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Navigating Financial Risk Management in Royal Caribbean Group: A Study of Interest Rate Risk

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Abstract

This work investigates the financial risk management (FRM) practises of Royal Caribbean Group (RCG), focusing on its management of interest rate risk. Using a combination of financial impact modelling and market valuation analysis, the study evaluates RCG's current hedging strategies, including interest rate swaps, and their effectiveness in mitigating volatility, ensuring cash flow stability, and enhancing market confidence. Findings reveal that while RCG's existing strategies effectively reduce the downside risk (swaps lower volatility of interest expenses by 11.2%, for the 12 years), they limit potential gains when there are favourable market conditions. Recommendations include indexing new loans and their corresponding swap agreements to EURIBOR instead of SOFR for improved alignment with macroeconomic trends.

Keywords

Financial Risk Management, Market Risk, Hedging Strategies, Corporate Finance, Financial Instruments, Interest Rate Risk

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Disclaimer

This work is part of a group research project, and as such, first-person plural pronouns are applied. We used artificial intelligence tools to help us with syntax construction and grammar within this thesis, improving comprehensiveness. This is the sole use of artificial intelligence in our thesis. All calculations and reasoning are original work done by us, with all resources used properly listed.

1. Introduction

In 2021, when the global cruise industry was at a standstill, Royal Caribbean Group (RCG) faced over $18 billion in gross long-term debt, with a third of its total maturing up to 2023 (Royal Caribbean Cruises Ltd. 2022, 85), yet through a combination of strategic hedging, debt restructuring, and liquidity preservation (Barnes, Johnston, and Edgecliffe-Johnson 2022), the company not only weathered the storm but emerged with new plans for sustainable growth. As of December 6th, 2024, the strategies implemented seem to have had the intended result, with RCG's share price hitting an all-time high of $258.09, representing a year-to-date growth of 99%, while the Dow Jones U.S. Travel & Leisure Index has grown 24% (The Wall Street Journal 2024). Given the high valuation of the company's shares and with massive amounts of investors' money at stake, it's more critical than ever to evaluate whether RCG's financial risk management is foolproof or if there's space for improvement.

After suffering a significant setback during the COVID-19 pandemic, the cruise industry has significantly recovered. It was projected by the Cruise Lines International Association (CLIA) that 34.7 million passengers would travel in 2024, which is 17% more than in 2019 (CLIA 2024). This positive outlook, allied with the projections that by 2028, the cruise industry is expected to account for approximately 3.8% of the $1.9 trillion global vacation market (J.P. Morgan 2024), RCG seems to have the right backdrop to grow, assuming its exposure to financial risks is well managed.

Although the study of financial risk management (FRM) is and always has been essential for whatever company one chooses to look at, it becomes extremely relevant in today's global economy, where businesses face increasingly complex risks, with effective FRM helping organisations navigate financial threats such as market volatility, interest rate fluctuations, and economic crises, ensuring stability and continuity. Research indicates that companies with robust risk management frameworks are better equipped to withstand disruptions, reducing the chances of financial distress (IRMI 2021).

There's no doubt that in the aftermath of the 2008 financial crisis, various regulations and standards were set, mandating financial firms to follow more stringent FRM practises (e.g. Basel III, Dodd-Frank Act, DORA). However, for non-financial firms there hasn't been the same level of obligations put into place; still, an article from the British Journal of Economics found that non-financial firms use derivatives 10% more than financial companies (Lenee and Oki 2017).

In this thesis, we aim to provide a holistic understanding of how FRM affects RCG, considering both its direct impact on financial profitability (measured by operational profit and net income) and its influence on the company's market valuation (change in stock returns). We assess the effectiveness of RCG's strategies in managing key financial risks by examining their role in ensuring internal financial stability and shaping external market perceptions. Our analysis explores how risk management practices safeguard the company's profitability against fluctuations in fuel prices, interest rates, and exchange rates. We also investigate how effective risk management builds investor confidence, as reflected in the resilience of RCG's stock returns during periods of heightened volatility, but not only. By combining these perspectives, we evaluate the suitability of RCG's current strategies and offer recommendations for enhancing its long-term success.

In pursuing this objective, we consider two interconnected dimensions of how FRM impacts RCG. The first dimension focuses on the direct financial implications of risk management, viewed from

an accounting perspective. This involves exploring how well RCG's risk management practises address endogenous profitability—its ability to protect its financial results and maintain stable cash flows despite exposure to significant risks, such as fluctuations in fuel prices, interest rates, and exchange rates.

The second dimension takes a broader perspective, examining how RCG's FRM practises influence its external valuation, particularly through the lens of investor and consumer perceptions. In an industry characterised by inherent risks, robust risk management can create a sense of stability and reliability. When stakeholders perceive that RCG is effectively managing its risks, this confidence can be reflected in its stock returns. For example, if a significant risk factor, such as a change in fuel prices, occurs and RCG's stock price remains relatively unaffected, it may signal that investors trust the company's risk management framework to safeguard its operations and profitability. This perceived robustness can enhance investor sentiment, thereby benefiting the company's valuation and market performance.

This dual focus allows us to assess whether RCG's risk management practises are sufficient for its operational and financial needs and whether they contribute to building trust and confidence among its stakeholders in a way that supports long-term success.

We centred our thesis on commodity price risk and interest rate risk; for each of these, volatility and general effect on cashflows were examined, with a sensitivity analysis and worst-case scenario performed. Our findings indicate that while RCG's current strategy effectively manages risk, its strict focus on minimising volatility limited potential advantages. We recommend exploring collar options for fuel exposure and indexing new loans to EURIBOR instead of SOFR.

1.1. Company overview

The history of RCG has been one of success. The cruise company was founded in 1968 (then Royal Caribbean Cruises (RCC)) by three Norwegian ship owners and an American hospitality

entrepreneur, intending to cover the U.S.'s rapidly growing cruise market (Royal Caribbean Group 2024; Wright 2023). Launching its first boat in the sea in 1970, it quickly realised there was a need to expand, adding 3 other vessels to its portfolio of ships in the next 12 years (with 2 of these newer ships being amongst the largest cruise ships in the world at the time) (Wright 2023; Smith and Brotherton 2013).

Being a highly innovative company RCC has stood out. From pioneering the first-ever cruise ship enlargement to aiming to have the world's largest cruise ship (a record that has since been consecutively achieved), to leasing islands to have private destinations for guests (Smith and Brotherton 2013; Wright 2023).

Incorporated in Liberia but with headquarters in Miami, Florida (U.S.), the enterprise has been public since 1993, being quoted on the New York Stock Exchange (NYSE) under the ticker RCL (Royal Caribbean Cruises Ltd. 2024a; Wright 2023). Over time RCC merged with several smaller firms, opening the way for new market segments and locations. This implied changes in its organisation, ultimately leading to name changes and a unique structure.

Nowadays, this structure revolves around having the parent company that owns multiple cruise brands (Appendix 1), overseeing its strategies, finances, and operations, as well as handling corporate governance, investor relations and overall risk management. Each of these brands has its own identity, target audience, and operational focus; however, RCG manages these brands as a single business to maximise shareholder value, given their similarity in overall processes and systems as well as the regulatory environment.

Still, when it comes to RCG, naturally people would think of Royal Caribbean International (RCI, also known as Royal Caribbean Cruises) as it is the flagship cruise line and the market leader in 2022, with 20% of the market share, followed by Norwegian Cruise Line Holdings and Carnival Cruise Line, both with 11%. Also on the top 10 leading cruise lines worldwide is TUI Cruises, with

3% of the market share, a brand for which RCG has a joint venture with the TUI Group and Hapag-Lloyd Cruises (Statista 2024c). Meaning, in the shipping sector, specifically the cruise sub-sector to which RCG belongs, it stands irrevocably as a leader, with a consolidated position over the years. Its operations span globally through its presence on four continents and adapting its fleet deployment to seasonal demand and market trends in each region, a key insight for studying the firm's FRM strategies. Also relevant is the portion of revenues coming from these operations worldwide, with 25% coming exclusively from outside of North America in the first semester of 2024 (Royal Caribbean Cruises Ltd. 2024b).

In general, RCG has had strong financial years with successful post-pandemic recovery and growth, totalling $13.9 billion in revenues in 2023, which was sustained by robust consumer demand for its brands. Meanwhile, Carnival Corporation, which has been focused on deleveraging, posted $21.6 billion in revenues for 2023 (Statista 2024a) and Norwegian Cruise Line Holdings included about $8.5 billion (Statista 2024b). By growing its fleet and implementing strategic initiatives, RCG remains at the forefront of profitability and innovation in the sector as it rebounds more strongly than average across the industry. The broader cruise industry also experienced growth in 2023, but RCG largely outshined many peers because of a premium-orientated strategy, creatively designed vessels and several operational execution advantages, allowing them to maintain a certain consistency over the last 10 years (Poirot 2024).

RCG continues to innovate with new ships like Icon of the Seas, launched in 2024, and Utopia of the Seas, both designed to increase capacity and improve energy efficiency. The firm is also exploring sustainable technologies to reduce its environmental impact, aligning with industry trends toward greener cruising (Royal Caribbean Cruises Ltd. 2023). Additionally, by partnering with companies like SpaceX for their Starlink product – which improves onboard internet – RCG continuously works on enhancing guest experiences. The company also owns resorts like Perfect

Day at CocoCay and collaborates with global ports to streamline logistics and expand its market reach (Royal Caribbean Group 2022a).

1.2. Financial Risk Management

1.2.1. The Theory

In the perfect world envisioned by Modigliani-Miller, where taxes, transaction costs, bankruptcy costs, and agency costs do not exist, markets are perfect, and investors behave rationally, FRM would be unnecessary. Investors would hedge their own risk or diversify their exposure, rendering firms' risk management redundant, the cost of capital would remain constant no matter what risk management strategies a firm uses, and volatility would not have any associated costs.

With its imperfections, the real world makes all these assumptions crumble, taxes, as well as transaction, bankruptcy and agency costs, exist, markets are imperfect, and investors are sometimes irrational. In this reality, FRM becomes essential (Hommel 2005).

It is due to Modigliani-Miller's assumptions not holding that FRM can make such a difference for companies because it involves a detailed and structured process of identifying, assessing, and mitigating financial risks that typically stem from market volatility and that could impact a company's performance. Effective FRM ensures that a company can navigate these risks in a way that protects its value and stabilises its cash flows. As highlighted by Christoffersen (2011), the key objective of FRM is to manage uncertainty in financial markets while optimising business performance, essentially through hedging.

By strategically using financial instruments like derivatives — such as options, futures, forwards and swaps—to hedge against adverse market movements, firms can potentially mitigate risks and protect shareholder value (Deloitte 2018). Traditionally, FRM has been based on a variance-minimisation model, where the goal is to reduce the volatility of a company's future cash flow. However, there are some propositions of FRM also being concerned with preventing the worst-

case financial scenarios that could push a company into distress. In these cases, where the worst-case scenario is a drop in market prices, companies might purchase "out-of-the-money" put options to shield against large potential losses, ensuring that they are prepared for rare but severe negative outcomes, while still benefiting from positive market movements (Stulz 2022).

Moreover, some companies view FRM as more than just a defensive strategy. By actively managing risks, they can also capitalise on opportunities during periods of market turbulence, potentially increasing profitability. Thus, FRM not only protects against financial threats but can also serve as a tool for enhancing a company's strategic positioning in the market, as long as these companies have a comparative advantage in doing so (Stulz 2022). Hence, whether the goal of the firm is to protect itself against financial threats or to improve its strategic positioning, using derivative instruments, that is by entering into financial contracts whose value changes according to an underlying asset, which is usually the asset the company wishes to hedge against, firms manage their risk exposure.

One way to hedge is to take a long or short position against an asset. A long hedge position is a tactic used when firms want to guard against future price increases because they will need to source the asset at a future price, as opposed to short hedging, which is used when firms already own the asset and need to guard against future price declines. In both situations, the hedge will prevent the company's margins from declining and offset the loss of rising and falling markets (Deloitte 2018). Essentially, what is being performed when companies hedge is a trade on specific financial risks with other institutions, who are more predisposed and likely better equipped to take on and manage these risks. Thus, the kind of protection that might be offered in a derivatives contract enables a firm to choose, or at the very least manage, which form of risk it wishes to be exposed to (International Monetary Fund 2000).

1.2.2. Literature Review

In this section, by highlighting what has already been explored before in the field, we aim to pinpoint the areas that require further studies to be done, and hence where the gaps in knowledge lie and that we want to fill when it comes to FRM.

Broadly speaking, historically FRM has been focused on capturing and mitigating the complexities of the financial markets, not only for firms but also for investors. Particularly quantitative-based models are much more developed — in terms of risk measurement parameters, hedging models and solvency/liquidity requirements — for either investors or financial firms, leaving out of the picture the similar numerical approach for nonfinancial firms. For example, to mention FRM and not bring up the 2008 financial crisis would be to tell an incomplete story, given that it established the significance of risk analysis in financial firms; however, RCG is not a financial firm, and hence its practice of FRM has a distinct place in the literature.

To situate this thesis within the broader academic conversation, Graham and Rogers (2002) found that hedging can add about 1.1% to market value by increasing debt capacity, while Guay and Kothari (2003), indicated that the cash flows generated by hedge portfolios are modest and unlikely to account for large changes in value. Bartram, Brown, and Conrad (2011) have also examined the role of derivatives in financial risk management, finding that firms using these instruments effectively reduce their risk exposure, particularly during market downturns. Such firms often operate in commodity-based industries or have substantial foreign operations, making them more vulnerable to exchange rates, interest rate, and commodity price risks. Derivative users experience significantly lower cash flow and stock return volatility compared to non-users and show reduced systematic risk. Despite being larger and older, these firms exhibit a slightly lower unadjusted Tobin's q, suggesting that while derivatives mitigate volatility, their use may not directly enhance firm valuation.

