

PAIRS TRADE STRATEGY: COSTCO VS WALMART

GAETANO PIO TOTI

Pairs Trade Strategy: Costco vs
Walmart. A Comparative Analysis

Work project carried out under the supervision of:

Professor Fernando Anjos

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Abstract

The proposed investment strategy is intended for academic purposes only. The project focuses on assessing the effectiveness of a Pairs Trade strategy, involving the construction of a long-short portfolio by recommending a long position in one company and a short position in another. Success hinges on identifying undervaluation and overvaluation within the selected companies. The study employs Costco and Walmart as case studies, analyzing historical returns, conducting a comprehensive financial analysis, and employing various evaluation methods. The conclusion advocates adopting a long position on Costco and a short position on Walmart based on the findings.

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GROUP PART – TOTI & SICOLI

1. Industry Analysis

Understanding the dynamics of an industry is essential for informed strategic decision-making and recognizing potential risks and challenges that could affect the business environment. This chapter aims to provide a comprehensive understanding of the competitive landscape, key industry trends, and future outlooks. The goal is to acquire valuable insights that will enable us to interpret the forthcoming strategies of Costco and Walmart.

1.1 Key Players Analysis: Environmental Analysis of Market Leaders, Challengers, and Newcomers

The retail landscape in the United States has undergone substantial transformation in recent decades, primarily due to new entrants in the industry who leverage their significant scale to offer high-quality products at prices lower than those typically found in traditional retail outlets. Warehouse clubs, in particular, have been rapidly outpacing traditional grocery stores in the U.S. market. This trend is driven by consumers' growing preference for both time and cost savings, leading to significant enhancements in their overall well-being.

The main players in the sector can differentiate to each other on several key features, from the business model that they address to the location and type of offer and consumer that they target. For analysis purposes, we divided the main representative players in the US scenario into three types: the market leaders, the challengers and the newcomers.

The market leaders are those that in terms of size and market share dominate the segment, and these players are Walmart (which operates in the sector of warehouse clubs with the controlled Sam's Club), Kroger and Costco. Based on a research conducted by Solomon Partners, they respectively control 28%, 10% and 8% of market shares (Moses 2023).

Walmart/Sam's Club

Walmart is one of the largest retailers in the world, operating in 19 countries outside the US with \$573 billion revenues in 2022, serving 230 million customers every week through more than 10,500 stores and numerous eCommerce websites (Walmart 2022). Walmart entered the warehouse club sector through the membership-only warehouse club Sam's Club that operates in 44 states in the US and Puerto Rico. Since the segment was first opened in 1983, it has grown rapidly to serve families and entrepreneurs through nearly 600 clubs in the U.S., website and mobile applications. Sam's Club had net sales of \$73.6 billion for fiscal 2022, representing 13% of Walmart's consolidated fiscal 2022 net sales. As a membership-only warehouse club, membership income is a significant component of the segment's operating income. Sam's Club operates with a lower gross profit rate and lower operating expenses as a percentage of net sales than the other segments.

Costco Wholesale

Costco is an American international retail company founded in Seattle in 1983. It operates in 847 locations all over the world where it is principally engaged in the operation of membership warehouses. They operate membership warehouses and e-commerce websites based on the concept that offering members low prices on a limited selection of nationally-branded and private-label products in a wide range of categories will produce high sales volumes and rapid inventory turnover. It totaled \$222.7 billion in revenue for Financial Year (FY) 2022, having 304,000 employees worldwide. At the end of 2022 it registered 118 million cardholder and a member renewal rate of 93% in the US and 90% in Canada (Costco 2022).

Kroger

Kroger is a renowned American retailing company founded in 1883 that has evolved into one of the largest and most trusted supermarket chains in the United States. Kroger operates a vast network of stores across the country, offering a wide range of food products, household essentials, and even pharmaceutical services through its various subsidiaries. Beyond its dedication to providing fresh and affordable groceries, Kroger also embraces innovation, with initiatives in online shopping, technology integration, and sustainability, making it a prominent player in the ever-evolving retail landscape. It registered \$148 billion in sales in 2022, employing 430,000 full and part time workers and they recently launched their first membership program, Boost (Kroger 2022).

The challengers in this sector are those that have a smaller market share and tend to differentiate from market leaders for their innovative offer of products and/or services. In this category we are including, for a matter of synthesis, two (relatively big) players: Target and BJ's Wholesale.

Target Corporation

Target has become a key player in the US retail market, registering approximately \$107 billion of total revenues in 2022 (with \$20 billion originating from the online segment, and a 5-year Sales' Compound Annual Growth Rate (CAGR) of 8.5% (Target Corporation 2022). The strategy of the company relies on a unique product mix that includes exclusive owned brands along with national leading brands and the creation of an engaging experience for each customer, maintaining its relevance through customer loyalty programs like Target Circle, that allows abitudinal customers to exploit special discounts and rewards when using internal payment methods such as Target credit/debit card.

BJ's Wholesale Club Holdings, Inc

Commonly referred as BJ's, it is an American membership-only warehouse club that was able to grow its net sales of 49% over the last five-year reported period (2018-2022), generating cumulative Free Cash Flow of over 2 billion dollars. It now counts 6.8 million members (+27% since 2018) thanks to low prices further amplified by coupons and promotions as well as own brands, which contributed to 24% of merchandise net sales in Financial Year (FY) 2022 (BJ's Wholesale 2022). The company demonstrates to be particularly focused on data usage to improve member experience, instilling a culture of cost discipline, adopting a more proactive approach to growing their membership base and building an omnichannel offering oriented towards making shopping at BJ's more convenient.

Finally, newcomers are the players that, in terms of market share, are significantly distant from the other players in the sector, but they have the potential to emerge through the implementation of new business models that can eventually influence the dynamics of the market in the future.

We chose WebrestaurantStore as a representative of this category from the membership club segment in the US.

WebrestaurantStore

WebstaurantStore, established in 2004, is a prominent e-commerce platform specializing in providing a wide range of restaurant equipment and supplies to businesses in the foodservice industry. The company has experienced rapid growth, becoming a respected resource for restaurateurs, foodservice professionals, and discerning consumers. With a diverse catalog and a primary focus on the business-to-business (B2B) sector, WebstaurantStore also caters to individual consumers and small businesses, strategically accessing a broad customer base. Operating exclusively online, the platform capitalizes on digital advantages, offering seamless browsing and product acquisition. Embracing a warehouse club model, it facilitates bulk purchasing, particularly catering to businesses with high-demand procurement needs, aligning with the imperative for efficiency.

1.2 Market Trends

The aforementioned profound transformation in the US retail industry has been mainly driven by significant technological advancements, shifting consumer preferences, and the overarching influence of relevant economic factors, which, in turn, have shaped market trends within the sector.

Notably, there has been a rapid rise in the prominence of national and discount grocers, such as Walmart, Costco, and Target, at the expense of traditional supermarket grocers, which were once the preferred choice for consumers. Back in 2003, only 21% of consumers considered discount stores their primary source for grocery shopping while, as of 2023, this figure has surged to an impressive 62%, according to a report provided by Solomon Partners (Moses 2023).

This shift in consumer behavior has had a tangible impact on the competitive landscape, with the presence of supermarket grocers diminishing significantly compared to their national counterparts. Over a ten-year span, between 2012 and 2022, the number of supermarket grocers

dropped from 26,746 stores to 25,897, marking a decline of 3%. In contrast, national grocers saw substantial growth, increasing from 53,250 to 70,055 stores, a remarkable increase of 31%.

One key driver behind these changes is the growth of online grocery shopping. The online grocery market has quadrupled in size from 2018 to 2022, skyrocketing from \$27 billion to \$128 billion. Projections indicate that it is poised to reach \$263 billion by 2026, with a growth rate of 20%.

National grocers, including Walmart, Target, and Costco, are leading the charge in online grocery sales, competing head-to-head with the huge and diversified conglomerate Amazon in this segment. In particular, the influence of the Seattle-based giant on the industry is becoming an increasingly significant concern for current market leaders, as it has shown the most substantial growth in grocery sales in the latest years.

1.2.1 Technological Advancements

Advances in technology have brought about a profound transformation in the shopping journey, resulting in a landscape where on one hand, there are businesses entirely focused on direct-to-consumer shipping and social media marketing (such as online grocers), while on the other, traditional brick-and-mortar retailers have embraced new technologies to lure consumers back to their physical stores.

Here are some of the fundamental technological advancements that have reshaped the retail industry as known to this day:

- Buy-Online-Pick-Up-In-Store (BOPIS): According to Biron (2019), 68% of US consumers have utilized the buy-online-pick-up-in-store service, reflecting the growing popularity of this hybrid shopping model.
- RFID Technology (Radio-Frequency Identification): RFID technology has revolutionized inventory management and supply chain operations. It involves using wireless communication to track and identify products, enhancing accuracy and efficiency.

- QR Codes (Quick Response Codes): QR codes have become widely spread in retail, serving as a convenient way for consumers to access product information, discounts, and other digital content using their smartphones.
- Automated Check-Out: Automation in the check-out process accelerates transactions and reduces wait times, contributing to a more efficient and smoother shopping experience.
- Mobile Payments and Mobile Wallets: The widespread adoption of mobile payments and wallets like Apple Pay and Google Wallet has simplified the payment process, offering consumers a safer and faster way to complete their purchases.
- Delivery Applications: Delivery applications, such as Uber Eats or Glove, have gained prominence by providing convenient and on-demand delivery services for a wide range of products, including groceries, meals, and retail items.

Overall, technological innovations have played a significant role in shaping the modern retail industry, promoting convenience, efficiency, and a seamless integration of online and offline shopping experiences.

1.2.2 Consumer Preferences

Data from a YouGov report (Nguyen 2022) sheds light on consumer preferences, revealing that approximately half of consumers in the US (49%) and the UK (53%) express a renewed enjoyment of in-person shopping compared to pre-COVID times. A survey at the beginning of 2022 further indicates shifts in spending patterns among UK consumers, with increased expenditures on household fuel (63%), groceries (58%), and online purchases (42%) compared to pre-pandemic levels. These changes are not exclusively driven by consumer preference trends but are also influenced by macroeconomic conditions, such as inflation and geopolitical instability.

Indeed, economic challenges, particularly inflation, have exacerbated the financial strain on American households. An August survey by YouGov (Nguyen 2022) found that 81% of US consumers who purchased groceries between June and August noticed higher prices compared to the beginning of the year. This trend extended to other categories, including dining

out/takeout, overall household expenses, personal care products, and clothing. Globally, few categories remained untouched by price increases, with notable impacts on food (74%), household products (47%), and cars (33%).

Another noteworthy theme is the rise of consumer consciousness, influencing choices in nearly every industry. Consumers and brands are increasingly embracing sustainability and environmentally friendly products. As evidence of this shift, a considerable percentage of holiday shoppers in the US (37%) and the UK (34%) express an intention to purchase second-hand items as gifts.

Moreover, the geopolitical landscape also played a pivotal role in shaping consumer sentiments. Russia's invasion of Ukraine in early 2022 drew attention to how companies responded—or failed to respond—to the crisis. At a time when 45% of global consumers appreciate brands taking a stance on social issues, the conflict prompted expectations for brands to issue public responses. A majority of consumers worldwide supported such responses (55%), with expectations extending beyond words to concrete actions. Specifically, consumers called for brands to contribute to humanitarian efforts in Ukraine (71%) and cease business operations in Russia (58%). These sentiments were reflected in the business realm, where a YouGov poll (Nguyen 2022) among US registered voters indicated that 68% would be more inclined to purchase from a brand contributing to humanitarian efforts in Ukraine.

1.2.3 Economic Factors

The United States, as the global economic powerhouse, stands at the forefront of economic affairs, outpacing even China. Following a temporary contraction in Gross Domestic Product (GDP) growth in the aftermath of the COVID-19 pandemic, the nation has witnessed a steady resurgence. Notably, the GDP exhibited a 2.1% increase in 2022, though marginally weaker than the robust growth experienced in 2021, that has been the strongest since 1984. A pivotal factor in this revival was consumer spending, contributing 1.9% to the annual growth in 2022. Encouragingly, economic prospects brightened in the latter half of 2022, sustaining momentum into the early months of 2023 (ECLAC 2023).

