

Financial Uncertainty in Earnings Per Share and Stock Prices: A Monte Carlo Simulation Study of US Business Services Multinationals

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Abstract: *This study examines the financial uncertainties in EPS income and share price predictions for 30 U.S. multinational corporations and MNCs in the Business Services Global Industry. Using Monte Carlo simulation with 20,000 iterations and a 99% confidence level, the results suggest that market consensus on EPS and share prices may be overly optimistic. The findings highlight the potential discrepancies between predicted revenue and actual market conditions, emphasizing the need for cautious forecasting in future financial analyses.*

Keywords: Monte-Carlo Simulation, Financial Analysis, Global US Industry Analysis, Profitability Analysis, Multinational Corporations

1. Introduction

An MNC is a large enterprise that is controlled by or belongs to a country other than its parent nation, where it was originally established. Multinational corporations have a significant presence and influence outside the country of origin, usually in subsidiaries, branches, or affiliates. Here is one definition supported by references to academic and authoritative sources: "Multinational corporations (MNCs) are business firms with operations in more than one country" Cavusgil et al. 2008, "MNCs are business enterprises that engage in foreign direct investment (FDI) and own or control value-added activities in more than one country." Dunning 1993. They can coordinate and control activities across national frontiers by using resources, capabilities, and networking to carry on various business activities on a worldwide basis." (Buckley & Casson, 1976). The central ownership and central management are located in MNCs home country. They have headquarters in a home country while having subsidiaries, branches, or affiliates in other countries. The multinational corporation also often operates within globally integrated value chains with sourcing of inputs, production, and distribution over multiple nations." (Rugman & Verbeke 2001)

Theoretical perspectives on multinational corporations provide conceptions in understanding the behavior and strategies of these organizations, along with the impacts they have on the global economy. Some key theoretical perspectives take into consideration the Internalization Theory, which was proposed by Buckley and Casson (1976) and further extended by Rugman (1981). It looks to explain why firms would internalize certain activities compared to using market transaction methods. MNCs internalize activities through FDI to exploit advantages arising due to firm ownership in overcoming market imperfections; these imperfections may relate to transaction costs or contractual incompleteness. The eclectic paradigm, also known as the OLI framework, was developed by John Dunning 1977, 1993; this paradigm integrates three factors-Ownership (O), Location (L), and Internalization (I)-using this approach, the paradigm

attempts to explain the motivations behind firms' internationalization. From this perspective, the firms operating abroad exploit the ownership advantages, and location-specific advantages, and internalize activities to gain benefits.

Product Life Cycle Theory - Raymond Vernon 1966: This theory states that the companies expand internationally to take advantage of the different stages the product may go through in its life cycle. During the product's early life cycle, the products are first produced and manufactured in the home country exported to foreign markets and finally during later stages of product life, the production is shifted abroad as demand in foreign markets grows up. Further, another framework known as 'Internalization-Local Responsiveness Framework' Ghoshal and Bartlett 1988, emphasizes the tension between global integration and local responsiveness confronted by MNCs. That would imply MNCs have to trade off their compulsions for centralization and standardization with the requirement of adapting themselves to the local market conditions and preferences. Finally, befitting to mention here the "Global Value Chain Perspective", influenced by the works of Gereffi 1994 and others. This perspective looks at how MNCs arrange and coordinate production activities across countries in a way to capture value and attain competitive advantage. It also underlines the significance of the relationship and the governance structures within the global value chains.

Scope and significance of financial analyses in MNC's.

The scope and importance of financial analysis for multinationals are performance appraisal, risk management, investment decisions, and communication with the stakeholders.

To begin with, it would be logical to refer to "Performance Evaluation", as financial analysis serves to present to MNCs the means to measure and chart their financial health and performance over time. This includes looking at profitability, liquidity, leverage, efficiency, and some other major financial ratios. According to, financial ratios that reflect operation efficiency and profitability of the MNCs include ROA- return