However, at a granular level, the cruise business has historically lacked in-depth research, in particular related to financial risk management, with most of the studies alike focusing on comparable sectors like the shipping industry or the airline sector. In recent years, however, some empirical research and theoretical developments have started to appear. Caiazza (2012) briefly explored the strategies and financial instruments employed by key players in the industry. The journal article starts by presenting the challenges faced, continuing with a comparative analysis of the main financial risk management tools used by a representative cross-section – RCG, Carnival Corporation and Star Cruises. More recently, Wu (2024) presented a deeper investigation, emphasising the high capital requirements and revenue fluctuations in this substantially integrated industry. Using financial ratios and the Entropy TOPSIS method, Wu evaluated the solvency, profitability, and operational efficiency of major firms in the business (RCG, Carnival Corporation, and Norwegian Cruise Line). Suggesting companies should have an internal look at financial performance to understand the drivers that aid in investment and management decision-making. Finally, it proposes three tactics to enhance performance: fleet optimisation, shareholder benefits, and fuel hedging.

Consequently, this thesis builds upon previous work by exploring on the one hand, a relatively straightforward regression model to explain the impact of FRM on a nonfinancial company's market valuation and the other, by laying out the strategy to follow when one wishes to quantify the financial impact of specific FRM strategies being performed by a company using only publicly available data, as well as, by suggesting, based on this evaluation, potential strategy improvement. This approach is possible by synthesising various other perspectives discussed in the FRM field.

1.2.3. For RCG

To really be able to study the way RCG does FRM, we need to explore the ways and hence the types of financial risk the company is exposed to. For the purpose of this work, when we refer to

types of financial risk and their definition, it is to the portion of these risks that applies to nonfinancial firms. The way nonfinancial firms might be exposed in the financial risk landscape, can be divided into four core types of risks generally accepted – influenced by internal decisions such as credit and liquidity risk, and mainly external factors like market and operational risk - that pose significant challenges to the company's capability of maintaining its operations, financing new initiatives, and fulfilling debt obligations (GARP 2022). RCG is not exempt from these risks and the financial instability their interplay may provoke, as such it adds value to explore their relationship with the firm specifically (Royal Caribbean Cruises Ltd. 2024a, 28).

To begin with, there are macroeconomic factors that create risk exposures that are independent of what any firm is able to control, like the unexpected risk of incurring losses due to fluctuations in fair values or future cash flows because of changes in market prices (Hunziker 2012). RCG faces substantial exposure to market risk from exchange rates, fuel prices, and interest rate fluctuations, all of which add further complexity to its financial risk profile.

For once, changes in currency exchange rates can affect the value of earnings in foreign markets. A strong U.S. dollar can diminish the value of revenues generated in other currencies, impacting the company’s bottom line. Another factor comes from RCG’s significant amount of foreign-denominated debt; it ended 2023 with $5.5 billion in export credit facilities, with the final size of each facility depending on fluctuations in the EUR/USD exchange rate. This currency exposure is a persistent source of risk, as RCG operates globally and derives revenue from various markets with differing economic conditions (Royal Caribbean Cruises Ltd. 2024a, 29-32).

Fuel prices represent another critical factor, as not only market risk exposure but also as they play a substantial role in RCG's operational expenses, and hence could also be considered a source of operational risk. Fuel costs are inherently volatile, influenced by geopolitical factors, supply chain disruptions, and regulatory shifts, such as the push for environmentally sustainable fuels. Given

that fuel costs represent around 15% of RCG's operating expenses, any increase directly decreases operational profit, thereby reducing overall profitability, or even in a more extreme situation puts pause to operations. RCG's ability to hedge against fuel price volatility offers some buffer, but hedging might only partially mitigate the impact, as price spikes or regulatory fuel restrictions could still lead to substantial cost increases. The compliance with new fuel regulations adds further uncertainty in terms of cost implications for RCG's operational strategy; still, it is something that RCG is working towards; which might add more hedging strategies on new underlying assets, and hence it could increase the burden and complexity of FRM for the firm (Royal Caribbean Cruises Ltd. 2024a, 30-32).

Finally, interest rate fluctuations represent another layer of market risk that intensifies RCG's financial vulnerability, particularly given its substantial debt obligations. As of the end of 2023, $3.7 billion of RCG's debt was tied to variable interest rates, exposing the company to increased interest expenses and hence a higher cost of servicing debt if rates rise. Although RCG utilises interest rate swap agreements to manage some of this exposure, these strategies might not entirely shield the company from rising costs if market rates surge unexpectedly (Royal Caribbean Cruises Ltd. 2024a, 32).

Together, these factors create a complex web of market-driven risk intertwined with operational risk that RCG must continuously manage. These risks interlink with credit and liquidity challenges, as higher expenses and fluctuating revenues can strain cash flow and complicate debt servicing. These latter risks depend more on the strategic choices RCG makes and internal risk factors.

It is debatable whether RCG's exposure to credit risk is significant. Looking at this risk as the danger of counterparty non-performance in terms of the derivative agreements, credit facilities and new ship progress payment guarantees the firm has in place with counterparties, then it is relevant to highlight the set of guidelines that RCG follows about instrument maturities and credit ratings

to preserve liquidity and safety. Then we can argue that the selection RCG does, on the financial and other institutions it conducts significant business with, based on their credit ratings and on not being individually dependent on just a few institutions, reduces the likelihood of facing losses from non-performance. And hence agree with the fact that RCG does not face meaningful credit risk, more specifically concentration and default, under the current practises it adheres to.

Evaluating liquidity risk in the firm, however, leaves no doubt as to the importance of it and to the role it plays in FRM done by RCG. For once, the company's reliance on debt financing intensifies the risk that RCG might not have enough readily available cash to cover short-term obligations. RCG historically draws on a mix of cash flow, available credit facilities and the issuance of debt or equity to meet its financing needs (Royal Caribbean Cruises Ltd. 2024a, 28). A significant part of the financial challenge RCG faces stems from the firm's existing heavy debt obligations. As of 31st of December 2023, the company carries a $21.5 billion in total debt, which requires ongoing cash flows to meet interest payments and repay principal, consuming a large portion of operational cash flow. Compounding these issues is the possibility that RCG may need to take on even more debt to meet its financial obligations or to fund future growth.

Building on the rationale outlined above, our analysis will focus primarily on the exposures to fuel prices, interest rates, and exchange rates, as these are the key drivers that significantly influence market risk, operational risk and consequently liquidity risk. The perspective that when managed effectively, these exposures have the potential to yield the most substantial benefits for RCG aligns closely with the priorities the firm emphasises in its 2023 10-K report as well as our own: that once the management of these risks is stabilised, this management can act as the cornerstone for improving RCG's liquidity and ensuring long-term resilience.

Beyond the main scope of this work, but still important to acknowledge are other non-financial risks that RCG faces, which, while not directly financial in origin, will have tangible financial

implications in the coming years. Climate risks and regulatory changes stand to reshape the types of fuel RCG is permitted to use and the associated costs. These risks are directly tied to global environmental goals and industry-specific mandates that seek to reduce emissions and minimise the environmental footprint of cruise operators. As we will mention in more detail in the commodity price risk section, RCG has already begun to address these challenges. This intersection of climate and financial risk underscores the broader context in which RCG operates, where external pressures and internal adaptations must be closely aligned; hence, understanding these additional dimensions provides a fuller picture of RCG's risk landscape.

2. Data architecture and research approach

To achieve the goal of this work we reviewed a variety of sources, including RCG's annual 10-K filings with the Security and Exchange Commission (SEC) and recent industry trends. This allowed us to understand the company's historical practises and future objectives as disclosed in its financial reports and strategic statements.

2.1. Data

The two main models we have used require different types of data; one utilises internal data reported by the company plus some market data and the other exclusively uses market data.

For the financial impact model – which focuses on the company's financial statements and examines the direct impact of hedging strategies on reported internal metrics – we have collected information from various sources for the last 10-year period. Data regarding RCG's accounting was retrieved from the annual mandatory SEC filing reports, available on the company's website (the same reports can also be obtained from the SEC's website). Given that there is not a file with the firm's financial statements for the complete period available we have aggregated the data in a single master file. For each year, we have used the latest data available to obtain the most accurate view possible, given that there may be changes after the reporting period.

When it comes to auxiliary data such as fuel prices and interest rates, we chose to use datasets from reputable sources. For the relevant fuel, we collected annual price averages from the U.S. Energy Information Administration (EIA), performing the necessary adjustments to guarantee that both RCG's and EIA's information were in the same unit (dollars per metric ton). The same information was taken for West Texas Intermediate Crude Oil Spot Price (a key benchmark widely used in the energy sector and financial markets) and transformed to perform comparisons (U.S. Energy Information Administration, 2024). Additionally, benchmark LNG prices were also collected from the Federal Reserve Bank of St. Louis (FRED 2024a).

To explore the interest rate exposure that RCG faces, we retrieved three different interest rate benchmarks based on the company's debt profile and its interest rate swap agreements. The USD LIBOR — mostly tied to RCG's revolving credit facilities, senior notes and term loans— has been extracted from two separate datasets, for the 6-month rate. From Macrotrends Data, we collected data from 2012 through 2020, corresponding to the rates for each month (Macro Trends 2020) and the more recent data from 2021 up until June 2024, is from FedPrimeRate.com (2024). It is relevant to mention that while the LIBOR has been historically used for the global interest rate benchmark, it was phased out gradually, and as of June 30th of 2024, it was discontinued due to reliability concerns (Marquit 2023), with the U.S. Federal Reserve's (FED) preferred alternative being a benchmark more closely defined as a risk-free rate, such as the Secured Overnight Financing Rate (SOFR), specifically the variant used as the reference rate for financial contracts pertaining to future fluctuations is the Term SOFR (J.P. Morgan 2022).

Since RCG completed its transition from LIBOR to SOFR for substantially all of its interest rate swap agreements by the 31st of December of 2023 (Royal Caribbean Cruises Ltd. 2024a, 49), with the transition starting in the beginning of 2023, we opted for only using LIBOR for any back testing done on interest rate exposure until the 31st of December of 2022. While for evaluating potential

strategies for the periods after this date, we have used the historical SOFR for 2023 until October 2024, collected from the Federal Reserve Bank of St. Louis dataset (FRED 2024b), and then the Term SOFR forward curve as the benchmark interest rate for determining the interest paid on future debt obligations, collected from Blue Gamma (2024) for the period after the 31st of October 2024 (Appendix 2). Finally, the EURIBOR was also obtained from the ECB Data Portal, mostly due to the unsecured term loans RCG has linked to this rate. This dataset contains the 6-month EURIBOR rates corresponding to the average of the observations in each month, from 2012 through 2024 (European Central Bank 2024a). To estimate the performance of RCG on its interest rate swap agreements, we needed to obtain the Euribor forward rates as the benchmarks for this agreement; we collected them from the Chatham Financial dataset for the next 5 years (Appendix 3) (Chatham Financial 2024).

For the market valuation model and the subsequent regression developed using daily data, we utilised an index for market sentiment and proxy variables for fuel, interest rate, exchange rate and market sentiment, namely the United States Oil Fund, LP (USO), Invesco DB U.S. Dollar Index Bullish EFT (UUP), MSCI World Index, United States 6-Month Bond Yield (US6M) and Germany 6-Month Bond Yield (Germany Yield) (Investing.com 2024f; Investing.com 2024e; Investing.com 2024a; Investing.com 2024h; Investing.com 2024c).

These regressions also utilise RCG's stock historical data as well as Carnival Corporation's stock historical data (Investing.com 2024g; Investing.com 2024b). For other experiments done inside the scope of our market valuation model, we have also included data for iShares 1-3 Year Treasury Bond ETF (SHY) (Nasdaq, n.d.), along with other internal RCG factors. Given the daily frequency of this data, for the days in which information was missing (either due to the market being closed on one exchange and not the other, or because trading in the exchange was suspended), we only considered the days in which all the variables had information.

In the running of the financial impact model described above we have encountered a number of challenges that ended up having some impact on our study, such as differences in the arrangement of information, missing information and outliers. In the next paragraph, we will encompass these difficulties, how they might affect our decisions and how we solved them.

The first challenge encountered was the difference in information disclosed from year to year, specifically in 2019 and in 2021, reporting methods differ from previous ones. To overcome this, we made estimations (applying historical growth rates) where possible; when these were not feasible, we relied on assumptions (Appendix 4). Another challenge was that RCG had been invested in many businesses that were later incorporated into the firm and then extinguished, leading to gaps in the financial reports, like in the previous points we dealt with it, by estimating and assuming when necessary. Finally, we must mention that RCG, as well as the remaining cruise industry, was deeply affected by the Covid-19 global pandemic. The company's operations stopped in March 2020 and only progressively restarted in late 2021, hence this portion of the data constitutes an outlier, with some values missing and others not following the usual pattern of ordinary operations.

2.2. Methodology

The market valuation model used in this work consists of looking at the exogenous variables to the company, essentially market data, to explain the influence they could have on the stock returns of RCG, which is a measure of value. Hence, the statistical regression model employed seeks to analyse the sensitivity of RCG's daily stock returns to key financial risk factors, leveraging a set of carefully selected independent variables. The dependent variable in the model is the daily change in RCG's stock returns, calculated as the percentage change from the previous trading day. This measure captures the short-term movements in RCG's stock price, which are presumed to reflect the market's assessment of the company's exposure to various risk factors.

The independent variables are proxies for RCG's financial risk exposures and control for broader market sentiment. First, daily changes in the price of the USO are included as a proxy for fuel price risk. To account for interest rate risk, two measures are incorporated: the daily variation in yields of U.S. 6-month Treasury bonds, representing interest rate exposure for RCG's USD-denominated debt benchmarked to SOFR, and the daily variation in yields of Germany 6-month Treasury bonds, which serves as a proxy for EUR-denominated debt benchmarked to EURIBOR. These yield changes align closely with the semi-annual amortisation schedules of RCG's loans, and the swaps used to hedge this exposure, which we will explain in greater detail in the section dedicated to interest rate risk. To capture the company's exposure to exchange rate risk, the daily changes in the price of the UUP are used. UUP reflects the fluctuations in the value of the USD relative to a basket of world currencies via a USDX futures contract, which is significant given RCG's multinational operations and financial obligations in EUR. Lastly, to control for the influence of broader market sentiment and consumer confidence, the model includes daily changes in the price of the MSCI World Index in USD. This variable accounts for the general movement in global equity markets, ensuring that the coefficients of the risk-related variables are more reflective of specific hedging or risk management practises rather than broad market trends. A caveat is that RCG's stock is part of this index with a weight of 0.06%, however, given its dispersion, the effect from RCG on the index is minimal (MarketScreener 2024).