The labor market played a pivotal role in reinforcing the economic rebound. Throughout 2022, the job market displayed remarkable strength, generating an average of 399,000 new jobs per

month and an annual addition of 4.8 million jobs. This positive trend persisted into the first quarter of 2023, witnessing the creation of over one million new jobs, averaging 345,000 per month.

However, a noteworthy challenge emerged in the form of inflation, which surged to 8% in 2022, marking the highest annual level in four decades. Although a moderation trend commenced, with a decline to 5% in March 2023 from the peak of 6.5% in December 2022, underlying pressures persist. Core inflation, excluding volatile energy and food categories, experienced a slight increase from 5.5% in February to 5.6% in March. The Federal Reserve, responding to the urgency, implemented seven interest rate hikes in 2022, the most aggressive since the 1980s, and followed with two more in early 2023. The federal funds rate went from near zero in March 2022 to approximately 5% in March 2023.

The shocking fall down of Silicon Valley Bank (SVB) in March 2023 added a layer of complexity to the economic landscape. Driven in part by the devaluation of assets amid rising interest rates, SVB's collapse triggered a cascade effect in the banking sector. With nearly 60% of SVB's assets tied to fixed-rate securities, the spike in interest rates rendered these bonds less valuable, prompting a massive withdrawal of \$42 billion within 24 hours (ECLAC 2023). This led to forced sales of securities at significant losses, amplifying the shockwave that reverberated not only domestically but also across international financial markets. Subsequently, another bank, Signature Bank, experienced a similar fate.

Despite these banking sector challenges, the Federal Reserve, in its March 22, 2023 meeting, maintained its focus on reducing the inflation. The decision to approve a quarter-point interest rate increase reflected a commitment to vigilance in the presence of persistently high inflation and a labor market displaying robust growth.

In the end, the implications of recent banking sector stresses, coupled with uncertainties surrounding the central bank's future actions, have raised concerns about the trajectory of the U.S. economy. Although recent economic indicators showcase resilience, simultaneously addressing the challenges posed by inflation, troubled banks, and market hypersensitivity adds another layer of complexity for U.S. authorities. In this impervious environment, policy decisions may inadvertently contribute to a more pronounced economic slowdown in the next few years.

1.3 Industry SWOT Analysis

To gain a deeper insight into the array of strategies that each target company (Costco and Walmart) employs to navigate its challenges, a SWOT analysis has been conducted to evaluate the external and internal factors impacting their businesses.

Strengths

One of the notable strengths inherent in industry leaders within this sector pertains to the extensive brand recognition they have systematically cultivated over time. Renowned entities, including but not limited to Costco and Walmart, have entrenched themselves in the collective public consciousness through a judicious combination of strategic methodologies and the regularity with which customers engage with these brands. Some time ago, former Costco CEO Jim Sinegal (Byrnes 2013) disclosed their dual-product strategy. This strategy includes basic items that customers find consistently on a day-to-day basis, and "treasure hunt" items, which are products that continually change and are offered at remarkable prices while supplies last. These products encompass renowned brand names and, according to Sinegal, play a pivotal role in drawing customers to shop at Costco. This is because they create a sense of urgency, as customers understand they may not find these items again at such attractive prices in the future. Meanwhile, companies like Walmart have elevated their advertising efforts to the point where their stores have become readily recognizable and almost synonymous with the act of shopping itself. This is particularly advantageous because their loyal customer base frequents these establishments routinely. Customers have come to consider these stores as familiar and inviting, seamlessly incorporating them into their daily or weekly shopping routines.

Membership-based business models capitalize on this recognition and loyalty. They offer customer loyalty programs that are not only beneficial to the customers but also provide a reliable stream of income for the companies. Customers enjoy significant savings by consolidating their shopping needs in one place, as opposed to visiting multiple stores. For companies, these membership fees provide a financial cushion that ensures a degree of economic stability. Furthermore, they allow these businesses to maintain competitive pricing in the market by optimizing their profit margins.

In addition to these strengths, the industry giants are known for their substantial bargaining power when negotiating with suppliers. This is a crucial advantage, especially in times of inflation when rising costs impact the profit margins of all sector players. Larger corporations, supported by their substantial income from membership fees, have the ability to negotiate more favourable deals, which helps them weather economic challenges more effectively.

Furthermore, big-box retailers like Costco, Walmart, and others have built their reputation on offering a comprehensive catalogue of products. This has positioned them as one-stop shopping destinations. The sheer diversity and breadth of their product offerings put them in direct competition with local retailers, making it challenging for the latter to match the variety and selection offered by these industry giants.

Weaknesses

While we have underscored various merits of the warehouse membership club industry, it is imperative to acknowledge that these very strengths can be construed as limitations when compared with traditional retail enterprises. Divergent consumer preferences and the enjoyment derived from shopping across a spectrum of stores for varied products need to be recognized. Some individuals exhibit a tendency for specific private labels from different brands and prefer to concentrate on particular items during each shopping excursion. For such customers, committing to a singular warehouse featuring a subscription-based membership model may not align with their shopping habits and inclination for variety-seeking behavior. Additionally, the associated cost of membership may dissuade certain customer segments, particularly those with lower incomes, who might be disinclined to bear what they perceive as a 'fixed cost' distributed over the course of the year.

Another constraint within the warehouse club business model is that enterprises like Costco predominantly target an older, suburban demographic with higher incomes, emphasizing savings on bulk purchases and necessitating ample space for product handling and storage. Their ideal clientele comprises middle-aged, employed adults with families. However, this focused approach toward an aging consumer base presents challenges for Costco. As this demographic ages, they tend to adopt more conservative financial habits and display reduced inclination for bulk purchases. Simultaneously, their capacity to transport and manage substantial quantities of items diminishes. Conversely, millennials, constituting the largest and fastest-growing consumer segment, do not align with Costco's traditional customer profile.

Younger generations often face constraints in terms of transportation and storage options, which do not align with the bulk offerings of Costco. The inability to attract younger demographics thus emerges as a business vulnerability for Costco, implying a potential decline in sales due to evolving demographics.

Moreover, large big-box retailers frequently endeavor to accommodate a broad spectrum of customer needs, aspiring to be a comprehensive one-stop shopping destination. While this strategy effectively serves many customers, it inherently restricts their specialization in meeting highly specific requirements. In contrast, stores purposefully designed to fulfill niche demands inherently provide a more extensive and tailored selection within their specific product category, offering a superior range of options for distinct preferences.

Opportunities

In the retail industry, the prevailing trend of the past decade has been the extensive adoption of e-commerce platforms. While e-commerce gained swift traction in the fashion sector, its uptake in retail, especially for fresh food delivery, lagged due to quality concerns. However, with enhanced service quality, the retail industry has now embraced e-commerce as a significant trend. This shift to e-commerce is particularly intriguing for membership club retailers as it combines the benefits of online shopping, such as the convenience of comparing different stores, with the concept of loyalty programs inherent in the membership itself. A study led by Xu and Meng (2023), explores the viability of paid membership systems in e-commerce, considering variable search costs. The findings reveal that e-commerce platforms employing a paid membership model are well-suited for successful marketing campaigns. This system proves most effective for retailers aiming to maximize profits, especially when combined with promotional activities in the online market. Members appreciate the convenience of selecting groceries from home and utilizing services like home delivery or the option to pick up purchases at the nearest store entrance. For instance, Costco's e-commerce platform experienced sales growth (Costco 2022), particularly in categories like furniture, electronics, mattresses, appliances, and exercise equipment, attributed to their expanded big and bulky delivery capacity, improving service and overall value.

Another significant trend in the big-box retail sector is the emphasis on private label products, which typically offer high profit margins and foster strong customer loyalty. Costco's Kirkland

Signature, for instance, has achieved robust global growth by consistently offering new products, cost savings, and improved quality.

The industry actively pursues an opportunity to leverage targeted memberships, allowing companies to introduce specialized options tailored to different customer segments to expand their customer base. Costco, as detailed in its annual report, has developed its own membership structure, offering a Gold Star membership for individuals and business memberships designed specifically for businesses, including individuals with business or retail sales licenses. Business members can add additional cardholders (affiliates) subject to the same annual fee. Paid cardholders can upgrade to an Executive membership, earning 2% rewards on qualified purchases and accessing additional savings and benefits on various business and consumer services, including auto and home insurance and the Costco auto purchase program.

Threats

The industry confronts a substantial threat, primarily arising from the potential entry of tech giants such as Amazon. Amazon's extensive product range combines the convenience of online shopping with enticing special deals facilitated by a dense network of retailers on its platform. Moreover, Amazon Prime functions as a membership program, offering subscribers benefits similar to those provided by warehouse clubs, supplemented by streaming and digital services, along with exclusive promotions.

External factors capable of reshaping the industry landscape include the risk of an economic downturn, which can restrict clients' discretionary spending and reduce overall shopping frequency. Additionally, shifts in consumer preferences, marked by an increasing emphasis on environmental and social concerns, may cast a shadow on the image of large-scale retail stores. The "buy in bulk" business model, at times, conflicts with the sustainability objective of minimizing waste and consumption, prompting adjustments in general shopping patterns. Adapting to this evolving landscape can be particularly challenging for some industry players.

Another notable factor observed in recent years is the issue of global dependencies. Membership clubs often rely on global supply chains to procure products at competitive prices. The COVID-19 pandemic underscored the vulnerabilities associated with global supply chain disruptions, impacting various businesses, especially those, like retail, dependent on rapid inventory turnover.

In summary, this concise analysis aimed at providing insights into various dimensions of the industry. Effectively addressing these challenges while capitalizing on strengths and opportunities will be crucial for warehouse club companies to ensure the ongoing success of the sector, and this aspect will be emphasized in the valuation of our target companies.

1.4 Competitive Forces Evaluation within the Industry

Porter's Five Forces functions as an analytical framework for evaluating the competitive dynamics within an industry. These five forces—buyer power, supplier power, threat of entry, rivalry, and substitutes—facilitate the assessment of industry challenges. Furthermore, they assist companies in identifying potential opportunities, including unexplored market gaps overlooked by competitors. The application of Porter's Five Forces proves to be a valuable methodology for shedding light on the external landscape of the Warehouse Club industry, representative of both Costco and Walmart.

Buyer Power

In the Wholesale Club sector, customers, referred to as club members, exert influence in two primary ways: price sensitivity and bargaining power. Price sensitivity is evaluated based on the significance of cost, product differentiation, and competitive dynamics among buyers. Warehouse clubs, renowned for their cost-effective approach, cater to customers seeking larger quantities at lower costs due to the bulk selling model. With the sector primarily offering essential household items without significant product differentiation, such as toilet paper and milk, competition among customers is virtually non-existent, resulting in moderate price sensitivity among buyers.

Bargaining power is influenced by factors such as size, concentration, access to information, and the potential to internally produce goods. The industry benefits from size and concentration, as numerous buyers purchase small quantities, and only three major warehouse clubs dominate the US market. This limited choice empowers the industry. Buyers in the Warehouse Club industry possess limited knowledge of industry costs, and their capacity to replicate products is virtually non-existent. This is because warehouse clubs offer products that are difficult for regular consumers to imitate, such as detergent and peanut butter. Given the industry's

concentration, limited buyer information, and the inability to self-manufacture brands, buyers exhibit minimal bargaining power.

Considering these factors, a low level of buyer power is evident in the Warehouse Club industry.

Supplier Power

Supplier power, similarly to buyer power, pivots on price sensitivity and bargaining power. In this context, the focus transitions from the industry's interaction with its customers to its engagement with suppliers. In evaluating supplier power, the industry, symbolized as the "buyer," engages with manufacturers supplying products to wholesale clubs.

Major players such as Costco and Walmart prioritize cost sensitivity, aligning with the wholesale clubs' pursuit of cost efficiency achieved through substantial-volume purchases. The absence of differentiation in supplier industry products, largely comprising generic items, amplifies competition on pricing within the industry, thereby intensifying price sensitivity.