on assets, ROE- return on equity, and EPS - earnings per share,. The other commonly used technique is the practice of "Risk Management" since financial analysis plays a significant role in identifying different risks faced by MNCs, such as foreign exchange risk, interest rate risk, commodity price risk, credit risk, and operational risk. According to the historical data analysis, market trend, volatility will definitely help MNCs in developing effective risk management strategies with hedging techniques. The other major process in this regard is "Investment Decisions." Financial analysis is helpful for MNCs to take critical investment decisions on things like capital budgeting, international expansion, M&A, joint ventures, and divestitures. According to, by assessing investment opportunities based on their risk-adjusted returns, cash flow projections, and synergy potential, MNCs can effectively allocate resources and hence maximize shareholder value. Brealey, R. A., Myers, S. C., & Allen, F. 2016. Also, "Stakeholder Communication" has to be taken into account because financial analysis provides a means for MNCs to communicate their financial performance and outlook to the stakeholders like investors, lenders, regulators, analysts, employees, and the public. Timely and transparent reporting of financial results increases stakeholders' faith and beliefs in the management, governance, and long-term sustainability of the MNCs, as commented by Palepu, K. G., Healy, P. M., & Peek, E. 2013. Finally, "Strategic Planning and Decision-Making Process" falls under the scope of financial analysis since it forms a base for strategic planning and decision-making in MNCs. According to Ross, S. A., Westerfield, R. W., & Jordan, B. D. 2015, the analysis of financial data coupled with market trends and competitive dynamics, as well as macroeconomic factors, allows MNCs to formulate business strategies, set targets of performance, allocate resources properly, and timely respond to changes taking place within the marketplace. Monte-Carlo simulation and its application in Economics and Business Research

Monte Carlo simulation has a number of applications in economics research for example, the estimation of economic models, analysis of uncertainty, policy evaluation among others.

Monte Carlo simulation has also been applied to economics research on the "Estimation of Economic Models" by Pakes, A., & Pollard, D. 1989 and Tauchen, G. E. (1986). It also appears regularly in the analysis of Uncertainty as shown by (Judd, K. L., Maliar, L., & Maliar, S. 2011). and (Geweke, J. 1989). The "Policy Evaluations have also been targeted in the use of Monte Carlo methods are described by (Kehoe, T. J., Levine, D. K., & Romer, P. M. 1992). and (Krusell, P., & Smith, A. A. 1998). Monte Carlo simulations have been used as a research method in analyzing "Asset Pricing" according to Mehra, R., & Prescott, E. C. 1985 and - Longstaff, F. A., & Schwartz, E. S. (2001). Also, "Labor Economics and Macroeconomics have been used according to Hansen, G. D. (1985) and Heathcote, J., Storesletten, K., & Violante, G. L. 2014. This literature review represents a sample of the

innumerable literature that makes use of Monte Carlo simulation in economic research. Monte Carlo simulation has given economists a strong tool through which complex economic models can be analyzed, quantify uncertainty, and conduct policy evaluations in a computationally tractable manner.

The US Global Industry in the Business Services appears in GlobalEDGE which is a research web portal developed by Michigan State University MSU. It contains a vast amount of information about international business and trade, including data, tools, and resources for companies, educators, and policymakers alike.

GlobalEDGE provides access to various databases, interactive tools, insights related to countries, and other tools that assist users through the complexities in global markets. This would also be helpful for anyone specifically interested in international business, economics, or international trade. GlobalEDGE offers various resources for analyzing corporations, especially about international business. The first search in Global Edge has been done to obtain the total Global Market Share of the Business Services Industry. As we can see in Figure 1, the dominant Global Economy is the US with 51.81% of market capitalization. Note that the source cited by Global Edge is the Forbes Global 2000 List Forbes 2023 Figure 1. Global Market Share of the Business Services Industry

The Forbes Global 2000 Lists

This annual ranking by Forbes magazine lists the world's largest public companies by revenue, profit, assets, and market value. The list gives insight into the world's biggest and most powerful companies across various industries. Each company making it on the Forbes Global 2000 list gets ranked based on a composite score based on the above-mentioned metrics. It acts as a benchmark for investors, analysts, and policymakers where one can set a baseline against which investors can judge the global economic landscape and lead corporations against a common set of criteria. The Forbes Global 2000 ranking is often regarded as one of the most prestigious lists in the business world, whereby stakeholders refer to make sense of the corporate global landscape on market trends and economic indicators. It's an important tool for those looking to understand the nature of the global economy in great detail and to know the important players moving within the different industries. Utilizing these tools will offer insight in-depth into the corporations operating in global markets, thereby enabling a decision-maker to make prudent decisions on investment, market entry strategies, and competitive positioning.

Precisely, for this research, the data of Forbes Global List 2000 markets provided by S&P, gathered from Xignite in 2023, has been collected, (see figure 2).