This regression framework is designed to isolate and quantify the impact of these financial risk factors on RCG's stock returns while controlling for external market influences. By analysing the coefficients and significance levels of each variable, we aim to shed light on the impact of RCG's risk management strategies on market valuation, either because it actually impacts the company's financial fundamentals or the investor/consumer sentiment. However, before arriving at the final model that seems to best translate this relationship, we constructed various other regressions, whose

relationships turned out to be statistically insignificant but still provided some insights. These regressions included data from annual returns of USO, SHY and FXE as independent variables to try and explain annual revenue growth, annual EBITDA margin, and annual growth of net income, producing three additional regression models we will also evaluate (Investing.com 2024f; Nasdaq n.d.; Investing.com 2024d). Following the same logic, we tried to determine the impact of quarterly growth rates of average fuel prices, interest rates and exchange rates on quarterly net income growth.

Before delving into the next section, it's important to clarify our approach to hedging effectiveness. While volatility reduction is often used as a measure of hedging effectiveness, it is not the sole metric considered in this analysis. For RCG, the use of swaps to convert variable expenses into fixed ones inherently results in lower volatility. While we confirm and highlight this success, we employed an additional approach to evaluate and rank hedging strategies by analysing the cash flows generated by the swaps themselves.

3. Financial Risk Exposures

While the obvious goal for FRM in all companies is to control fluctuations in cash flows resulting from risk exposures, RCG has set some additional objectives to achieve with its chosen FRM strategy, besides cash flow control, which we will take into account when suggesting improvements. The first additional priority is to maintain a strong liquidity position, important not only due to the firm's strict debt covenants but also because of the nature of the day-to-day operations of the cruise industry. This position would allow RCG to improve the creditworthiness of the business, which contributes towards the next objective of reaching an unsecured balance sheet and a balanced debt maturity profile, which in turn might help reduce interest rate expenses all through the use of financial derivatives (Royal Caribbean Cruises Ltd. 2024a, 5).

The following sections provide an overall analysis of the influence of the current hedging strategies done by RCG on its stock returns, followed by an in-depth analysis of each risk in terms of how it is currently being hedged by RCG and its financial impacts (through volatility control and positive cash flow hedges). Based on this, we provide recommendations for improvement for the two primary risk exposures: commodity price and interest rate.

3.1. Market Valuation Model

To understand if and how each of these risks affects RCG, we performed a multilinear regression analysis to explain variations in daily stock returns over the last 10 years through changes in the daily prices of USO (a proxy for fuel price), UUP (a proxy for the exchange rate), MSCI World Index (proxy for the market), US6M (proxy for LIBOR/SOFR) and Germany Yield (proxy for EURIBOR) with the results being as follows:

Regression Statistics	
Multiple R	0.56909689
R Square	0.32387127
Adjusted R Square	0.3225103
Standard Error	0.02672449
Observations	2490

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.0004521	0.000536866	0.84211	0.39980753	-0.000600651	0.00150485
USO	-0.02012604	0.022713395	-0.886087	0.37565655	-0.064665177	0.0244131
UUP	0.07511414	0.114240053	0.657511	0.51091306	-0.148901405	0.299129683
MSCI World	1.94959439	0.060266442	32.34959	6.828E-192	1.831416753	2.06777203
US6M	-0.01340656	0.00599991	-2.23446	0.02554146	-0.025171897	-0.001641217
Germany Yield	-0.00640058	0.002606961	-2.455188	0.01414919	-0.011512618	-0.001288538

Figure 1- RCG's market valuation model

Starting with the R-squared value of 0.3238 indicates that approximately 32.38% of the variation in RCG's daily stock returns is explained by the regression model. While this shows a moderate level of explanatory power, it also implies that other external factors not included in the model likely influence RCG's stock performance, which is also valid due to the complexity involving the prediction of stock returns. At the same time the intercept, at 0.00045, is not statistically significant, indicating no significant baseline return independent of the included variables.

The MSCI World coefficient of 1.95, represents the standard CAPM beta, which measures RCG's systematic risk relative to the overall market, with a beta significantly greater than 1, RCG's stock is almost twice as sensitive to market movements as the market average. This heightened sensitivity reflects the high-risk nature of the cruise industry, which is heavily influenced by macroeconomic conditions, global consumer confidence, and discretionary spending. For every 1 percentual point (p.p.) change in the market, RCG's stock moves by approximately 1.95 p.p., underscoring its vulnerability to market volatility since the relation goes both ways.

The coefficients for interest rates, represented by US6M (-0.0134) and Germany Yield (-0.0064), are both negative and statistically significant, with p-values of 0.0255 and 0.0141, respectively. Because these are the yields of debt securities issued by governments like the U.S. and Germany, they represent the risk-free rate of return in the market like the SOFR and EURIBOR and thus, it follows that rising interest rates increase the cost of servicing variable-rate debt, a significant portion of RCG's financial structure, and reduce stock returns as a result. Additionally, higher interest rates may dampen consumer demand for vacations, further contributing to the negative impact (we will study this in further detail, in the interest rate risk section). RCG's interest rate risk management practices which include swap agreements help mitigate this exposure, which can be seen in the small magnitude of both betas, an increase by 1 p.p. in SOFR (or EURIBOR) would lead to a decrease in 0.01 (0.006) p.p. in RCG's stock returns, which is not that materially significant.

For the exchange rate, the statistically insignificant result (p-value = 0.51) is unsurprising and aligns with expectations, likely due to natural hedging. This approach involves balancing revenues and expenses in the same foreign currency, which reduces exposure to exchange rate volatility. Additionally, as will be detailed in the next section, RCG manages exchange rate risk in conjunction with interest rate risk, further mitigating its potential impact on stock returns.

The insignificance of fuel prices, however, is noteworthy. Considering the critical role of fuel as a major operational cost and its explicit recognition as a risk by RCG, one would expect a stronger relationship. This result likely reflects the effectiveness of RCG's fuel hedging strategy; by hedging fuel price risk, RCG appears to neutralise its impact on stock returns, which reassures investors and stabilises market valuation.

To explore this hypothesis further, we conducted a comparative analysis using Carnival Corporation, a peer company that does not hedge fuel price risk. Replacing RCG's stock returns with Carnival's as the dependent variable, the regression showed that the USO coefficient is statistically significant at a 99% confidence level and has a pronounced negative impact on Carnival's stock returns. This suggests that the absence of fuel hedging exposes Carnival to greater market valuation volatility tied to fuel price fluctuations. Moreover, the magnitude of the negative impact on Carnival's stock returns is larger than that estimated for RCG, reinforcing the importance of hedging in mitigating commodity risk.

In contrast, Carnival's results reveal similar sensitivities to interest rates, but the coefficients are slightly more pronounced. For US6M, Carnival's coefficient is -0.0188, and for Germany Yield, it is -0.0099, both statistically significant. These slightly stronger negative effects may reflect Carnival's higher exposure to variable-rate debt (20% vs 17% of total debt after the swap effect in 2023, for Carnival and RCG, respectively) or less effective hedging practises (Carnival Corporation 2024, 63). As for exchange rate risk, Carnival seems to hedge against it more actively than RCG; at the very least the firm is clearer on what main foreign currencies it is exposed to and how it deals with them, which may explain why its exchange rate proxy has a higher, though statistically insignificant, coefficient compared to RCG (Carnival Corporation 2024, 62; Royal Caribbean Cruises Ltd. 2024a, 130) (for Carnival's regression see Appendix 5).

The contrasting approaches to exchange rate risk and fuel price risk management between RCG and Carnival align with findings in the existing literature. Mello and Ruckes (2005) suggest that firms in competitive markets make hedging decisions strategically, often influenced by the actions of their competitors. Adam, Dasgupta, and Titman (2007) further propose that firms may forgo hedging if they see strategic advantages in maintaining cash flow flexibility. Carnival's greater sensitivity to fuel prices and exchange rates may reflect a strategic decision to prioritise operational flexibility, while RCG's hedging practises emphasise stability and risk mitigation.

Ultimately, the analysis underscores the importance of robust risk management practises in the cruise industry, where exposure to macroeconomic factors, interest rates, and fuel prices can significantly influence stock returns. RCG's approach to hedging appears to mitigate key risks effectively, while Carnival's strategy leaves it more vulnerable to market volatility, potentially impacting its long-term financial performance and valuation. These differences provide a nuanced understanding of how risk management decisions shape firm-specific outcomes in the same industry.

As for the annual regressions included in appendices 6 to 8, they differ from the daily regressions in several ways. Aside from the data periodicity, these annual regressions do not account for a market control variable, such as MSCI World, which was intentionally omitted to isolate the effects of interest rates, fuel prices, and exchange rates on revenue growth, annual EBITDA margin, and net income growth. Despite the statistical insignificance of many variables in these regressions, the signs of the coefficients remain intuitive. For instance, the negative coefficient for USO in the revenue growth model reflects the expected impact of rising fuel prices on operational costs and profitability. The R-squared values differ across the regressions, with the revenue growth model having the highest explanatory power ($R^2 = 0.80$), while EBITDA margin and net income growth have lower values (0.27 and 0.51, respectively). This indicates that revenue growth is more directly

tied to the variables tested, while profitability is influenced by additional factors not included in the model.

A surprising factor is the negative coefficient for SHY in the revenue growth regression, which suggests that as interest rates fall (reflected by a rise in SHY ETF), RCG's revenue growth decreases, which is counterintuitive. Typically, lower interest rates should stimulate demand, but this negative relationship may indicate that lower rates signal economic weakness, reducing consumer confidence. Additionally, because we did not include a market control variable in the regression, the proxy for interest rates is likely absorbing the market influence effects as well, not just shocks to interest rates. This could explain the unexpected negative impact of lower interest rates on revenue growth.

As for our quarterly regression (Appendix 9), to explain changes in net income we used the true changes in prices for Heavy Fuel Oil (HFO), LIBOR/SOFR as benchmark interest rates, and EUR/USD exchange rates. However, the explanatory power of these variables was low, with an R-squared value of 0.04, and the coefficients were statistically insignificant. This may be attributable to a combination of factors, including the still relatively small sample size (50 observations), potential model specification issues, omitted variables or multicollinearity, or inherent data limitations. Additionally, unaccounted-for seasonality or time-dependent effects in the quarterly data could conceal relationships. In light of these difficulties, we determine that the model is not appropriate for making trustworthy conclusions.

We have concluded the evaluation of results from the market valuation model and will now transition to examining the financial impact model for each risk to assess whether the conclusions drawn here are reflected in the actual financial impacts of RCG's hedging practises.

3.2. Exchange Rate Risk

Exchange rate risk, also known as forex risk, emerges when there is a need to convert currency-denominated values from one currency to the other, thus exposing such values to foreign exchange rates. For a company based in the U.S. like RCG, it implies that as the U.S. dollar appreciates, the effective value collected in other currencies decreases, which is undesirable. Conversely, it reduces expenditures denominated in foreign currencies, which can be beneficial.

RCG's exchange rate risk has four facets: foreign currency-denominated loans, international operations, foreign investments, and the remeasurement of assets and liabilities.

According to RCG's annual reports, its primary source of concern is Euro-denominated loans intended for shipbuilding, for which it uses forward contracts as a hedge against volatility. As of December 2023, RCG had $8 billion in ship orders, with 43.5% exposed to foreign currency risk, which was partially hedged using forward contracts. According to RCG, international business operations don't pose a serious threat in terms of exchange rate risk since, not only overtime, the many currencies in which its transactions are denominated have variations that offset each other, as the income in each currency is used to cover that same currency expenses, thus a natural hedging. We are confident that this strategy works; however, due to a lack of data, we cannot confirm so.

The foreign investments of RCG consist of investments in subsidiaries and in operations abroad. To control for this, the RCG strategy passes by denominating part of their debt in the given currencies, reducing their forex risk. Finally, for remeasurements, RCG enters derivative contracts to control the volatility that arises when translating the net values of assets and liabilities from its foreign subsidiaries. These hedging strategies typically involve forward contracts, sometimes backed up by cross-currency swaps and collar options, to manage exchange rate fluctuations.

Due to limitations in available data, we decided not to focus on the exchange rate risk, as conclusions would be heavily, if not solely, influenced by assumptions. However, we believe that

since the main exposure comes from vessel loans, RCG's interest rate hedging strategies naturally align with its exchange rate risk management. After all, the interest rate parity theory states that the difference in interest rates between two countries ($i_d \; and \; i_f$) is equal to the expected change in their exchange rates over time, ensuring that there is no arbitrage opportunity in the foreign exchange markets.

$$F = S \cdot \left(\frac{1 + i_d}{1 + i_f} \right) \tag{1}$$

where F is the forward exchange rate (domestic currency per foreign currency) and S is the spot exchange rate (domestic currency per foreign currency) (Madura and Fox 2007, 266).

In practical terms for RCG, if U.S. interest rates (i_d) rise relative to euro interest rates (i_f), the USD would likely appreciate against the EUR, making euro-denominated debt cheaper when converted to USD. In managing interest rate risks (through swaps), RCG also indirectly manages its exposure to these exchange rate movements.

3.3. Interest Rate Risk

This section is divided into two parts, based on how interest rates impact RCG. First, we examine RCG's current risk management practises, which effectively reduce volatility in interest expenses but are less successful as cash flow hedges. Notably, RCG's swap agreements show a countercyclical pattern: when revenues are low, interest expenses remain high, and when revenues are strong, interest expenses are low. Second, we assess how interest rates influence demand. While higher interest rates traditionally reduce consumer spending, RCG's high-income customer base appears less affected. Historical data suggests demand for RCG's luxury cruises often increases even when interest rates rise, as its customers are not typically burdened by debt in the same way as more price-sensitive consumers. Based on this, we later explore the possibility of involving call options, which cap interest rates at a manageable level while allowing RCG to benefit from market rate declines, or of tweaking the current swap agreements.