Regarding bargaining power, the Warehouse Club industry's substantial size and concentration augment its influence. The limited number of warehouses with confined shelf space provides the industry with a negotiating advantage. Furthermore, the industry's extensive experience in supplier interactions equips it with valuable insights into supplier costs, further fortifying its bargaining power. Some warehouse clubs, exemplified by Costco with its Kirkland brand, even possess the capability to manufacture their own items. Expanding upon these factors, it seems that the supplier influence within the Warehouse Club industry is comparatively limited.

Threat of New Entrants

The threat of new entrants in the Warehouse Club industry depends on several crucial factors, including capital requirements, resource accessibility, economies of scale, cost efficiency, product distinctiveness, distribution capacity, legal barriers, potential countermeasures, and switching expenses. The interplay of these elements contributes to the intricate nature of breaking into this market.

Significant capital and resources are essential for venturing into the Warehouse Club industry, given the need for substantial investments in expansive warehouses, a robust transportation

network, and a sizable product inventory. This endeavor entails a considerable financial commitment, rendering it a high-cost undertaking.

Moreover, existing industry players enjoy significant economies of scale, forming a formidable barrier for newcomers. These established companies have nurtured relationships and alliances over time, giving them a substantial competitive edge that new entrants would lack.

The competitive landscape in warehouse clubs, heavily reliant on low prices, opens the door to the threat of retaliation. Collaborative efforts among current market leaders to undercut a newcomer's prices could significantly impede their progress, utilizing price wars as a strategy to neutralize new entrants.

However, certain aspects could facilitate entry into the industry. Minimal product differentiation implies that newcomers do not necessarily need to introduce unique products but can offer the same common items found in existing clubs. Additionally, there are no legal barriers preventing entry into the market. Moreover, the switching costs for buyers, who need to pay for yearly memberships, are relatively low, typically ranging from fifty to one hundred dollars, making it reasonably affordable for consumers to switch to a different club.

To wrap up, the overall difficulty of entering the industry is primarily driven by high capital requirements, the presence of economies of scale, cost advantages, and the potential for retaliatory actions. Nevertheless, the absence of product differentiation, the lack of legal barriers, and the low switching costs do provide some openings for potential entrants. However, the prevailing challenges outweigh these opportunities, resulting in a low threat of entry into the Warehouse Club industry.

Rivalry

Competition within the Warehouse Club industry is influenced by key factors, including industry concentration, product similarity, capacity, exit barriers, and cost conditions. The Wholesale Club sector exhibits a high level of concentration, with just a few major clubs dominating the market. Our analysis categorizes the competitive landscape into market leaders, challengers, and newcomers (refer to Table 1.1 in the Appendix). This notable concentration intensifies competition among these players. In recent times, the industry has matured, with all organizations striving for top-line revenue growth. The increase in sales indicates that there is no excessive capacity, due to rising demand. However, the lack of product differentiation means

that companies primarily compete on pricing, given that each of the three wholesale clubs offers nearly identical merchandise, making it challenging to stand out in the market.

Exit barriers in this industry are exceptionally high. The Wholesale Club business involves substantial investments in goods, transportation, warehousing, and storage. Selling off these assets would result in significant losses. Given the industry's high concentration, low product differentiation, absence of overcapacity, and the presence of formidable exit barriers and cost conditions, rivalry remains elevated within the Wholesale Club sector.

Substitutes

The Warehouse Club industry faces a notable threat from substitutes, particularly major global wholesale retailers like Amazon or eBay, which offer enhanced convenience compared to wholesale clubs, notably Costco.

Walmart, initially not a warehouse club, evolved with the development of its Sam's Club division and now provides a vast array of retail items, surpassing even the variety offered by wholesale clubs such as Costco. While Costco stocks around 4,000 different items, Walmart boasts approximately 15,000 items. Moreover, Walmart's extensive network of locations, many open 24 hours a day, offers customers the flexibility to shop at any time.

Target, another retail giant, offers a similar breadth and variety of products as Walmart. Additionally, Target provides unique benefits, including the Cartwheel app for mobile coupons and the Red Card, granting members a 5% discount on purchases.

Amazon, as an online retail behemoth, presents an even wider range of products compared to wholesale clubs and entices Prime members with various rewards such as free two-day shipping and free streaming instant video. Furthermore, the cost of switching to these substitutes is remarkably low since they typically don't require membership fees, unlike wholesale clubs. Hence, the threat of substitutes is substantial within the industry.

The external analysis of the Warehouse Club industry reveals that buyer power, supplier power, and the threat of entry are low, while rivalry and substitutes pose high levels of concern. This assessment is illustrated in Figure 1.1 (refer to the Appendix), providing a comprehensive overview of these forces' interactions within the industry. In this competitive landscape, the

industry maintains the upper hand over both buyers and suppliers, benefiting from a low threat of new entrants, collectively supporting industry profitability. However, challenges arise in the form of high rivalry due to intense price competition within a concentrated and undifferentiated market. Furthermore, the presence of numerous substitutes, such as global and online retailers steadily gaining profitability, adds to the industry's concerns.

In summary, the analysis indicates that while Wholesale Clubs enjoy particular competitive advantage with regard to suppliers, buyers and potential new entrants, they may face a decline in profitability due to the competitive pressures of rivalry and the growing influence of substitutes.

1.5 Macro Analysis: Influence of Main Economic Factors

The macroeconomic landscape significantly shapes the retail consumer industry, given its direct-to-consumer nature. Various factors play a crucial role in influencing the macroeconomic context, including fluctuations in consumer prices (inflation), the nation's wealth growth (represented by GDP), and the prevailing interest rates for borrowing (Federal Reserve rate).

1.5.1 Inflation Rate

The inflation rate, reflecting the pace at which prices rise over time, is a pivotal indicator for understanding a nation's macroeconomic context. Both private enterprises and public entities consider this rate in formulating pricing strategies and policy interventions. Moreover, inflation expectations are vital for predicting a nation's future growth trajectory and the corresponding actions of its central bank, in this case, the Federal Reserve (referred to as Fed hereafter).

In 2022, the United States experienced its highest inflation rate since the 1980s, reaching an unprecedented 8.00%. The only instances of a higher rate occurred in 1974 and 1980, coinciding with the first (1974) and second (1979) oil crises. Over the past decade, the rate had hovered around 2%, with a notable increase in 2021 (+3.46%, from 1.23% to 4.70%) and a subsequent rise in 2022 (+3.30%, from 4.70% to the current 8.00%). The current elevated

inflation is attributed to various factors, many stemming from the repercussions of the COVID-19 pandemic.

Economist Michael Gapen from Bank of America identifies three main causes for the rising prices (Paul, 2023):

- Increased household demand and supply-chain disruptions during the pandemic. With people staying at home during the COVID-19 outbreak, demand decreased. However, as restrictions lifted, consumer spending surged, leading to heightened demand against a backdrop of reduced production during the pandemic's peak.
- The Russian-Ukrainian conflict, significantly impacting gas prices and consequently affecting the overall energy industry.
- A robust labor market response to reopenings. Reduced travel during the pandemic resulted in falling prices for many services, but as these prices rebounded over the past 12 months, a high demand for labor emerged, accompanied by substantial wage gains. Labor constitutes a significant portion of service production costs, resulting in increased costs for services paid by consumers.

In conclusion, the peak of inflation in the U.S. can be attributed to a combination of unexpectedly increased domestic demand, geopolitical instability, and dynamics within the labor market. Retail industry leaders must carefully navigate these challenges and implement strategic countermeasures, such as reducing gross profit margins in the short term instead of transferring increased costs to consumers, to safeguard their competitive advantage. The risk of disruption is significant, as competitors may exploit any missteps by industry leaders to gain a strategic advantage.

1.5.2 GDP Growth

The Gross Domestic Product (GDP) stands as a critical macroeconomic metric, quantifying the total value of all final goods and services produced within a country's borders during a specific timeframe, measured at market prices. Its trajectory serves as a significant indicator of a nation's economic growth and overall development.

In the case of the United States, the GDP has demonstrated consistent growth since the 1960s. In 1960, the U.S. GDP amounted to \$543.30 billion, while by 2022, it had reached an impressive \$25,462.70 billion, reflecting a noteworthy Compound Annual Growth Rate (CAGR) of 6.4% over a span of 62 years. Notably, the GDP growth rate turned negative only twice in the past two decades, specifically in 2009 and 2020, both years characterized by significant economic challenges.

In 2009, the subprime crisis triggered a global economic downturn, evolving into the Sovereign Debt Crisis in Europe. In 2020, the COVID-19 Pandemic had a profound impact on the U.S. economy, resulting in 1,182,276 deaths and 107,297,444 recovered individuals. This crisis left an indelible mark on the North American giant, affecting both its economy and national security.

Despite these challenges, the resilience and global pivotal role of the United States were evident in its response to the crises. Following the -2.60% growth rate in 2009, the U.S. rebounded in 2010 with a growth rate of 2.71%, maintaining a consistent percentage increase in the vicinity of 2% for the subsequent nine years. In 2020, the rebound was even more pronounced, with a remarkable +5.95% growth rate after experiencing a negative growth rate of 2.77% in the previous year. This brought the post-COVID GDP to \$23,315 billion, surpassing the pre-COVID level of approximately \$21,390.98 billion in 2019.

This resilience underscores Washington's ability to thrive under pressure and navigate through global economic, health, and geopolitical challenges, offering an optimistic forecast for the retail industry in the coming years.

1.5.3 Interest Rates

In the United States, various indicators are used to measure interest rates, guiding the Federal Reserve in implementing monetary policy to achieve its objectives of maximum employment and price stability (Fed 2023). Key indicators include:

- Federal Funds Rate: the rate at which banks lend to each other overnight, directly influenced by the Federal Reserve through monetary policy decisions. Changes in this short-term rate impact borrowing costs across the economy.
- Discount Rate: the rate at which banks can borrow directly from the Federal Reserve, providing an alternative to interbank borrowing. Used in specific circumstances when banks access funds directly from the Fed.
- Interest on Excess Reserves (IOER): the rate at which the Federal Reserve pays interest on banks' excess reserves held at the Fed. Serves as a floor for the federal funds rate, encouraging banks to retain excess reserves.
- Yield on U.S. Treasury Securities: yields on Treasury bills, notes, and bonds serve as indicators of longer-term interest rates. The 10-year Treasury yield, in particular, is closely monitored for insights into future economic conditions and inflation.
- Prime Rate: the interest rate offered by banks to their most creditworthy clients, influencing various consumer and business loans. Influenced by the federal funds rate and market conditions.

These indicators collectively offer insights into the overall interest rate landscape in the U.S., crucial for understanding borrowing and lending costs across different timeframes. The Federal Reserve employs its policy tools to shape these rates in alignment with its assessment of economic conditions and its dual mandate.

The primary tool at the disposal of the Federal Reserve is the federal funds rate, commonly referred to as the Fed Rate, highlighting its direct link to the US Central Bank. For our analysis, we consider this rate as the key interest rate for the nation.

The Fed rate experienced multiple increases last year, starting in March 2022, when the Fed initiated a rate hike, beginning with 25 basis points (bp, a standard unit for measuring interest rates representing 1/100th of a percentage point or 0.01%), followed by +50bp in May, +75bp in June, and another +75bp in July. This upward trend continued until July 26th, 2023, when the interest rate peaked at 5.50% and has remained at this level as of the time of writing.

Although there are no direct implications for the retail industry, increased pressure on households for mortgages, loans, etc., could reduce consumer spending power, compromising budgets for non-essential items.

1.6 Forecast Industry Outlook

According to McKinsey (2023), after a challenging 2022 marked by inflation and supply chain disruptions, grocery executives anticipated a return to a more stable environment. While inflation has decreased significantly and supply shortages have eased, persistent effects and ongoing margin pressures have tempered optimism. Despite a drop in inflation to 3.2% in July, food prices rose 4.9% year over year through July 2023, leading consumers to adapt by seeking less expensive options. Private brands and warehouse clubs benefited from this shift, with private-brand goods showing double-digit growth.