Broadcom (AVGO) Stock Key Data	
Summary	Analysts
CONSENSUS RECOMMENDATION	Outperform
CONSENSUS PRICE	1513.81
RANGE OF PRICE TARGETS	1050.50 to 1720.00
RANGE OF EPS	45.93 to 54.50
CONSENSUS EPS	50.31
CONSENSUS REVENUE	\$52.64B
RANGE OF REVENUE	\$49.64B to \$55.02B
Consensus Price Target is the stock price analysts expect to see within a period of 0-18 months.	
EPS and Revenue estimates are for the next 12 months.	
Markets data provided by S&P and by Xignite	

Figure 2: Example of Data Collected using Forbes Global List 2000. Original Sources S&P and Xignite

2. Current Analysis

The research collects data from 30 out of the total 43 US MNCs that appear in the market dominance. 13 corporations have been excluded from this list due to the lack of data. he collected data was organized in an Excel sheet, and the following parameters were analyzed.

- 1) The consensus Revenue in billion USD. The range of lowest and highest revenue values.
- 2) The consensus earnings per share EPS and the range of lowest and highest EPS values.
- 3) The consensus share price and the range of lowest and highest share prices.

Companies in our original list of Business Services:

The US global industry in Business Services which dominates the World arena with almost 52% share in market capitalization is made by 43 companies. Out of these 43 we

have been able to simulate results in 30 of them representing this 69.7% of the total US representation in the Forbes Global List 2000. The names of the companies analyzed are here:

United Parcel Services, Fedex, Capital One, DXC, Manpower, Rocket Corporation*, XPO, Ch Robinson, Automatic Data Process, CSX, Rep. Services, Norfolk, Booz Allen, Global Payments, Gallagher, Cintas, Moodys, Onemain, Broadridge, Globe life, Prologis, Equifax, Old dominion, Paychex, PennyMac, Akamai Tech*, Airbnb, Zillow*, Peloton Interactive*, Public Storage, Verisk Analytics, Fleet Corp, Copart, Air lease*, MSCI, Etsy*, DocuSign*, Vici Corp, Medical Properties Trust, W.P. Carey, Zscaler. **Discarded corporations.*

Research results

Results of the Uncertainty Analysis of the Consensus Revenue after simulating with 20.000 iterations at a 99% confidence level are as follows and presented in Figure 3.

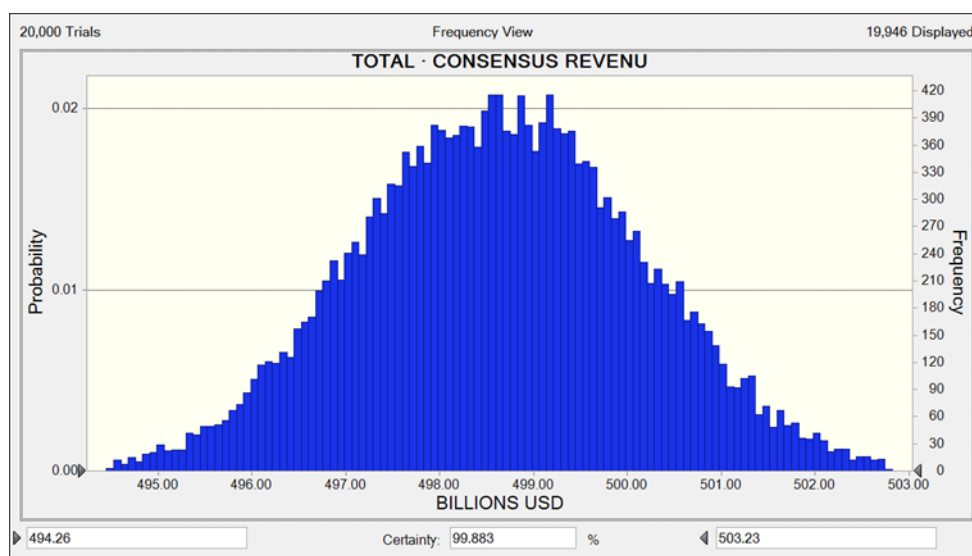


Figure 3: Analysis of Consensus Revenue

Consensus Revenue Analysis

Consensus revenue refers to an estimate of future revenue that is derived from the average or median predictions of multiple financial analysts or experts, (in this case experts' opinions collected by the sources S&P and Xignite in 2023). These estimates are typically aggregated by financial data services and represent a general expectation of a company's future financial performance. Consensus revenue forecasts are used by investors, analysts, and companies themselves to gauge market expectations and to benchmark actual financial results against these predictions. The consensus revenue accumulated for US global companies in the year 2024 is 454.01 Bill.USD. This is a value obtained by all the corporations analyzed being this a forecast for the next 12 month (year 2024).

