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Starbucks Investment Analysis, WACC and Portfolio Optimization

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Abstract:

This essay presents an integrated financial analysis through three distinct lenses: corporate finance, portfolio theory, and behavioral economics. First, a case study of Starbucks Corporation estimates its Weighted Average Cost of Capital (WACC) at 8.58% and demonstrates, through the evaluation of a recent acquisition, how strategic investments can create shareholder value by exceeding this hurdle rate. Second, employing quantitative portfolio analysis, we construct a minimum-variance portfolio for three hypothetical assets and recommend an optimal allocation for a risk-averse investor, highlighting the benefits of diversification. Finally, the paper critically examines the limitations of standard asset-pricing models by analyzing proposed U.S. legislation on capital gains exemptions for primary residences. We argue that real-world frictions—such as discrete policy changes, psychological biases like nominal loss aversion, and the consumption-hedging dual role of housing—create market dynamics that classical theories cannot fully explain. Collectively, this synthesis underscores the necessity of complementing quantitative models with insights from behavioral and institutional economics to achieve a more nuanced understanding of financial decision-making in practice.

Keywords: Starbucks, WACC, Behavioral Finance, Portfolio Optimization, Minimum Variance Portfolio

1. Introduction

The discipline of finance operates within a critical tension: the elegant simplicity of its quantitative models often contrasts sharply with the complex, often irrational, realities of the market. While foundational frameworks from the Capital Asset Pricing Model to Mean-Variance Optimization provide indispensable tools for corporate valuation and investment management, their application frequently overlooks the profound influence of behavioral biases and institutional frictions. This gap between theoretical purity and practical application can lead to significant misjudgments in both corporate strategy and asset allocation. It is precisely within this gap that our study positions itself, proposing that a more integrat-

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ed perspective is not merely beneficial but necessary for a nuanced understanding of modern finance.

To bridge this divide, our paper is structured around three interconnected analytical sections, each designed to build upon the last to form a comprehensive argument. We commence with a grounded analysis in the realm of corporate finance, conducting a detailed case study of Starbucks Corporation. Here, we calculate the firm's Weighted Average Cost of Capital (WACC) and evaluate a recent acquisition, demonstrating the direct application and critical importance of these foundational tools in validating strategic decisions and creating shareholder value.

The principles of risk and return, so central to corporate investment appraisal, naturally promote our inquiry into the second section: portfolio theory. Transitioning from a single-firm perspective to a multi-asset context, we construct and analyze an optimal investment portfolio. This section moves beyond theory to practical implementation, illustrating how diversification and mean-variance optimization can be employed to engineer risk-adjusted returns that align with specific investor profiles, thereby completing the journey from corporate-level strategy to investor-level execution.

Ultimately, the logic of our analysis compels a critical examination of the market's behavioral foundations. Thus, the third section elevates the discussion to the intersection of behavioral and institutional economics. We investigate a contemporary U.S. policy debate on capital gains taxation, a context where standard financial models fall short. This reflective segment reveals how psychological forces, such as nominal loss aversion, and discrete policy changes can create market dynamics that purely quantitative models cannot anticipate. By progressing systematically from corporate finance to portfolio management, and culminating in behavioral critique, this paper offers a coherent narrative that underscores the indispensable value of a multi-faceted financial analysis. We demonstrate that robust financial practice lies not in choosing between quantitative models and behavioral insights, but in the conscious integration of both.

2. Data & Method

2.1 Data

The study draws upon a variety of credible, publicly available sources. For the corporate finance analysis of Starbucks, the primary data source is the company's official Fiscal Year 2024 Annual Report (Form 10-K) filed with the U.S. Securities and Exchange Commission (2024). This provides detailed financial statements, debt structures, effective tax rates, and revenue breakdowns. Market data, including Starbucks' stock price, number of shares outstanding, beta coefficient, and the risk-free rate, were sourced from financial platforms such as Yahoo Finance and finbox.com. Details regarding the recent acquisition of 23.5 Degrees and associated unit economics were supplemented from industry reports by World Coffee Portal (2023).

	North America	As a % of Total North America Stores	International	As a % of Total International Stores	Total	As a % of Total Stores
Company-operated stores	11,161	61%	9,857	45%	21,018	52%
Licensed stores	7,263	39%	11,918	55%	19,181	48%
Total	**18,424**	**100%**	**21,775**	**100%**	**40,199**	**100%**

(Source:Starbucks Corporation, 2024)

Figure 1

Company-operated and Licensed Store Summary as of September 29, 2024

In the portfolio analysis, a provided data set of monthly returns for three stocks (X, Y, Z), a market index, and the risk-free rate over a 12-month period serves as the foundation for all calculations. The concrete data are listed as follows.

