-asset ratio of 30%.

- (e) ABC's current dividend payout ratio is 28.99% while the average payout ratio for the plumbing industry is 22%. Smith has planned to cut down this ratio to 25% of retained earnings to make room for potential growth. As shareholders have in the past favored capital gains over cash dividends, Smith projects that the dividend reduction will not have much of a negative impact on the value of the firm.

REQUIREMENTS

1. Incorporate and update the information given in Table 1 to reflect the changes for the upcoming year.
2. Prepare the income statement and balance sheet for next year based on these assumptions: (a) cash, fixed assets, payables and accruals will grow with sales; (b) the current composition of interest-bearing debts, which includes short-term bank loans and long term bonds, will be maintained for next year; (c) a tax rate of 40%; (d) 10% interest rate on all interest-bearing debts; (e) 50 million common shares outstanding.
3. The current market price of ABC's common stocks is at \$23.05. If all assumptions are realized, what is your estimate for ABC's stock a year from now based on today's P/E ratio?
4. If the growth rate of ABC next year is only 6%, but all other assumptions are maintained, what will ABC's stock price be? If this growth rate turns out to be a better-than-expected rate of 12%, how much will this stock be worth a year from now based on this model?
5. You believe that there is a 50% probability for ABC to grow at 10% next year, a 30% probability at 6%, and a 20% probability of attaining a maximum growth rate of 12%. Based on these three scenarios, what is your expected stock price of ABC next year? What is the standard deviation of your estimate? What will the price range be like if you place a 95% confidence interval?

INSTRUCTOR'S MANUAL

1. Days Sales Outstanding (DSO) is, by its definition, equal to Accounts Receivable/Daily Sales. This implies that the projected (Accounts Receivable/Sales) ratio to be equal to DSO/365. Employing this mathematical relationship generates a projected (Accounts Receivable/Sales) ratio of 9.589% ($=35/365 = 9.589\%$) when a DSO of 35 is applied. The inventory turnover ratio is the reciprocal of the (Inventories/Sales) ratio. As the inventory turnover ratio is projected to be 6x, the (Inventory/Sales) ratio becomes 16.67% ($= 1/6 = 16.67\%$). The remaining ratios are also updated in Table 3 based on the new projections made by the various departments.
2. Projected income statements and balance sheets for the current as well as the upcoming year are compiled in Table 4. Abbreviated notes of reasoning are listed under the column "Changes." Specific details of the rationale for the projected statements are provided, as is required, in the order in which they are presented in this section. All dollar values are expressed in millions, except for earnings per share (EPS), ratios, stock prices, and shares outstanding.
 - (1) Sales:
As Sales is expected to increase by 10%, Sales of next year will amount to \rightarrow
 $\$3,000 * (1 + 10\%) = \$3,300$.
 - (2) Operating Cost (including Depreciation):
Operating Costs is expected to be 90% of projected Sales $\rightarrow 90\% * \$3,300 = \$2,970$.
 - (3) Earnings before Interest and Taxes (EBIT):
EBIT = Sales minus Operating Costs $\rightarrow \$3,300 - \$2,970 = \$330$.