3.3.1. Interest rate and its effect on debt

Following the 2008 financial crisis, central banks implemented low-interest rate policies to stimulate the economy. While it made borrowing cheaper and offered investment opportunities, it also reduced returns on bank deposits. In 2016, as the economy recovered, the Federal Reserve began raising rates to prevent excessive inflation, setting a trend for other central banks. During the pandemic, rates dropped to near-zero levels but quickly rose again due to inflationary pressures, supply chain disruptions, and political tensions. Currently, U.S. benchmark interest rates are expected to stabilise around 3–4% by 2025 (Neufeld 2023; Moore 2024).

With this unstable backdrop, it is no surprise that, according to Banerjee et al. (2023), half of nonfinancial firms in the euro area, U.K., and U.S. with variable-rate debt use hedging to manage interest rate exposure. These firms, typically larger with lower cash reserves, use hedging to protect their interest coverage ratios and market valuations. For the cruise industry, interest rates are critical

as they directly impact financing for new ships and fleet maintenance. Cruise ships are among the most expensive vessels, costing up to $1.3 billion with returns spread over 25 to 30 years (Kizielewicz 2017). Due to the high costs and long return periods, cruise companies rely on equity, loans, public offerings, and special-purpose vehicles to finance these projects (Stopford 2008). However, the industry's high-risk perception leads to less favourable loan terms (Ivey 2023), and despite these challenges, loans remain a key financing tool, supported by private funding, IPOs, and government assistance. Specifically, RCG manages liquidity by using revolving credit facilities, term loans, and senior notes, all of which are heavily influenced by interest rate changes. To understand to which extent, we need to deep dive into the company's debt profile over the last few years, which is made up of different types of debt according to their maturity, their creditor and, most importantly for this work, whether they have a variable (floating) or fixed interest rate. The top three most used debt instruments for RCG in 2023, were unsecured senior notes (with fixed-rate interest), followed by unsecured term loans (also fixed-rate interest) and USD unsecured term loans (with variable-rate debt). In terms of its debt structure, without swap agreements in place, 75.6% of total debt involved fixed-rate interest payments at the end of 2023, while at the end of 2021, this proportion was much lower at around 57.7%, according to the 10-K SEC filings for each year. In 2023, RCG used interest rate swap agreements solely to convert a portion of floating-rate debt to fixed-rate debt, achieving approximately 83.2% fixed-rate debt. In contrast, at the end of 2021, the company managed its market risk by converting both fixed-rate debt to variable debt and variable debt to fixed debt, resulting in 65.7% of debt being fixed after the swap effect.

Understanding the terms of RCG's contracts is essential for evaluating its exposure to interest rate risk. For variable-rate debt, interest payments are calculated at repayment based on a benchmark rate (e.g., LIBOR/SOFR for USD, EURIBOR for EUR) plus a margin accounting for risk and costs, creating a floating rate (Tamplin 2023). Fixed-rate debt, by contrast, has predetermined interest

rates set for the entire contract duration. Companies can modify their rate exposure through interest rate swaps; these contracts allow firms to exchange interest payments on a specified notional amount for a set period, effectively altering their initial rate structure. In swaps, the notional amount is only a reference, with payments netted based on rate differences. Fixed-rate holders benefit when floating rates exceed the fixed rate, while floating-rate payers' profit when rates fall (Tamplin 2023). The choice between fixed and floating rates might depend on rate forecasts. If rates are expected to rise, firms typically swap floating-rate loans for fixed rates to lock in lower costs. For effective hedging, swaps must match the loan's payment schedule, maturity, and principal. When firms have a view on the future interest rate environment, that also plays a role in the decision process; specifically floating-rate loans, with lower upfront costs, are preferred by firms with short-term plans or variable cash flows, offering flexibility to manage liquidity (Derivative Logic 2016; Columbia Threadneedle Investments 2019). For the specific case of RCG, since June 2022 there has been an abrupt rise in interest rates, which has meant that the primary goal of firms' swap agreements has been to convert a portion of their floating-rate debt to a fixed-rate basis, which would help manage the risk of increasing interest rates (Royal Caribbean Cruises Ltd. 2023, 129; European Central Bank 2024b). We have access to the evolution of these agreements since 2012 and studied them based on the swaps designated as cash flow hedges. Their effectiveness has been assessed by RCG on an ongoing basis by evaluating how successful they are in offsetting changes in the fair value or cash flows of interest expenses. On average for the 12 years, the swap notional covered 92,41% of outstanding principal for loans hedge, which is quite a high hedge ratio.

Based on this setup, our analysis will focus on two main types of debt that use two different kinds of hedging: the corporate bonds RCG issues (senior unsecured notes) and the term loans RCG takes on, to finance the building of new ships. The clearest tool being used to hedge interest exposure is the swaps done on both the term loans and the unsecured senior notes. As of the end of 2023, RCG

chooses to hedge only the term loans tied to the financing of new ships, with the total notional amount in interest rate swaps being $1.6 billion. Between May 2013 and November 2023, RCG also used swap agreements on the unsecured senior notes outstanding during this period, however with a much smaller notional of $650 million (Royal Caribbean Cruises Ltd. 2022, 126-130). In order to have a well-rounded analysis of the hedging done in the last 12 years, we are mostly studying the impact of the cash flow hedge on the financials of the firm such as interest expenses/income and consequentially net income. Still, we calculated the volatility of interest expenses from 2012 to 2023, leveraging a structured approach to loan payments detailed later in this section. The volatility of global interest expenses was measured at 32.8%, reflecting relatively stable costs over the period. For items specifically being hedged, the volatility increased to 72.7%, indicating higher fluctuations for items that are proactively chosen to be hedged; remarkably, without these hedging measures, the volatility increased by 11.2%. However, as we mentioned these results are not surprising since RCG's interest rate swap agreements, active in this period mostly turn variable-rate debt into fixed-rate debt.

We examine three specific swap agreements that RCG has managed from April 2012 to May 2024, focusing on two term loans for the Quantum and Odyssey of the Seas, and the unsecured senior notes. These agreements, chosen for their unique traits, showcase RCG's diverse interest rate management strategies and reflect its broader financial management techniques. Our analysis, detailed further in appendices 14 and 15, uses swap rates derived from LIBOR, SOFR, and EURIBOR, adjusted for certain assumptions due to data gaps. This includes assuming interest payments align with the last day of each month, and that swap rates match the original loan rates, underpinning the intent to use these swaps as targeted hedges.

We analyse the effectiveness of these swaps in terms of cash flow hedges, noting that while they are generally successful in buffering against rate increases (volatility reduction), their efficacy can

vary with timing and market conditions. For a complete list of assumptions and a more comprehensive analysis of all swap activities, please see Appendix 4.

Starting with the unsecured senior notes, RCG utilised swaps to transition from fixed to floating rates, a strategy well-suited to a low-interest rate environment, which was the case when the contract started. This agreement, which covered the entire $650 million of unsecured senior notes issued in November 2012, was distinctive, as it was the only contract implemented to hedge bonds during the period studied. The notes, carrying a coupon rate of 5.25% and maturing in November 2022, were fully matched by the swap notional, maintaining a consistent principal amount throughout the contract's duration. Interest payments on these bonds were fixed at semi-annual intervals at 2.63%, while the swap exchanged these for a floating rate derived from the 6M LIBOR plus an annual margin. This setup yielded initial savings, for instance, the first coupon payment in May 2013 involved a floating rate payment of 2.02%—lower than the fixed rate, thus saving RCG 0.61% of the swap notional. Over the first nine coupon payments, this trend continued, saving RCG $26.5 million in interest payments. However, the strategy proved less effective from November 2017 through 2019, with RCG facing a cumulative excess in interest payments of 1.61% over the fixed coupon rate due to rising benchmark interest rates. The easing of monetary policies during the pandemic briefly reversed this trend (Goldman 2020), providing savings until May 2022. Yet, with the sharp increase in interest rates thereafter, the last year of coupon payments resulted in a loss, with floating rates exceeding fixed rates by 2.25%. Overall, RCG's strategic use of swaps reflects an attempt to leverage favourable market rates, although the unexpected rise in interest rates post-2022 posed challenges. Despite this, the total swap cash flow from this agreement resulted in net savings of $18.8 million, winning the bet 65% of the time.

Turning to the term loans converted from floating to fixed interest rates, the dynamics differ from the unsecured senior notes. RCG benefits from the swap when the market floating rate exceeds the

fixed rate, as well as, unlike the static principal in the previous example, as loan repayments are done the swap notional decreases. We structured the loan payments across the seven term loans to establish swap cash flows, assuming equal principal repayments as the loan amortisation method. For example, the Quantum of the Seas term loan, initiated in October 2014 with a $791.1 million principal, involves semi-annual repayments of $33 million. Initially tied to LIBOR and transitioning to Term SOFR in 2023, the loan features a variable rate plus a yearly margin of 1.3%. The all-in swap rate was fixed at 3.74% until 2022 and adjusted to 3.78% thereafter. Notably, the swap covers 92.91% of the principal, increasing to 93.04% by October 2023 to secure $184 million of the remaining $197.8 million principal. This strategy contrasts with the previous approach, reflecting RCG's preference for safeguarding against significant interest rate increases on larger loans, the focus is on managing within the budgeted interest expenses rather than optimising costs through periods of gains and losses. By April 2024, despite earlier excess payments totalling $32.4 million, projections indicate potential savings of $3.96 million over the next five semesters until maturity of the loan (November 2026) due to favourable forward SOFR rates.

Similarly, the Odyssey of the Seas term loan, initiated in 2021, showcases a gradual increase in both fixed and floating rates through 2024, aimed at hedging against anticipated rate hikes. This loan, notable for financing a mega-ship, is paired with two distinct swap agreements initiated in March 2021 and 2022, each with its all-in swap fixed rates and notional amounts of $345 million and $173 million, respectively. Over the observed period (3 years), the swaps rates generally remained above the fixed rates, and still, the impact of rising rates was neutralised. Initially, the swaps mirrored the challenging economic conditions of the pandemic with a negative cash flow of -$15.6 million in 2020. However, by March 2024, this turned positive to $23.5 million, reflecting an economic recovery and the swaps' effectiveness in risk management. The second Odyssey swap showed quicker recovery, with cash flow turning positive to $2.8 million by March 2024. Given

that this is RCG's most recent loan, its future swap cash flows are highly susceptible to the evolving economic landscape. With fixed swap rates currently below the forecasted average 6M SOFR of 3.6% (Blue Gamma 2024), the loan is positioned favourably under present conditions.

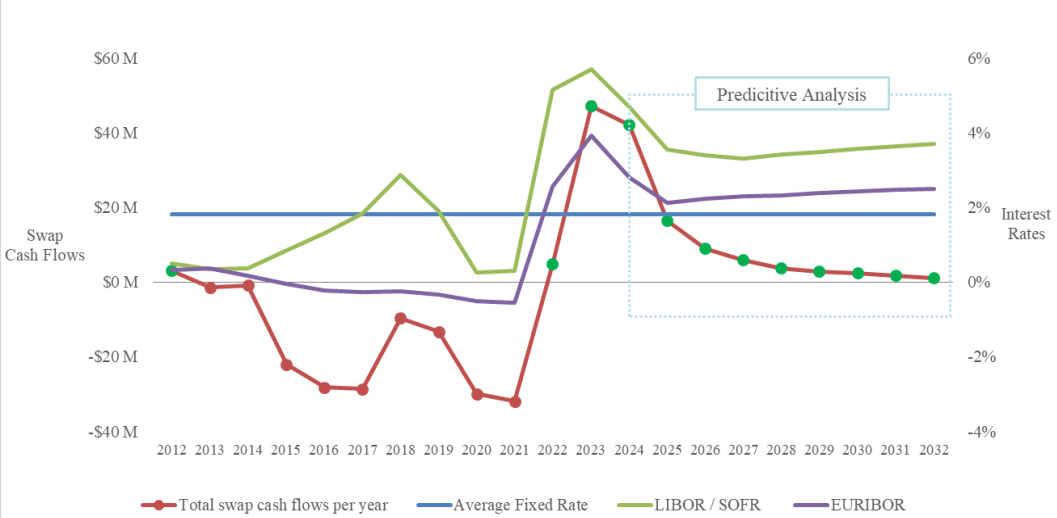

Figure 2 - Comparison of swap cash flows to fixed and variable interest rates

Overall, the firm paid interest above the swap floating rate 46% of the time, a number that is bound to change starting from 2024, as the annual swap cash flows are expected to remain consistently positive (Figure 2). This positive trend is supported by the fact that the majority of RCG's swap agreements have locked in an average semi-annual interest rate of 1.81%, which is significantly lower than the benchmark variable rates. This strategic fixing of rates has effectively insulated RCG from the higher variable rates that SOFR, and EURIBOR suggest over the forthcoming years. As we approach the latter part of the timeline, the swap cash flows gradually converge towards zero, due to the repayment of the underlying loans, which diminishes the outstanding principal amounts that the swaps cover. Obviously, for a more truthful projection of RCG's financial landscape up to 2032, it would be essential to consider any new loans the company might acquire, however, based on what is already available we can expect better years ahead for RCG, which means there might be margin for trying out a new strategy (Appendix 12).

Now that we have evaluated what has happened to the interest expenses of RCG with its swap agreements in place under actual market conditions, we stress test how well this strategy holds up under a 1 p.p. increase in the benchmark interest rate and by how much must this benchmark rate increase so that the company has a net income of zero (this analysis is done only considering the impact of interest rate rises on the debt that the firm hedges while disregarding the remaining debt). Furthermore, in our analysis, we have chosen to overlook the effect of the tax shield on net income due to the RCG tax structure, which involves numerous subsidiaries operating across multiple jurisdictions. This complexity makes it challenging to accurately quantify the impact of taxation on the company's financial results. However, it is important to recognise the general principle that companies benefit from a tax shield when using debt to finance their operations because the tax shield is essentially a reduction in taxable income due to deductible interest expenses.