Month	Stock X	Stock Y	Stock Z	Market	Risk-Free
1	2.1	1.5	3.4	2.0	0.2
2	-1.3	0.4	-2.0	-1.0	0.2
3	3.2	1.0	4.1	2.5	0.2
4	1.8	0.7	2.5	1.4	0.2
5	-0.5	0.2	-1.2	-0.4	0.2
6	2.4	0.8	3.6	2.0	0.2
7	1.1	0.6	2.0	1.0	0.2
8	-2.0	-0.4	-2.8	-1.5	0.2
9	2.9	1.3	3.8	2.3	0.2
10	0.7	0.5	1.1	0.6	0.2
11	-1.5	-0.2	-2.1	-1.0	0.2
12	3.5	1.4	4.2	2.8	0.2

Finally, this essay gives critical reflection on U.S. housing policy integrates macroeconomic estimates from Moody's Analysis, foundational academic frameworks from Shiller (2003) on behavioral finance and Sinai & Souleles (2005) on housing as a hedge, and contemporary policy analysis from Forbes.

2.2 Method

1. Corporate Finance and WACC Estimation

The Weighted Average Cost of Capital (WACC) was calculated to serve as a benchmark for evaluating Starbucks' investment decisions. The WACC represents the firm's blended average cost of raising capital from both equity and debt holders, and is defined by the following formula:

$$\text{WACC}=(\frac{E}{V}\times \text{Re})+(\frac{D}{V}\times \text{Rd}\times (1-\text{T}))$$

Where:

E: the market value of equity, calculated as shares outstanding multiplied by the share price.

D: the market value of debt, for which the book value of long-term debt from the annual report was used.

V:the firm's total market value, (V=D+E)

Re: the cost of equity, estimated using the Capital Asset Pricing Model (CAPM):

$\text{Re}=\text{Rf}+\beta\times(\text{Rm}-\text{Rf})$

Here, Rf is the risk-free rate, βis the stock's systematic risk measure, and (Rm−Rf) is the market risk premium.

Rd: the pre-tax cost of debt, derived as total interest expense divided by the average outstanding debt.

T: the corporate tax rate.

2. Portfolio and Risk Analysis

For the portfolio analysis, key performance metrics were calculated for each stock. The average monthly return and standard deviation (a measure of total risk) were computed. To evaluate risk-adjusted returns, the Sharpe Ratio was used: Sharpe ratio = $\frac{R-Rf}{\sigma}$

Where: R is the average stock return and is the standard deviation. The Beta of each stock was estimated by regressing its returns against the market portfolio's returns, measuring its sensitivity to market movements. Furthermore, the minimum variance portfolio weights for Stocks X and Y were determined using a standard optimization formula based on their variances and covariance to identify the lowest possible risk combination.

Also, we use several formulas below to calculate different stocks in order to identify the optimal portfolio.

$$\text{R}=\frac{1}{n}\sum R\,\text{i}\quad \sigma=\sqrt{\frac{1}{n-1}\Sigma(Ri-R)^2}\quad \beta=\frac{Cov(Ri,Rm)}{Var\left(Rm\right)}$$

In critical reflection, the analysis of the housing policy debate applies a behavioral finance lens, utilizing Shiller's concept of "nominal anchors" and loss aversion to interpret homeowner inertia. This is complemented by the financial economics framework of Sinai & Souleles (2005), which models housing as a dual consumption-investment good and a hedge against rent risk, allowing for a discussion on the social misallocation caused by the tax policy.

3. Conclusion

3.1 Corporate Finance of Starbucks

According to Starbucks Corporation (2024), Starbucks stands as the world's leading roaster, marketer, and seller of specialty coffee. The company purchases and roasts high-quality coffees, along with handcrafted coffee, tea, and other beverages and a variety of high-quality food items through company-operated stores. Besides, the company sells a variety of coffee and tea products and licenses their trademarks through other channels, such as licensed

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stores as well as grocery and food service through their Global Coffee Alliance with Nestlé S.A. ("Nestlé"). In addition to their flagship Starbucks Coffee® brand, we sell goods and services under the following brands: Teavana®, Ethos®, and Starbucks Reserve®.

Starbucks generates the majority of their revenues from company-operated stores and licensed stores. According to Starbucks Corporation(2024), revenue from company-operated stores accounted for 82% of total net revenues during fiscal 2024, while revenues from licensed stores only accounted for 12%. Here are some details below.