A McKinsey survey (2023) revealed that consumers spent significantly more on groceries in the past few months, with grocery spending representing a higher share of their income. Grocery executives, however, remain pessimistic about growth prospects in 2023, citing challenges such as labor shortages and demand volatility. Five key trends are expected to shape the grocery landscape:

- Ongoing Pressure to Deliver Value: Consumers prioritize reducing spending, leading to increased interest in private-brand offerings and discounts. Private brands, known for higher margins, are gaining popularity.
- Elevated Personalized Experience: Omnichannel experiences have become crucial, with personalization being a key factor in consumer loyalty. Grocers are urged to use purchase history for informed product offerings and invest in omnichannel capabilities.
- Broader Business Diversification: Grocery retailers are exploring new revenue streams and entering new categories, creating partnerships with tech companies, and expanding into consumer services. This diversification is seen as a strategy to enhance the consumer value proposition.
- Acceleration of Generative AI: Automation and AI, particularly generative AI, are gaining traction in grocery retail. Retailers are experimenting with AI technologies to improve customer experience, with examples like Kroger's Chefbot and Walmart's AI-powered simulations.
- Sustainability as a Driver: Consumer spending is increasingly influenced by sustainability commitments, and there is a link between ESG efforts and sales growth.

Grocers are urged to embrace sustainability to ensure long-term success, with initiatives like renewable energy adoption and recycling solution coalitions.

Despite challenges, grocery executives can restart growth and navigate uncertainties by focusing on these trends and developing effective strategies.

INDIVIDUAL PART – GAETANO PIO TOTI

2. Comparative Analysis

This chapter conducts a comprehensive comparative analysis, delving into the core principles of the Pairs Trade Strategy. It begins by examining alternative valuation techniques, specifically Trading Comparables and Precedent Transactions. Evaluating their outcomes and potential pitfalls, these methods are then compared with the Discounted Cash Flow (DCF) model, utilizing a Football Field Analysis Model.

Following this, the chapter extensively explores the qualitative aspects of technical analysis, inspecting the profitability of our intuition. The Pairs Trade Strategy undergoes accurate testing through an extensive series of backtests, scenario analyses, and simulation analysis, contributing to an overall understanding of its potential implications and performance outcomes. Conclusive remarks at the end of the chapter summarize the strengths and weaknesses of the strategy, ultimately providing an investment recommendation.

2.1 Fundamental Analysis: Different Valuation Techniques

As a common procedure in the financial field, we proceeded to test the robustness of our appraisal deriving from the Discounted Cash Flow Model, comparing it with two other valuation techniques: Trading Comparables and Precedent Transactions. In the end, the results will be summarized in the Football Field Chart, which we will analyze and highlight the potential implications for our Pairs Trade Investment Strategy.

2.1.1 Trading Comparables

The Trading Comparables Analysis, also known as the Multiples Approach, is a valuation method grounded in the principle that similar assets are traded at comparable prices (Smith

2022). This approach operates on the assumption that the ratios employed to compare firms, such as Key Performance Indicators (KPIs), Profitability Margins, or Coverage Ratios, are consistent across similar entities. Consequently, by juxtaposing a target company's financial metrics with those of comparable companies, a valuation range for the target company can be established.

In our study, we identified eight companies operating in the retail industry, each specializing in distinct segments within the sector: Target Corp. (general merchandise and discount retailer), Kroger Co. (grocery and supermarket chain), Dollar General Corp. (discount variety stores), Dollar Tree Inc. (discount variety stores through Dollar Tree and Family Dollar brands), Dollarama Inc. (Canadian chain of dollar stores), Five Below (discount stores targeting teens and pre-teens), BJ's Wholesale Club (membership-based warehouse club), and Canadian Tire Corp, Ltd. (Canadian retail company with stores in different segments such as automotive, hardware, sports).

For each of these companies, we initially sourced key financial data from Bloomberg, including Market Valuation (Enterprise Value and Equity Value) and Last Twelve Month (LTM) Financial Key Performance Indicators (KPIs). Subsequently, we calculated LTM Profitability Margins (Gross Profit %, EBITDA %, EBIT %, and Net Income %). We also retrieved Coverage and Multiple Ratios (from the same source, Bloomberg), comparing the data with our two target companies. The target companies' data were directly obtained from their financial statements (2023), and Market Price per Share was retrieved from Yahoo Finance as of 10/11/2023. The analysis culminated in collecting the Highest, Lowest, Median, and Mean values for each metric, and a percentile rank of the Comparable Multiples (Price to Earnings, Enterprise Value to EBITDA, Enterprise Value to Sales, and Price to Book) was generated, as summarized in Table 3.1 (Appendix). The color-coded representation in the table highlighted red for values in the 10th percentile, yellow for the 50th percentile, and green for the 90th percentile.

Four "Most Similar Companies" were then identified based on key financial metrics: Enterprise Value (Target Corp.), EBITDA (Kroger Co.), Gross Profit % (BJ's Wholesale Club), and Total Debt/Enterprise Value (Dollar General Corp.), as illustrated in Table 3.2 (Appendix).

Implied valuations for the target companies were derived using the median multiples of trading comparables, considering Price to Earnings (P/E), Enterprise Value to EBITDA (EV/EBITDA), Enterprise Value to Sales (EV/Sales), and Price to Book (P/B) ratios. The results were

categorized into subsets, presenting the implied valuation based on each multiple for the entire sample (All Comparables) or the most similar companies (Most Similar).

In the first subset, detailed in Table 3.3 (Appendix), the Implied Valuation based on the Price to Earnings (P/E) multiple was calculated. For Costco, the Target Per Share Price ranged from \$251.00 to \$322.63, while for Walmart, it ranged from \$82.42 to \$105.94.

Next, the Implied Valuation based on the Enterprise value to EBITDA (EV/EBITDA) multiple, detailed in Table 3.4 (Appendix), yielded a Target Per Share Price range of \$220.61 to \$266.05 for Costco and \$105.45 to \$129.62 for Walmart.

Continuing the analysis, the third subset comprehended the Implied Valuation based on the Enterprise Value to Sales (EV/Sales) multiple, as presented in Table 3.5 (Appendix), and resulted in a Target Per Share Price range of \$377.15 to \$535.77 for Costco and \$154.14 to \$224.33 for Walmart.

Finally, the Implied Valuation based on the Price to Book Ratio (P/B, calculated as Market Price Per Share on Book Value per Share), summarized in Table 3.6 (Appendix), showed a Target Per Share Price range of \$342.67 to \$359.23 for Costco and \$217.86 to \$228.89 for Walmart.

It is noteworthy that implied valuations based on All Comparable Companies multiples are generally higher, with the exception of the Price to Book (P/B) ratio, where the median multiple value of Most Similar Companies is higher than that of All Comparable Companies.

To wrap up, while the Trading Comparables Analysis serves as a valuable tool in assessing a company's valuation by leveraging industry-wide metrics, it is essential to acknowledge certain nuances, particularly within the dynamic landscape of the retail field. This method implicitly captures market sentiments towards the entire sector, and valuations may inherently reflect industry trends of undervaluation or overvaluation. Moreover, it is crucial to exercise caution in generalizing the results, as the retail industry exhibits a significant diversity of players. In the context of this analysis, retail giants like Walmart and Costco, with their Enterprise Values of \$457.07 billion and \$269.78 billion respectively, compete against notably smaller entities. For instance, Target Corp., the closest comparable company, has an Enterprise Value of \$79.85 billion. This remarkable contrast in dimensions underscores the importance of considering the unique characteristics of each company, especially in an industry where enterprises vary widely in size and scope. As such, while the Trading Comparables Analysis provides valuable insights,

a conservative approach that considers individual company dynamics alongside industry trends is crucial for a comprehensive and accurate valuation assessment (Nath 2021).

2.1.2 Precedent Transactions

The Precedent Transactions Analysis is an appraisal technique that leverages historical prices and multiples paid for comparable companies, serving as a benchmark to evaluate the value of a target company. This method aims to provide an estimate of the potential value of a share of stock in the context of an acquisition (Kenton 2022).

In our analysis, we identified fifteen Mergers and Acquisitions (M&A) deals that occurred from 2015 to 2023 in the expansive retail industry. These transactions, with an Announced Total Value range spanning from \$5.26 billion to \$68.37 billion, formed the foundation of our examination. From Bloomberg, we retrieved their relevant Last Twelve Months (LTM) Transaction Multiples (Table 3.7, Appendix) - Transaction Value to EBITDA (TV/EBITDA), Transaction Value to EBIT (TV/EBIT), and Transaction Value to Sales (TV/Sales) - and proceeded with the implied valuation for both our target companies based on the median value of each multiple. We adhered to the convention of equating Transaction Value to Enterprise Value, a widely accepted practice in the realm of precedent transactions valuation (Lisy 2019).

Focusing our lens on two retail giants, Costco and Walmart, our analysis revealed intriguing findings. For Costco, the Per Share Price exhibited a substantial spread between its extremities. The valuation based on the Transaction Value to EBITDA (TV/EBITDA) multiple amounted to \$332.52, while the Transaction Value to EBIT (TV/EBIT) multiple suggested \$399.37, and the Transaction Value to Sales (TV/Sales) multiple indicated \$943.76. Consequently, this established Costco's Per Share Price range between \$332.52 and \$943.76, as summarized in Table 3.8 (Appendix).

Conversely, Walmart's implied valuation consistently portrayed lower results across all multiples, despite recording consistently superior financial metrics - encompassing EBITDA, EBIT, and Sales. This discrepancy, which could also be inferred in the Trading Comparables Analysis, is to be mostly attributed to the remarkable difference in Total Outstanding Shares— 2.69 billion for Costco compared to 442.60 million for Walmart, as retrieved from the latest available financial statements (2023). Specifically, the TV/EBITDA valuation proposed a target

per share price of \$164.96, juxtaposed with \$159.12 based on TV/EBIT and \$404.87 based on TV/Sales - establishing a valuation range from \$159.12 to \$404.87 for Walmart (Table 3.9, Appendix). Noteworthy is the observation that the TV/Sales valuation yielded the highest result for both companies, underscoring Walmart and Costco's formidable revenue-generating power.

In our study of Precedent Transactions valuation results, it is evident that Depreciation and Amortization (D&A) significantly influences the target companies' implied valuations. This is particularly manifest with Costco when comparing the TV/EBITDA and TV/EBIT valuation methods, which yield notably different figures (\$332.52 for TV/EBITDA compared to \$399.37 for TV/EBIT). In contrast, Walmart's valuation remains relatively stable, showing minimal variation and even lower figures in the case of TV/EBIT (\$159.12 versus \$164.96, using TV/EBITDA). Two primary factors accounted for this distinction: the variance between EBITDA and EBIT, amounting to approximately \$11 billion for Walmart and a comparatively modest \$2 billion for Costco, and the higher median multiple of TV/EBIT compared to TV/EBITDA (23.25x vs. 15.64x). The multiples difference effectively compensated for the normal reduction from EBITDA to EBIT for Costco, given its smaller magnitude, but proved less compensatory for Walmart, resulting in a divergence in valuation.

To conclude, our exploration of the Precedent Transactions Analysis has revealed valuable insights into the dynamics of retail industry mergers and acquisitions. However, it is crucial to approach this method with caution, just as with Trading Comparables, recognizing that each transaction may possess unique characteristics, influenced by the specificities of the companies involved and the period in which they occurred (Tamplin 2023). This caution becomes particularly pronounced when dealing with a substantial time span, such as in our case - from 2015 to the present day.

2.1.3 Football Field

After completing the assessment of both target companies using the three primary valuation models (Discounted Cash Flow, Trading Comparables, and Precedent Transactions), we consolidated the outcomes in the Football Field Analysis, a widely employed tool in finance for synthesizing and comparing results from various appraisal techniques.

In particular, we developed three scenarios based on the valuation outcomes derived from both the DCF and Multiples methods: Pessimistic, Base, and Optimistic. In the case of the Discounted Cash Flow approach, the share price valuation obtained from the model served as the Base case. The Pessimistic and Optimistic scenarios were extracted from the WACC Sensitivity Analysis. The Worst case represented the resulting share price under the lowest growth rate and highest WACC value, while the Best case denoted the share price under the highest growth rate and lowest WACC value.

