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Analytic Risk Measurement of Maritime Transportation Stocks During the COVID-19 Pandemic and the Russia-Ukraine War

by

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Abstract

The COVID-19 pandemic and the Russia-Ukraine war have impacted global financial stability, as evidenced by the stock market collapse on global exchange markets. Consequently, the recent crisis has impacted the downturn in market risk to a range of businesses, inevitably to the maritime transportation stocks. Therefore, this study aims to provide a quantitative risk exposure assessment of global maritime companies' stocks, as a guide for investment decisions in this industry. This study estimates the risk level using the value-at-risk (VaR) and expected shortfall (ES), with a volatility model of GJR-GARCH(1,1,1) and Student's *t* distribution assumption, for 216 maritime transportation equities from 1 January 2018 to 31 March 2023. The majority of daily closing price data is acquired from Yahoo! Finance (215 stocks) and a small portion of stock information is obtained from TradingView (1 stock). Considering the overall stocks, it is estimated that the average risk level of maritime transportation stocks increased by 23.45%, 12.98%, and 9.33% during the COVID-19 shocks, intra-pandemic, and the geopolitical tension between Russia and Ukraine, respectively. The COVID-19 pandemic has had a severe impact on the majority of maritime transportation stocks across all global exchange markets, resulting in both momentarily and prolonged effects. In comparison, the influence of the Russia-Ukraine conflict is more limited and smaller scale. Furthermore, the passenger sub-sector experienced the greatest impact during the COVID-19 shock, as indicated by the huge rise in the average sub-sector risk level by 45.81%. Meanwhile, the average risk level of container business is higher in the intra-pandemic period by 32.17%. The impact of the Russia-Ukraine war impacted FESH (Far-Eastern Shipping Company PLC, traded in the Moscow Exchange) and HLAG (Hapag-Lloyd AG, traded in the Frankfurt Stock Exchange), as they reached their lowest level at -62.21% and -20.67% respectively.

Keywords: Maritime transportation stocks, Shipping stocks, COVID-19, Russia-Ukraine war, Financial risk, Risk assessment, GJR-GARCH, Value-at-risk, Expected shortfall

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Chapter 1. Introduction

1.1 Background

The financial stability of the world industry had been challenged by the recent events that led to a global disruption. The coronavirus disease (COVID-19) outbreak is one of the culprits that put a severe impact on the recent world economic and financial downturn. This dangerous viral infection of SARS-CoV-2 has led to a global pandemic of severe acute respiratory illness, posing a significant risk to human health and mortality (Hu et al., 2021). This disease was discovered in early December 2019, originated in Wuhan City, China, and was officially recognized by the World Health Organization (WHO) as an outbreak in late January 2020 due to its rapid and widespread transmission (Harapan et al., 2020). As of December 2021, WHO has recorded over 287 million confirmed COVID-19 cases and more than 5.4 million deaths, with an estimation of 14.83 million excess fatalities (Msemburi et al., 2023).

To prevent the easily transmitted virus from widespread via close contact during the pandemic, governments have implemented public measures such as enforcing lockdowns that require people to stay at home and workplace closures. However, the health regulation imposed by the government and the prevailing pandemic situations have profoundly altered community lifestyles and business practices, undeniably affected the global economy and market confidence. In the first quarter of 2020 World Economic Outlook, the International Monetary Fund (IMF, 2020) projected the world GDP growth would decline to -3%, surpassing the severity of Global Financial Crises (GFC) in 2008, with the accumulated loss to world GDP from the pandemic estimated to be approximately $9 trillion. In the same quarter of 2020, World Trade Organization (WTO, 2020) predicted the world trade to decline by 13% - 32% because the pandemic disrupted the economic activity.

The unexpected COVID-19 pandemic situation not only contracted the macroeconomic factors but also prevailed negative sentiments over the global financial market that impacted a slump in the stock market. Major global stock markets indices such as BVSP (Brazil), CAC40 (France), DAX (Germany), FTSE100 (the UK), N225 (Japan), S&P500 (the US), and SSE (China) experienced a great collapse in March 2020 (Lu et. al., 2023). In addition, the S&P 500 index annualized returns reached a notable downturn of approximately -12.20% in 2020 (Verma et. al., 2021). Therefore, it is expected that the stock market worldwide exposed to an extraordinarily high potential downside risk, posing significant challenges for investors and market participants because of the pandemic.

Not even two years after the COVID-19 pandemic for the economy to recover, global trade activity and financial markets encountered a new shock triggered by the Russia-Ukraine war. This extraordinary event started when Russia recognized parts of eastern Ukraine (Donetsk and Luhansk) as sovereign on 21 February 2022 and intensified with a substantial military invasion launched by Russia into Ukraine on 24 February 2022. The aggression has devastated the conflicted nations, resulting in loss of life, impaired productivity, and extensive damage to the infrastructure. The geopolitical tension brought worldwide attention that prompted governments to establish sanctions on Russia to dampen the war, including measures such as trade restrictions, travel bans, and asset freezes.

The impact of the war and the imposed sanctions has resulted in significant adverse economic and financial repercussions in many aspects with Russia holding an important figure in the energy sector, while Ukraine is on food supply. The war is estimated to contract over 30% of the Ukrainian economy and brought the world GDP to fall about -1% (nearly around $1.5 trillion) compared to pre-war estimation (Liadze et. al., 2023). Hence, the European financial market witnessed another crash in response to this crisis. Ahmed et. al. (2022) observed that the abnormal return of STOXX Europe 600 dropped the highest at about -0.41% on 21 February 2022 with a cumulative negative return of -4.02% over 21 days around the date ([-10, +10] days). While the highest crash was experienced in the Russian stock market (MOEX Index, 33%), other markets outside Europe also plunged because of the geopolitical risk, such as the US (S&P500, 1.2%), Hong Kong (HSI, 3.2%), China (SSE Composite Index, 1.7%), and Japan (N225, 1.8%) during the war announcement (Thompson & Liakos, 2022; He, 2022).

Similarly, the global emergency state of the COVID-19 pandemic and the Russia-Ukraine war also devastated the shipping industry, which acts as a prominent macroeconomic driver in facilitating global trade. Verschuur et. al. (2021) estimated that the world maritime trade encountered a substantial drop ranging from -7.0% to -9.6% in the first eight months of the COVID-19 outbreak, equivalent to 206–286 million tonnes (volume losses) or 225–412 billion USD (monetary loss). Kamal, et. al. (2022) reported that 43 maritime transportation stocks listed on the New York Stock Exchange (NYSE) responded quickly and negatively during the COVID-19 outbreak announcement. Moreover, during the early stage of the Russia-Ukraine war (February – March 2022), the Baltic Dry Index (BDI), which represents a global benchmark for the price of shipping dry bulk, witnessed a substantial surge of 59%, potentially leading to an additional 3.7% rise in grain food prices worldwide (UNCTAD, 2022). Based on the collected evidence, it is expected that the maritime transportation stock market experienced a substantial downside risk and need further investigation.

1.2 Research Objectives

Acknowledging the importance of earning returns on investment for shareholders with its sensitive trait to financial stress due to the COVID-19 pandemic and Russia-Ukraine war and stock market on capital raising for maritime transportation businesses, this research aims to provide quantitative market risk information during the crisis period. To better understand the challenges in managing a shipping stock portfolio, this research also exhibits a comparison of the risk exposure levels within the shipping industry itself and between the shipping industry to other sectors. Therefore, the primary research question to investigate the risk position in this research is:

"To what extent has the financial risk level of the maritime transportation stocks increased during the COVID-19 pandemic and the Russia-Ukraine war turmoil period?"

In adequate to answer the primary research question, the following secondary sub-research questions are addressed:

(1) What are maritime transportation stocks on the global stock market?
(2) What is meant by financial risk level in a stock market?
(3) What method can be used to examine the financial risk in maritime transportation stock?
(4) What was the stock market condition in the pre-crises period?
(5) How were the various sub-sectors within maritime transportation exposed to risk during the crisis period?
(6) To what extent the risk assessment method is reliable to examine the financial risk?