- (4) **Cash:**
 Based on the assumption made in this case, Cash increases at the same rate as the growth in Sales, which amounts to $\rightarrow \$50*(1+10\%) = \55 .
 The above calculation implies that the ratio of Cash to Sales remains constant despite the growth in sales. The same could also be said regarding the line items Fixed Assets and (Payables + Accruals). As these two items are also growing with sales, ratios of Fixed Assets/Sales and (Payables + Accruals)/Sales, are implicitly assumed unchanged despite the growth in revenue. However, if the instructor does not wish to adhere to these assumptions, these three ratios could then be specified at some predetermined target levels to get around these implicit assumptions.
- (5) **Accounts Receivable (AR):**
 Accounts Receivable for next year is based on the projected AR/Sales ratio of 9.589% and is calculated as follows $\rightarrow (9.589\%)*(\$3,300) = \$316.44 = \$316$ (rounded)
- (6) **Inventories:**
 Inventory is projected to be 16.67% of sales $\rightarrow (16.67\% = 1/6) *(\$3,300) = \$550.00 = \550 (rounded).
- (7) **Fixed Assets (FA):**
 Based on the assumptions given in this case, ABC's Fixed Assets increase at the same rate as Sales do and is equal to current Fixed Assets $* (1+ 10\%) = \$1,000 *1.1 = \$1,100$.
- (8) **Total Assets (TA):**
 Projected Total Assets = Sum of Cash, AR, Inventory and FA = $\$55 + \$316.44 + \$550 + \$1,100 = \$2, 021.44 = \$2,021$ (rounded).
- (9) **Total Liabilities (TL):**
 Once Total Assets is determined, given Liabilities/Assets target ratio of 30%, Total Liabilities (TL) = $30\% * \$2,021.44 = \$606.43 = \$606$ (rounded).
- (10) **Total Common Equity (E):**
 The company has not issued preferred stock. Total equity (E) in this case = Total Assets – Total Liability = $\$2, 021.44 - \$606.43 = \$1,415.01 = \$1,415$ (rounded)
- (11) **Payables + Accruals:**
 (Payables + Accruals) are assumed to grow in proportion to Sales which is = $\$200*(1+10\%) = \220 .
- (12) **Interest-Bearing Debts (IBD):**
 Although there is no line item of interest-bearing debt (IBD), it could be calculated by subtracting non-interest bearing liabilities (Payables + Accruals) from Total Liabilities $\rightarrow = TL - (\text{Payables} + \text{Accruals}) = \$606.43 - \$220 = \$386.43 = \$386$ (rounded).
- (13) **Interest Expense (IE):**
 In this case, interest is assumed to be 10% of interest-bearing debts. Therefore, Interest Expense = $10\% * \text{Interest-Bearing Debts} = 10\% * \$386.43 = \$38.64 = \39 (rounded).
- (14) **Short-Term Bank Loans (STBL):**
 In this case, as the portion of Short-Term Bank Loans to total Interest-Bearing Debts is assumed to remain unchanged, we could determine this ratio from the *current year's* balance sheet and then multiply this ratio by the *projected* Interest-Bearing Debts. The ratio of

- (STBL/IBD) for the current year = $\$100/\850 . Multiplying this ratio by the projected IBD yields $(\$100/\$850) * \$386.43 = \$45.46 = \$45$ (rounded).
- (15) Long-Term Bonds (LTB):
As projected Interests-Bearing Debts comprises of Short-Term Banks Loans and Long-Term Bonds, LTB then equals projected IBD minus projected STBL = $\$386.43 - \$45.46 = \$340.97 = \341 (rounded).
- (16) Earnings before Taxes (EBT):
EBT is equal to EBIT – Interest Expense and is = $\$330 - \$38.64 = \$291.36 = \291 (rounded).
- (17) Taxes:
40% of EBT (= $\$291.36$) = $\$116.54 = \117 (rounded).
- (18) Net Income (NI):
Net Income = Earnings Before Taxes - Taxes = $\$291.36 - \$116.54 = \$175$ (rounded).
- (19) Dividend:
The CFO plans to reduce ABC's dividend payout ratio to 25% for next year. Total dividend is then projected to be 25% of Net Income → $25\% * \$174.81 = \$43.70 = \$44$ (rounded).
- (20) Addition to Retained Earnings:
Addition to Retained Earnings = Net Income – Dividend = $\$175$ (rounded) - $\$44$ (rounded) = $\$131.11 = \131 .
- (21) Retained Earnings:
Projected Retained Earnings next year = Retained Earnings (current year) + Addition to Retained Earnings (next year) → = $\$800 + \$131.11 = \$931.11 = \931 (rounded).
- (22) Common Stock:
Projected Common Stock = Projected Total Common Equity – Projected Retained Earnings = $\$1,415.01 - \$931.11 = \$483.90 = \484 (rounded).
3. In order to project the stock price based on the current P/E ratio, we need to know (a) Earnings Per Share (EPS) at the current year, (b) P/E ratio at the current year and (c) the projected EPS for next year. After (b) and (c) are found, multiplying (b) by (c) will yield the forecast for the stock price next year. Current EPS = Net Income at current year/number of outstanding common share = $\$69$ million/ 50 million = $\$1.38$ per share; (b) Current P/E = $\$23.05/\$1.38 = 16.70$; (c) Projected EPS for next year is determined as follows. As projected common stock increases to $\$483.9$ million from $\$150$ million from the current -year level, an additional $\$334$ million (rounded) worth of stocks must be sold to the public. With the current stock valued at $\$23.05$ per share, ABC will need to issue additional 14.49 (rounded) million shares (= $\$333.90$ million/ $\$23.05$ per share). Adding these 14.49 million new shares to the existing 50 million shares gives us a total of 64.49 (rounded) million shares outstanding for next year. Therefore the projected EPS = projected Net Income of 174.82 million divided by 64.49 million shares = $\$2.71$. Multiplying $\$2.71$ (rounded) by the current P/E ratio of 16.70 results in a projected stock price of $\$45.28$ (see Table 5).
4. Applying the same method, if ABC's growth rate turns out to be 6%, assuming all other assumptions hold, the stock price of ABC will be reduced to $\$45.05$. If the growth rate increases to 12%, the forecasted price will then be as high as $\$45.39$. Refer to Table 6 and 7 for the calculations of projected prices under the growth-rate assumptions of 6% and 12%, respectively.
5. Use stated probabilities for this scenario analysis, the expected stock price of ABC is projected at $\$45.23$ (Table 8). In order to find out the standard deviation of this estimate, we first obtain the variance under this scenarios analysis, and then take a square-root of this variance to determine its