Concerning Multiples Valuation, we defined the Pessimistic scenario as the lowest figure in each valuation, and the Optimistic scenario as the highest, with the Base case representing their mean. In the Precedent Transactions, we performed a parallel valuation for the purpose of performing the Football Field Analysis. This involved calculating the Target Per Share price using the mean of Transaction Multiples instead of the median (refer to Table 3.10). This adjustment was made due to the inherent challenges in identifying deals that could be considered "Most Similar," a distinction more readily achieved in the Trading Comparables analysis.

The Football Field Analysis for Costco, showcased in Figure 3.1 and Table 3.11 (Appendix), presents a conflicting trend: the Discounted Cash Flow Model indicates undervaluation compared to the current share price (\$577.12 as of November 10, 2023). In contrast, the Transaction and Comparables Multiples (excluding TV to Sales) suggest the opposite, consistently yielding valuations lower than the current share price, marked in red on the graph, resulting in an overall Target Per Share Price valuation of \$445.33 (calculated as the average value of all the scenarios from the different valuations).

Conversely, the Football Field Analysis for Walmart, illustrated in Figure 3.2 and Table 3.12 (Appendix), highlights that despite the DCF, and most trading and transaction multiples, suggests overvaluation, the company is perceived as fairly undervalued based on its current share price (\$166.19 as of November 10, 2023). This perception is mainly attributed to EV to Sales and TV to Sales, as well as the Price to Book valuation. These factors collectively contribute to the distinction from Costco, guiding the Per Share Price mean toward the undervaluation conclusion, resulting in a Target Per Share Price of \$185.35.

In conclusion, it is crucial to note, as already mentioned, that the Trading Comparables and Precedent Transactions methods inherently face challenges related to the dimension of comparable companies and deals. Identifying true comparables and relevant precedent

transactions proves difficult, as does accounting for market sentiment (if the market is overpaying, so will you) and broader economic conditions (particularly relevant for precedent transactions, as duplicating the same macroeconomic scenarios is unlikely). However, perhaps the most significant drawback of Multiple Valuations is the inability to integrate firm-specific information. Consider Microsoft as an example, whose multiples were perceived as exceedingly high in past years, neglecting several underlying factors driving Microsoft's valuation, from its virtual monopoly in enterprise computing (Windows) to its dominance in productivity applications (Office) and the substantial growth potential in its cloud business (Azure) – essentially, its ability to generate long-term value (Nath 2021). In our perspective, as underlined in the Discounted Cash Flow Model assumptions and considerations, the same principle applies to Costco, predominantly due to its business model centered on Warehouse Clubs, which we view as a premium that may not have been adequately discounted by the market, considering its long-term growth prospects and potential for value creation.

2.2 Technical Analysis and Pairs Trade Strategy Backtesting

The Technical Analysis approach hinges on the idea that a security's price reflects all publicly available information. It involves a statistical examination of price movements, with the goal of discerning underlying market sentiment by identifying patterns and trends.

The foundation of modern technical analysis is grounded in three key assumptions (Scott et al., 2016):

- The market efficiently incorporates all information, and any mispricing in securities is likely to dissipate swiftly as it becomes widely known.
- Prices exhibit trends, and analyzing past returns is crucial in understanding potential future patterns of a stock or security.
- History tends to repeat itself, with technical analysts attributing the repetitive nature of price movements and broader market conditions to market psychology influenced by emotions such as fear or excitement.

Our analytical focus extended to reviewing the historical returns of Costco and Walmart, aiming to identify potential trends that could evolve into profitable investment opportunities. This led to the development of a long-short strategy based on the concept of Mean Reversion, which was then compared with our Pairs Trade Strategy intuition, rigorously backtested both in-sample and out-of-sample. To assess the robustness of our strategy, we subjected it to scenario analysis, systematically evaluating potential flaws, drawbacks, and points of resilience.

Ultimately, the effectiveness of the investment strategy underwent exhaustive testing through a Monte Carlo simulation, providing a more comprehensive understanding of its potential outcomes.

2.2.1 Analysis of Past Returns: a basic Mean Reversion Strategy

For the foundational stage of our technical analysis, we sourced historical price data for Costco and Walmart from Yahoo Finance (2023), spanning from January 1, 2015, to December 31, 2019. The exclusion of the COVID-19 Pandemic period, a market-shifting event explored separately in our Out-of-Sample case for the Pairs Trade Strategy, was a strategic decision.

Within the examined five-year timeframe, we designed a Mean Reversion Strategy grounded in the notion that asset prices may deviate from their long-term or average levels, eventually returning to them. This concept, well-established in the US Market (Serletis, Rosenberg, 2009), aligns with the Efficient Market Hypothesis (EMH) assumption that the average level reflects intrinsic value. In the short term, stock prices might not align with their intrinsic valuation, providing an opportunity for us to capitalize on this mispricing.

Our Mean Reversion Strategy sought to illustrate, from a purely market-oriented perspective, the potential existence of these mispricings, particularly in the case of our targeted companies. We aimed to evaluate whether our Fundamental Analysis findings — specifically, the assertion that Costco and Walmart are currently mispriced — align with market dynamics. This assessment involved calculating the spread between historical prices of Costco and Walmart ($\text{spread} = P_{\text{Costco}}/P_{\text{Walmart}}$). We categorized three preference ranges:

- High spread, indicating a short position (sell Costco, buy Walmart)

- Correctly priced spread, triggering strategy inactivity
- Low spread, signifying a long position (buy Costco, sell Walmart).

We assessed the strategy's performance using different Moving Averages (MA), which are simple mathematical tools that smooth out data with constantly updated averages (Hyndman, 2009). Results indicated the most favorable outcome with a 10-day Moving Average (+9% Cumulative Return), followed by the 20-day Moving Average (+4% Cumulative Return), and the 5-day Moving Average (0% Cumulative Return). Conversely, longer Moving Averages (50d, 100d, 125d) yielded negative results (refer to Table 3.13, Appendix).

A plausible explanation is that shorter-term Moving Averages, like the 10-day and 20-day, promptly respond to recent price changes, enabling the strategy to capture short-term trends. Their responsiveness enables quick adaptation to evolving market conditions, facilitating the exploitation of potential profitable opportunities.

In contrast, longer-term moving averages (50-day, 100-day, 125-day) exhibit resistance to immediate price fluctuations, lagging in identifying short-term trends. This lag may weaken their effectiveness in capturing the nuances of rapidly changing market dynamics, resulting in delayed signals and missed opportunities, leading to suboptimal performance.

In conclusion, the positive cumulative returns generated by the Mean Reversion Strategy with shorter Moving Averages suggest that the identified mispricings were indeed realized during the examined period. However, it is essential to acknowledge that our analysis did not factor in real-world complexities, such as the impact of transaction costs. In a dynamic strategy like Mean Reversion, involving frequent entry and exit from positions, transaction costs could potentially nullify the positive cumulative returns and even result in a negative outcome.

2.2.2 Pairs Trade Strategy: In-Sample vs Out-of-Sample Backtesting

Building upon the insights derived from Mean Reversion analysis, our next step involved testing the Pairs Trade Strategy. Unlike the Mean Reversion, this strategy is characterized by less frequent activity and aligns more closely with a longer-term approach rooted in the

principles of Value Investing. Value Investing posits that investing in undervalued companies, as determined by their financial statements, and shorting overvalued ones could be profitable (Piotroski, 2001).

By adopting a strategy that requires less frequent trading, we aimed to assess its performance and resilience to real-world complexities, such as transaction costs, which could significantly impact the overall effectiveness of an active trading strategy. Consequently, we implemented the Pairs Trade Strategy, going long on Costco and short on Walmart, based on the in-sample historical prices and returns. As expected, this approach yielded positive results, as summarized in Table 3.14 and Figure 3.3 (Appendix), with an Info Sharpe (IS), i.e., the risk-adjusted return, of 0.42, given an Average Return of 8.4%, and Standard Deviation of 20% (both per annum values).

The strategy outcome resulted in 52% positive days (calculated as positive daily returns on total trading days) and exhibited a daily skewness of 0.39 and a daily kurtosis of 11.92, based on daily strategy return (calculated as the sum of the daily returns of going long on Costco and short on Walmart). Positive skewness suggests an asymmetrical distribution with more extreme positive values, while positive kurtosis indicates a higher likelihood of extreme events, in this case, on the positive side.

Encouraged by these results, we extended our analysis to the period from January 1, 2020, to November 10, 2023—the final day of our valuation—retrieving historical prices from Yahoo Finance (2023) to conduct an out-of-sample backtest of the strategy. The outcomes, detailed in Table 3.15 and Figure 3.4 (Appendix), surpassed the in-sample results. The strategy achieved an Info Sharpe (IS) of 0.44, with an average return of 9.2% and a standard deviation of 21% (both per annum values).

The strategy demonstrated a positive day percentage of 54%. The daily skewness was 0.31, and the daily kurtosis was 8.31, indicating a distribution of daily returns more exposed to the positive end, and with a higher likelihood of extreme values—which is desirable for potential investors.

2.2.3 Scenario Analysis

Following the assessment of our investment strategy's profitability through back-testing, our subsequent step involved a Scenario Analysis comprising two scenarios:

- Changes in Market Conditions
- Interest Rate Changes

The study aimed to subject the strategy to diverse macroeconomic contexts, utilizing real-world scenarios from the past 20 years. The objective was to highlight how the strategy might respond to similar events in the future, guided by the technical analysis principle that historical trends tend to repeat. It is crucial to note the importance of exercising caution against generalizations, acknowledging the impact of variations in economic factors across different periods and the intrinsic differences between the companies under examination (the 2023 versions of Costco and Walmart compared to their mid-2000s counterparts).

After formulating sub-scenarios (Worst Case, Neutral Case, Best Case) for both Changes in Market Conditions and Interest Rate Changes, we identified actual events from the past two decades impacting the S&P500 and the broader US economy that could fall into these categories. The strategy was then placed within the context of these events to assess its performance under varying conditions.

In the Changes in Market Conditions Scenario, the envisioned worst case is the Dot-Com Bubble of 2001, which had a profound disruptive impact on the markets. The neutral case was situated in the context of 2015, recognized as a flat year, although with glimpses of volatility (Irwin 2015). The best-case scenario reflected the recovery period following the COVID-19 pandemic. The strategy's results in these scenarios are summarized in Table 3.16 (Appendix).

As expected, the strategy performed poorly in the Worst Case scenario (Info Sharpe of 0.03, given an average annual return of 0.9% and a standard deviation of 34%), while performing well in the Neutral Case (Info Sharpe of 0.81, given an average return p.a. of 16.91% and a standard deviation of 21%) and greatly overperforming in the Best Case (Info Sharpe of 2.36, given a remarkable annualized average return of 42% and a standard deviation of 18%).

Although Costco and Walmart, as traditional brick-and-mortar retail businesses, were not as directly impacted by the Dot-Com Bubble as many technology companies, the overall economic environment and investor sentiment during the crisis had broader repercussions, influencing

various sectors, including retail – hence explaining the poor performance of both companies, and in turn, of the whole strategy.

Moving to the Interest Rate Changes scenario, the three designed sub-cases were: Fed Rates Hike of 2006 (Worst), Dovish Fed of 2008 (Neutral), Fed Rate Cuts of 2002-2003 (Best). The strategy demonstrated high resilience to the stress-test case (Worst Case, with an Info Sharpe of 0.29, given an annualized average return of 6% and a standard deviation of 21%). Impressive performances were recorded under the neutral case (Info Sharpe of 0.66, given an average annual return of 17.7% and a standard deviation of 27%) and the best case (Info Sharpe of 0.79, given an annualized average return of 22.8% and a standard deviation of 29%), as highlighted in Table 3.17 (Appendix).

