Case Study: Walmart Inc.

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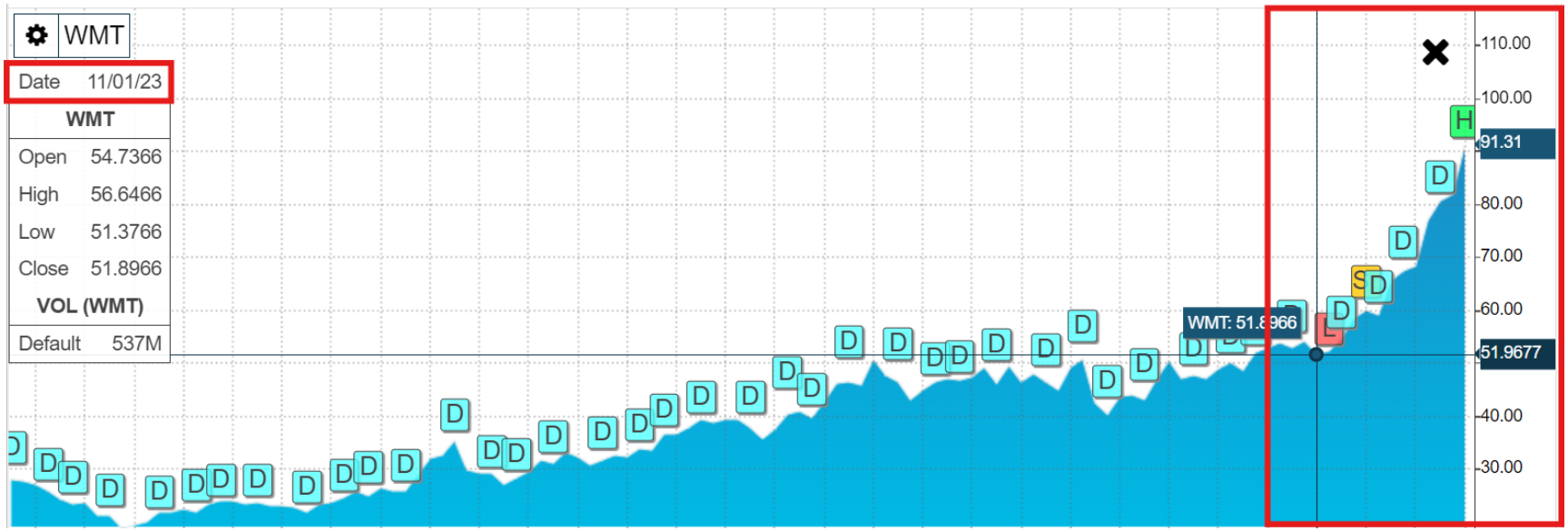
- Walmart is one of the largest retail companies, securing the top spot on the Fortune Global 500 list for multiple consecutive years.
- Walmart operates through multiple business formats.
  - standard supermarkets
  - supercenters
  - Sam's Club membership stores
  - the e-commerce platform "Walmart.com"

- Walmart was founded in 1962, experiencing a long period of steady growth.
- However, year 2023 witnessed a dramatic surge of its stock price, unusual to happen on a mature company.



- According to the DDM, the value of the stock V_i can be represented as:

$$V_i = \sum_{t=1}^{\infty} \frac{D_t}{(1+k)^t}$$

- For simplicity, we suppose that dividend grows at a constant rate g:

$$V_i = \frac{D_1}{k-g}$$

Year	Dividend Per Share (D)	Year	Dividend Per Share (D)
2024	0.76	2018	2.04
2023	2.24	2017	2.00
2022	2.20	2016	1.96
2021	2.16	2015	1.92
2020	2.12	2014	1.88
2019	2.08	2013	1.59

表: 10 Years' Dividend Per Share of Walmart Inc.

$$\text{Historical g} = \sqrt[10]{\frac{2.28}{1.88}} - 1 = 0.02$$

Year	Cash Dividends	Net Income	Shareholder's Equity
2024	6140	15511	83861
2023	6114	11680	76693
2022	6152	13673	83253

表: Necessary Data for Dividend Discounted Model (Dollars in Million)

Year	Retention rate	ROE
2024	0.6	0.185
2023	0.48	0.15
2022	0.55	0.164
average	0.54	0.166

表: 3 Years' Retention Rate and ROE of Walmart Inc.

$$\text{Implied g} = \text{Retention rate} \times \text{ROE} = 0.54 \times 0.166 = 0.09$$

$$\text{Historical g} = 0.02$$

- In view of the trend of the stock price this year, it's more practical to use a growth rate close to the Implied g rather than Historical g.