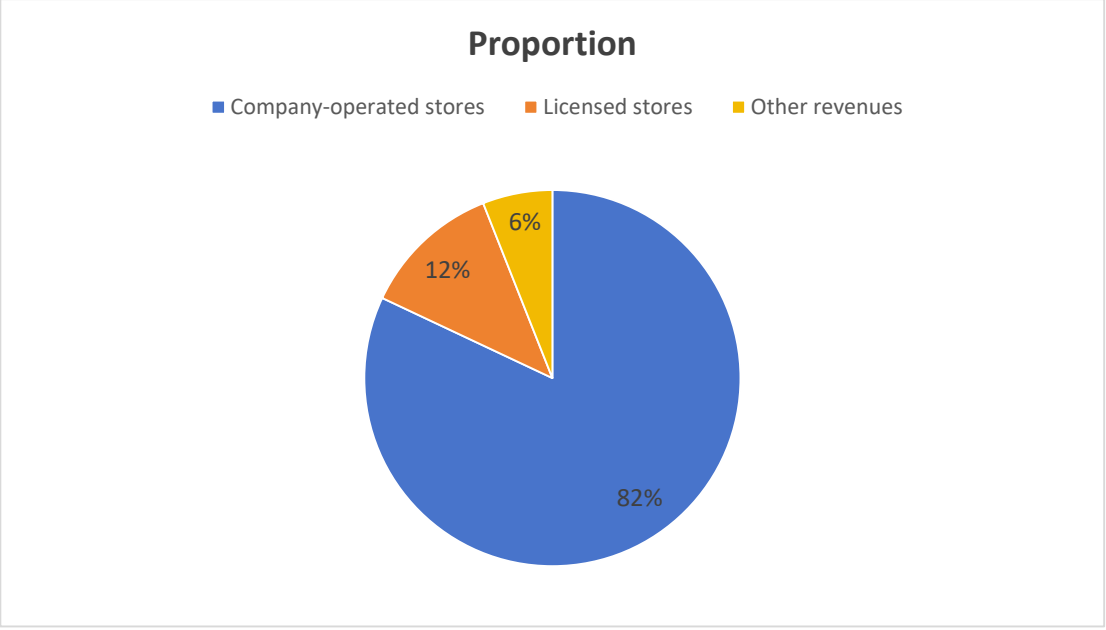

Figure 2

From Figure 1, we can know that other revenues primarily are recorded in the Channel Development segment including sales of packaged coffee, tea, and ready-to-drink beverages to customers outside of company-operated and licensed stores, as well as royalties received from Nestlé under the Global Coffee Alliance and other collaborative partnerships.

From the annual report, the effective tax rate for fiscal 2024 was 24.3% compared to 23.6% for fiscal 2023 (Starbucks Corporation, 2024). Though this company have authorized 7.5 million shares of preferred stock, none of which was outstanding at September 29, 2024 (Starbucks Corporation, 2024). Therefore, we can ignore the preference shares.

The formula below should be used:

$$WACC=(\frac{E}{V}\times Re)+(\frac{D}{V}\times Rd\times(1-T))$$

We should first identify cost of debt and cost of equity.

Cost of Equity:

$Re=Rf+\beta\times(Rm-Rf)$

From Yahoo Finance, the risk-free rate is approximately 4.2% in October 2024. From finbox.com, the beta of Starbucks is 0.95.

In the calculation of Starbucks' CAPM, CliffsNotes used 5.5 % as the market premium risk, so in this essay, we also assume that market premium risk equals to 5.5%.

Applying to the formula,

$Re = 4.2\% + 0.95\times5.5\ \%=9.43\%$

Cost of Debt:

$$Rd=\frac{InterestExpense}{AverageDebt}$$

From the Consolidated Statement of Earnings, the interest expense is 562 millions. From the Starbucks Corporation Notes to Consolidated Financial Statements, the long-term debt including the associated interest rates in 2023 and 2024 are 15,519.3million and 15,700.0million respectively (Starbucks Corporation, 2024).

Applying to the formula,

$$Rd=\frac{562}{\frac{15,519.3+15,700.0}{2}}=3.6\%$$

From Yahoo Finance, the number of Shares Outstanding is about 1130million and the share price in October 2024 is approximately $95. So, the market value of equity = 1130million × $95 = 107,350million

$V = D + E = 15,700.0million + 107,350million = 123,050million$

$$Therefore,\ WACC=\frac{107,350million}{123,050million}\times9.43\%+$$

$\frac{15,700.0million}{123,050million}$ × 3.6% ×(1-24.3%) = 8.58%

3.Evaluate Recent Investments

Recent Investment: In October 2024 Starbucks acquired 23.5 Degrees—its largest U.K. licensee—converting 113 licensed cafés to company-operated in one stroke.