1.3 Relevance

Market risk is an inherent trait that is present in every investment decision, particularly under dynamic stock market conditions. Hence, market risk is an integral element of the stock market, arising from the inherent uncertainty of returns resulting from the fluctuations in global economic and financial conditions. Market risk can be observed as a manifestation and reflection of the broader economic forces, market participants, and other circumstances that impact the performance of stocks. Furthermore, it incorporates a multitude of elements, including fluctuations in interest rates, foreign exchange rates, economic growth prospects, pandemic situations, geopolitical events, and industry-specific trends, all of which possess the

potential to have a substantial influence on stock prices. Investors operating within this particular environment are confronted with the knowledge that their investment returns are vulnerable to the fluctuations of these external factors. Furthermore, it is essential to consider these factors on investing in marine transportation companies, which are known for their fluctuating revenue and operational patterns.

Therefore, this thesis aims to provide contributions from three viewpoints. Firstly, guiding investment decisions within the maritime business. As part of risk management in stock investment, computation and quantification of market risk in maritime transportation stocks is the initial phase. This endeavor holds significance as it equips investors with valuable insights that are essential for making informed decisions to mitigate possible losses. This thesis offers a market risk assessment, enabling investors and market participants to gain confidence in navigating the volatile assets under world circumstances.

Second, this thesis aims to identify the response to the shipping market valuation associated with the COVID-19 pandemic and the ongoing conflict between Russia and Ukraine. Hence, this thesis offers significant insights into the impacts of the recent crisis on financial stability. Beyond its scholarly contributions, this thesis plays a crucial role in raising awareness of the unique challenges and opportunities presented by the maritime transportation sector within the equity market during the recent crisis periods. This research contributes to a greater knowledge of this unique yet crucial component of the global financial environment of shipping transportation equity. It emphasizes the significance of viewing maritime transportation companies as a unique asset class with distinct risk characteristics.

Third, this thesis enriches the existing literature within the field of maritime transportation stocks and finance. It is well acknowledged that the information about these stocks is limited. Therefore, this research adds depth and breadth to the literature by offering a compressive examination of market risk within this particular sector. Hence, this study aims to overcome the current gaps in knowledge, providing a consolidated resource for financial researchers, practitioners, and investors who are interested in gaining a more profound understanding of the risk dynamics in maritime transportation equity.

1.4 Research Design and Methodology

This thesis is designed to examine the risk level associated with 216 maritime transportation stocks listed in 36 global exchange markets throughout the period from 1 January 2018 to 31 March 2023. Furthermore, we classified these securities into their respective sub-sectors based on the companies' business range. In this study, we analyze the stock returns from the daily closing price retrieved from two sources: Yahoo! Finance (215 stocks) and TradingView

(1 stock). By employing the estimating approach of value-at-risk (VaR) and expected shortfall (ES), we may determine the levels of risk associated with the chosen stocks. To investigate the risk level during the periods of crisis, we subset the risk estimation into four regimes, which are (1) the tranquil period or pre-shock period (1 January 2018 – 31 December 2019), (2) the COVID-19 pandemic shock (1 January 2020 – 15 January 2021), (3) the intra-pandemic of COVID-19 (16 January 2021 – 31 January 2022), and (4) the Russia-Ukraine war (1 February 2022 – 31 March 2023). Moreover, four scenarios were formulated to estimate the VaR and ES values and thereafter we present the most optimum outcome among those scenarios in the analysis. We examine the risk level based on the GJR-GARCH(1,1,1) volatility model with the Student's *t* distribution, which yields the most optimum outcome.

1.5 Thesis Structure

This thesis comprises six chapters, i.e., Chapter 1 – Introduction, Chapter 2 - Stocks and Financial Risk, Chapter 3 – Research Methodology, Chapter 4 – Publicly Listed Maritime Transportation Companies, Chapter 5 – The Risk Level of Maritime Transportation Stocks, and Chapter 6 – Conclusions. Additionally, we provide the full details of risk estimation in the Appendix.

Chapter 1 explains the background of why this research is conducted, outlines the research objectives in response to the challenges identified, elucidates the contribution of this thesis, and presents a concise review of the methodological approach. Chapter 2 centers its attention on comprehending the investment of stocks within the maritime business, delves into the concept of market risk during periods of economic and financial turmoil, explores relevant literature, and defines the problem that needs to be addressed. Chapter 3 provides a thorough exposition of the research methodology and the experimental framework employed in the risk modeling. Chapter 4 presents an overview and classification of the publicly listed maritime companies that have been identified across global exchange markets. Chapter 5 explains the descriptive statistics of the selected maritime transportation stock returns, examines the evolution of risk levels seen during the pre-crisis and crisis periods, investigates the impact of the crisis on the various sub-sectors of the maritime industry, and assesses the modeling option. Chapter 6 summarizes the findings and discussion of this study, as well as provides potential avenues for business and future research.

Chapter 2. Stocks and Financial Risk

This chapter commences with a preliminary study on stocks as a financing option in the maritime business, followed by the rationale behind maritime business opting to become publicly listed in stock markets. Moreover, this chapter describes the scope of risk assessment in this research, particularly about the market response during the crisis periods. This chapter also includes relevant literature reviews that address the approach of risk assessment and concludes with a problem definition in this research.

2.1 Stock Financing in Maritime Business

The maritime transportation sector is characterized by its capital-intensive business model, requiring careful financial management in order to preserve its assets and optimize business development. To support its high investment operation, the corporation strategically engages in a diverse range of capital-raising activities. The industry typically has two main methods of capital-raising for obtaining cash: (1) acquiring debt through raising loans or bonds, (2) equity financing though issuing or selling shares or stocks (Daniel & Yildiran, 2019).

The two forms of capital are a building block for determining asset value of a shipping firm. Assets refer to resources that are owned, controlled by the firm, and expected to yield future economic benefits for itself. On a balance sheet that reflects the financial position of a company at specific point in time, assets are represented by the consolidation value of a company's liabilities and equity (Stopford, 2009). Liabilities pertain to the financial obligations or indebtedness of a firm towards its lenders, whereas equity represents the residual interest in a company's assets subsequent to the deduction of its liabilities.

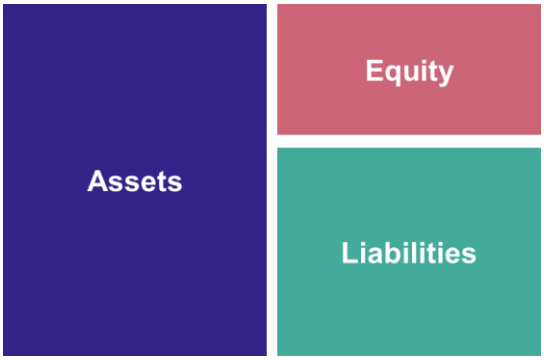

Figure 2.1 Illustration of typical capital structure in a maritime transportation company (Source: Author's elaboration)

Traditionally, the maritime transportation industry has relied significantly on liabilities/debt financing as its external funding to attain its target capital structure, indicated by the substantial leverage ratio between liabilities and shareholder's equity (Drobetz et. al., 2013). However, because of the high degree of volatility in freight rates and asset prices, maritime transportation firms experience substantial challenges in gaining financial access through bank loans for their investment plans. As a result, these companies may decide to obtain funds from additional sources such as equity financing and modify their capital structure to align with the environment of the industry. Moreover, securing funds in exchange for the firm’s partial ownership or stocks in equity financing through the capital market might be an appealing plan, given equity valuations are favorable to enhance profitability (Merika et. al., 2015).

2.2 Maritime Business Participation in Stock Exchanges

In response to the dynamic and swiftly evolving business climate, maritime businesses are currently placing greater emphasis on enhancing their firm market value by prioritizing investment plans that generate returns, sustainable profitability, and growth potential that surpass the associated costs (Syriopoulos, 2007). Moreover, the valuation of an investment is established by the price of a single share of the company's stock, which is traded on structured and regulated capital markets referred to as stock exchanges (Berk & DeMarzo, 2020). Recognizing the significance of this situation, the trading of stocks on the exchange markets as a means of acquiring funds has considerable importance for the shipping sector.