In conclusion, it is important to underscore that the presented Scenario Analysis results do not aim to preclude potential pitfalls of the investment strategy. The back-testing period was relatively short and only illustrative of past performance in potential macroeconomic scenarios that could represent the near future. Instead, it serves as an overall strategy cross-check, and results should be interpreted considering that every macroeconomic context and period could differ significantly. This is particularly relevant in analyzing different Interest Rate Changes over the past 20 years, as an increase or decrease outcome could vary greatly depending on the specific underlying economic conditions.

2.2.4 Simulation Analysis

In the final phase, we assessed potential outcomes of our investment strategy through a Simulation Analysis, utilizing a Monte-Carlo Simulation Model. Our starting hypothesis involved defining specific parameters:

- Assumed Initial Investment: \$100,000
- Average Annual Return: 8.4%
- Annualized Standard Deviation: 20%
- Investment Horizon: 5 Years

Notably, the Average Return and Annualized Standard Deviation were obtained from the In-Sample Backtesting results. The decision to opt for a 5-year Investment Horizon was influenced by the intrinsic nature of our Value Investing strategy, which operates on longer-term timeframes. However, it also considered that an excessively prolonged investment horizon diminishes the robustness of predicting the strategy's performance, thus guiding our choice.

Based on the defined parameters, we performed a simple Monte-Carlo Simulation (PCM 2023). During this process, we randomly generated returns for a 5-year investment horizon based on the specified Average Return and Annualized Standard Deviation, calculating the projected Ending Value at Year 5. This simulation iterated 10,000 times, and the outcomes were systematically collected.

The analysis revealed that, on average, the strategy yielded an ending value of \$149,141.76 (+8.23% potential CAGR on the initial investment), with a median of \$139,499.07 and a standard deviation of \$63,016.88 (see Table 3.18 in the Appendix). This highlights a certain level of variability in ending values and, consequently, the overall riskiness of the strategy. However, these results align with the risk-return trade-off.

2.2.5 Conclusive Remarks

In summarizing our assessment of the Pairs Trading Strategy, it is crucial to highlight several key points.

Firstly, it is important to note that past success in trading strategies does not guarantee future success. Secondly, our strategy implementation did not consider real-world complexities, such as transaction costs that include borrowing fees, margin fees, and commission fees. This decision was based on the assumption that the Pairs Trade Strategy, rooted in the concept of Value Investing and thus a generally less dynamic strategy, should not incur significant transaction costs, except in the initial setup. Thirdly, although the performance of the Investment Strategy analyzed in this study presents a strong case for its implementation, it is essential to recognize that future refinement may be necessary. This may involve incorporating portfolio rebalancing and risk management techniques, such as employing stop-loss orders, setting maximum drawdown limits, or hedging the position, given the inherent risk nature of such a strategy.

However, and to conclude, despite acknowledging potential vulnerabilities and pitfalls, we maintain the belief that the Pairs Trade Strategy focused on Costco vs. Walmart represents a compelling investment opportunity. Our confidence in this Investment Strategy is rooted in the companies' financials, business models, as well as backtesting, scenario analysis and simulation analysis performances, leading us to strongly recommend its consideration.

Appendix

Figures:

Figure 3.1 – Football Field Chart, Costco

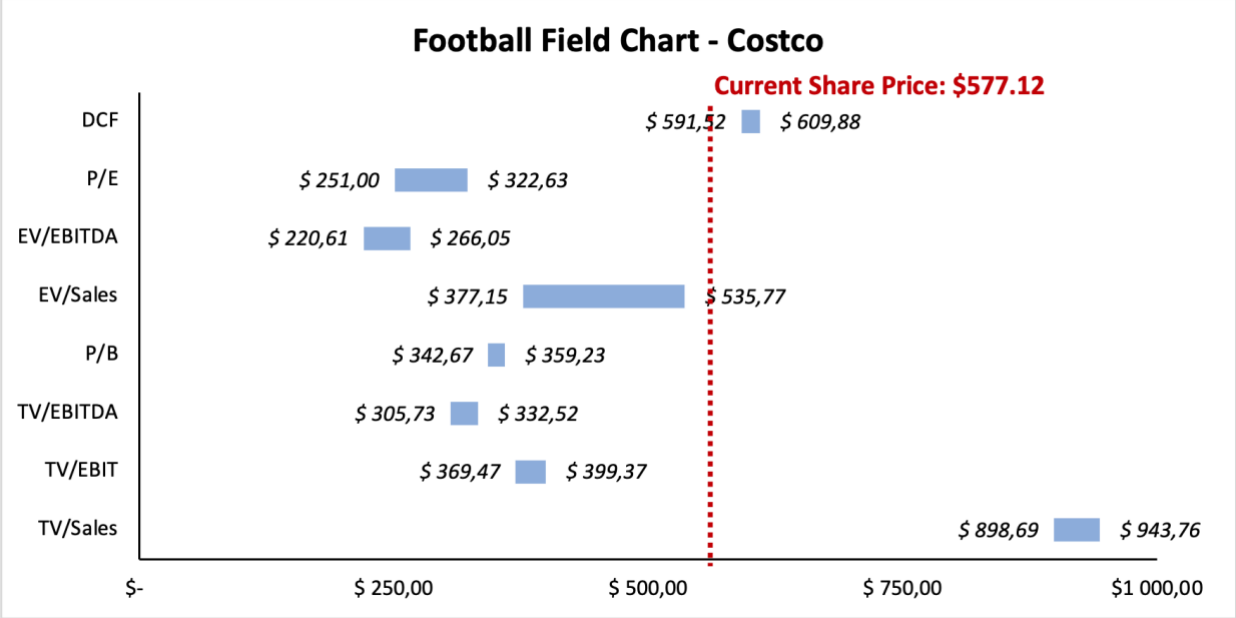


Figure 3.2 – Football Field Chart, Walmart

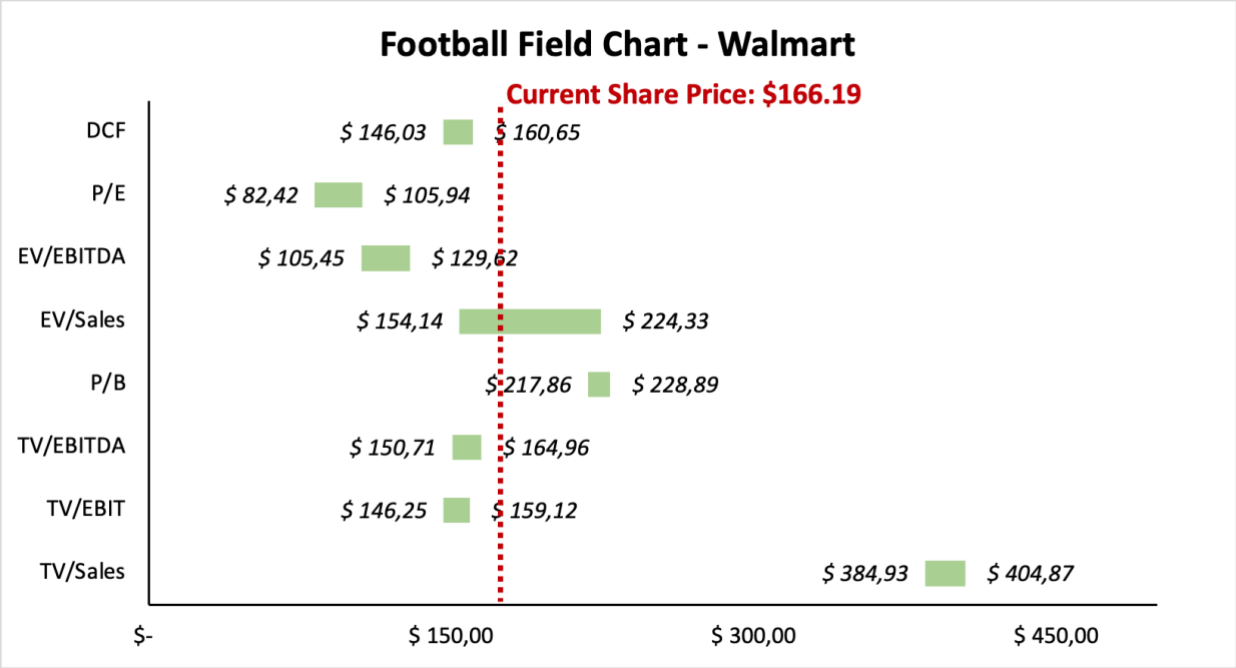


Figure 3.3 – Pairs Trade Strategy: In-Sample Results



Figure 3.4 – Pairs Trade Strategy: Out-of-Sample Results



Tables:

Table 3.1 – Trading Comparables Analysis (Sources: Bloomberg, Walmart Annual Report, Costco Annual Report)

| Company | Market Valuation | | LTM Financial SPKs | | | | | LTM Profitability Margins | | | | Coverage Ratios | | EPS | P/E | EV/EBITDA | EV/Sales | P/B |
|------------------------------|------------------|--------------|--------------------|---------|---------|------------|----------------|---------------------------|--------|--------------|---------------|-------------------|-----------------|----------|--------|-----------|----------|---------|
| | Enterprise Value | Equity Value | Revenue | EBITDA | EBIT | Net Income | Gross Profit % | EBITDA % | EBIT % | Net Income % | Total Debt/EV | Total Debt/EBITDA | Net Debt/EBITDA | | | | | |
| WALMART INC | 457,078 | 410,958 | 611,298 | 31,378 | 20,488 | 11,688 | 24.1% | 5.1% | 3.4% | 2.6% | 0.33 | 1.47 | 1.47 | 4.4x | 28.55x | 14.57x | 1.9x | 3.35x |
| COSTCO WHOLESALE CORP | 269,788 | 265,358 | 226,958 | 9,698 | 7,798 | 5,848 | 12.1% | 4.3% | 3.4% | 2.6% | 0.33 | 0.82 | 0.46 | 13.20 | 43.71x | 27.83x | 1.5x | 12.37x |
| TARGET CORP | 79,858 | 11,238 | 106,898 | 8,128 | 5,008 | 3,768 | 25.2% | 7.6% | 4.7% | 3.5% | 0.24 | 2.73 | 2.38 | 8.12 | 27.51x | 13.31x | 1.7x | 6.91x |
| KROGER CO | 58,178 | 103,018 | 147,008 | 7,668 | 2,738 | 3,198 | 21.5% | 5.2% | 3.8% | 2.2% | 0.4 | 2.57 | 2.34 | 4.39 | 40.88x | 9.23x | 3.5x | 3.91x |
| DOLLAR GENERAL CORP | 45,658 | 5,548 | 59,048 | 5,348 | 2,808 | 1,928 | 30.3% | 13.7% | 7.2% | 4.9% | 0.4 | 3.12 | 3.05 | 8.69 | 21.36x | 11.85x | 1.78x | 6.02x |
| DOLLAR TREE INC | 37,128 | 8,358 | 29,688 | 2,448 | 1,638 | 1,168 | 30.1% | 8.2% | 5.5% | 3.9% | 0.28 | 2.17 | 2.04 | 5.27 | 20.86x | 9.58x | 1.51x | 3.95x |
| DOLLAR BARR INC | 23,078 | 21,958 | 4,128 | 1,258 | 1,338 | 662,208 | 53.5% | 30.4% | 31.3% | 16.1% | 0.13 | 3.77 | 9.7 | 9.1 | 20.08x | 17.69x | 3.31x | 803.65x |
| FIVE BELOW | 12,288 | 1,368 | 1,348 | 723,078 | 342,908 | 270,238 | 32.8% | 21.6% | 10.3% | 8.1% | 0.14 | 2.19 | 1.61 | 4.84 | 42.81x | 17.98x | 3.99x | 8.21x |
| BJ'S WHOLESALE CLUB HOLDINGS | 11,668 | 1,058 | 49,548 | 1,638 | 770,218 | 493,658 | 17.6% | 5.2% | 4.0% | 2.7% | 0.20 | 2.38 | 2.25 | 38.83 | 16.65x | 9.18x | 4.6x | 8.21x |
| CANADIAN TIRE CORP CLASS A | 11,148 | 5,308 | 13,028 | 1,848 | 1,508 | 428,858 | 46.8% | 14.2% | 13.0% | 3.3% | 0.47 | 3.02 | 3.75 | 9.88 | 7.64x | 6.40x | 3.4x | 1.45x |
| Highpt | 457,078 | 410,958 | 611,298 | 31,378 | 20,488 | 11,688 | 53.89% | 30.42% | 32.32% | 16.11% | 0.7x | 3.22x | 3.05x | \$ 18.20 | 43.71x | 27.83x | 5.33x | 803.65x |
| Lowest | 11,668 | 21,958 | 1,348 | 723,078 | 342,908 | 270,238 | 12.5% | 4.2% | 3.8% | 3.5% | 0.2x | 2.2x | 4.6x | \$ 1.05 | 7.64x | 6.25x | 3.5x | 1.45x |
| Mean | 45,488 | 6,778 | 30,348 | 3,658 | 2,388 | 1,548 | 27.93% | 9.27% | 6.06% | 3.90% | 0.3x | 2.59x | 1.91x | \$ 5.92 | 22.60x | 12.12x | 1.52x | 9.39x |
| Median | 45,318 | 7,518 | 34,388 | 3,898 | 2,518 | 1,548 | 27.83% | 7.81% | 3.89% | 3.47% | 0.2x | 2.48x | 2.03x | \$ 6.06 | 24.60x | 12.01x | 1.88x | 7.51x |
| WALMART INC | 457,078 | 410,958 | 611,298 | 31,378 | 20,488 | 11,688 | 24.14% | 5.13% | 3.44% | 2.6% | 0.33 | 1.47x | 1.47x | \$ 4.4x | 28.55x | 14.57x | 1.9x | 3.35x |
| COSTCO WHOLESALE CORP | 269,788 | 265,358 | 226,958 | 9,698 | 7,798 | 5,848 | 12.15% | 4.27% | 3.43% | 2.6% | 0.33 | 0.82x | 0.46x | \$ 13.20 | 43.71x | 27.83x | 1.5x | 12.37x |