This research shows that according to our 20.000 iterations (simulations) at a 99% confidence level, there is a 99% certainty that the income of the US Global companies analyzed will be in the range 494-503 Bill.USD, more than what is expected by the consensus making this consensus too conservative according to this research

Sensitivity Analysis on Consensus Revenue

The chart of Figure 4 explains using a sensitivity analysis that there are two companies (UPS and FedEx) that represent the biggest disparity in the simulation, contributing 41 and 38% respectively. Both companies impact high on the volatility of the US Global Business Services industry analyzed.

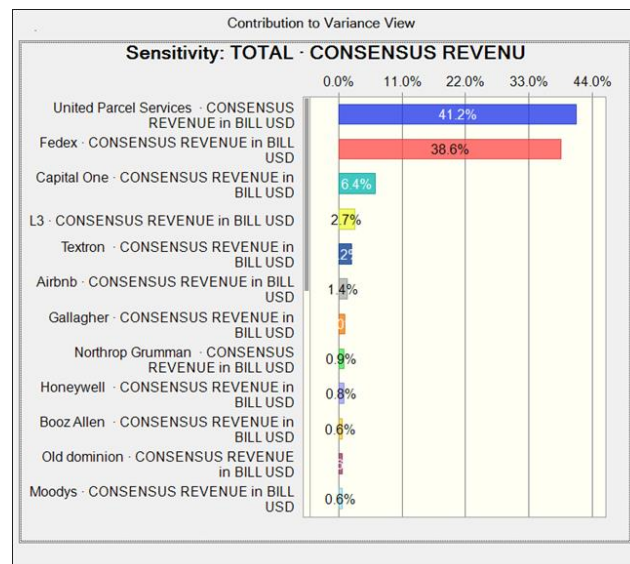


Figure 4: Sensitivity Analysis Consensus Revenue

Sensitivity Analysis on EPS.

Initially, the average EPS value of those shares analyzed related to the 30 companies analyzed is 8.03 USD/share. Here a second simulation including 20.000 iterations at a 99% confidence level as well has been completed, stating that there is only a 61% certainty of improving these expected results, see Figure 5.

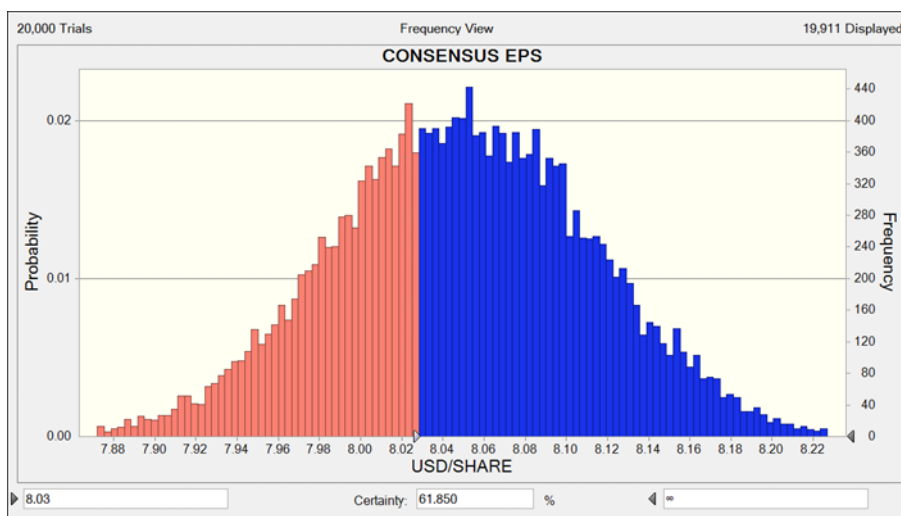


Figure 5: EPS Consensus Analysis and Simulation

Sensitivity Analysis on EPS

The company that contributes the most to the volatility of the EPS consensus is Capital One with 42% followed by Fedex with almost 19%, see Figure 6.