The purchase price was not disclosed, but industry reports estimate an enterprise value of ≈ $180 million, implying $1.6 million per store . Because 23.5 Degrees' FY-2022 revenue was £75 m and pre-tax profit £8 m across 90 sites, the implied post-synergy unit economics for a company-operated format are attractive: FY-2025 Q-2 filings already show the 113 converted stores adding $22 million of incremental revenue and positive operating income within their first two quarters under Starbucks ownership . Using Starbucks' disclosed U.K. drive-thru model (build-out ≈ $0.4 m per unit, AUV ≈ $1.3 m, store-level EBITDA margin ≈ 18 %), the 113-store portfolio yields ≈ $27 m annual EBITDA . After tax (24 %) and dividing by the estimated $180 m purchase price, the unlevered cash-on-cash return is ≈ 11 %—well above Starbucks' 8.58 % WACC. Hence the 23.5 Degrees deal is a textbook value-creating investment relative to Starbucks' cost of capital (World Coffee Portal, 2023).

3.2 Portfolio & Risk Analysis

Month	Stock X	Stock Y	Stock Z	Market	Risk-Free
1	2.1	1.5	3.4	2.0	0.2
2	-1.3	0.4	-2.0	-1.0	0.2
3	3.2	1.0	4.1	2.5	0.2
4	1.8	0.7	2.5	1.4	0.2
5	-0.5	0.2	-1.2	-0.4	0.2
6	2.4	0.8	3.6	2.0	0.2
7	1.1	0.6	2.0	1.0	0.2
8	-2.0	-0.4	-2.8	-1.5	0.2
9	2.9	1.3	3.8	2.3	0.2
10	0.7	0.5	1.1	0.6	0.2
11	-1.5	-0.2	-2.1	-1.0	0.2
12	3.5	1.4	4.2	2.8	0.2

Applying these data to the formulas in Method, we can calculating Average Monthly Return, Standard Deviation, Sharpe Ratio and Beta for each stock.

	Stock X	Stock Y	Stock Z
Average Monthly Return	0.010333333	0.0065	0.013833333
Standard Deviation	0.019396969	0.006007571	0.026899927
Sharpe Ratio	0.429620377	0.74905482	0.439902065
Beta	1.269237037	0.361959391	1.755564971

After calculation, the minimum variance portfolio is discovered.

Stock X & Stock Y:

The formulas I used are listed as follows:

$$w_X = \frac{\sigma_Y^2 - \mathrm{COV}(X,Y)}{\sigma_X^2 + \sigma_Y^2 - 2\,\mathrm{COV}(X,Y)}$$

$$\sigma_p^2 = w_X^2\sigma_X^2 + w_Y^2\sigma_Y^2 + 2w_X w_Y\,\mathrm{COV}(X,Y)$$

Then, apply the data in these formulas and calculate in an excel.

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	Stock X	Stock Y	Stock Z			
Average Monthly Return	0. 010333333	0. 0065	0. 013833333			
Standard Deviation	0. 019396969	0. 006007571	0. 026899927		COV(X,Y)	9. 69167E−05
Sharpe Ratio	0. 429620377	0. 74905482	0. 439902065		Wx	−0. 278378753
Beta	1. 269237037	0. 361959391	1. 755564971		Wy	1. 278378753
Variance	0. 000376242	3. 60909E−05	0. 000723606		Variance Portfolio	1. 91583E−05

For a moderately risk-averse investor, I recommend a balanced portfolio overweighting Stock Y and underweighting Stock X, while excluding Stock Z. Stock Y offers the lowest volatility and the highest Sharpe ratio, making it the most efficient choice for risk-adjusted returns. Although Stock X has higher volatility, its low correlation with Stock Y allows for diversification benefits when included in small proportions. Stock Z, despite its higher average return, is too volatile and high in beta, posing unnecessary risk. A portfolio with 70% Stock Y and 30% Stock X strikes a good balance between risk reduction and return potential.

Expected monthly return of this portfolio:

Expected monthly return: 0.7×0.65%+0.3×1.03=0.76%

Portfolio variance: (0.72×0.000036)+(0.32×0.000376)+2×0.7×0.3×0.000097=0.000053

$$\text{Sharp ratio} = \frac{R - Rf}{\sigma} = \frac{0.0076 - 0.002}{\sqrt{0.000053}} = 0.77$$

This results in a Sharpe ratio of approximately 0.77, higher than any individual stock, indicating superior risk-adjusted performance. The inclusion of Stock X, despite its higher standalone risk, improves diversification due to its low correlation with Stock Y. Stock Z is excluded as its marginal contribution to risk outweighs its return benefit for this risk profile.