standard deviation (σ). The variance is the sum of the squared deviation under each scenario multiplied by the respective probabilities of a scenario. This deviation is measured by the distance between the projected stock price under a specific scenario and the expected mean of 45.23. This procedure will result in an estimated variance of 0.01628 (refer to the column D in Table 9). The square-root of the variance yields a standard deviation (σ) of \$0.1276. Subtracting 1.96* standard deviation (σ) from the expected price of \$45.23, will generate a lower bound estimate of \$44.98 for a 95% confidence interval. Adding 1.96* standard deviation (σ) to the expected price will generate an upper bound estimate of \$45.48 for this interval.

REFERENCE:

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Table 1: Selected Ratios: ABC Plumbing, INC. and Its Industry

	ABC: Current Year	Industry
Operating Costs/Sales	93.33%	88.50%
Receivables/Sales	11.67%	8.88%
Inventories/Sales	20.00%	9.12%
Liability/Assets	35.00%	25.00%
Payout ratio	28.99%	22.00%

Table 2: ABC's Income Statement and Balance Sheet

Income Statement (in Million)	<u>Current year</u>
sales	\$ 3,000
Operating cost (including depreciation)	2,800
Earning before interest and tax (EBIT)	\$ 200
Less Interest expense	85
Earning before tax (EBT)	\$ 115
Taxes	46
Net income	\$ 69
Dividends	20
Addition to retained earning	\$ 49
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Balance Sheet (in Million)	<u>Current year</u>
<i>Asset</i>	
Cash	\$ 50
Accounts receivables	350
Inventories	600
Fixed assets	1,000
Total assets	\$ 2,000
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<i>Liabilities and Equity</i>	
Payables + Accruals	\$ 200
short-term bank loans	100
Total current liabilities	\$ 300
Long-term bonds	750
Total liabilities	\$ 1,050
Common stock	150
Retained earnings	800
Total common equity	\$ 950
Total liabilities and equity	\$ 2,000



Table 3: Updated Ratios

Updated Ratios

	ABC: Current Year	ABC: Next Year	Industry
Operating costs/Sales	93.33%	90.00%	88.50%
Receivables/Sales	11.67%	9.589%	8.88%
Inventories/Sales	20.00%	16.67%	9.12%
Liability/Assets	35.00%	30.00%	25.00%
Payout ratio	28.99%	25.00%	22.00%