- We take advantage of CAPM model to obtain the required return and take it as the discount rate k.

```
. reg RWMTt RSP500t
```

Source	SS	df	MS	Number of obs	=	71
				F(1, 69)	=	17.95
Model	.036502981	1	.036502981	Prob > F	=	0.0001
Residual	.140329556	69	.002033762	R-squared	=	0.2064
				Adj R-squared	=	0.1949
Total	.176832537	70	.002526179	Root MSE	=	.0451

RWMTt	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
RSP500t	.441056	.1041069	4.24	0.000	.2333684	.6487436
_cons	.0071446	.0054432	1.31	0.194	-.0037142	.0180035

$$\begin{aligned} E(R_{WMT}) &= E(R_f) + \beta[E(R_m) - E(R_f)] \\ &= 4.68\% + 0.44(13.8\% - 4.68\%) \\ &= 8.7\% \end{aligned}$$

- Gorden growth model:

$$g' = \frac{P_0 \times \text{Required return} - D_0}{P_0 + D_0} = 0.0773$$

Year	Dividend Per Share	Present Value at 8.7%
0	0.76	0.76
1	$0.83 = 0.76 \times (1 + 9\%)$	0.76
2	$0.90 = 0.83 \times (1 + 8.68\%)$	0.76
3	$0.97 = 0.9 \times (1 + 8.37\%)$	0.76
4	$1.05 = 0.97 \times (1 + 8.05\%)$	0.75
5	$1.13 = 1.05 \times (1 + 7.73\%)$	0.75
After Year 5	$125.59 = 1.13 \times (1 + 7.73\%) \div (8.7\% - 7.73\%)$	82.75

表: The Present Value of the Dividends in Three-Stage Model

$$\text{Intrinsic value} = 0.76 + 0.76 + 0.76 + 0.75 + 0.75 + 82.75 = 86.53$$

- The FCFE model projects the future FCFE values and discounts them back to the present value using the cost of equity (k_e) as the discount rate. This provides the estimated equity value of the company:

$$V_i = \sum_{t=1}^{\infty} \frac{FCFE_t}{(1+k_e)^t}$$

- Specifically, if the firm is in its mature, constant-growth phase, it is possible to use a model similar to the reduced from DDM:

$$V_i = \frac{FCFE_1}{k-g}$$

- The PRAT model is a framework used to estimate a company's sustainable growth rate. It is based on four key factors: Profit margin (P), Retention ratio(R), Asset turnover (A), and Financial leverage (T). These components reflect how efficiently a company generates profits, retains earnings, utilizes its assets, and employs debt.

$$\mathrm{g} = \mathrm{P} \times \mathrm{R} \times \mathrm{A} \times \mathrm{T}$$

	Jan31,2024
Cash dividends declared	6,140
Net income	15,511
Net sales	642,637
Total assets	252,399
Total shareholders' equity	83,861

表: Financial Data (US$ in millions) of Walmart Inc.

$$\text{Retention rate} = (\text{Net income} - \text{Cash dividends declared}) \div \text{net income}$$

$$= (15,511 - 6,140) \div 15,5110.54 = 0.60$$

$$\text{Profit margin} = 100 \times \text{Net income} \div \text{Net sales}$$

$$= 100 \times 15,511 \div 642,637 = 2.41\%$$

$$\text{Asset turnover} = \text{Net sales} \div \text{Total assets}$$

$$= 642,637 \div 252,399 = 2.55$$

$$\text{Financial leverage} = \text{Total assets} \div \text{Total shareholders' equity assets}$$

$$= 252,399 \div 83,861 = 3.01$$

$$\text{g} = 0.55 \times 2.23\% \times 2.35 \times 3.07 = 8.89\%$$

- We will use the single-stage valuation model to calculate the future growth rate of FCFE.