Starting with the basis scenario, the case where we obtained RCG's net income without any swaps in place but with the underlying loan interest payments, by using the isolated effect of the swaps captured in the exercise above, which essentially translated into interest expenses being based on the actual loan rates for each period. For 2012, to the net income reported of $18.3 million, we subtracted the positive swap cashflow of $3.1 million and determined when interest rate swaps were in place. Which resulted in a lower net income of $15.3 million, so the firm was better off hedging the interest rate. Following the same logic for the next 11 years, we see that only 2012, 2022 and 2023 (Appendix 13) had better profitability with the swaps, specifically in 2023 the net income was $1.65 billion without swaps, versus 1.70 billion with the swaps. If we were to disregard the time value of money, in the 12 years being studied, the swap cash flows accounted for an added interest expense of $111.8 million; however, with the same underlying loans but without the swaps, the volatility of net income would be 2.16% higher than with the swaps in place. Hence, although the strategy lost cash, it was successful in decreasing volatility.

Another test done in order to evaluate the sensitivity of RCG's current swap agreements to rises in the benchmark interest rate was to calculate the effect that these swaps have on net income volatility with a 1 p.p. rise in LIBOR/SOFR. To the net income without the swap effect that was calculated for the basis scenario, we added the interest payments done with no swaps in place (based on the actual loans' interest rate, $0.13 B), which allowed us to arrive at the net income without interest rate swaps nor underlying loan interest payments, which in 2023 was $1.78 billion ($1.65 B + $0.13 B). To the net income without swap effect or interest payments, we subtracted the interest payments for when the interest rate benchmark (LIBOR/SOFR) increased by 1 p.p., arriving at the net income without interest rate swap but with underlying loan interest payments (when the interest rate was up by 1 p.p.), which in 2023 was at $1.59 billion ($1.78 B - $0.19 B). For this previous interest payment ($0.19 B), we calculated the new hypothetical interest rate by adding 1 p.p. to the real one, and then we recalculated the new swap floating rate resulting from the fixed and new floating interest rate, keeping in mind the zero floors of some swaps. From there, we recalculated the swap effect and finally added the effect to the net income without any interest swap agreements but with underlying loan interest payments (1 p.p. up) (Appendix 14). In fact, the swaps did reduce net income volatility over the last 10 years when interest rates rose by 1 p.p. each year. There was still an increase in volatility with the swaps in place, by 5.9% however without hedging the increase in volatility would have been 6.4%.

This begs the question: for what value of interest rate does the company go bankrupt? Using a worst-case scenario approach, similar to the previous sensitivity analysis, we utilized the solver tool in Excel, to determine the required change in interest rates that would reduce RCG's net income until zero for each year. This analysis assumes uniform annual shifts in exchange rates (a parallel movement in interest rates). The findings (Appendix 15) indicate that significant increases in interest rates necessary to zero out RCG's net income are generally unlikely, except for 2012, where

an increase of 5.36 p.p. would suffice. Notably, the required interest rate hikes are smaller when swaps are not in place; on average an increase of 60.23 p.p. would be enough to bring profitability down versus a necessary increase of 73.39 p.p. when the firm has swaps, meaning there´s protection that the swaps offer by fixing rates. The exception is 2013 and 2014, where the necessary rise is smaller when there are no swaps because this is the period where most swap agreements are converting fixed-rate debt into variable rate. As we advance in time, the outstanding principal of this debt is lower and hence has less impact on the net income (a caveat for 2020, 2021 and 2022, when net income was already negative and hence, we did not extend the analysis for).

3.3.2. Interest rate and its effect on demand

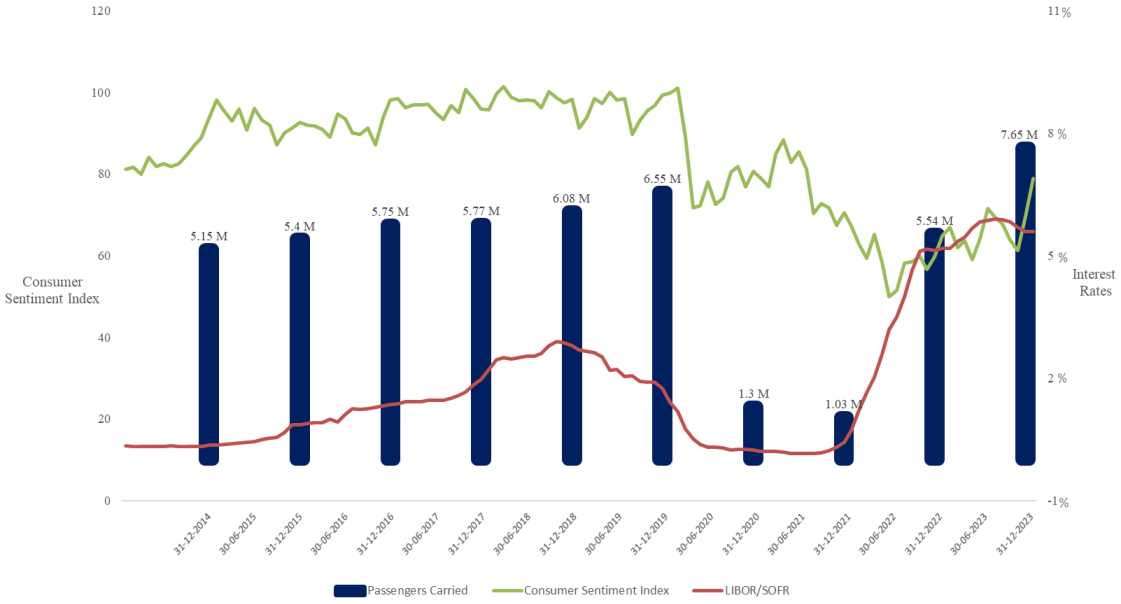

Figure 3 - RCG's passengers carried vs Interest Rate vs Consumer Sentiment Index

As was mentioned in the beginning, interest rate fluctuations can also have an impact on RCG's core business. A backwards analysis of the last 10 years of RCG's number of passengers carried against the benchmark interest rate (LIBOR/SOFR) and a consumer sentiment index (University of Michigan 2023) (Figure 3), allows us to see a pattern of higher interest rate periods with higher tickets being sold (from 2015 to 2018), accompanied with an increase in revenues (Appendix 16),

partly motivated by periods of high inflation, but still we can see the growth is mostly driven by higher ticket sales. This increase, while general consumer sentiment is slowing down, indicates that despite traditional theory suggesting that higher interest rates curb discretionary spending and hence demand in general, RCG's ticket sales actually increased during periods of interest rate spikes, specifically in 2022 and 2023 (here there could be some post-pandemic effect of families wanting to travel again when they can).

This counterintuitive trend can be explained by the unique characteristics of RCG's consumer base, which differs significantly from the general population, for whom the traditional theory was built upon and is most impacted by economic fluctuations. RCG caters to a more exclusive segment of the market, typically less affected by macroeconomic changes that would reduce disposable income for luxury expenditures. This is supported by industry insights from Bain & Company, which highlight the resilience of the luxury segment even amid economic pressures, emphasising the sustained spending on luxury experiences despite broader market turbulence (D'Arpizio et al. 2024). Further corroborating this observation, Statista (2024d) reports robust growth in the luxury travel sector, including a significant recovery in luxury cruise market value, suggesting that affluent consumers continue to prioritise these types of experiences. The resilience of luxury markets, particularly in travel and hospitality, indicates that RCG's core customer maintains their consumption patterns even during periods of rising interest rates. This scenario supports the notion that RCG's revenues could increase alongside interest rates, as their target consumers remain relatively insulated from the financial pressures affecting the average consumer.

This effect, where RCG's revenues and demand increase alongside rising interest rates, holds significant relevance for FRM since it underscores an opportunity for RCG to refine its approach to interest rate management by considering the broader impacts on its business, not just its debt obligations. Incorporating revenue trends into interest rate hedging decisions enables RCG to align

its financial strategies with operational realities. By doing so, RCG not only guards against the potential downsides of interest rate rises but also positions itself to capitalise on the accompanying increases in consumer spending within its market segment.

3.3.3. Recommendations

Our analysis of the impact of interest rate hedging on demand and company profits underscores that RCG primarily uses hedging as a volatility-minimising strategy rather than a profit-generating activity. This aligns with industry norms, where non-financial companies prioritise financial stability over speculative gains. Studies by Brown, Crabb, and Haushalter (2003) and Adam, Fernando, and Salas (2015) emphasise that while firms may adjust hedge ratios effectively, the economic benefits of selective hedging are minimal, often failing to significantly enhance financial performance compared to systematic approaches. RCG's strategy of fixing interest rates provides invaluable predictability, enabling the company to assess the financial impact of new loans and future debt obligations with certainty. This provision is critical for a capital-intensive company like RCG, as it helps with effective financial planning and negotiations for new loans. In our view, for a firm with substantial debt, the ability to forecast obligations with confidence outweighs the uncertain savings from market-driven fluctuations, which largely rely on speculation. Even if RCG wanted to take advantage of its market views, and hence choose other alternative instruments such as call options, they are still less suitable for the firm due to the significant upfront costs associated with purchasing options for each settlement period—typically 24 for an average term loan. If RCG wished to buy a call option for a new term loan in January, with a typical notional of $900 million, to cap interest rates at 4% in six months (which is still a high cap, but reasonable due to current market conditions), this call option would cost $7.1 million (assuming the Black-Scholes model, with input data from the 12th of December 2024, with an annual volatility of SOFR at 0.6%, current SOFR at 4.62%, U.S. 6 months treasury bill yield of 4.17%, and a per contract price of $0.78), if

RCG wanted a higher protection, then a cap of 3% would cost $15.7 million ($1,75 per contract for 900 000 contracts) (Appendix 17). This is a cost that RCG would have to incur for every settlement period (every 6 months), so even though options would allow taking advantage of periods with lower interest rates, their premium is too high for RCG's usual debt size, and substantial hedge ratio, with the $7,1 million option premium, for just one settlement period, representing 11,6% of the average yearly interest payment, over the last 12 years. These limitations reaffirm the efficacy of RCG's reliance on swaps, which provide stability and simplify financial operations, at lower costs. The firm's commitment to managing the liquidity constraints it faces, and its strict debt covenants also stand against using options, or other financial derivatives that require an upfront payment for an uncertain, and possibly, minimal benefit. The certainty swaps provide is not only beneficial for managing debt but is also viewed favourably by credit rating agencies, firms with fixed-rate debt are more likely to receive credit rating upgrades, enhancing their financial profile (Saunders, 1999), which is another one of RCG's goals with its FRM strategy. Looking forward, while RCG's focus on swaps remains prudent, the company should reevaluate the indices used for its variable-rate loans. Transitioning from SOFR to EURIBOR could be a strategic move, particularly for euro-denominated debt, as it would align debt obligations with the currency of revenues reducing exchange rate volatility and hence enhance natural hedging effects. This shift could not only decrease financing costs but also adapt them to regional economic conditions, optimising risk management and strengthening financial resilience against economic fluctuations

4. Conclusion

The purpose of this thesis was to analyse and evaluate RCG's financial risk management strategies. Our work, based on the investigation of financial disclosures related to financial risk made by the firm, allowed us to verify the effectiveness of its strategies. While the current approach provides a good hedge against interest rate risk, there is room for improvement. The existing tactic provides an excellent result on the downsides of the risk; however, it is somewhat restrictive, blocking the company from reaching benefits on the upsides.

Our recommendations pass through the analysis of swap alternative hedging instruments available in the market, suggesting that for interest rate risk, an adaptation of the benchmark interest rate used in the current swap agreements could prove a step towards aligning EUR-denominated debt with macroeconomic trends.

The cruise industry remains a fascinating yet underexplored field, particularly when it comes to financial risk management. This thesis offers a fresh perspective, presenting innovative research that can serve as a blueprint for other companies within the sector to refine their own approaches. Beyond the cruise industry, the insights gained here have broader implications. The techniques and strategies employed by an industry leader like RCG could resonate with other sectors facing similar financial challenges, such as maritime shipping or aviation. These industries share parallels in capital intensity, exposure to market volatility, and the need for robust risk management frameworks.

With the right financial risk management, companies can confidently navigate the turbulent waters of an ever-changing world.

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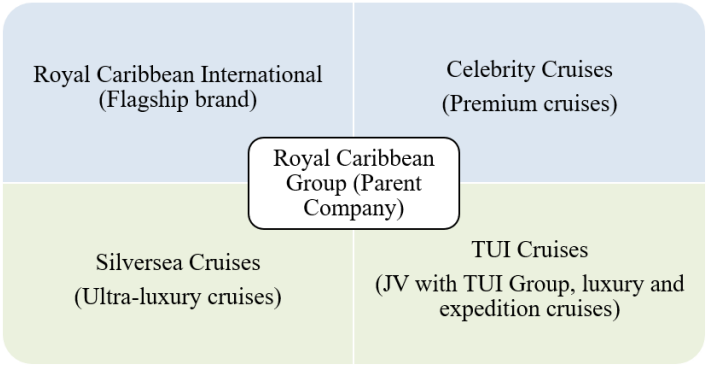
6. Appendix



Appendix 1 - RCG's structure

Semi Annual									
Start Date	21-10-2024	31-12-2024	30-06-2025	31-12-2025	30-06-2026	31-12-2026	30-06-2027	31-12-2027	30-06-2028
End Date	31-12-2024	30-06-2025	31-12-2025	30-06-2026	31-12-2026	30-06-2027	31-12-2027	30-06-2028	31-12-2028
Rates	4.68%	4.12%	3.54%	3.34%	3.39%	3.35%	3.32%	3.38%	3.42%
Semi Annual									
Start Date	31-12-2028	30-06-2029	31-12-2029	30-06-2030	31-12-2030	30-06-2031	31-12-2031	30-06-2032	31-12-2032
End Date	30-06-2029	31-12-2029	30-06-2030	31-12-2030	30-06-2031	31-12-2031	30-06-2032	31-12-2032	30-06-2033
Rates	3.44%	3.49%	3.54%	3.57%	3.60%	3.63%	3.67%	3.71%	3.74%

Appendix 2 - SOFR Forward Rates

EURIBOR										
Date	05/12/2024	05/06/2025	05/12/2025	05/06/2026	07/12/2026	07/06/2027	06/12/2027	05/06/2028	05/12/2028	05/06/2029
6- Month	2.80%	2.22%	2.13%	2.15%	2.23%	2.28%	2.29%	2.31%	2.33%	2.35%