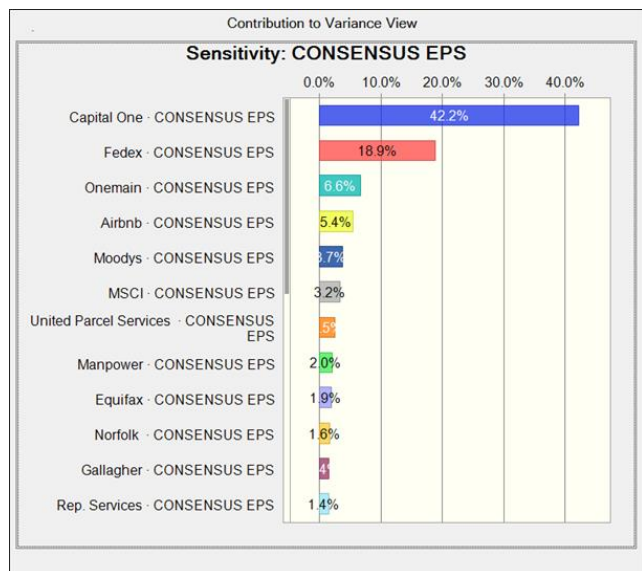


Figure 6: Sensitivity Analysis Consensus EPS

Consensus Analysis on Average Share Price.

The estimated average price of the 30 companies listed analyzed is 198.98 USD/share. After our simulation we expect only a 15% probability that the results obtained are what is expected or higher, making the consensus given by the experts quite optimistic. See Figure 7.

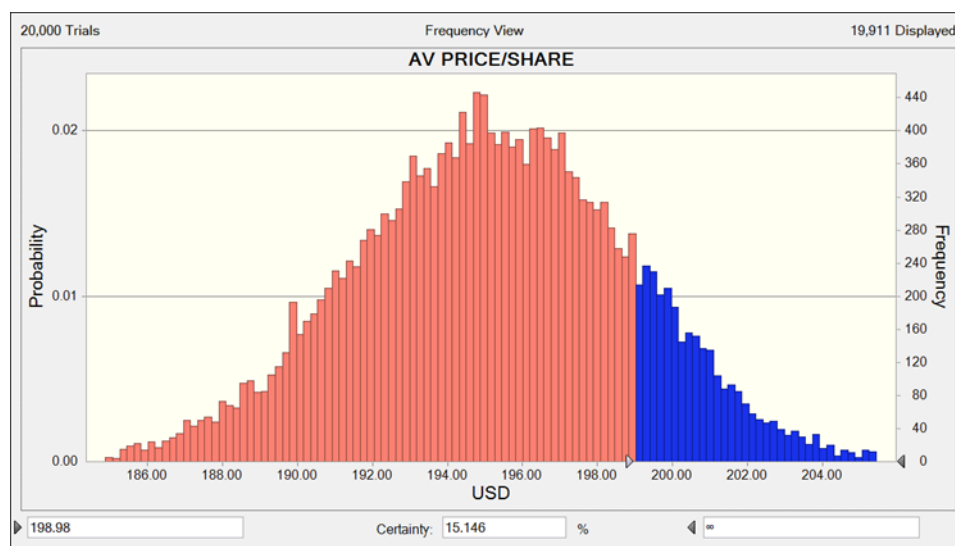


Figure 7: Consensus Analysis of Price/Share

Sensitivity Analysis on Share Price

The company that contributes the most to the volatility of the EPS consensus is Cintas with 37%, see Figure 8.

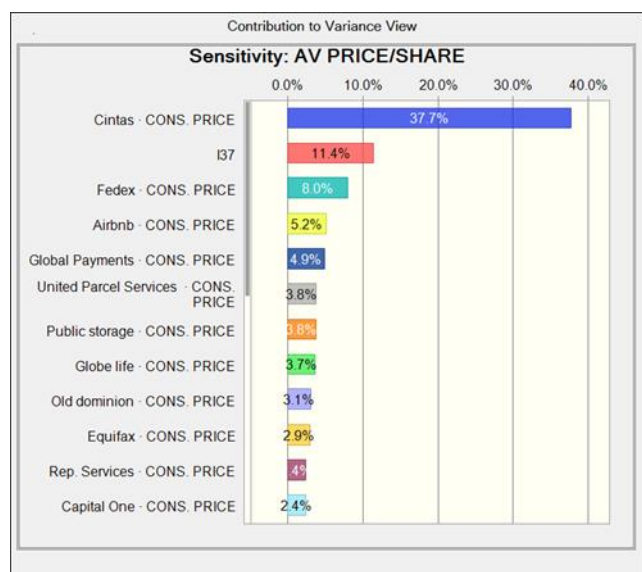


Figure 8: Sensitivity Analysis on Average Price/Share

3. Conclusions

This study reveals that the market consensus for EPS and share prices in U.S. multinational corporations may be overly optimistic. Based on Monte Carlo simulations, there is a significant level of uncertainty surrounding the expected financial outcomes. These findings emphasize the importance of adopting a more cautious approach when forecasting future EPS and share price values for multinational corporations operating in the U.S. Business Services industry.

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