Table 3.2 – Most Similar Companies

| Most Similar Companies | |
|------------------------|------------------------------|
| Enterprise Value | TARGET CORP |
| EBITDA | KROGER CO |
| Gross Profit % | BJ'S WHOLESALE CLUB HOLDINGS |
| Total Debt/EV | DOLLAR GENERAL CORP |

Table 3.3 – Implied Valuation (Price to Earnings, P/E)

| Implied Valuation (P/E) | All | Most Similar Companies |
|-----------------------------|--------|------------------------|
| Median P/E Multiple | 24,4x | 19,0x |
| Walmart EPS | 4,34 | 4,34 |
| Costco EPS | 13,20 | 13,20 |
| Target Per Share Price (\$) | | |
| Walmart | 105,94 | 82,42 |
| Costco | 322,63 | 251,00 |

Table 3.4 – Implied Valuation (Enterprise Value to EBITDA, EV/EBITDA)

| Implied Valuation (EV/EBITDA) - Walmart | All | Most Similar Companies |
|---|----------|------------------------|
| Median EV/EBITDA Multiple | 12,6x | 10,5x |
| Walmart EBITDA | 31,378 | 31,378 |
| Walmart EV | 395,468 | 330,368 |
| Walmart Net Debt | 46,278 | 46,278 |
| Walmart Equity Value | 349,188 | 284,088 |
| Walmart Shares | 2,694B | 2,694B |
| Target Per Share Price (\$) | \$129,62 | \$105,45 |

| Implied Valuation (EV/EBITDA) - Costco | All | Most Similar Companies |
|--|----------|------------------------|
| Median EV/EBITDA Multiple | 12,6x | 10,5x |
| Costco EBITDA | 9,698 | 9,698 |
| Costco EV | 122,188 | 102,078 |
| Costco Net Debt | 4,428 | 4,428 |
| Costco Equity Value | 117,768 | 97,648 |
| Costco Shares | 442,604M | 442,604M |
| Target Per Share Price (\$) | \$266,05 | \$220,61 |

Table 3.5 – Implied Valuation (Enterprise Value to Sales, EV/Sales)

| Implied Valuation (EV/Sales) - Walmart | All | Most Similar Companies |
|--|----------|------------------------|
| Median EV/Sales Multiple | 1,1x | ,8x |
| Walmart Sales | 611,298 | 611,298 |
| Walmart EV | 650,628 | 461,528 |
| Walmart Net Debt | 46,278 | 46,278 |
| Walmart Equity Value | 604,358 | 415,258 |
| Walmart Shares | 2,694B | 2,694B |
| Target Per Share Price (\$) | \$224,33 | \$154,14 |

| Implied Valuation (EV/Sales) - Costco | All | Most Similar Companies |
|---------------------------------------|----------|------------------------|
| Median EV/Sales Multiple | 1,1x | ,8x |
| Costco Sales | 226,958 | 226,958 |
| Costco EV | 241,568 | 171,358 |
| Costco Net Debt | 4,428 | 4,428 |
| Costco Equity Value | 237,138 | 166,938 |
| Costco Shares | 442,604M | 442,604M |
| Target Per Share Price (\$) | \$535,77 | \$377,15 |

Table 3.6 – Implied Valuation (Price to Book, P/B)

| Implied Valuation (P/B) - Walmart | All | Most Similar Companies |
|-----------------------------------|----------|------------------------|
| Median P/B Multiple | 7,6x | 7,9x |
| Walmart Book Value | 83,75B | 83,75B |
| Walmart EV | 633,188 | 662,918 |
| Walmart Net Debt | 46,278 | 46,278 |
| Walmart Equity Value | 586,918 | 616,648 |
| Walmart Shares | 2,694B | 2,694B |
| Target Per Share Price (\$) | \$217,86 | \$228,89 |

| Implied Valuation (P/B) - Costco | All | Most Similar Companies |
|----------------------------------|----------|------------------------|
| Median P/B Multiple | 7,6x | 7,9x |
| Costco Book Value | 20,65B | 20,65B |
| Costco EV | 156,098 | 163,428 |
| Costco Net Debt | 4,428 | 4,428 |
| Costco Equity Value | 151,678 | 159,008 |
| Costco Shares | 442,604M | 442,604M |
| Target Per Share Price (\$) | \$342,67 | \$359,23 |

Table 3.7 – Precedent Transactions Analysis Summary

| Comparable Transactions | Transaction Information | | | | | | LTM Transaction Multiples | | |
|------------------------------|-------------------------|--------------------------------------|-----------|-----------------------|----------------|-------------------------------|---------------------------|---------|----------|
| | Announce Date | Acquirer | Deal Type | Announced Total Value | Percent Sought | Completion / Termination Date | TV/EBITDA | TV/EBIT | TV/Sales |
| Catamaran Corp | 30/03/2015 | UnitedHealth Group Inc | M&A | 13,23B | 100% | 28/07/2015 | 15.64 | 23.25 | 0.61 |
| Omnicare Inc | 21/05/2015 | CVS-Health Corp | M&A | 11,39B | 100% | 18/08/2015 | 19.59 | 19.29 | 1.74 |
| Volpar Corp/The | 20/03/2016 | Sherwin-Williams Co/The | M&A | 11,38B | 100% | 01/06/2017 | 16.68 | 19.3 | 2.64 |
| Danone US Inc | 07/07/2016 | Danone SA | M&A | 12,35B | 100% | 12/04/2017 | 24.56 | 33.39 | 3 |
| CST Brands LLC | 22/08/2016 | Alimentation Couche-Tard Inc | M&A | 5,26B | 100% | 28/06/2017 | 10.26 | 18.67 | 0.48 |
| Cabela's Inc | 03/10/2016 | Bass Pro Outdoor World LLC | M&A | 9,60B | 100% | 26/09/2017 | 22.03 | 33.31 | 2.29 |
| Panera Bread Co | 05/04/2017 | JAB Holding Co Sarl | M&A | 7,48B | 100% | 19/07/2017 | 18.09 | 29.36 | 2.63 |
| Aetna Inc | 03/12/2017 | CVS-Health Corp | M&A | 68,11B | 100% | 29/11/2018 | 15.81 | 18.65 | 1.11 |
| Evernorth Health Inc | 08/03/2018 | Cigna Corp | M&A | 68,37B | 100% | 21/12/2018 | 9.37 | 12.44 | 0.68 |
| Tiffany & Co | 25/11/2019 | LVMH Moët Hennessey Louis Vuitton SE | M&A | 17,44B | 100% | 07/01/2021 | 14.39 | 23.83 | 3.98 |
| Dunkin' Brands Group Inc | 30/10/2020 | Inspire Brands Inc | M&A | 11,58B | 100% | 16/12/2020 | 24.31 | 27.74 | 8.86 |
| HD Supply Holdings Inc | 16/11/2020 | Home Depot Inc/The | M&A | 11,09B | 100% | 28/12/2020 | 13.09 | 16.78 | 1.86 |
| Michaels Cos Inc/The | 03/03/2021 | Apollo Asset Management Inc | M&A | 6,12B | 100% | 16/04/2021 | 5.59 | 11.47 | 1.16 |
| JAA Inc | 07/11/2022 | Ritchie Bros Auctioneers Inc | M&A | 7,97B | 100% | 21/03/2023 | 11.44 | 18.94 | 3.75 |
| Crestwood Equity Partners LP | 16/08/2023 | Energy Transfer LP | M&A | 6,13B | 100% | 03/11/2023 | 10.85 | 25.99 | 1.02 |
| Minimum | | | | | | 5.59x | 11.47x | .48x | |
| 25th Percentile | | | | 18.27x | | 11.15x | 18.66x | 1.07x | |
| Median | | | | | | 15.64x | 23.25x | 1.86x | |
| Mean | | | | | | 14.42x | 21.55x | 1.72x | |
| 75th Percentile | | | | | | 18.84x | 26.87x | 2.82x | |
| Maximum | | | | | | 24.56x | 33.39x | 8.86x | |

Table 3.8 – Precedent Transactions Analysis: Costco Implied Valuation

| Implied Valuation - Costco | | | |
|-----------------------------|-----------|---------|----------|
| LTM Transaction Multiples | | | |
| | TV/EBITDA | TV/EBIT | TV/Sales |
| Transaction Value (TV) | 151,60B | 181,19B | 422,13B |
| Less: Net Debt | 4,42B | 4,42B | 4,42B |
| Equity Value | 147,17B | 176,76B | 417,71B |
| Target Per Share Price (\$) | 332,52 | 399,37 | 943,76 |

Table 3.9 – Precedent Transactions Analysis: Walmart Implied Valuation

| Implied Valuation - Walmart | | | |
|-----------------------------|-----------|---------|----------|
| LTM Transaction Multiples | | | |
| | TV/EBITDA | TV/EBIT | TV/Sales |
| Transaction Value (TV) | 490,67B | 474,95B | 1137,00B |
| Less: Net Debt | 46,27B | 46,27B | 46,27B |
| Equity Value | 444,40B | 428,68B | 1090,72B |
| Target Per Share Price (\$) | 164,96 | 159,12 | 404,87 |

Table 3.10 – Precedent Transactions Analysis: parallel valuation (using the Mean instead of the Median)

| Implied Valuation - Walmart | | | |
|------------------------------------|---------------|---------------|---------------|
| LTM Transaction Multiples (Mean) | | | |
| | TV/EBITDA | TV/EBIT | TV/Sales |
| Transaction Value (TV) | 452,30B | 440,26B | 1083,28B |
| Less: Net Debt | 46,27B | 46,27B | 46,27B |
| Equity Value | 406,02B | 393,99B | 1037,00B |
| Target Per Share Price (\$) | 150,71 | 146,25 | 384,93 |

| Implied Valuation - Costco | | | |
|------------------------------------|---------------|---------------|---------------|
| LTM Transaction Multiples (Mean) | | | |
| | TV/EBITDA | TV/EBIT | TV/Sales |
| Transaction Value (TV) | 139,74B | 167,95B | 402,19B |
| Less: Net Debt | 4,42B | 4,42B | 4,42B |
| Equity Value | 135,32B | 163,53B | 397,77B |
| Target Per Share Price (\$) | 305,73 | 369,47 | 898,69 |