Appendix 3 - EURIBOR Forward Rates

General	We used historical growth rates from 2013 to 2023
	Assume that projections of forward rates (SOFR, EURIBOR) and fuel prices will hold for modelling hedging impacts
	Assume the cruise industry will continue its recovery post-COVID-19, with increasing demand and revenue growth aligned with global projections
	In regressions dates without data for one of the variables were not used (data cleaning)
Interest Rate	Given that we do not know the exact date for each swap agreement, we used the closest rate for the end of the given month (except for Odyssey of the Seas where we had access to its credit agreement)
	Assume no significant changes to RCG's debt structure outside what is analysed (e.g., principal repayment schedules and interest rate hedging)
	Zero-floor rates for the Harmony of the Seas and Odyssey of the Seas loans and respective swaps (for all the analyses performed)
	To build the loan payment structure we used the equal payment method for principal repayment
	For Odyssey of the Seas we assume swap dates were renegociated to match the deferral of the term loan
	Since only swap rates are disclosed by RCG we assume that loan rates match these
	Assume that within one year the % of remaining principal covered by the swap does not change
	For prediction we calculated % covered by swaps with the historical growth rate of the % covered in that swap
	In sensitivity and worst-case scenarios the increases/decreases in rates are equal within the same year
	In sensitivity and worst-case scenarios the effect on remaining debt and tax shield effect are not taken into account

Appendix 4 - Assumptions Table

Regression Statistics	
Multiple R	0.56250893
R Square	0.316416297
Adjusted R Square	0.315040323
Standard Error	0.028770808
Observations	2490

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-0.000178965	0.000577974	-0.309641511	0.75685956	-0.001312325	0.000954396
USO	-0.072658208	0.024452579	-2.971392389	0.00299298	-0.120607746	-0.024708669
UUP	0.051033851	0.122987512	0.414951483	0.67821326	-0.190134756	0.292202457
MSCI World	2.089406561	0.064881095	32.20362679	1.893E-190	1.962179959	2.216633162
US6M	-0.018797467	0.006459328	-2.910127337	0.00364495	-0.031463688	-0.006131245
Germany Yield	-0.009954673	0.002806578	-3.546907649	0.000397	-0.015458146	-0.0044512

Appendix 5 - Carnival's market valuation model

Regression Statistics	
Multiple R	0.895649315
R Square	0.802187696
Adjusted R Square	0.683500314
Standard Error	0.923992878
Observations	9

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.251322831	0.316966516	0.7929	0.463781	-0.5634655	1.0661112
USO	-0.411347887	0.915572222	-0.44928	0.672035	-2.7649012	1.94220543
SHY	-75.86795126	18.61547449	-4.075531	0.009582	-123.72055	-28.015351
FXE	0.633346756	4.498911373	0.140778	0.893541	-10.931473	12.1981666

Appendix 6 - Revenue Growth regression

Regression Statistics	
Multiple R	0.52104381
R Square	0.27148666
Adjusted R Square	-0.1656214
Standard Error	2.34410599
Observations	9

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-0.4161338	0.804122116	-0.5175	0.626879	-2.4831955	1.6509279
USO	2.74896754	2.322743365	1.1835	0.289808	-3.2218344	8.7197694
SHY	17.3668702	47.2261705	0.367738	0.728122	-104.03187	138.76561
FXE	-4.5427751	11.41342681	-0.39802	0.707041	-33.881923	24.796373

Appendix 7 - EBITDA margin regression

Regression Statistics	
Multiple R	0.713951348
R Square	0.509726528
Adjusted R Square	0.215562444
Standard Error	0.164049079
Observations	9

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.251605457	0.056275396	40.010477	1.83879E-07	2.10694495	2.39626597
USO	0.224533445	0.162554045	1.3812849	0.22573162	-0.193325	0.64239192
SHY	-1.695114176	3.305059509	-0.512885	0.629879935	-10.19104	6.80081176
FXE	-0.527912204	0.7987532	-0.66092	0.537895497	-2.5811727	1.52534826

Appendix 8 - Net Income regression

Regression Statistics	
Multiple R	0.204060885
R Square	0.041640845
Adjusted R Square	-0.02086084
Standard Error	0.373870155
Observations	50

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	3.031392813	0.054322127	55.804016	6.6313E-44	2.92204804	3.14073758
HFO	0.182893944	0.370597461	0.4935111	0.62399963	-0.5630801	0.92886794
Interest Rate	-0.07904388	0.095025174	-0.83182	0.40980782	-0.2703196	0.11223188
Exchage Rate	-1.74298309	1.386311818	-1.257281	0.21499813	-4.533484	1.04751787

Appendix 9 - Quarterly regression

Oasis of the Seas term loan (fixed to floating)	*2012 April*	*2012 October*	*2013 April*	*2013 October*	*2014 April*	*2014 October*	*2015 April*	*2015 October*	*2016 April*	*2016 October*	*2017 April*	*2017 October*	*2018 April*	*2018 October*	*2019 April*	*2019 October*	*2020 April*	*2020 October*	*2021 April*	*2021 October*	*2022 April*	*2022 October*	*2023 April*	*2023 October*	*2024 April*	*2024 October*
Fixed rate	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%	2.71%						
LIBOR/SOFR	0.74%	0.53%	0.41%	0.35%	0.32%	0.33%	0.43%	0.66%	0.99%	1.29%	1.42%	1.67%	2.47%	2.90%	2.52%	1.90%	0.51%	0.25%	0.19%	0.23%						
Swap floating result rate	2.31%	2.20%	2.14%	2.11%	2.10%	2.10%	2.15%	2.27%	2.43%	2.58%	2.65%	2.77%	3.17%	3.39%	3.20%	2.89%	2.19%	2.06%	2.03%	2.05%						
Difference	0.40%	0.51%	0.57%	0.60%	0.61%	0.61%	0.56%	0.44%	0.28%	0.13%	0.06%	-0.06%	-0.47%	-0.68%	-0.49%	-0.18%	0.52%	0.64%	0.68%	0.65%						
Number of times company lost	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0						

Unsecured senior notes (fixed to floating)	*2012 May*	*2012 November*	*2013 May*	*2013 November*	*2014 May*	*2014 November*	*2015 May*	*2015 November*	*2016 May*	*2016 November*	*2017 May*	*2017 November*	*2018 May*	*2018 November*	*2019 May*	*2019 November*	*2020 May*	*2020 November*	*2021 May*	*2021 November*	*2022 May*	*2022 November*	2023 May	2023 November	2024 May	2024 November
Fixed rate			2.63%	2.63%	2.63%	2.63%	2.63%	2.63%	2.63%	2.63%	2.63%	2.63%	2.63%	2.63%	2.63%	2.63%	2.63%	2.63%	2.63%	2.63%	2.63%	2.63%				
LIBOR/SOFR			0.41%	0.35%	0.33%	0.36%	0.45%	0.85%	0.92%	1.32%	1.45%	1.84%	2.50%	2.87%	2.20%	1.91%	0.37%	0.26%	0.16%	0.31%	2.59%	5.16%				
Swap floating result rate			2.02%	1.99%	1.98%	2.00%	2.04%	2.24%	2.28%	2.48%	2.54%	2.74%	3.07%	3.25%	2.92%	2.77%	2.00%	1.94%	1.89%	1.97%	3.11%	4.40%				
Difference			0.61%	0.64%	0.65%	0.63%	0.59%	0.39%	0.35%	0.15%	0.09%	-0.11%	-0.44%	-0.63%	-0.29%	-0.15%	0.63%	0.68%	0.73%	0.66%	-0.48%	-1.77%				
Number of times company lost			0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	1	1				

Celebrity Reflection term loan (floating to fixed)	*2012 April*	*2012 October*	*2013 April*	*2013 October*	*2014 April*	*2014 October*	*2015 April*	*2015 October*	*2016 April*	*2016 October*	*2017 April*	*2017 October*	*2018 April*	*2018 October*	*2019 April*	*2019 October*	*2020 April*	*2020 October*	*2021 April*	*2021 October*	*2022 April*	*2022 October*	*2023 April*	*2023 October*	*2024 April*	*2024 October*
Fixed rate			1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.43%	1.44%	1.44%	1.44%	1.44%
LIBOR/SOFR			0.41%	0.35%	0.32%	0.33%	0.43%	0.66%	0.99%	1.29%	1.42%	1.67%	2.47%	2.90%	2.52%	1.90%	0.51%	0.25%	0.19%	0.23%	2.02%	5.11%	4.62%	5.30%	5.39%	5.17%
Swap floating result rate			0.41%	0.38%	0.36%	0.37%	0.42%	0.53%	0.70%	0.85%	0.91%	1.04%	1.44%	1.65%	1.46%	1.15%	0.46%	0.33%	0.29%	0.32%	1.21%	2.75%	2.51%	2.85%	2.89%	2.79%
Difference			-1.02%	-1.05%	-1.07%	-1.06%	-1.01%	-0.90%	-0.73%	-0.58%	-0.52%	-0.39%	0.01%	0.23%	0.04%	-0.28%	-0.97%	-1.10%	-1.13%	-1.11%	-0.22%	1.33%	1.07%	1.41%	1.45%	1.35%
Number of times company lost			1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	0	0	0	0	0

Quantum of the Seas term loan (floating to fixed)	*2012 April*	*2012 October*	*2013 April*	*2013 October*	*2014 April*	*2014 October*	*2015 April*	*2015 October*	*2016 April*	*2016 October*	*2017 April*	*2017 October*	*2018 April*	*2018 October*	*2019 April*	*2019 October*	*2020 April*	*2020 October*	*2021 April*	*2021 October*	*2022 April*	*2022 October*	*2023 April*	*2023 October*	*2024 April*	*2024 October*
Fixed rate							1.87%	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%	1.89%	1.89%	1.89%	1.89%
LIBOR/SOFR							0.43%	0.66%	0.99%	1.29%	1.42%	1.67%	2.47%	2.90%	2.52%	1.90%	0.51%	0.25%	0.19%	0.23%	2.02%	5.11%	4.62%	5.30%	5.39%	5.17%
Swap floating result rate							0.87%	0.98%	1.15%	1.30%	1.36%	1.49%	1.89%	2.10%	1.91%	1.60%	0.91%	0.78%	0.74%	0.77%	1.66%	3.20%	2.96%	3.30%	3.34%	3.24%
Difference							-1.01%	-0.89%	-0.73%	-0.58%	-0.51%	-0.39%	0.02%	0.23%	0.04%	-0.27%	-0.97%	-1.09%	-1.13%	-1.10%	-0.21%	1.33%	1.07%	1.41%	1.45%	1.35%
Number of times company lost							1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	0	0	0	0	0

Anthem of the Seas term loan (floating to fixed)	*2012 April*	*2012 October*	*2013 April*	*2013 October*	*2014 April*	*2014 October*	*2015 April*	*2015 October*	*2016 April*	*2016 October*	*2017 April*	*2017 October*	*2018 April*	*2018 October*	*2019 April*	*2019 October*	*2020 April*	*2020 October*	*2021 April*	*2021 October*	*2022 April*	*2022 October*	*2023 April*	*2023 October*	*2024 April*	*2024 October*
Fixed rate								1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.95%	1.95%	1.95%	1.95%
LIBOR/SOFR								0.66%	0.99%	1.29%	1.42%	1.67%	2.47%	2.90%	2.52%	1.90%	0.51%	0.25%	0.19%	0.23%	2.02%	5.11%	4.62%	5.30%	5.39%	5.17%
Swap floating result rate								0.98%	1.15%	1.30%	1.36%	1.49%	1.89%	2.10%	1.91%	1.60%	0.91%	0.78%	0.74%	0.77%	1.66%	3.20%	2.96%	3.30%	3.34%	3.24%
Difference								-0.95%	-0.79%	-0.64%	-0.57%	-0.45%	-0.04%	0.17%	-0.02%	-0.33%	-1.03%	-1.15%	-1.19%	-1.16%	-0.27%	1.27%	1.01%	1.35%	1.39%	1.29%
Number of times company lost								1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	0	0	0

Ovation of the Seas term loan (floating to fixed)	*2012 April*	*2012 October*	*2013 April*	*2013 October*	*2014 April*	*2014 October*	*2015 April*	*2015 October*	*2016 April*	*2016 October*	*2017 April*	*2017 October*	*2018 April*	*2018 October*	*2019 April*	*2019 October*	*2020 April*	*2020 October*	*2021 April*	*2021 October*	*2022 April*	*2022 October*	*2023 April*	*2023 October*	*2024 April*	*2024 October*
Fixed rate										1.58%	1.58%	1.58%	1.58%	1.58%	1.58%	1.58%	1.58%	1.58%	1.58%	1.58%	1.58%	1.58%	1.60%	1.60%	1.60%	1.60%
LIBOR/SOFR										1.29%	1.42%	1.67%	2.47%	2.90%	2.52%	1.90%	0.51%	0.25%	0.19%	0.23%	2.02%	5.11%	4.62%	5.30%	5.39%	5.17%
Swap floating result rate										1.15%	1.21%	1.34%	1.74%	1.95%	1.76%	1.45%	0.76%	0.63%	0.59%	0.62%	1.51%	3.05%	2.81%	3.15%	3.19%	3.09%
Difference										-0.44%	-0.37%	-0.25%	0.16%	0.37%	0.18%	-0.13%	-0.83%	-0.95%	-0.99%	-0.96%	-0.07%	1.47%	1.21%	1.55%	1.59%	1.49%
Number of times company lost										1	1	1	0	0	0	1	1	1	1	1	1	0	0	0	0	0

Harmony of the Seas term loan (floating to fixed)	*2012 May*	2012 November	*2013 May*	2013 November	*2014 May*	2014 November	*2015 May*	2015 November	*2016 May*	2016 November	*2017 May*	2017 November	*2018 May*	2018 November	*2019 May*	2019 November	*2020 May*	2020 November	*2021 May*	2021 November	*2022 May*	2022 November	*2023 May*	2023 November	*2024 May*	2024 November
Fixed rate										1.13%	1.13%	1.13%	1.13%	1.13%	1.13%	1.13%	1.13%	1.13%	1.13%	1.13%	1.13%	1.13%	1.13%	1.13%	1.13%	
EURIBOR										0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.32%	3.37%	4.06%	3.79%	
Swap floating result rate										0.58%	0.58%	0.58%	0.58%	0.58%	0.58%	0.58%	0.58%	0.58%	0.58%	0.58%	0.58%	1.74%	2.26%	2.61%	2.47%	
Difference										-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	0.61%	1.13%	1.48%	1.34%	
Number of times company lost										1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	