According to the findings of Mourdoukoutas and Stefanidis (2009), the Greek shipping companies listed on prominent US exchange markets have not only fulfilled but surpassed ship owners’ expectations, which has resulted in an expansion of their capital structure, elevated their reputation and prestige, fortified their leverage in bargaining with cash lenders, and an increase in opportunities for entrepreneurial endeavors. It is believed that shipping firms have come to recognize the benefits of engaging in public listing on global stock exchange markets, as indicated by the recent increase in the number of initial public offerings (IPO) within the shipping industry. The increasing number of IPO in this sector has been reinforced by notably elevated freight rates and strong cash flow performance, which has been underpinned by optimistic stock markets of the rising in the US and Chinses economy around late 2003-2007 (Merikas et. al., 2009). This phenomenon has captured the attention of investors who recognized the attractiveness of investing in listed shipping companies.

However, the decision of shipping companies to become publicly traded through an IPO is closely connected to the current state of the stock market. Shipping businesses are more likely to consider IPO as an instrument of generating funds when stock markets are strong

and investor sentiment is optimistic (Merikas et al., 2009). In cases where the present stock price is lower than the average Future Net Asset Values (NAV) or if the shares are underpriced to their underlying assets, the decision to proceed with the IPO may be postponed or reassessed (Goulielmos, 2021). Hence, the impact of the stock market on IPOs in the maritime industry encloses its influence on investor appetite. When stock prices are deemed promising and attractive, investors are more inclined to exhibit interest in engaging in these offerings. On the other hand, in the event of stock price volatility or unappealing market conditions, the interest of investors in maritime stocks may diminish. This demonstrates the dynamics of the stock market, maritime transportation IPO trends, and investors' behavior.

Furthermore, Syriopoulos & Bakos (2019) identified a total of 94 public maritime transportation companies on prominent stock exchange markets worldwide, together possessing an approximate market capitalization of USD 133.2 billion by the end of 2016, such as from the US region (specifically the NYSE and NASDAQ stock markets), Europe region (including London, Oslo, Brussels, and Copenhagen), Asia region (including Shanghai, Hong Kong, South Korea, Tokyo, and Singapore). The listed maritime transportation industry/sector itself can be divided into various sub-sectors, each specializing in vessel portfolios designed to transport certain types of commodities that align with their respective features (dry bulk, liquid bulk, specialized, and passenger). Hence, the industry exhibits a diverse range of specialization and competitiveness, which is driven by the different cargo requirements and commercial objectives.

2.3 Market Risk and Risk Management

The notion of risk captures the extent of the probability of an entity encountering unforeseen or unfavorable outcomes. Hence, any course of action or conduct that leads to the occurrence of loss is attributed to the extent of risk. From a financial risk perspective, Crouhy et al. (2014) describe it as the degree of variability (or volatility) in achieving profitability and its likelihood to incur unexpected monetary losses. Hence, the concept of risk encompasses the level of potential poor returns involved in investment decision-making.

When individuals or organizations make a decision, they are subject to several risks. García (2017) classified several types of risk affecting an entity in gaining profit, which are (1) market risk, (2) credit risk, (3) operational risk and (4) liquidity risk. In regards to the given risk factors, one of the primary risk management methods that non-financial firms should prioritize is the management of market risk, such as the application in this study for the shipping sector, as this risk cause a significant impact on profit generation. In addition, this particular form of risk is also commonly referred to as systematic risk, which the concept is not interchangeably

with systemic risk terms. Furthermore, systematic (market) risk refers to the inherent uncertainty as a result of the fluctuation in economic or financial instruments, which subsequently impact prices. Meanwhile, the systemic concept covers the collapse of the financial system as a result of market shock, rather than being attributed to one component or sector. The market circumstances that are being discussed are the industry's susceptibility to risk in stock prices, interest rates, foreign exchange rates, and commodity price movements, in which a high-risk profile is typically associated with significant levels of volatility.

Given the importance of market risk information in guiding investment decisions, the existing literature primarily concentrated on investigating risk in physical shipping markets index, alongside its associated return and volatility, and derivatives to preserve the sector revenue stream, rather than emphasizing risk management in the financial market for the maritime sector. For example, the forecasting of forthcoming market dynamics of dry bulk freight rate, amongst the high volatility observed in the Baltic Dry Index (BDI) for Panamax and Capesize vessel size (Karaoulanis & Pelagidis, 2021; Pelagidis & Karaoulanis, 2021). Furthermore, the dynamics spillover model of BDI, which is the benchmark of the dry bulk market, has been developed to predict future commodity price returns in maritime trade, specifically for copper, coal, wheat, soybean, and corn (Bandyopadhyay & Rajib, 2023). Hence, these studies assist shipowners, charterers, and other market participants in hedging the risk for future fleet operation through the utilization of shipping derivatives, for example with Forward Freight Agreements (FFAs).

Other commodity price volatility has been observed to have a dynamic connectedness to other sectors of shipping markets, such as oil, which is essential for ship bunkering. As an example, the high correlation between the Bernt oil price and the returns of liner shipping stock during the periods of past financial crises, such as the 2007 – 2009 financial crises and the 2010 – 2012 Eurozone debt crises (Maitra et. al. 2020). In a different sector case, dynamic fluctuations in the price of oil have been shown to have a negative relationship with tanker rates, leading to an adverse revenue stream. (Sun et. al., 2014; Pouliasis & Bentsos, 2023). Hence, the number of tankers' port calls experiences a significant decrease when there is an observed increase in futures crude oil prices, heightening the risk associated with liquid bulk shipping (Mi et. al., 2022). Thus, the analysis of these studies provides that the risk hedging activity between oil market derivatives and shipping companies related to bunker costs will benefit the company.

Nevertheless, research on risk management of the shipping stock market remains valuable to enhance investment strategy in the maritime business. Mohanty et. al. (2021) examines the influence of macroeconomic variables on the returns of 102 shipping stocks from early 2001 to late 2016 using a Quantile Regression (QR) method. They discovered that the various shipping sub-sectors exhibit varying degrees of sensitivity to several economic

factors, including the return of the major market indices, currency rates, and long-term interest rates, but these factors are strongly interrelated to huge losses in a bearish market. Thus, portfolio diversification measures to mitigate the overall risk because of economic shocks during periods of high volatility are highly recommended.

A similar investigation into the relationship between economic factors to shipping stocks also has been investigated by Zhao & Tansuchat (2019). Using Vector Autoregression (VAR) model, they described a positive correlation and co-movement between the stock index of the 20 Shanghai shipping companies with West Texas Intermediate (WTI) oil commodity prices during 2007 – 2018. Meanwhile, Mhd Ruslan & Mokthar (2021) used a different approach to provide a comprehensive analysis of the relationship between Brent and WTI oil prices with the share prices of three prominent liner shipping companies, which are Hapag-Lloyd from Germany, Hyundai from South Korea, and Yang Ming from Taiwan. They utilized various Generalized Autoregressive Conditional Heteroskedasticity (GARCH) models to exhibit asymmetric behavior of stock volatility, in which positive shocks (good news) exert a more pronounced influence compared to the opposite condition during 2017 – 2020. Similarly, these studies hold considerable importance for investors, market participants, and regulators as they seek to anticipate the market sentiment in the shipping industry concerning oil price information.

Previous studies have demonstrated that the shipping market, including its financial market, is susceptible to macroeconomic shocks in the world. Hence, a range of risk hedging measures can be utilized by considering the degree of risk and volatility in this sector. However, the prevailing market risk in the maritime sector warrants further investigation, particularly during times of crisis because the shipping market is highly subject to the influence of external risk factors. The scope of this study is to examine the market risk level associated with the shipping sector.

2.4 Market Reaction in Financial, Health, and Geopolitical Crises

As briefly discussed, the financial market always fluctuates which makes the degree of market risk inevitably vary over time, especially the extreme losses during crisis periods. An example of extreme economic turmoil is Global Financial Crisis (GFC) or the Great Depression, which was triggered by a rapid increase in asset prices (Kwong & Wong, 2022). Several approaches have been utilized to examine the impact level of GFC on the global stock market and interconnectedness with other financial factors, such as Value-at-Risk (VaR) and Conditional Value-at-Risk (CVaR) methods (Alexandridis & Hasan, 2020; Cao, 2021; Ma et. al., 2020). In addition, the term CVaR is also used interchangeably with Expected Shortfall (ES).