$$\text{g} = 100 \times (\text{Equity market value} \times \text{r} - \text{FCFE}) \div (\text{Equity market value} + \text{FCFE})$$

- Look up the data through the Internet. The FCFE value of Walmart Inc. on January 31, 2024 was 16,632 million. As of January 31, 2024, Walmart's market capitalization is 444,892 million, resulting in a g value of 0.0478.

Walmart Ratios and Metrics

Market cap in millions USD. Fiscal year is February - January.

Current | Millions | Data Sour... | Download

Fiscal Year	Current	FY 2024	FY 2023	FY 2022	FY 2021	FY 2020	2019 - 2015
Period Ending	Nov 27, 2024	Jan 31, 2024	Jan 31, 2023	Jan 31, 2022	Jan 31, 2021	Jan 31, 2020	2019 - 2015
Market Capitalization	738,555	444,892	387,989	387,816	397,486	324,828	Upgrade
Market Cap Growth	49.77%	14.67%	0.04%	-2.43%	22.37%	16.67%	Upgrade
Enterprise Value	796,612	511,073	452,544	438,666	458,434	399,487	Upgrade
Last Close Price	91.88	54.55	46.78	44.76	44.27	35.49	Upgrade
PE Ratio	37.96	28.68	33.22	28.36	29.42	21.83	Upgrade
Forward PE	34.71	24.21	22.76	21.06	24.69	22.44	Upgrade

- From the previous calculations, it is determined that k $<$ g.Therefore, we use the three-stage growth model to calculate the present value.
- The g values for the intermediate years derived through linear interpolation are shown in the table below:

	Year Value	g_t
1	g_1	0.0889
2	g_2	0.0786
3	g_3	0.0684
4	g_4	0.0581
5	g_5	0.0478

表: FCFE growth rate (g) forecast

Year	FEFC	Present Value at 8.7%
0	16632	16632
1	$18110.58 = 16632 \times (1 + 0.0889)$	1661.07157
2	$19534.08 = 18110.58 \times (1 + 0.0786)$	16532.31996
3	$20870.21 = 19534.08 \times (1 + 0.0684)$	16249.43022
4	$22082.77 = 20870.21 \times (1 + 0.0581)$	15817.40765
5	$23138.32 = 22082.77 \times (1 + 0.0478)$	15246.99148
After Year 5	$618477.9276 = 23138.32 \times (1 + 0.0478) \div (0.087 - 0.0478)$	374927.1931

表: The Present Value of FCFE in Three-Stage Model(US$ in millions)

$$\text{Intrinsic value} = 1661.07157 + 16532.31996 + 16249.43022$$
$$+15817.40765 + 15246.99148 + 374927.1931 = 455434.414$$

- The estimated intrinsic value was 455434.414 million, higher than the verified market capitalization data (444,892 million).
- The number of shares of Walmart Inc. was 8.038 billion. The estimated stock price was **$56.66**. The market price was **$54.46**

- The historical data of Walmart may not be an appropriate material to estimate the current stock price.
- we turned to seek the relevance between Walmart and its peers/competitors.
  - Costco (csc), Target (tar) and Dollar General (dlg).
- To estimate the ratios of Walmart, we use regression analysis to find the correlation between them.

```
. reg w csc
```

Source	SS	df	MS	Number of obs	=	17
				F(1, 15)	=	1.79
Model	106.817259	1	106.817259	Prob > F	=	0.2013
Residual	896.941718	15	59.7961145	R-squared	=	0.1064
				Adj R-squared	=	0.0468
Total	1003.75898	16	62.734936	Root MSE	=	7.7328

w	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
csc	.5705617	.4268924	1.34	0.201	-.3393379	1.480461
_cons	6.76766	16.41902	0.41	0.686	-28.22866	41.76398

```
. reg w dlg
```