Odyssey of the Seas term loan 1 (floating to fixed)	2012 March	2012 September	2013 March	2013 September	2014 March	2014 September	2015 March	2015 September	2016 March	2016 September	2017 March	2017 September	2018 March	2018 September	2019 March	2019 September	2020 March	2020 September	2021 March	2021 September	2022 March	2022 September	2023 March	2023 September	2024 March	2024 September
Fixed rate																				1.60%	1.61%	1.61%	1.64%	1.64%	1.64%	1.64%
LIBOR/SOFR																				0.17%	1.64%	4.64%	4.37%	5.26%	5.39%	5.28%
Swap floating result rate																				0.56%	1.30%	2.80%	2.67%	3.11%	3.18%	3.12%
Difference																				-1.04%	-0.31%	1.19%	1.03%	1.47%	1.54%	1.48%
Number of times company lost																				1	1	0	0	0	0	0

Odyssey of the Seas term loan 2 (floating to fixed)	2012 March	2012 September	2013 March	2013 September	2014 March	2014 September	2015 March	2015 September	2016 March	2016 September	2017 March	2017 September	2018 March	2018 September	2019 March	2019 September	2020 March	2020 September	2021 March	2021 September	2022 March	2022 September	2023 March	2023 September	2024 March	2024 September
Fixed rate																						1.42%	1.46%	1.46%	1.46%	1.46%
LIBOR/SOFR																						4.64%	4.37%	5.26%	5.39%	5.28%
Swap floating result rate																						2.80%	2.67%	3.11%	3.18%	3.12%
Difference																						1.38%	1.21%	1.65%	1.72%	1.67%
Number of times company lost																						0	0	0	0	0

Appendix 10 – Resulting Swap Interest Rates

Oasis of the Seas	2010 April	2010 October	2011 April	2011 October	2012 April	2012 October	2013 April	2013 October	2014 April	2014 October	2015 April	2015 October	2016 April	2016 October	2017 April	2017 October	2018 April	2018 October	2019 April	2019 October	2020 April	2020 October	2021 April	2021 October
Remaining Principal	$ 402,500	$ 385,000	$ 367,500	$ 350,000	$ 332,500	$ 315,000	$ 297,500	$ 280,000	$ 262,500	$ 245,000	$ 227,500	$ 210,000	$ 192,500	$ 175,000	$ 157,500	$ 140,000	$ 122,500	$ 105,000	$ 87,500	$ 70,000	$ 52,500	$ 35,000	$ 17,500	$ -
Difference					0.40%	0.51%	0.57%	0.60%	0.61%	0.61%	0.56%	0.44%	0.28%	0.13%	0.06%	-0.06%	-0.47%	-0.68%	-0.49%	-0.18%	0.52%	0.64%	0.68%	0.65%
Swap Cashflow					$ 1,400	$ 1,679	$ 1,780	$ 1,770	$ 1,708	$ 1,588	$ 1,360	$ 1,001	$ 578	$ 241	$ 105	$ (102)	$ (651)	$ (833)	$ (515)	$ (158)	$ 361	$ 339	$ 237	$ 115

Unsecured Senior Notes	2012 November	2013 May	2013 November	2014 May	2014 November	2015 May	2015 November	2016 May	2016 November	2017 May	2017 November	2018 May	2018 November	2019 May	2019 November	2020 May	2020 November	2021 May	2021 November	2022 May	2022 November
Remaining Principal	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ 650,000	$ -
Difference		0.61%	0.64%	0.65%	0.63%	0.59%	0.39%	0.35%	0.15%	0.09%	-0.11%	-0.44%	-0.63%	-0.29%	-0.15%	0.63%	0.68%	0.73%	0.66%	-0.48%	-1.77%
Swap Cashflow		$ 3,933	$ 4,128	$ 4,193	$ 4,095	$ 3,803	$ 2,503	$ 2,275	$ 975	$ 553	$ (715)	$ (2,860)	$ (4,063)	$ (1,885)	$ (943)	$ 4,063	$ 4,429	$ 4,746	$ 4,259	$ (3,138)	$ (11,508)

Celebrity Reflection	2012 October	2013 April	2013 October	2014 April	2014 October	2015 April	2015 October	2016 April	2016 October	2017 April	2017 October	2018 April	2018 October	2019 April	2019 October	2020 April	2020 October	2021 April	2021 October	2022 April	2022 October	2023 April	2023 October	2024 April
Remaining Principal	$ 673,500	$ 645,438	$ 617,375	$ 589,313	$ 561,250	$ 533,188	$ 505,125	$ 477,063	$ 449,000	$ 420,938	$ 392,875	$ 364,813	$ 336,750	$ 308,688	$ 280,625	$ 252,563	$ 224,500	$ 196,438	$ 168,375	$ 140,313	$ 112,250	$ 84,188	$ 56,125	$ 28,063
Swap notional at end of year	$ 627,200		$ 600,000		$ 545,400		$ 490,900		$ 436,333		$ 381,792		$ 327,250		$ 272,708		$ 218,167		$ 163,625		$ 109,083		$ 55,000	
% of Principal Covered by Swap	93.13%		97.19%		97.18%		97.18%		97.18%		97.18%		97.18%		97.18%		97.18%		97.18%		97.18%		98.00%	
Swap notional	$ 627,200	$ 627,273	$ 600,000	$ 572,670	$ 545,400	$ 518,172	$ 490,900	$ 463,604	$ 436,333	$ 409,063	$ 381,792	$ 354,521	$ 327,250	$ 299,979	$ 272,708	$ 245,438	$ 218,167	$ 190,896	$ 163,625	$ 136,354	$ 109,083	$ 82,500	$ 55,000	$ 27,630
Difference		-1.02%	-1.05%	-1.07%	-1.06%	-1.01%	-0.90%	-0.73%	-0.58%	-0.52%	-0.39%	0.01%	0.23%	0.04%	-0.28%	-0.97%	-1.10%	-1.13%	-1.11%	-0.22%	1.33%	1.07%	1.41%	1.45%
Swap Cashflow		$ (6,397)	$ (6,586)	$ (6,390)	$ (6,070)	$ (5,509)	$ (4,638)	$ (3,584)	$ (2,689)	$ (2,247)	$ (1,595)	$ 38	$ 798	$ 115	$ (825)	$ (2,645)	$ (2,700)	$ (2,468)	$ (2,119)	$ (355)	$ 1,811	$ 1,166	$ 1,164	$ 800

Quantum of the Seas	2014 October	2015 April	2015 October	2016 April	2016 October	2017 April	2017 October	2018 April	2018 October	2019 April	2019 October	2020 April	2020 October	2021 April	2021 October	2022 April	2022 October	2023 April	2023 October	2024 April
Remaining Principal	$ 791,100	$ 758,138	$ 725,175	$ 692,213	$ 659,250	$ 626,288	$ 593,325	$ 560,363	$ 527,400	$ 494,438	$ 461,475	$ 428,513	$ 395,550	$ 362,588	$ 329,625	$ 296,663	$ 263,700	$ 230,738	$ 197,775	$ 164,813
Swap notional at end of year	$ 735,000		$ 673,800		$ 612,500		$ 551,250		$ 490,000		$ 428,750		$ 367,500		$ 306,250		$ 245,000		$ 184,000	
% of Principal Covered by Swap	92.91%		92.92%		92.91%		92.91%		92.91%		92.91%		92.91%		92.91%		92.91%		93.04%	
Swap notional	$ 735,000	$ 704,427	$ 673,800	$ 643,125	$ 612,500	$ 581,875	$ 551,250	$ 520,625	$ 490,000	$ 459,375	$ 428,750	$ 398,125	$ 367,500	$ 336,875	$ 306,250	$ 275,625	$ 245,000	$ 214,667	$ 184,000	$ 153,357
Difference		-1.01%	-0.89%	-0.73%	-0.58%	-0.51%	-0.39%	0.02%	0.23%	0.04%	-0.27%	-0.97%	-1.09%	-1.13%	-1.10%	-0.21%	1.33%	1.07%	1.41%	1.45%
Swap Cashflow		$ (7,387)	$ (6,269)	$ (4,885)	$ (3,698)	$ (3,124)	$ (2,240)	$ 83	$ 1,197	$ 196	$ (1,240)	$ (4,137)	$ (4,359)	$ (4,140)	$ (3,722)	$ (650)	$ 3,675	$ 2,619	$ 3,028	$ 2,676

Anthem of the Seas	2015 April	2015 October	2016 April	2016 October	2017 April	2017 October	2018 April	2018 October	2019 April	2019 October	2020 April	2020 October	2021 April	2021 October	2022 April	2022 October	2023 April	2023 October	2024 April
Remaining Principal	$ 742,100	$ 711,179	$ 680,258	$ 649,338	$ 618,417	$ 587,496	$ 556,575	$ 525,654	$ 494,733	$ 463,813	$ 432,892	$ 401,971	$ 371,050	$ 340,129	$ 309,208	$ 278,288	$ 247,367	$ 216,446	$ 185,525
Swap notional at end of year		$ 694,800		$ 634,375		$ 573,958		$ 513,542		$ 453,125		$ 392,708		$ 332,292		$ 271,875		$ 211,000	
% of Principal Covered by Swap		97.70%		97.70%		97.70%		97.70%		97.70%		97.70%		97.70%		97.70%		97.48%	
Swap notional	$ 725,009	$ 694,800	$ 664,583	$ 634,375	$ 604,166	$ 573,958	$ 543,750	$ 513,542	$ 483,333	$ 453,125	$ 422,916	$ 392,708	$ 362,500	$ 332,292	$ 302,083	$ 271,875	$ 241,143	$ 211,000	$ 180,808
Difference		-0.95%	-0.79%	-0.64%	-0.57%	-0.45%	-0.04%	0.17%	-0.02%	-0.33%	-1.03%	-1.15%	-1.19%	-1.16%	-0.27%	1.27%	1.01%	1.35%	1.39%
Swap Cashflow		$ (6,888)	$ (5,454)	$ (4,220)	$ (3,616)	$ (2,689)	$ (258)	$ 924	$ (103)	$ (1,595)	$ (4,645)	$ (4,884)	$ (4,659)	$ (4,223)	$ (904)	$ 3,847	$ 2,744	$ 3,257	$ 2,942

Ovation of the Seas	2016 April	2016 October	2017 April	2017 October	2018 April	2018 October	2019 April	2019 October	2020 April	2020 October	2021 April	2021 October	2022 April	2022 October	2023 April	2023 October	2024 April
Remaining Principal	$ 841,800	$ 806,725	$ 771,650	$ 736,575	$ 701,500	$ 666,425	$ 631,350	$ 596,275	$ 561,200	$ 526,125	$ 491,050	$ 455,975	$ 420,900	$ 385,825	$ 350,750	$ 315,675	$ 280,600
Swap notional at end of year		$ 795,417		$ 726,250		$ 657,083		$ 587,917		$ 518,750		$ 449,583		$ 380,417		$ 311,000	
% of Principal Covered by Swap		98.60%		98.60%		98.60%		98.60%		98.60%		98.60%		98.60%		98.52%	
Swap notional	$ 830,000	$ 795,417	$ 760,833	$ 726,250	$ 691,666	$ 657,083	$ 622,500	$ 587,917	$ 553,333	$ 518,750	$ 484,166	$ 449,583	$ 415,000	$ 380,417	$ 345,556	$ 311,000	$ 276,413
Difference		-0.44%	-0.37%	-0.25%	0.16%	0.37%	0.18%	-0.13%	-0.83%	-0.95%	-0.99%	-0.96%	-0.07%	1.47%	1.21%	1.55%	1.59%
Swap Cashflow		$ (3,611)	$ (2,943)	$ (1,864)	$ 1,126	$ 2,559	$ 1,183	$ (809)	$ (4,850)	$ (5,284)	$ (5,117)	$ (4,671)	$ (324)	$ 6,115	$ 4,600	$ 5,358	$ 4,958

Harmony of the Seas	2016 May	2016 November	2017 May	2017 November	2018 May	2018 November	2019 May	2019 November	2020 May	2020 November	2021 May	2021 November	2022 May	2022 November	2023 May	2023 November	2024 May
Remaining Principal	$ 965,300	$ 925,079	$ 884,858	$ 844,638	$ 804,417	$ 764,196	$ 723,975	$ 683,754	$ 643,533	$ 603,313	$ 563,092	$ 522,871	$ 482,650	$ 442,429	$ 402,208	$ 361,988	$ 321,767
Swap notional at end of year		$ 701,056		$ 728,373		$ 627,660		$ 551,325		$ 530,191		$ 427,142		$ 338,990		$ 287,000	
% of Principal Covered by Swap		75.78%		86.23%		82.13%		80.63%		87.88%		81.69%		76.62%		79.28%	
Swap notional	$ 731,537	$ 701,056	$ 763,057	$ 728,373	$ 660,695	$ 627,660	$ 583,756	$ 551,325	$ 565,537	$ 530,191	$ 459,999	$ 427,142	$ 369,807	$ 338,990	$ 318,889	$ 287,000	$ 257,452
Difference		-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	-0.56%	0.61%	1.13%	1.48%	1.34%
Swap Cashflow		$ (4,060)	$ (3,891)	$ (4,235)	$ (4,042)	$ (3,667)	$ (3,484)	$ (3,240)	$ (3,060)	$ (3,139)	$ (2,943)	$ (2,553)	$ (2,371)	$ 2,240	$ 3,824	$ 4,711	$ 3,843