The consequences of the financial crisis prompted experts in the business sector and regulatory authorities to engage in rigorous risk modeling. This effort is aiming to comprehensively measure the possible outcomes for future downside risks. Hence, its significance continues to increase up to the present times. Moreover, the financial markets have been confronted by another series of turmoil in the preceding three years, further underscoring the relevance of risk assessment measures.

Studies have examined that the economic crisis due to the COVID-19 pandemic leads to a global recession (Borio, 2020; Shibata, 2021), thus, posing a threat to financial stability (Adrian & Natalucci, 2020). Despite the risk in the GFC amplified by the interdependencies within the worldwide financial systems, the COVID-19 pandemic has also exerted a significant impact on the global scale economic system through the occurrence of unprecedented natural catastrophes damaging business prosperity. It has been investigated that the pandemic has impacted the fall in the world GDP growth to -3% (IMF, 2020) and a 13% – 32% decline in global trade (WTO, 2020). Furthermore, the pandemic has increased the risk of various financial markets in the world, indicated by the increase in volatility of commodity prices (Chen et. al., 2023; Qian et. al., 2023), bond yields rate as a measure of interest rates (Kim et. al., 2021; Zaremba et. al., 2022), and foreign exchange rate (Feng et. al., 2021; Thai Hung et. al., 2022).

Hence, the emergence of risk contagion triggered by the COVID-19 pandemic has evoked an unfavorable response in the stock market, which is part of the dynamic financial system. Lu et. al. (2023) identified a stock market crash occurring in March 2020, indicated by a sharp drop in the BVSP (Brazil), CAC40 (France), DAX (Germany), FTSE100 (the UK), N225 (Japan), S&P500 (the US), and SSE (China) stock index prices. Hence, the market reaction exhibited a sustained period of high volatility following the initial drop. Furthermore, they identified a risk spillover affecting various markets, and the geographic proximity was found to be reflective of the return co-movements, with the US market occupying a pivotal position.

Another approach to measuring the risk exposure of stock market return during the pandemic has been conducted by Li et. al. (2022). Using VaR model with Exponential GARCH (EGARCH), they found a substantial increase on the average loss for the China – SSE Large-Cap index (88.41%, from −1.250 to −2.356), UK – FTSE Small-Cap index (227.11%, from −0.879 to −2.876), and US – S&P500 Mid-Cap index (266.82%, from −1.342 to −4.922). In addition, Das et. al. (2023) measured the downside risk of the G7 equity market using various VaR models on SPTSX60 (Canada), CAC (France), DAX (Germany), FTSEMIB (Italy), NKY (Japan), UKX (the UK), and INDU (the US) indices. Hence, they compared the risk level of previous financial crises, including the 1998 Asian Financial Crisis (AFC), the 2002 Internet Bubble Bursting (IBB), and the 2008 Global Financial Crisis (GFC). It has been highlighted that COVID-19 displayed the greatest threat to global equity markets. Therefore, it is

recommended that investors consider portfolio diversification as a strategy to mitigate risk exposure, as well as authorities to implement policies in monitoring potential investors.

Figure 3.1 The fluctuations of seven major nation stock market index during the COVID-19 pandemic (Source: Author's calculation based on Yahoo! Finance data and inspired by Lu et. al., 2023)

From a more specific perspective, prior studies have highlighted the heightened risk exposure resulting from restrictive measures on mitigating the pandemic, which has brought negative sentiments in various transportation and logistics sectors, identified by the presence of long-term abnormal stock returns during the crash event (Farooq et. al., 2022; Maneenop & Kotcharin, 2023). As part of the volatile market in the transportation sector, Kamal et. al. (2022) observed similar attributes of high-risk exposure in the price of 43 publicly traded shipping stocks. Using an event study approach, the corresponding market value has substantially dropped by -10.28% during Italy's outbreak situation and a more severe fall by -20.73% during the implementation of the U.S. travel restriction coming from 26 European countries. Using a similar approach, Gavalas et. al. (2022) observed distinct cumulative abnormal returns in the Dow Jones Global Shipping Index (DJGSI) following 5-trading days from 11 March 2020 (-17.07% cumulative return over five days) and 8-trading days after the event (-23.14% cumulative return over fifteen days), in comparison with other freight rate indexes.

Despite the massive impacts of COVID-19 on the global and specific-firm stock market, global financial stability encountered another turmoil triggered by the Russia-Ukraine geopolitical conflict that arose within two years after the outbreak. Ahmed et al. (2022)

conducted an analysis of the abnormal return of STOXX Europe 600. They found that on 21 February 2022, the abnormal return experienced the most significant decline by -0.41%. Furthermore, during 21 days centered around this date ([-10, +10] days), the cumulative return exhibited a negative value of -4.02%. Hence, Alam et. al. (2022) identified that risk transmission exists among prominent European stock markets to the global market, particularly the G7 and BRICS nations. Eventually, this extraordinary event also heightened risks in various sectoral markets, especially in the energy derivatives market. Moreover, Banerjee (2023) assessed the extreme loss level using VaR estimation for future contract return in the crude oil (0.72), heating oil (0.60), gasoline (0.62), and natural gas (0.66) markets, from January to May 2022.

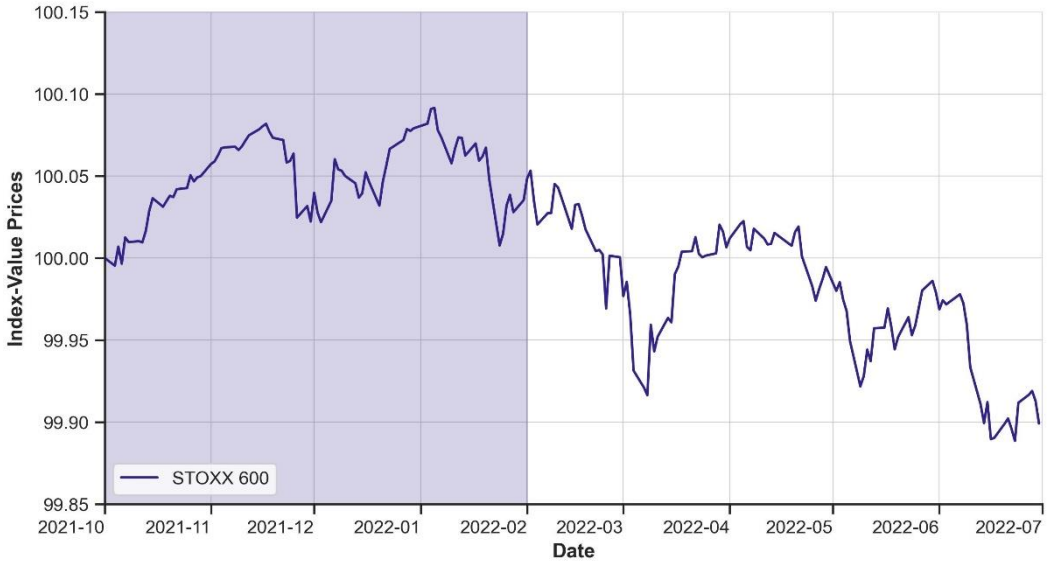

Figure 3.2 The fluctuations of European stock market index during the Russia-Ukraine war (Source: Author's calculation based on Yahoo! Finance data and inspired by Ahmed et. al., 2023)

Based on our preliminary analysis, we believe that the occurrences of COVID-19 and the Russia-Ukraine war have resulted in significant financial losses within the shipping sectors. To the best of our knowledge, only limited studies explain the volatility in the shipping business without explaining the financial losses during the crisis period, given the popular use of VaR in academics and professionals. However, previous studies have adopted this method to quantify the risk level in the maritime industry. Yang et. al. (2022) examined the risk level in dry bulk shipping using this technique, in which they found that the BDI rate returns exposed to more risk subsequent to the USA 2008 Subprime Mortgage Crisis, with an increase from 4.96% to 5.91% seen till 2019. For investment strategies in the shipping sector, Syriopoulos & Roumpis (2009) applied similar methodologies to calculate market-size weighted portfolio

risks of 17 shipping companies from 2002 – 2007. They determined that this portfolio had an average return of 0.59 and an average VaR of -4.11% with the GARCH method. Therefore, this methodology can be implemented in offering investment strategies and asset allocation methodologies tailored to the marine business.