Table 4: Projected Income Statement and Balance Sheet

	Current year	Changes	Next Year	Next Year
(Rounded)				
Income Statements (in Million)				
sales	\$ 3,000	(1+g%)	\$ 3,300.00	\$ 3,300
Operating cost (including depreciation)	2,800	90.00% of Sales	2,970.00	2,970
Earning before interest and tax (EBIT)	\$ 200		\$ 330.00	\$ 330
Less Interest expense	85	10% of (SR Loans + Long-term bonds)	38.64	39
Earning before tax (EBT)	\$ 115		\$ 291.36	\$ 291
Taxes (40%)	46		116.54	117
Net income	\$ 69		\$ 174.81	\$ 175
Dividends	20	25% of Net Income	43.70	44
Addition to retained earning	\$ 49		\$ 131.11	\$ 131
Balance Sheets (in Million)				
Asset				
Cash	\$ 50	(1+g%)	\$ 55.00	\$ 55
Accounts receivables	350	9.589% of Sales	316.44	316
Inventories	600	16.67% of Sales	550.00	550
Fixed assets	1,000	(1+g%)	1,100.00	1,100
Total assets	\$ 2,000		\$ 2,021.44	\$ 2,021
Liabilities and Equity				
Payables + Accruals	\$ 200	(1+g%)	\$ 220.00	\$ 220
short-term bank loans	100	(Its portion of current interest-bearing debt (IBD))* projected IBD	45.46	45
Total current liabilities	\$ 300		\$ 265.46	\$ 265
Long-term bonds	750	(Its portion of current interest-bearing debt (IBD))* projected IBD	340.97	341
Total liabilities	\$ 1,050		\$ 606.43	\$ 606
Common stock	150	current common stock + new issues	483.90	484
Retained earnings	800	Plus "Addition to Retained Earning from Income Statement"	931.11	931
Total common equity	\$ 950		\$ 1,415.01	\$ 1,415
Total liabilities and equity	\$ 2,000		\$ 2,021.44	\$ 2,021
*Interest-Bearing Debts (IBD)			\$ 386.43	\$ 386

Table 5: Projected Stock Price

Projected Stock Price	(Rounded)	
	Next Year	Next Year
Current EPS (current net income/# of current Shares -- 50 million)	\$ 1.38000	\$ 1.38
Current price of stock	\$ 23.05	\$ 23.05
Current P/E ratio (current stock price/ current EPS)	16.70290	16.70
Current price of stock	\$ 23.05	\$ 23.05
Addition to common stock (projected common Stock - current common stock, in \$ million)	\$ 333.89627	\$ 333.90
New issue of shares (addition to common stock / current stock price)	\$ 14.48574	\$ 14.49
Old Shares (in million)	50.00000	50.00
New Shares (in million)	64.48574	64.49
Projected EPS (Projected net income/# of total shares of next year --- 64.49 million)	\$ 2.71090	\$ 2.71
Projected stock price (current P/E multiplied by projected EPS)	\$ 45.27982	\$ 45.28



Table 6:
Projecting ABC's Stock Price for the Growth Rate of 6% - Assume All Other Assumption Are Realized.

Income Statements (in Million)	Current year		Changes		Next Year		(Rounded)	
sales	\$	3,000		(1+g%)	\$	3,180.00	\$	3,180
Operating cost (including depreciation)		2,800		90.00% of Sales		2,862.00		2,862
Earning before interest and tax (EBIT)	\$	200			\$	318.00	\$	318
Less Interest expense		85		10% of (SR Loans + Long-term bonds)		37.24		37
Earning before tax (EBT)	\$	115			\$	280.76	\$	281
Taxes (40%)		46				112.30		112
Net income	\$	69			\$	168.46	\$	168
Dividends		20		25% of Net Income		42.11		42
Addition to retained earning	\$	49			\$	126.34	\$	126
Balance Sheets (in Million)								
<i>Asset</i>								
Cash	\$	50		(1+g%)	\$	53.00	\$	53
Accounts receivables		350		9.589% of Sales		304.93		305
Inventories		600		16.67% of Sales		530.00		530
Fixed assets		1,000		(1+g%)		1,060.00		1,060
Total assets	\$	2,000			\$	1,947.93	\$	1,948
<i>Liabilities and Equity</i>								
Payables + Accruals	\$	200		(1+g%)	\$	212.00	\$	212
short-term bank loans		100		(Its portion of current interest-bearing debt (IBD))* projected IBD		43.81		44
Total current liabilities	\$	300			\$	255.81	\$	256
Long-term bonds		750		(Its portion of current interest-bearing debt (IBD))* projected IBD		328.57		329
Total liabilities	\$	1,050			\$	584.38	\$	584
Common stock		150		current common stock + new issues		437.21		437
Retained earnings		800		Plus "Addition to Retained Earning from Income Statement"		926.34		926
Total common equity	\$	950			\$	1,363.55	\$	1,364
Total liabilities and equity	\$	2,000			\$	1,947.93	\$	1,948
*Interest-Bearing Debts (IBD)								
					\$	372.38	\$	372
Projected Stock Price								
								(Rounded)
Current EPS (current net income/# of current Shares -- 50 million)					Next Year	1.38000	Next Year	1.38
Current price of stock					\$	23.05	\$	23.05
Current P/E ratio (current stock price/ current EPS)					\$	16.70290	\$	16.70
Current price of stock					\$	23.05	\$	23.05
Addition to common stock (projected common Stock - current common stock, in \$ million)					\$	287.20913	\$	287.21
New issue of shares (addition to common stock / current stock price)					\$	12.46027	\$	12.46
Old Shares (in million)						50.00000		50.00
New Shares (in million)						62.46027		62.46
Projected EPS								
(Projected net income/# of total shares of next year --- 62.46 million)					\$	2.69703	\$	2.70
Projected stock price (current P/E multiplied by projected EPS)								
					\$	45.04822	\$	45.05