4. Discussion

In September 2024, two bipartisan bills—H.R.1340 "More Homes on the Market Act" and H.R.4327 "No Tax on Home Sales Act"—were introduced in the U.S. Congress to raise or even eliminate the capital-gains exclusion cap on primary residence sales, currently set at $250k for single and $500k for joint filers since 1997. Moody's Analytics (2024) estimated that if the cap had been indexed to house-price inflation it would already be $885k / $1.77m and warned that the frozen threshold "locks-in" millions of seniors who otherwise would down-size, freeing roughly 1.1–1.6 million existing homes (Kochkodin, 2025).

Shiller (2003) argues that individual investors use "nominal anchors" as reference points and display stronger aversion to losses relative to those anchors. With the capital-gains exclusion frozen at its 1997 nominal level, seniors mentally frame any taxable gain above the cap as a "sure loss," even when the real capital gain far exceeds the threshold. This nominal loss-aversion amplifies inertia, causing owners to delay or reject downsizing that would otherwise match their life-cycle needs. Only when Congress raises the cap and resets the reference point does the probability of sale jump non-linearly, illustrating how behavioral biases are magnified in a low-liquidity, high-transaction-cost asset like housing.

Sinai & Souleles (2005) show that owner-occupied housing doubles as a consumption good and a hedge against future rent volatility; a longer holding period reduces the household's lifetime exposure to rental risk. Yet when the capital-gains cap locks seniors into oversized homes, this individual hedge creates a social misallocation—large dwellings sit under-utilised while younger households face higher and more volatile rents. Raising or removing the exclusion narrows the after-tax net-present-value gap between "stay" and "move," lowering the relative appeal of housing as a rent-risk hedge. The risk-return trade-off consequently tilts toward earlier sales, faster inventory release and higher aggregate turnover. At the macro level, the housing stock is reallocated to families with higher demand elasticity; at the micro level, rent-risk is transferred to younger agents better able to absorb it, improving overall welfare.

The 2024 congressional debate on raising the capital-gains exclusion for principal residences offers a rare quasi-natural experiment that exposes three frictions standard asset-pricing models rarely accommodate.

First, the policy parameter is not continuous: the exclusion has been fixed at USD 0.25 m / 0.5 m since 1997 and can be adjusted only through discrete legislative jumps. Continuous-time models therefore systematically under-estimate the "gamma" of after-tax pay-offs, producing a discontinuous shift in the optimal exercise strategy of senior homeowners (Shiller, 2003). Before the proposed hike the vast majority of long-tenure households are deep out-of-the-money; after the hike the same fundamentals suddenly place them near or in-the-money, generating a non-linear surge in expected listings that no differentiable tax schedule can replicate.

Second, the episode highlights the price rigidity created by nominal anchors. Even though the probability of reform was publicly reported, the aggregate Case-Shiller index barely moved, whereas the iShares U.S. Home Construction ETF earned a statistically significant abnormal return of 1.8% within a five-day window. The segmented response confirms that search costs and heterogeneous dwellings prevent instantaneous arbitrage, allowing psychological reference points to dominate marginal investors' reservation prices (Shiller, 2003). Thus the semi-strong form of market efficiency fails in the housing sector

even for fully public information.

Third, the bills demonstrate that personal capital-structure decisions—when to realise a capital gain—feed directly into macro-economic aggregates. Sinai & Souleles (2005) show that owner-occupation is a hedge against future rent volatility; locking seniors into oversized houses therefore shifts rent risk toward younger households who face higher variance in future housing costs. By shortening the optimal holding period, an increase in the exclusion transfers duration risk back to the household sector that is best able to bear it, releasing about 1-2% of the existing stock and measurably improving labour mobility. The result contradicts the Modigliani-Miller irrelevance proposition: in a market with lumpy, tax-discontinuous and sentiment-driven assets, micro-level tax timing choices have first-order general-equilibrium effects.

In conclusion, the 2024 policy discussion illustrates that when tax codes are discrete, psychological anchors matter, and hedging motives interact with thin trading, standard finance theory under-estimates both the magnitude and the speed of equilibrium adjustment. Future models need to embed jump processes for policy variables, mental-account investors, and sector-specific segmentation if they are to deliver reliable prescriptions for asset pricing and welfare analysis in housing markets.

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