2.5 Literature Review

While VaR is widely used for measuring downside risk, there exist several approaches for selecting the optimal VaR model and evaluating its robustness (backtest). Therefore, the table below will cover the utilization of Value at Risk (VaR) in the present research. Hence, we selected literature that has a relation to COVID-19, the Russia-Ukraine war, and the shipping industry.

Table 2.1 Studies on measuring stock price risk levels using VaR or ES

Authors	Topics	Methodology	Findings
Banerjee (2023)	Energy future contracts risk during the Russia-Ukraine war	Data: Contract prices of crude oil, heating oil, gasoline, and natural gas at NMEX from January 2022 – May 2022 Model: ARMA (1,1)-APARCH (1,1) Backtest: dynamic quantile Significance level: 1% and 5%	In extraordinary situations, ES (or CVaR) can quantify the risk level better than VaR
Das et. al. (2023)	Stock market risk comparison during the AFC, IBB, GFC, and COVID-19	Data: G7 stock index (SPTSX60, CAC, DAX, FTSEMIB, NKY, UKX, INDU) from 1990 – 2022 (Overall), January – December 1998 (AFC), January – December 2002 (IBB), January – December 2008 (GFC) Model: Normal, Student's *t*, Monte Carlo, GARCH Backtest: Kupiec's Proportion of Failure (POF) Significance level: 1% and 5%	In COVID-19, The G7 nations have demonstrated a higher degree of risk as compared to prior crises. Japan has been exposed to the least risk during COVID-19 compared to other nations.
Li et. al. (2022)	Stock market risk in COVID-19 situation for different total market capitalization indices	Data: SSE (mega, mid, small-cap, FTSE (100, 250, small), S&P (500, mid-cap 400, small-cap 600) from 3 July 2019 – 15 December 2020 (6 months for normal period, 6 months shock, and 6 months endurance)	The size of market capitalization has an impact on risk exposure.

Authors	Topics	Methodology	Findings
		Model: EGARCH Significance level: 5%	
Shaik & Padmakumari (2022)	Stock market risk in the BRICS and US during the GFC and COVID-19	Data: IBOVESPA, IMOEX, NIFTY, SSE, JTOPI, and DJIA from 2006 – 2001 (overall), 2008 – 2009 (GFC), and 2020 – 2021 (COVID-19) Model: Normal, Historical, EMWA Backtest: Binomial, Traffic Light, Kupiec's POF and Time Until First Failure (TUFF), Christofferson's conditional coverage, Time Between Failure (TBF) Significance level: 5%	The EWMA approach outperforms the other two estimating methods studied in this study. During a crisis, VaR calculation is thought to poorly estimate the risk level.
Song et. al. (2023)	Stock market risk during the GFC and COVID-19 in China	Data: SSE Composite Index from January 2007 – November 2020 Model: Cornish-Fisher, SGED-EGARCH, QR-SGED-EGARCH Backtest: Failure rate, Kupiec's failure rate Significance level: 1% and 5%	VaR with QR-SGED-EGARCH and Cornish-Fisher methodologies have demonstrated strong performance during crisis periods
Syriopoulos & Roumpis (2009)	Shipping portfolio risk	Data: 17 shipping companies from NYSE, NASDAQ, and AMEX from 2002 – 2007 Model: Normal, Cornish-Fisher, GARCH Backtest: Kupiec's unconditional coverage, independence test, Christofferson's conditional coverage Significance level: 5%	Shipping stocks of smaller firms have less risk compared to larger corporations. Hence, the incorporation of smaller shipping businesses into the portfolio does not elevate the level of risk.

2.6 Problem Definition

According to our preliminary studies, it has been identified that maritime transportation companies are utilizing the sale of stocks as a means of securing financial resources for their operational needs, to which potential investors are presented with the opportunity to consider allocating their investments within this sector. However, investing in stocks is vulnerable to the inherent risks present in the market. Hence, the market price of the shipping industry is

influenced by the recent economic crisis, particularly the impact of the COVID-19 pandemic and the ongoing geopolitical conflict between Russia and Ukraine. Additionally, the Value-at-Risk (VaR) and Expected Shortfall (ES) are popular methods for assessing the degree of risk in managing the assets of a company or investor. Nevertheless, the current body of literature on the subject of risk exposure in the stock market of marine transportation is still limited. Therefore, it is crucial to investigate the risk exposure of the dynamic stock price caused by the recent crises in the aforementioned global shipping enterprises. This study possesses the potential to provide valuable insights for investors in guiding their investment decisions in the maritime business.

Chapter 3. Research Methodology

This chapter presents the methodological technique used to quantify the risk exposure associated with marine transportation stocks. To start this chapter, we provide a statistical measure, the volatility model, along with the concept of value-at-risk (VaR) to evaluate the risk associated with an asset, and a backtesting technique to evaluate the robustness of the risk model. The chapter will conclude by presenting the experimental framework that addresses the statistical concept discussed in this chapter as a technique for estimating risk.

3.1 Statistics of Stock Returns

The fundamental element of the financial risk inherent in an asset arises in its price variations over time under the scope of market dynamics. The price variations or changes of a risky investment over time relative to its initial price are known as returns. Suppose P_t represents the price of a share at a time t, the actual return between the present time t and one-step previous time $t-1$ is defined as $P_t - P_{t-1}$. The relative changes (R_t) between the two specified times would be calculated by using the previous price as the reference point, this is defined as $(P_t - P_{t-1})/P_{t-1}$. Hence, the return of a stock price series can also be expressed as a log-normal return as follows.

$$R_t = \ln\left(\frac{P_t}{P_{t-1}}\right) = \ln\left(1 + \frac{P_t - P_{t-1}}{P_{t-1}}\right) \approx \frac{P_t - P_{t-1}}{P_{t-1}} \tag{3.1}$$

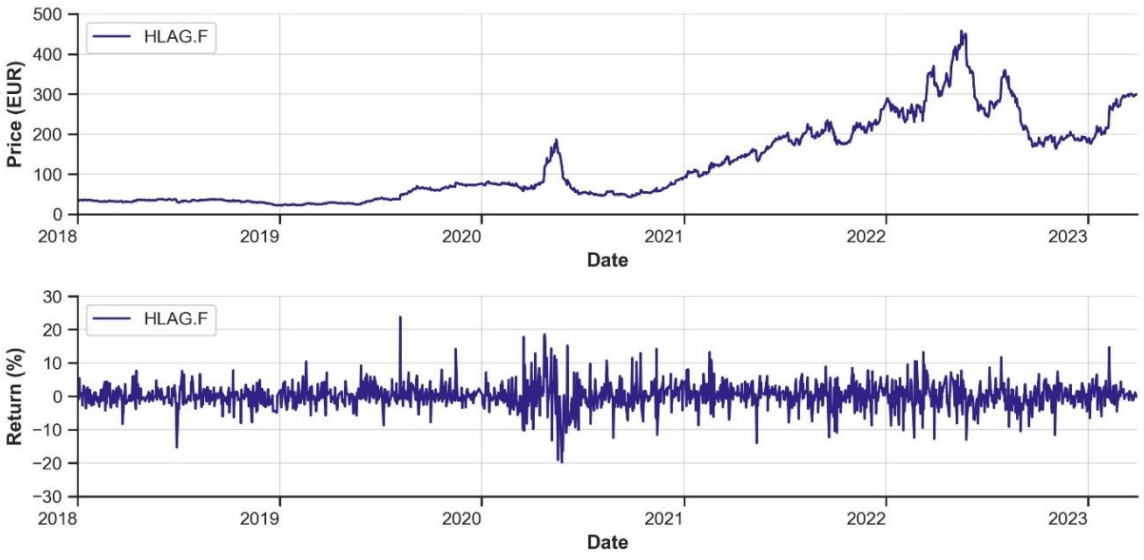

Figure 3.1 Stock price (top) and returns (bottom) illustration (Source: Author's findings)

The log returns approach is frequently utilized in finance and econometrics data due to its additive property. Furthermore, the contrasts between the two approaches are small and it is important to consider the appropriate use of either simple returns (relative changes) or log returns in financial modeling (J.P. Morgan & Reuters, 1996). Hence, we will employ the log return technique and define it as the return value in this research.