Table 3.11 – Football Field Table, Costco

| Target Per Share Price - Costco | | | | |
|---------------------------------|----------------------|-----------|---------------------|--|
| | Pessimistic Scenario | Base Case | Optimistic Scenario | |
| DCF | \$ 591,52 | \$ 599,53 | \$ 609,88 | |
| P/E | \$ 251,00 | \$ 286,82 | \$ 322,63 | |
| EV/EBITDA | \$ 220,61 | \$ 243,33 | \$ 266,05 | |
| EV/Sales | \$ 377,15 | \$ 456,46 | \$ 535,77 | |
| P/B | \$ 342,67 | \$ 350,95 | \$ 359,23 | |
| TV/EBITDA | \$ 305,73 | \$ 319,13 | \$ 332,52 | |
| TV/EBIT | \$ 369,47 | \$ 384,42 | \$ 399,37 | |
| TV/Sales | \$ 898,69 | \$ 921,22 | \$ 943,76 | |

| | | |
|---------------------|----|--------|
| Target Price | \$ | 445,33 |
|---------------------|----|--------|

Table 3.12 – Football Field Table, Walmart

| Target Per Share Price - Walmart | | | | |
|----------------------------------|----------------------|-----------|---------------------|--|
| Valuation Method | Pessimistic Scenario | Base Case | Optimistic Scenario | |
| DCF | \$ 146,03 | \$ 152,49 | \$ 160,65 | |
| P/E | \$ 82,42 | \$ 94,18 | \$ 105,94 | |
| EV/EBITDA | \$ 105,45 | \$ 117,53 | \$ 129,62 | |
| EV/Sales | \$ 154,14 | \$ 189,24 | \$ 224,33 | |
| P/B | \$ 217,86 | \$ 223,38 | \$ 228,89 | |
| TV/EBITDA | \$ 150,71 | \$ 157,84 | \$ 164,96 | |
| TV/EBIT | \$ 146,25 | \$ 152,69 | \$ 159,12 | |
| TV/Sales | \$ 384,93 | \$ 394,90 | \$ 404,87 | |

| | | |
|---------------------|----|--------|
| Target Price | \$ | 185,35 |
|---------------------|----|--------|

Table 3.13 – Mean Reversion Strategy Results

| | | | | | | | | | | | | |
|---|-------|----|--------|----|--------|----|--------|-----|---------|-----|---------|------|
| Cumulative Mean Reversion Strategy Return | 5D MA | 0% | 10D MA | 9% | 20D MA | 4% | 50D MA | -2% | 100D MA | -7% | 125D MA | -14% |
|---|-------|----|--------|----|--------|----|--------|-----|---------|-----|---------|------|

Table 3.14 – Pairs Trade Strategy: In-Sample Results

| | Daily | Annual |
|--------------------|--------|-------------|
| Average Return | 0,032% | 8,4% |
| Standard Deviation | 1,2% | 20% |
| Info Sharpe | | 0,42 |

| Strategy Results | |
|---------------------|--------|
| Returns Correlation | 0,47 |
| Positive Days | 52% |
| Daily Skew | - 0,39 |
| Daily Kurt | 11,92 |
| Daily Max | 8,97% |
| Q3 | 0,62% |
| Med | 0,0% |
| Q1 | -0,53% |
| Daily Min | -8,88% |

Table 3.15 – Pairs Trade Strategy: Out-of-Sample Results

| | Daily | Annual |
|--------------------|-------|-------------|
| Average Return | 0,04% | 9,2% |
| Standard Deviation | 1,3% | 21% |
| Info Sharpe | | 0,44 |

| Strategy Results | |
|---------------------|--------|
| Returns Correlation | 0,64 |
| Positive Days | 54% |
| Daily Skew | 0,31 |
| Daily Kurt | 8,31 |
| Daily Max | 11,25% |
| Q3 | 0,71% |
| Med | 0,1% |
| Q1 | -0,62% |
| Daily Min | -7,41% |

Table 3.16 – Scenario Analysis Results: Change in Market Conditions

| Scenario Analysis Results | | | | |
|---------------------------|--------------|---------------|-------------------------|--------|
| 1. Worst Case | | | | |
| | Daily | Annual | Strategy Results | |
| Average Return | 0,00% | 0,9% | Returns Correlation | 0,60 |
| Standard Deviation | 2,1% | 34% | Positive Days | 52% |
| Info Sharpe | 0,03 | | Daily Skew | - 0,04 |
| | | | Daily Kurt | 0,98 |
| | | | Daily Max | 6,99% |
| | | | Q3 | 1,25% |
| | | | Med | 0,2% |
| | | | Q1 | -1,38% |
| | | | Daily Min | -8,40% |
| 2. Neutral Case | | | | |
| | Daily | Annual | Strategy Results | |
| Average Return | 0,07% | 16,9% | Returns Correlation | 0,35 |
| Standard Deviation | 1,3% | 21% | Positive Days | 55% |
| Info Sharpe | 0,81 | | Daily Skew | - 0,54 |
| | | | Daily Kurt | 3,53 |
| | | | Daily Max | 4,04% |
| | | | Q3 | 0,75% |
| | | | Med | 0,1% |
| | | | Q1 | -0,55% |
| | | | Daily Min | -7,10% |
| 3. Best Case | | | | |
| | Daily | Annual | Strategy Results | |
| Average Return | 0,16% | 42,0% | Returns Correlation | 0,56 |
| Standard Deviation | 1,1% | 18% | Positive Days | 60% |
| Info Sharpe | 2,36 | | Daily Skew | 0,81 |
| | | | Daily Kurt | 5,43 |
| | | | Daily Max | 6,39% |
| | | | Q3 | 0,71% |
| | | | Med | 0,2% |
| | | | Q1 | -0,52% |
| | | | Daily Min | -3,46% |

Table 3.17 – Scenario Analysis Results: Interest Rate Change

| Scenario Analysis Results | | | |
|---------------------------|-------------------------|---------------|--|
| 1. Worst Case | | | |
| | Daily | Annual | |
| Average Return | 0,02% | 6,0% | |
| Standard Deviation | 1,3% | 21% | |
| Info Sharpe | | 0,29 | |
| | Strategy Results | | |
| Returns Correlation | 0,19 | | |
| Positive Days | 47% | | |
| Daily Skew | 0,55 | | |
| Daily Kurt | 4,30 | | |
| Daily Max | 7,35% | | |
| Q3 | 0,85% | | |
| Med | 0,0% | | |
| Q1 | -0,66% | | |
| Daily Min | -4,59% | | |
| 2. Neutral Case | | | |
| | Daily | Annual | |
| Average Return | 0,07% | 17,7% | |
| Standard Deviation | 1,7% | 27% | |
| Info Sharpe | | 0,66 | |
| | Strategy Results | | |
| Returns Correlation | 0,62 | | |
| Positive Days | 52% | | |
| Daily Skew | 0,61 | | |
| Daily Kurt | 4,09 | | |
| Daily Max | 8,84% | | |
| Q3 | 0,92% | | |
| Med | 0,1% | | |
| Q1 | -0,90% | | |
| Daily Min | -5,68% | | |
| 3. Best Case | | | |
| | Daily | Annual | |
| Average Return | 0,09% | 22,8% | |
| Standard Deviation | 1,8% | 29% | |
| Info Sharpe | | 0,79 | |
| | Strategy Results | | |
| Returns Correlation | 0,43 | | |
| Positive Days | 57% | | |
| Daily Skew | - | 5,59 | |
| Daily Kurt | 60,42 | | |
| Daily Max | 4,22% | | |
| Q3 | 0,94% | | |
| Med | 0,2% | | |
| Q1 | -0,66% | | |
| Daily Min | -19,71% | | |

Table 3.18 – Monte Carlo Simulation Result

| Output | | |
|---------------|----|------------|
| Mean | \$ | 149 141,76 |
| Median | \$ | 139 499,07 |
| St Dev | \$ | 63 016,88 |
| Min | \$ | 20 700,84 |
| Q1 | \$ | 103 401,35 |
| Q3 | \$ | 183 425,30 |
| Max | \$ | 554 421,72 |

References

- Biron, B. (2019). *From 3D printing to AR apps, these 12 pieces of shopping tech have changed retail as we know it over the last decade*. Business Insider. Accessible at: <https://rb.gy/fetszo>
- BJ's Wholesale Club Holdings (2022). BJ's Wholesale Club Holdings Annual report
- Byrnes, B. (2013) *Jim Sinegal on Costco's Pricing Magic*. The Motley Fool. Accessible at: <https://rb.gy/1cb0wk>
- CB Insights (2021), *The top 20 reasons Startups fail*, CB Insights Accessible at: <https://shorturl.at/mDLZ8>
- Costco (2022). Costco 2022 Annual Report
- Economic Commission for Latin America and the Caribbean (ECLAC), United States economic outlook: 2022 year-in-review and early 2023 developments (LC/WAS/TS.2023/2), Santiago, 2023.
- Federal Reserve Website (2023). Accessible at: <https://www.federalreserve.gov/aboutthefed.htm>
- Gross Domestic Product* (2023). U.S. Bureau of Economic Analysis (BEA). Accessible at: <https://www.bea.gov/data/gdp>
- Hyndman, R. (2009). *Moving averages*. International Encyclopedia of Statistical Science. Springer.
- Inflation (CPI)* (2023). OECD Data. Accessible at: <https://data.oecd.org/price/inflation-cpi.htm>
- Irwin, N. (2015). *Financial Markets Were Flat in 2015. Thank Goodness*. The New York Times. Accessible at: <https://rb.gy/hrfa7y>
- Kenton, W. (2022). *Precedent Transaction Analysis: Definition and How It Works*. Investopedia.com. Accessible at: <https://shorturl.at/sxzNZ>
- Kroger (2022). Kroger 2022 Annual Report
- Lisy, J. (2019). *M&A Essentials: Understanding Purchase Price*. Cohen&Co. Accessible at: <https://shorturl.at/dBGS7>
- McKinsey (2023), *The state of grocery in North America 2023*, McKinsey & Company. Accessible at: <https://shorturl.at/flGJ9>
- Moses, S. (2023). *U.S. Grocery: A few things you may not know*. Solomon Capital Partners Report.
- Nath, A. (2021). *Why valuation multiples fail in an exponential world*. Firstlinks.com.au. Accessible at: <https://shorturl.at/htU02>
- Nguyen, H. (2022). *Retail and FMCG/CPG: Trends and insights round-up for 2022*. YouGov. Accessible at: <https://rb.gy/9gfls2>

Paul, T. (2023). *Why is inflation so high? An economist explains why everyday essentials cost more*. CNBC. Accessible at: <https://rb.gy/ytgp6z>

Philip Capital Management (PCM). (2023). *How to Perform Return Analysis with Monte Carlo Simulation*. Accessible at: <https://shorturl.at/kBGV9>

Piotroski, J. (2000). *Value Investing: The Use of Historical Financial Statement Information to Separate Winners from Losers*. Journal of Accounting Research. Vol. 38 Supplement 2000

Scott et. al (2016). *Technical Analysis - Modern Perspectives*. CFA Institute Research Foundation

Serletis, A. & Rosenberg, A. (2009). *Mean reversion in the US stock market*. Chaos, Solitons & Fractals. Volume 40, Issue 4, pp. 2007-2015.

Smith, T. (2022). *Multiples Approach*. Investopedia.com. Accessible at: <https://shorturl.at/fsAJL>

Tamplin, T. (2023). *Precedent Transactions Analysis*. Finance Strategists. Accessible at: <https://t.ly/y6tXI>

Target Corporation (2022). Annual Report

Tepper, T. (2023). *Federal Funds Rate History 1990 to 2023*. Forbes Advisor. Accessible at: <https://rb.gy/zdaynz>

United States GDP Growth Rate (2023). Trading Economics. Accessible at: <https://tradingeconomics.com/united-states/gdp-growth>

Walmart (2022). Walmart 2022 Annual Report

Xu, L & Meng, Z. (2023). *The role of membership fees in online retail market competition*. Research in International Business and Finance.

Yahoo Finance Historical Prices. Accessible at: <https://finance.yahoo.com>