Table 7:
Projecting ABC's Stock Price for the Growth Rate of 12% - Assume All Other Assumption Are Realized.

Income Statements (in Million)	Current year		Changes	Next Year		(Rounded)	
						Next Year	Next Year
sales	\$	3,000	(1+g%)	\$	3,360.00	\$	3,360
Operating cost (including depreciation)		2,800	90.00% of Sales		3,024.00		3,024
Earning before interest and tax (EBIT)	\$	200		\$	336.00	\$	336
Less Interest expense		85	10% of (SR Loans + Long-term bonds)		39.35		39
Earning before tax (EBT)	\$	115		\$	296.65	\$	297
Taxes (40%)		46			118.66		119
Net income	\$	69		\$	177.99	\$	178
Dividends		20	25% of Net Income		44.50		44
Addition to retained earning	\$	49		\$	133.49	\$	133
Balance Sheets (in Million)							
Asset							
Cash	\$	50	(1+g%)	\$	56.00	\$	56
Accounts receivables		350	9.589% of Sales		322.19		322
Inventories		600	16.67% of Sales		560.00		560
Fixed assets		1,000	(1+g%)		1,120.00		1,120
Total assets	\$	2,000		\$	2,058.19	\$	2,058
Liabilities and Equity							
Payables + Accruals	\$	200	(1+g%)	\$	224.00	\$	224
short-term bank loans		100	STBL/		46.29		46
Total current liabilities	\$	300		\$	270.29	\$	270
Long-term bonds		750	(Its portion of current interest-bearing debt (IBD))* projected IBD		347.17		347
Total liabilities	\$	1,050		\$	617.46	\$	617
Common stock		150	(Its portion of current interest-bearing debt (IBD))* projected IBD		507.24		507
Retained earnings		800	Plus "Addition to Retained Earning from Income Statement"		933.49		933
Total common equity	\$	950		\$	1,440.73	\$	1,441
Total liabilities and equity	\$	2,000		\$	2,058.19	\$	2,058
*Interest-Bearing Debts (IBD)				\$	393.46	\$	393
Projected Stock Price							
					Next Year		(Rounded)
Current EPS (current net income/# of current Shares -- 50 million)				\$	1.38000	\$	1.38
Current price of stock				\$	23.05	\$	23.05
Current P/E ratio (current stock price/ current EPS)				\$	16.70290	\$	16.70
Current price of stock				\$	23.05	\$	23.05
Addition to common stock				\$	357.23984	\$	357.24
(projected common Stock - current common stock, in \$ million)				\$	15.49847	\$	15.50
New issue of shares (addition to common stock / current stock price)					50.00000		50.00
Old Shares (in million)					65.49847		65.50
New Shares (in million)							
Projected EPS				\$	2.71751	\$	2.72
(Projected net income/# of total shares of next year --- 65.50 million)				\$	45.39024	\$	45.39
Projected stock price (current P/E multiplied by projected EPS)				\$		\$	

Table 8: Expected Stock Price

Scenario Analysis				
Growth rate	Probability	Stock Price	Probability * Stock Price	
10%	0.5	\$ 45.28	22.64	
6%	0.3	\$ 45.05	13.51	
12%	0.2	\$ 45.39	9.08	
Expected Price			45.23	

Table 9: Standard Deviation and A 95 % Confidence Interval

A	B	C	D
Growth rate	Stock price - Expected price (\$45.23)	Probability	Square of Column B * Probability
10%	0.05	0.5	0.00112
6%	-0.18	0.3	0.01018
12%	0.16	0.2	0.00498
Variance			0.01628
Standard Deviation			0.12760
95 % confidence Interval			
Expected price - 1.96 SD			44.98
Expected price + 1.96 SD			45.48