Source	SS	df	MS	Number of obs	=	17
				F(1, 15)	=	0.00
Model	.214172195	1	.214172195	Prob > F	=	0.9556
Residual	1003.5448	15	66.902987	R-squared	=	0.0002
				Adj R-squared	=	-0.0664
Total	1003.75898	16	62.734936	Root MSE	=	8.1794

w	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
dlg	-.0445291	.7870181	-0.06	0.956	-1.722018	1.63296
_cons	29.46493	15.9618	1.85	0.085	-4.556844	63.48671

```
. reg w csc dlg tar
```

Source	SS	df	MS	Number of obs	=	17
				F(3, 13)	=	1.57
Model	267.536301	3	89.1787669	Prob > F	=	0.2431
Residual	736.222676	13	56.6325135	R-squared	=	0.2665
				Adj R-squared	=	0.0973
Total	1003.75898	16	62.734936	Root MSE	=	7.5255

w	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
csc	.6823001	.4320107	1.58	0.138	-.2510022	1.615602
dlg	-.0243465	.7626601	-0.03	0.975	-1.671974	1.623281
tar	.9196121	.5544147	1.66	0.121	-.278128	2.117352
_cons	-13.36803	26.45811	-0.51	0.622	-70.5273	43.79125

```
. reg w tar
```

Source	SS	df	MS	Number of obs	=	17
				F(1, 15)	=	1.99
Model	117.380595	1	117.380595	Prob > F	=	0.1791
Residual	886.378381	15	59.0918921	R-squared	=	0.1169
				Adj R-squared	=	0.0581
Total	1003.75898	16	62.734936	Root MSE	=	7.6871

w	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
tar	.7727831	.5483065	1.41	0.179	-.3959046	1.941471
_cons	14.82419	9.928734	1.49	0.156	-6.338402	35.98679

- We calculate the Price/Earnings ratio for Walmart to be **35.991707**. The actual number is **35.66**.

- The earning per share on that date is 1.93, so the estimated price is **69.46**. Actual price on that date (31/07/2024) is **68.64**.

```
. reg w csc
```

Source	SS	df	MS	Number of obs	=	19
				F(1, 17)	=	4.28
Model	.478833608	1	.478833608	Prob > F	=	0.0542
Residual	1.90364008	17	.111978828	R-squared	=	0.2010
				Adj R-squared	=	0.1540
Total	2.38247368	18	.132359649	Root MSE	=	.33463

w	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
csc	.0738901	.0357324	2.07	0.054	-.0014986	.1492789
_cons	3.882728	.3861333	10.06	0.000	3.068058	4.697398

```
. reg w dlg
```

Source	SS	df	MS	Number of obs	=	19
				F(1, 17)	=	1.72
Model	.219011745	1	.219011745	Prob > F	=	0.2070
Residual	2.16346194	17	.127262467	R-squared	=	0.0919
				Adj R-squared	=	0.0385
Total	2.38247368	18	.132359649	Root MSE	=	.35674

w	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
dlg	-.0624784	.0476262	-1.31	0.207	-.162961	.0380042
_cons	5.112608	.3506874	14.58	0.000	4.372723	5.852494

```
. reg w tar
```

Source	SS	df	MS	Number of obs	=	19
				F(1, 17)	=	0.23
Model	.032206703	1	.032206703	Prob > F	=	0.6355
Residual	2.35026698	17	.138250999	R-squared	=	0.0135
				Adj R-squared	=	-0.0445
Total	2.38247368	18	.132359649	Root MSE	=	.37182

w	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
tar	-.0254068	.0526394	-0.48	0.635	-.1364661	.0856526
_cons	4.82681	.3454021	13.97	0.000	4.098075	5.555545

```
. reg w csc dlg tar
```

Source	SS	df	MS	Number of obs	=	19
				F(3, 15)	=	1.69
Model	.60103121	3	.200343737	Prob > F	=	0.2124
Residual	1.78144247	15	.118762832	R-squared	=	0.2523
				Adj R-squared	=	0.1027
Total	2.38247368	18	.132359649	Root MSE	=	.34462

w	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
csc	.0715607	.0458577	1.56	0.139	-.0261826	.169304
dlg	-.0329623	.0908101	-0.36	0.722	-.2265196	.1605949
tar	-.0171552	.0965872	-0.18	0.861	-.223026	.1887156
_cons	4.252488	.6130627	6.94	0.000	2.945775	5.5592

- We get the estimated P/B value of Walmart to be **5.25** or **5.12**.The real P/B value on that date is **6.08**.