Given the significant emphasis on financial risk in the returns of an asset in the present research, it is prudent to become acquainted with the statistical characteristics of the returns series before moving to the proceeding steps for financial modeling. Hence, successful investors, financial researchers, and other participants require statistical metrics of a risky investment to make an informed decision. To comprehend the distribution of a stock return, it is crucial to consider four significant statistical measures, e.g., the mean, variance, skewness, and kurtosis (Kritzman, 1994).

The first moment (mean) provides insight into the central position of the asset return. This measure represents the expected outcomes, the arithmetic average return, or the investment's rate of return. As an illustration, assuming an annual return of around 3% on an initial investment of 1000 USD, the estimated return on that asset would amount to approximately 30 USD over one year. Let T be the number of periods within an investment horizon, the mathematical equation is as follows.

$$\mu = \frac{1}{T}\sum_{t=1}^{T} R_t = \frac{R_1 + R_2 + R_3 + \cdots + R_T}{T} \tag{3.2}$$

The second moment (variance) provides insight into the level of spread or dispersion shown by an asset return. This measure quantifies the extent to which the returns of an investment deviate from its average return. Suppose two asset returns with a variance of 0.4 and 0.2, both exhibiting the same average return, the possibility of an investment return deviating from its expected outcomes is higher on the larger variance asset. Therefore, this statistic provides a greater depth of information about the risk associated with an investment, with a larger variance indicating a riskier asset. In addition, the square root of the variance is frequently referred to as the standard deviation or volatility of an asset. The mathematical equation of the population variance is as follows.

$$\sigma^2 = \frac{\sum_{t=1}^{T}(R_t - \mu)^2}{T} \tag{3.3}$$

The third moment (skewness) offers valuable insight into the leaning direction or asymmetric property of a return distribution. This measure illustrates in which direction the

distribution is pulled to a particular side, either favoring the right side or the left side from its average return. A positively skewed distribution ($S > 0$) has a characteristic of an elongated tail on the right side of the distribution, whereas the tail of a negatively skewed distribution ($S < 0$) is elongated to the left. Typically, it is observed that the average return of a positively skewed distribution tends to be greater than the median (the middle value of the distribution) and mode (the most frequent return). Hence, it is imperative to consider the median value when dealing with a significantly skewed asset.

$$S = \frac{\frac{1}{T}\sum_{t=1}^{T}(R_t - \mu)^3}{\sigma^3} \tag{3.4}$$

The fourth moment (kurtosis) quantifies the degree of peakedness or tailedness shown by a return distribution. The kurtosis value of a standard normal distribution is three ($K = 0$), also recognized as mesokurtic. Additionally, a distribution with a kurtosis value greater than three ($K > 3$), characterized by a high and narrow central peak with wide elongated tails, is referred to as leptokurtic. On the other hand, a distribution with a kurtosis value below three ($K < 3$), commonly referred to as platykurtic, is characterized by a flattened peak and thin tail. Therefore, the kurtosis indicates the degree of narrowness or flatness of the central peak of a "bell" distribution. Furthermore, the leptokurtic distribution is associated with increased risk in extreme occurrences as represented by its tail property.

$$K = \frac{\frac{1}{T}\sum_{t=1}^{T}(R_t - \mu)^4}{\sigma^4} \tag{3.5}$$

3.2 Stock Returns Distribution

The aforementioned statistical measure offers a fundamental feature for comprehending the distribution of asset returns in quantitative financial research. The distribution of a stock return changes illustrates the occurrences of the profit and loss of an asset portfolio during a specified time horizon. By comprehending the returns distribution, investors can obtain a sense of how risky is investing to those assets. In this section, we will emphasize two types of distributions: the normal and the Student's *t* distribution.

The normal distribution is frequently seen as the most assumed distribution for various statistical data, including financial returns. This distribution has a symmetrical bell-shaped curve, in which the likelihood of random variables is concentrated around the mean or

expected values. The normal distribution is characterized by two parameters, the mean ($\mu \in \mathbb{R}$) and the standard deviation ($\sigma > 0$), which are labeled as $X \sim N(\mu, \sigma^2)$. This distribution is represented in a probability density function as follows (Belzunce, 2016).

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2} \tag{3.6}$$

Historically, it has been common practice to assume that stock returns have a normal distribution and can facilitate research or professional applications due to their simplicity. However, the current stock returns are established to depart from normal probability distribution assumptions due to their tail property, which signifies the occurrence of extreme events that can significantly impact a portfolio allocation (Hu & Kercheval, 2010). Additionally, the Student's *t* distribution is an alternative probability function that can effectively capture the heavy tail features observed in stock returns.

The Student's *t* distribution is defined by three parameters, the mean ($\mu \in \mathbb{R}$), the standard deviation ($\sigma > 0$), and the degrees of freedom (ν), which are denoted as $X \sim t_\nu(\nu, \mu, \sigma^2)$. The value of the degrees of freedom in this particular distribution determines the excess kurtosis, in which the higher degrees indicate the narrowness of the central position and elongated tails. By utilizing the gamma function (Γ), the Student's *t* probability density function is constructed as follows.

$$f(t) = \frac{\Gamma\left(\frac{\nu+1}{2}\right)}{\sqrt{\nu\pi}\,\Gamma\left(\frac{\nu}{2}\right)} \left(1 + \frac{t^2}{\nu}\right)^{-\frac{\nu+1}{2}} \tag{3.7}$$

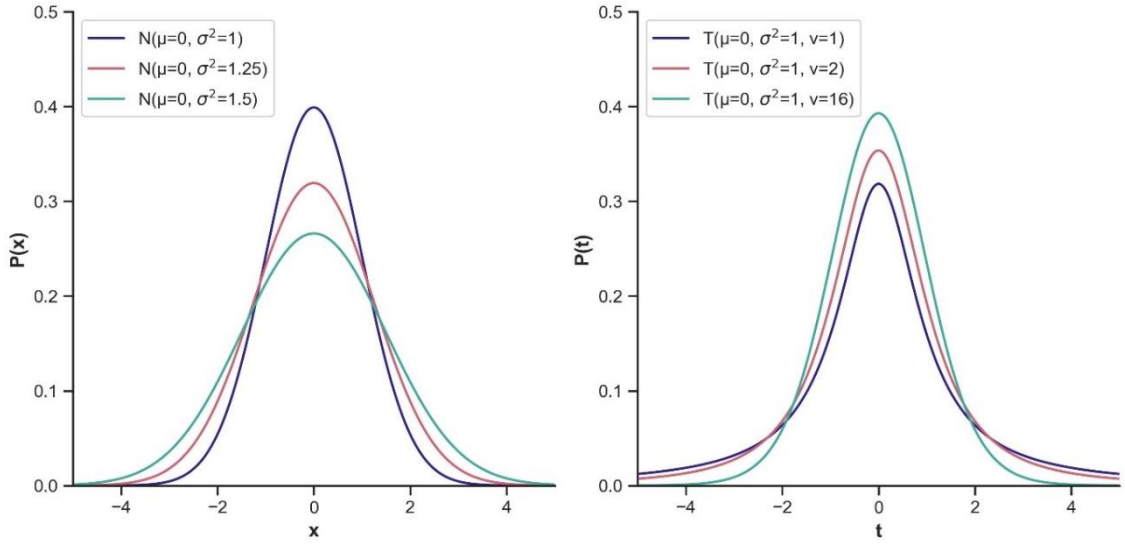

Figure 3.2 The normal (left) and Student's t (right) distribution (Source: Author's illustration)

Given the importance of understanding the riskiness of an asset depicted by the tail properties of the return distribution, it is necessary to conduct a normality test before making assumptions for investment decisions to avoid inaccurate estimates and losses. The objective of the normality test is to determine whether the empirical distribution deviates from the normal distribution assessed by a test statistic. There are several methods for evaluating the normality characteristics of the return distribution, e.g., Jarque–Bera (J–B), Shapiro–Wilk (S–W), Kolmogorov–Smirnov test.