Odyssey of the Seas swap 1	2021 March	2021 September	2022 March	2022 September	2023 March	2023 September	2024 March
Remaining Principal	$ 994,100	$ 952,679	$ 911,258	$ 869,838	$ 828,417	$ 786,996	$ 745,575
Swap notional at end of year		$ 421,667		$ 383,333		$ 345,000	
% of Principal Covered by Swap		44.26%		44.07%		43.84%	
Swap notional	$ 440,000	$ 421,667	$ 401,587	$ 383,333	$ 363,158	$ 345,000	$ 325,274
Difference		-1.04%	-0.31%	1.19%	1.03%	1.47%	1.54%
Swap Cashflow		$ (4,583)	$ (1,290)	$ 4,797	$ 3,936	$ 5,332	$ 5,296

Odyssey of the Seas swap 2	2021 March	2021 September	2022 March	2022 September	2023 March	2023 September	2024 March
Remaining Principal	$ 994,100	$ 952,679	$ 911,258	$ 869,838	$ 828,417	$ 786,996	$ 745,575
Swap notional at end of year		$ 191,667		$ 191,667		$ 173,000	
% of Principal Covered by Swap		20.12%		22.03%		21.98%	
Swap notional			$ 200,794	$ 191,667	$ 182,105	$ 173,000	$ 163,109
Difference				1.38%	1.21%	1.65%	1.72%
Swap Cashflow				$ 2,770	$ 2,323	$ 3,011	$ 2,976

Appendix 11 - Swap Cashflows (in thousands of dollars)

Celebrity Reflection	2024 October
Remaining Principal	$ -
Swap notional at end of year	
% of Principal Covered by Swap	98.46%
Swap notional	$ -
Difference	1.35%
Swap Cashflow	$ 372

Quantum of the Seas	2024 October	2025 April	2025 October	2026 April	2026 October
Remaining Principal	$ 131,850	$ 98,888	$ 65,925	$ 32,963	$ -
Swap notional at end of year					
% of Principal Covered by Swap	93.05%		93.06%		93.08%
Swap notional	$ 122,685	$ 92,028	$ 61,352	$ 30,681	$ -
Difference	1.35%	0.82%	0.53%	0.43%	0.46%
Swap Cashflow	$ 2,066	$ 1,005	$ 488	$ 264	$ 140

Anthem of the Seas	2024 October	2025 April	2025 October	2026 April	2026 October	2027 April
Remaining Principal	$ 154,604	$ 123,683	$ 92,762	$ 61,842	$ 30,921	$ (0)
Swap notional at end of year						
% of Principal Covered by Swap	97.46%		97.43%		97.40%	
Swap notional	$ 150,673	$ 120,506	$ 90,379	$ 60,236	$ 30,118	$ -
Difference	1.29%	0.76%	0.47%	0.37%	0.40%	0.37%
Swap Cashflow	$ 2,327	$ 1,144	$ 567	$ 335	$ 239	$ 112

Ovation of the Seas	2024 October	2025 April	2025 October	2026 April	2026 October	2027 April	2027 October	2028 April
Remaining Principal	$ 245,525	$ 210,450	$ 175,375	$ 140,300	$ 105,225	$ 70,150	$ 35,075	$ -
Swap notional at end of year								
% of Principal Covered by Swap	98.51%		98.50%		98.49%		98.47%	
Swap notional	$ 241,861	$ 207,286	$ 172,738	$ 138,175	$ 103,631	$ 69,079	$ 34,540	$ -
Difference	1.49%	0.96%	0.67%	0.57%	0.60%	0.57%	0.56%	0.59%
Swap Cashflow	$ 4,111	$ 2,321	$ 1,390	$ 985	$ 825	$ 594	$ 385	$ 204

Harmony of the Seas	2024 November	2025 May	2025 November	2026 May	2026 November	2027 May	2027 November	2028 May
Remaining Principal	$ 281,546	$ 241,325	$ 201,104	$ 160,883	$ 120,663	$ 80,442	$ 40,221	$ (0)
Swap notional at end of year								
% of Principal Covered by Swap	80.01%		80.75%		81.49%		82.24%	
Swap notional	$ 225,271	$ 194,861	$ 162,384	$ 131,099	$ 98,325	$ 66,151	$ 33,076	$ -
Difference	0.85%	0.56%	0.51%	0.52%	0.56%	0.59%	0.59%	0.60%
Swap Cashflow	$ 2,175	$ 1,250	$ 994	$ 844	$ 734	$ 575	$ 390	$ 198

Odyssey of the Seas swap 1	2024 September	2025 March	2025 September	2026 March	2026 September	2027 March	2027 September	2028 March	2028 September	2029 March	2029 September	2030 March	2030 September	2031 March	2031 September	2032 March	2032 September
Remaining Principal	$ 704,154	$ 662,733	$ 621,313	$ 579,892	$ 538,471	$ 497,050	$ 455,629	$ 414,208	$ 372,788	$ 331,367	$ 289,946	$ 248,525	$ 207,104	$ 165,683	$ 124,263	$ 82,842	$ 41,421
Swap notional at end of year																	
% of Principal Covered by Swap	43.63%		43.42%		43.21%		43.00%		42.80%		42.59%		42.39%		42.18%		41.98%
Swap notional	$ 307,204	$ 287,746	$ 269,762	$ 250,570	$ 232,672	$ 213,744	$ 195,932	$ 177,266	$ 159,539	$ 141,132	$ 123,491	$ 105,342	$ 87,785	$ 69,891	$ 52,418	$ 34,778	$ 17,389
Difference	1.48%	0.90%	0.61%	0.51%	0.54%	0.51%	0.50%	0.53%	0.55%	0.56%	0.58%	0.61%	0.63%	0.64%	0.66%	0.68%	0.70%
Swap Cashflow	$ 4,820	$ 2,763	$ 1,756	$ 1,377	$ 1,345	$ 1,193	$ 1,064	$ 1,039	$ 973	$ 895	$ 824	$ 753	$ 661	$ 561	$ 459	$ 354	$ 242

Odyssey of the Seas swap 2	2024 September	2025 March	2025 September	2026 March	2026 September	2027 March	2027 September	2028 March	2028 September	2029 March	2029 September	2030 March	2030 September	2031 March	2031 September	2032 March	2032 September
Remaining Principal	$ 704,154	$ 662,733	$ 621,313	$ 579,892	$ 538,471	$ 497,050	$ 455,629	$ 414,208	$ 372,788	$ 331,367	$ 289,946	$ 248,525	$ 207,104	$ 165,683	$ 124,263	$ 82,842	$ 41,421
Swap notional at end of year																	
% of Principal Covered by Swap	21.88%		21.77%		21.67%		21.56%		21.46%		21.36%		21.25%		21.15%		21.05%
Swap notional	$ 154,047	$ 144,290	$ 135,272	$ 125,648	$ 116,673	$ 107,182	$ 98,250	$ 88,890	$ 80,001	$ 70,771	$ 61,924	$ 52,823	$ 44,020	$ 35,047	$ 26,285	$ 17,439	$ 8,720
Difference	1.67%	1.08%	0.80%	0.70%	0.72%	0.70%	0.68%	0.72%	0.73%	0.75%	0.77%	0.79%	0.81%	0.82%	0.84%	0.86%	0.88%
Swap Cashflow	$ 2,719	$ 1,671	$ 1,148	$ 941	$ 907	$ 814	$ 732	$ 703	$ 653	$ 597	$ 544	$ 492	$ 429	$ 363	$ 295	$ 226	$ 154

Appendix 12 - Swap Cashflow Prediction (in thousands of dollars)

Net Income with and without Swaps and Loan Interest Payment												
In thousands of dollars	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Net Income with interest rate swap and underlying loan interest payments	$ 18,287	$ 473,692	$ 764,146	$ 665,783	$ 1,283,388	$ 1,625,133	$ 1,811,042	$ 1,878,887	$ (5,797,462)	$ (5,260,000)	$ (2,156,000)	$ 1,697,000
Net Income without interest rate swap but with underlying loan interest payments	$ 15,208	$ 475,066	$ 765,023	$ 687,807	$ 1,311,520	$ 1,653,737	$ 1,820,691	$ 1,892,189	$ (5,767,520)	$ (5,227,414)	$ (2,160,585)	$ 1,649,927
Net Income without interest rate swap nor underlying loan interest payments	$ 33,670	$ 496,782	$ 784,071	$ 727,289	$ 1,379,358	$ 1,737,924	$ 1,921,104	$ 1,971,243	$ (5,731,416)	$ (5,194,771)	$ (2,055,178)	$ 1,778,275

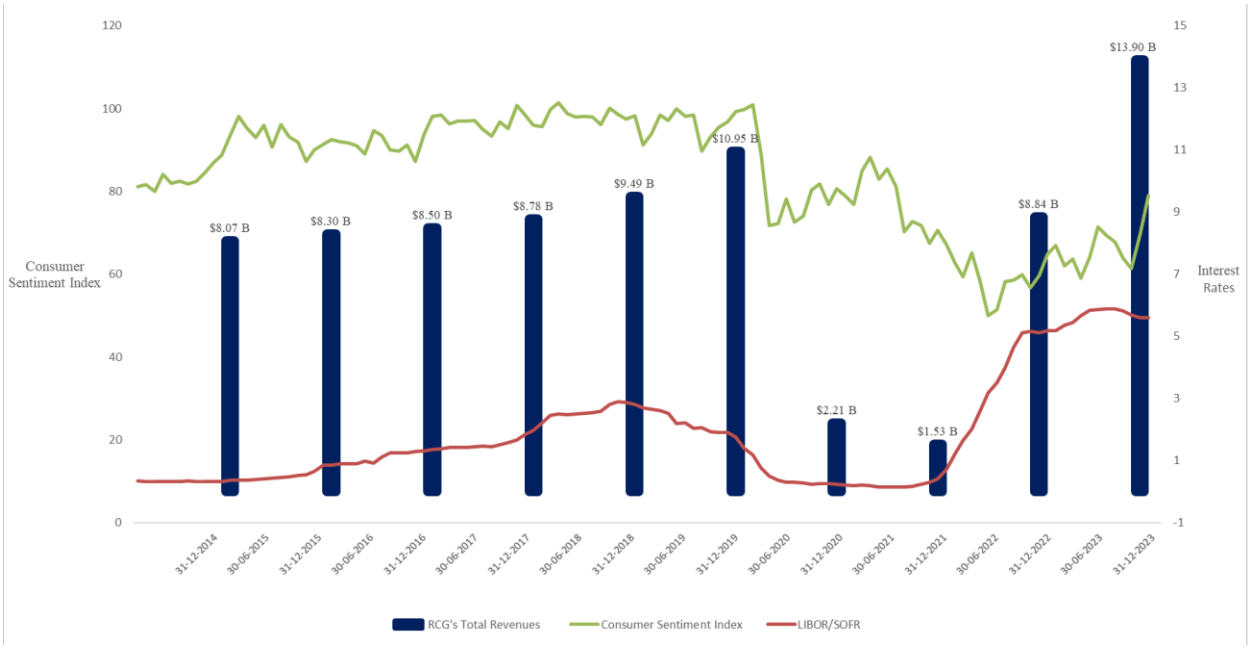
Appendix 13 - Net Income of basis case

Interest Rate Sensitivity Analysis												
In thousands of dollars	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Net Income without swap	$ 15,208	$ 475,066	$ 765,023	$ 687,807	$ 1,311,520	$ 1,653,737	$ 1,820,691	$ 1,892,189	$(5,767,520)	$(5,227,414)	$(2,160,585)	$ 1,649,927
Net Income without Swap given a 1p.p increase in interest rate	$ 11,795	$ 465,409	$ 756,277	$ 668,516	$ 1,281,517	$ 1,618,016	$ 1,788,666	$ 1,863,858	$(5,792,156)	$(5,254,403)	$(2,216,550)	$ 1,586,312
% change in NI (without)	-22.4%	-2.0%	-1.1%	-2.8%	-2.3%	-2.2%	-1.8%	-1.5%	0.4%	0.5%	2.6%	-3.9%
Net Income with Swap	$ 18,287	$ 473,692	$ 764,146	$ 665,783	$ 1,283,388	$ 1,625,133	$ 1,811,042	$ 1,878,887	$(5,797,462)	$(5,260,000)	$(2,156,000)	$ 1,697,000
Net Income with Swap given a 1p.p increase in interest rate	$ 11,462	$ 460,745	$ 752,051	$ 653,769	$ 1,270,834	$ 1,612,744	$ 1,799,869	$ 1,868,416	$(5,807,972)	$(5,271,905)	$(2,197,150)	$ 1,651,728
% change in NI (with swaps)	-37.32%	-2.73%	-1.58%	-1.80%	-0.98%	-0.76%	-0.62%	-0.56%	0.18%	0.23%	1.91%	-2.67%

Appendix 14 - Interest Rate Sensitivity Analysis

Interest Rate Worst-Case Scenario												
In percentual points	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Without Swaps	5.36	72.04	126.80	40.63	46.86	48.56	59.28	69.14	-	-	-	73.40
With Swaps	5.36	35.89	56.27	56.79	75.23	81.30	99.81	114.26	-	-	-	135.55

Appendix 15 - Interest Rates Worst Case Scenario



Appendix 16 - RCG's Total Revenues vs Consumer Sentiment Index vs Interest Rate

Black-Scholes - Call option with 4% cap		
Time to maturity (years)		0,5000
Strike price (cap)		0,0400
Current price (SOFR 6M)		0,0462
Annual Volatilty of SOFR		0,0060
Option Notional	$	900.000.000
Risk free rate (U.S. 6M Tresury Bill)		0,0417
d1		14,3942
d2		14,3892
N(d1)		1,0000
N(d2)		1,0000
Call Price (per unit)	$	0,0078
Call Price (per contract, 100 units)	$	0,7834
Total cost with Call Options	**$**	**7.050.331**

Black-Scholes - Call option with 3% cap		
Time to maturity (years)		0,5000
Strike price (cap)		0,0300
Current price (SOFR 6M)		0,0462
Annual Volatilty of SOFR 6M		0,0060
Option Notional	$	900.000.000
Risk free rate (U.S. 6M Tresury Bill)		0,0433
d1		54,6054
d2		54,6054
N(d1)		1,0000
N(d2)		1,0000
Call Price (per unit)	$	0,0175
Call Price (per contract, 100 units)	$	1,7470
Total cost with Call Options	**$**	**15.723.375**

Appendix 17 - Interest Rate Call option price