- Estimated prices are **59.27** and **57.80**. Actual price is **68.64**.

```
. reg w csc
```

Source	SS	df	MS	Number of obs	=	19
				F(1, 17)	=	4.96
Model	.006067189	1	.006067189	Prob > F	=	0.0397
Residual	.020785442	17	.001222673	R-squared	=	0.2259
				Adj R-squared	=	0.1804
Total	.026852632	18	.001491813	Root MSE	=	.03497

w	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
csc	.1290025	.0579108	2.23	0.040	.0068214	.2511835
_cons	.5479928	.0590978	9.27	0.000	.4233073	.6726783

```
. reg w dlg
```

Source	SS	df	MS	Number of obs	=	19
				F(1, 17)	=	0.49
Model	.000745103	1	.000745103	Prob > F	=	0.4955
Residual	.026107529	17	.001535737	R-squared	=	0.0277
				Adj R-squared	=	-0.0294
Total	.026852632	18	.001491813	Root MSE	=	.03919

w	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
dlg	-.0205322	.0294772	-0.70	0.496	-.0827236	.0416592
_cons	.7060098	.0406155	17.38	0.000	.6203185	.7917012

```
. reg w tar
```

Source	SS	df	MS	Number of obs	=	19
				F(1, 17)	=	6.27
Model	.007233984	1	.007233984	Prob > F	=	0.0228
Residual	.019618648	17	.001154038	R-squared	=	0.2694
				Adj R-squared	=	0.2264
Total	.026852632	18	.001491813	Root MSE	=	.03397

w	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
tar	.0911625	.0364114	2.50	0.023	.0143411	.1679839
_cons	.6047234	.03045	19.86	0.000	.5404795	.6689673

```
. reg w csc tar
```

Source	SS	df	MS	Number of obs	=	19
				F(2, 16)	=	8.11
Model	.013520399	2	.006760199	Prob > F	=	0.0037
Residual	.013332233	16	.000833265	R-squared	=	0.5035
				Adj R-squared	=	0.4414
Total	.026852632	18	.001491813	Root MSE	=	.02887

w	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
csc	.1313298	.0478138	2.75	0.014	.0299691	.2326905
tar	.0925458	.030944	2.99	0.009	.0269474	.1581441
_cons	.4708238	.0551904	8.53	0.000	.3538253	.5878222

```
. reg w csc dlg tar
```

Source	SS	df	MS	Number of obs	=	19
				F(3, 15)	=	8.08
Model	.016586504	3	.005528835	Prob > F	=	0.0019
Residual	.010266127	15	.000684408	R-squared	=	0.6177
				Adj R-squared	=	0.5412
Total	.026852632	18	.001491813	Root MSE	=	.02616

w	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
csc	.0376893	.0619277	0.61	0.552	-.0943065	.1696852
dlg	-.0735243	.0347372	-2.12	0.051	-.1475649	.0005163
tar	.1530606	.0400488	3.82	0.002	.0676986	.2384226
_cons	.6153712	.0846507	7.27	0.000	.4349425	.7957998

- The estimated P/S values are **0.716, 0.748, 0.659 and 0.730** respectively. The actual result is **0.83**.

- The estimated prices are **59.21, 61.86, 54.50 and 60.37**. The actual price is **68.64**.

- Some of the regressions happen to have successful results, while some exhibit large difference.
  - With a larger number of figures the models can work better.

- Walmart is in a growing stage recently. Its ratios, such as P/E, P/B and P/S have all seen dramatic growth in recent months, and that is why many of our models above were not as appropriate as one may expect.