The Kolmogorov–Smirnov (K–S) test was originally invented by Vladimir Ivanovich Smirnov (Kolmogorov, 1939) and developed by Massey (Massey, 1952) to compare two datasets. This test is considered to be a nonparametric approach that does not assume their distribution and is applicable to various dataset. However, compared to other method, this approach is less powerful and more conservative at the center of the distribution rather than at the tail (Mason & Schuenemeyer, 1983). Meanwhile, the S–W test (Shapiro & Wilk, 1965) shows a stronger performance than K–S as an alternative nonparametric method for detecting deviations from normal distribution (Uyanto 2022). Nevertheless, this approach is highly sensitive to large datasets and limited to smaller sample sizes (Uttley, 2019).

In contrast, the J–B test (Jarque & Bera, 1980; 1987) may yield inferior results for small sample sizes (Urzúa, 1996). Despite its limitation on short tail distribution, this test is the most powerful at capturing medium to long tail distribution (Thadewald & Büning, 2007). Therefore, we will utilize the J–B test in this study due to its sensitivity in evaluating the extreme events evidenced by the long plump tail properties. The J–B test statistic is defined as,

$$JB = \frac{n}{6}\left(S^2 + \frac{(K-3)^2}{4}\right) \tag{3.8}$$

where S and K represent the sample skewness and kurtosis from Equation (3.4) and (3.5) respectively. At significance level α, the null hypothesis (H_0) is rejected if the test statistic $JB > \chi^2_{1-\alpha,2}$, implying that the data are not normally distributed.

3.3 Volatility Model

We have now recognized the significance of obtaining in-depth information on stock return distribution concerning the profits (or losses) in investing endeavors. As part of the distribution measures, the variation or volatility in returns poses a significant challenge to predict when

making an important decision. Therefore, we engage in preliminary studies in selecting volatility-fitting approaches on the return distribution to enhance our risk model performance.

The Generalized Autoregressive Conditional Heteroskedasticity (GARCH) is a popular methodology in the fields of finance and econometrics studies to analyze time-varying volatility (Smolović, 2017; Das et al., 2023). The GARCH model, proposed by Bollerslev (1986), corresponds to a generalized expansion of the ARCH model originally developed by Engle (1982) to estimate the volatility of UK inflation. The primary purpose of employing the GARCH model is to estimate the dispersion properties of stochastic processes, e.g., stock return. Whereby the variance is reliant on the past values, i.e., the estimation of variance at a previous point $t-1$ influences the current variance at the point t. The GARCH forecasting model is presented as follows.

$$\sigma_t^2 = \omega + \sum_{i=1}^{q} \alpha_i \epsilon_{t-i}^2 + \sum_{i=1}^{p} \beta_i \epsilon_{t-i}^2 \tag{3.9}$$

$$\epsilon_t = \sigma_t e_t \tag{3.10}$$

$$r_t = \mu_t + \epsilon_t \tag{3.11}$$

The coefficients $\omega > 0$, $\alpha \geq 0$, $\beta \geq 0$ are required to ensure that the conditional variance σ^2 remains positive. The constant coefficient, denoted as ω, represents the unconditional variance. The α_i parameter refers to the autoregressive factors that record the response of the previous shocks. The β_i parameter represents the variance coefficients that indicate the persistence of the shocks. The term ϵ_t denotes the residual term in the model. The e_t variable is the innovation product or white noise that is independent and identically distributed (i.i.d.) to a specified distribution. In addition, if the β_i coefficient is assigned to zero, the resulting model is classified as an ordinary ARCH process.

Although the ARCH/GARCH model is powerful in recognizing the distinction between conditional and unconditional volatility in stock returns, this method operates under the assumption of a symmetric response of shocks to the return volatility. Therefore, Glosten, Jagannathan, and Runkle (Glosten et al., 1993) introduced an asymmetric or leverage component (γ_i) to the GARCH process. They also proposed the variable $I_{[\varepsilon_{t-i}<0]}$, to which the value is equal to one when the argument is satisfied. This modification is known as GJR-GARCH, as shown in Equation (3.12).

$$\sigma_t^2 = \omega + \sum_{i=1}^{q} \alpha_i \epsilon_{t-i}^2 + \sum_{i=1}^{o} \gamma_i \, \epsilon_{t-i}^2 I_{[\epsilon_{t-i}<0]} + \sum_{i=1}^{p} \beta_i \sigma_{t-i}^2 \tag{3.12}$$

The preceding concept elucidates the advantages and limitations associated with the volatility modeling. Therefore, we are motivated to investigate and compare the different approaches in explaining the volatility witnessed in the recent crises. We select the simple GARCH(1,1) and GJR-GARCH(1,1,1) models based on the sufficiency of these specifications in explaining the risk exposure, as demonstrated by the previous studies. Furthermore, we also employ the assumptions of normal and Student's *t* distribution to generate the standardized residuals.

3.4 Value-at-Risk Estimation

As frequently mentioned in the previous chapter, Value-at-Risk (VaR) is one of the popular techniques to assess the market risk exposure of the global stock market. Given the importance of managing assets and instruments of the company that are subject to market circumstances from monetary losses that harm the organization, risk measurement is the initiation stage of risk management. Therefore, this section briefly describes the concept behind the popular VaR estimation as part of the risk management strategies that will be used for this research.

Before addressing the concept of VaR, it would be useful to provide a quick overview of other approaches used in describing the level of riskiness in financial risk management, such as the beta coefficient and Sharpe ratio. The beta test has been used extensively to explain the degree of sensitivity exhibited by a stock's return in response to global economic and financial fluctuations, relative to the corresponding market return, and examines the significance of such responsiveness on a portfolio (Morelli, 2011; Bodnar et al. (2019); Chakrabarti & Das, 2021). Despite its straightforward interpretation of stock volatility, in which a stock's beta with a value greater than one ($\beta > 1$) implies greater volatility than the market, the beta coefficient assumes that the relationship between the stock of interest and the market is linear, whereas the response during extreme events such as financial crises should be asymmetric (Alexeev et al., 2019).

Moreover, the Sharpe ratio possesses a greater capacity to estimate the adjusted return or compensation provided to investors in exchange for assuming increased risk inside their portfolio in dynamic market (Coates & Page, 2009; Benjlijel & Mansali, 2021). However, this ratio experiences less robustness when confronted with outliers within a distribution and is vulnerable to the manipulation of risk-adjustment features to modify the investor's trading strategy (Cvitanić et al., 2007; K. C. & Laha, 2021). Additionally, the VaR technique is often employed in several studies as a more efficient means of assessing potential financial losses under dynamic market conditions (Li et al., 2022; Shaik & Padmakumari, 2022; Das et al.,

2023). Although this estimation demonstrates an established capacity to express the level of risk exposure, it is susceptible to potential inaccuracy due to the underlying distribution assumption. Therefore, we conducted a thorough preliminary study to select the distribution model wisely.

The concept of VaR refers to the statistical estimation of the worst possible financial losses that a company's assets could encounter over a time horizon (Linsmeier & Pearson, 2000). Since J.P. Morgan released the RiskMetricsTM system to measure trading portfolio risks in October 1994 (J.P. Morgan & Reuters, 1996), the use of VaR has become a market practice. Hence, the Basel Committee on Banking Supervision (BCBS, 2016) suggests the VaR measurements as a standard for practitioners to assess their risk exposure. Moreover, VaR possesses the capacity to evaluate risk across a wide spectrum of securities and risk aspects, extending beyond market risk, because of its explicit expression in quantifying the potential losses.

The mathematical expression of VaR is provided by Belzunce et al. (2016), in which the VaR is defined as the quantile function, F^{-1}, of a random variable X at a point p (see Equation 3.13). The random variable X can be expressed as the profit and loss of an asset (or portfolio), F^{-1} is its inverse function of the probability distribution, then the VaR$[X; p]$ is the greater value for $100p\%$ occurrences. Therefore, the VaR gives an expression of the utmost (maximum) risk based on the level p location. This expression makes the tail behavior of the quantile probability function essential for the accurate computation of Value at Risk (VaR).

$$VaR[X; p] = F^{-1}(p), \text{ for all } p \in (0,1) \tag{3.13}$$

Based on the aforementioned formula, the VaR estimation can be calculated under the assumption that the stock returns adhere to the standard normal (N) and Student's t (t_ν) distribution functions (Hu & Kercheval, 2010).

$$VaR_p = \mu + \sigma N^{-1}(p) \tag{3.14}$$

$$VaR_p = \mu + \sigma {t_\nu}^{-1}(p) \tag{3.15}$$

To perform the VaR calculation, Holton (2013) emphasizes on determining several aspects. First, the time horizon t over the possible loss is estimated. For example, one trading day, a week of trading days, or years. Second, the desired quantile p position of possible loss to which risk is accepted. This value is associated with the statistical confidence level $(1 - \alpha)$ and the significance level (α). Third, the monetary unit in which the potential loss is expressed. However, the VaR can also be represented as a percentage relative to the initial value for a

supple expression. As an illustration, supposing the estimated VaR for a certain portfolio in a specified time horizon is 1% and the initial value of such portfolio is 10,000 USD, the corresponding VaR in monetary terms would amount to 1,000 USD.

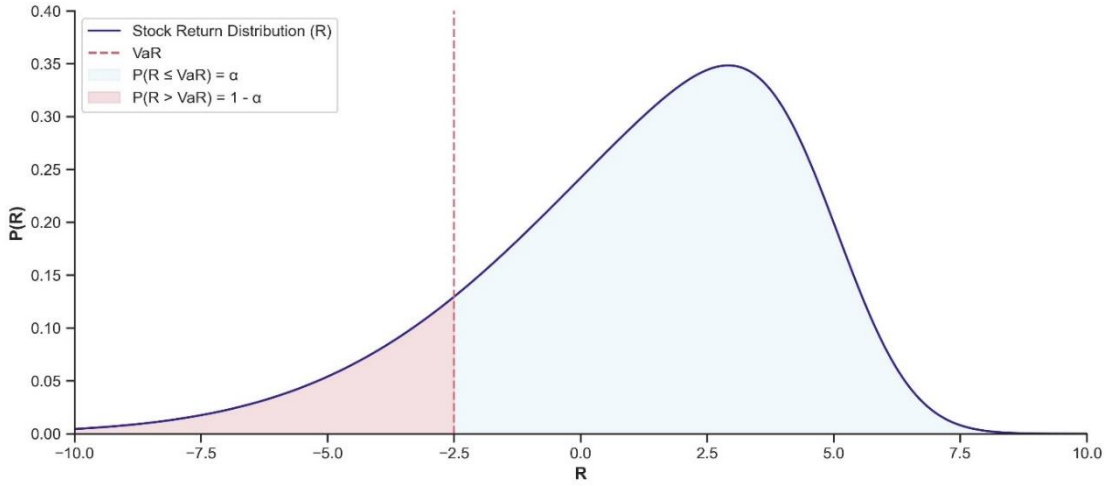

Figure 3.3 Graphical illustration of VaR estimation on profits and losses distribution (Source: Author's elaboration)

However, the VaR estimation is considered inadequate in capturing the tail character of the loss distribution, particularly during times of financial crisis. On the other hand, the Expected Shortfall (ES) can assess the tail character better. The mathematical expression of ES also provided by Hu & Kercheval (2010), which represents the expected losses below VaR. Similarly, ES calculation can be calculated under the standard normal (N) and Student's t (t_ν) distribution functions, as expressed in Equation (3.16 – 3.18), where ψ and g_ν represent the density function of standard normal and Student's t.

$$ES[X;\alpha] = E[X|X \leq F^{-1}(p)], \text{ for all } p \in (0,1) \tag{3.16}$$

$$ES_p = \mu + \sigma \frac{\psi\left(\Phi^{-1}(p)\right)}{1-p} \tag{3.17}$$

$$ES_p = \mu + \sigma \frac{g_\nu\left(t_\nu^{-1}(p)\right)}{1-p}\left(\frac{\nu + \left(t_\nu^{-1}(p)\right)^2}{\nu - 1}\right) \tag{3.18}$$

Following the selection of GARCH models, we proceed to calculate the parametric VaR and ES by utilizing the assumptions of standard normal and Student's *t* distribution. The objective is to highlight the effects of extreme returns occurrences on the return distribution through a comparative analysis of different techniques, in which the tail characteristics of the stock returns distribution indicate the extreme returns.

3.5 Backtesting Procedure

To evaluate how well the selected models explain the risk exposure during the specified time horizon, we need to examine the accuracy and reliability of the model. We will describe the backtesting procedure as an attempt to assess the robustness of the models. The backtesting procedures provided in this section are executed through Kupiec's Proportion of Failure (POF).

Kupiec (1995) proposed the POF test, also known as likelihood ratio, to determine the model accuracy by comparing the number of expected violations to the number of realized violations. The realized violations occur when the observed return falls below the computed VaR or ES. The null hypothesis in this test, implying the realized probability equal to the theoretical probability, is rejected if the test statistic is statistically significant at a level p determined by the chi-square distribution with one degree of freedom ($\chi^2_{k=1}$). The following equation presents the test statistic of Kupiec's POF.

$$LR_{UC} = -2\ln\left[\frac{(1-p)^{N-x}p^x}{\left(1-\frac{x}{N}\right)^{N-x}\left(\frac{x}{N}\right)^x}\right] \tag{3.19}$$

The probability level p refers to the theoretical probability or the significance level, typically expressed as values such as 1% and 5%. The N component denotes as the length of sample, while the x component represents the total number of violations seen in the sample. Therefore, the x/N expression gives the probability of the realized or observed violation.

3.6 Experimental Framework

To examine the level of risk demonstrated by the selected maritime transportation stocks during the COVID-19 pandemic and the Russia-Ukraine war, we adopt the framework outlined in this section. We will explain the overarching methodology in our study, describe the approach in which we provide the result of risk assessment in alignment with our research purpose, and discuss the sensitivity scenarios regarding our model selection.

Before our risk assessment discussion, we will address the procedure for retrieving maritime transportation stock data that will be examined. We will examine a total of 216 individual traded stocks across 36 international exchange markets, in which the selection process will be described in the next chapter. We select the maritime transportation stocks by only considering their primary exchange market as a representation of the share price of

publicly listed companies while avoiding the influence of currency rate differences. Hence, we categorize the collected stock within maritime sub-sectors to explain the varying levels of risk experienced by each type of market.

As we are interested in the effects of COVID-19 and the Russia-Ukraine war on the stock return, we computed the risk measurement based on the daily closing price of the selected stocks from the beginning of January 2018 – the end of March 2023 from Yahoo! Finance (215 stocks) and TradingView (1 stock, FESH.ME). This information is elaborated in the following chapter. Subsequently, we describe the data through their descriptive statistics and discuss the result of the Jarque–Bera normality test. Moreover, the risk level is determined by the calculation of Value-at-Risk (VaR) and Expected Shortfall (ES) methodologies, which are applied throughout the corresponding whole time horizon. Subsequently, we examine the level of risk exposure and backtest within several time regimes, which are (1) the tranquil period or pre-shock period (1 January 2018 – 31 December 2019), (2) the COVID-19 pandemic shock (1 January 2020 – 15 January 2021), (3) the intra-pandemic of COVID-19 (16 January 2021 – 31 January 2022), and (4) the Russia-Ukraine war (1 February 2022 – 31 March 2023).

We include the tranquil period (pre-shock, Regime 1) as a reference to analyze the effect of the shock. For the COVID-19 shock period (Regime 2), we follow the outbreak event that summits the volatility. Furthermore, we define the intra-pandemic period (Regime 3) as the endurance horizon of the market while the world is still experiencing the pandemic. For the war period (Regime 4), we presume that the prevailing market condition has alleviated near the end of the selected period from the pessimistic sentiment but still needed to be captured while the geopolitical tension has not shown signs of diminishing. The time horizon length for the selected regimes is determined in accordance with the recommendation of the Basel Committee (BCBS, 2016) to report the VaR (or ES) and backtest results over a minimum of 250 trading days.

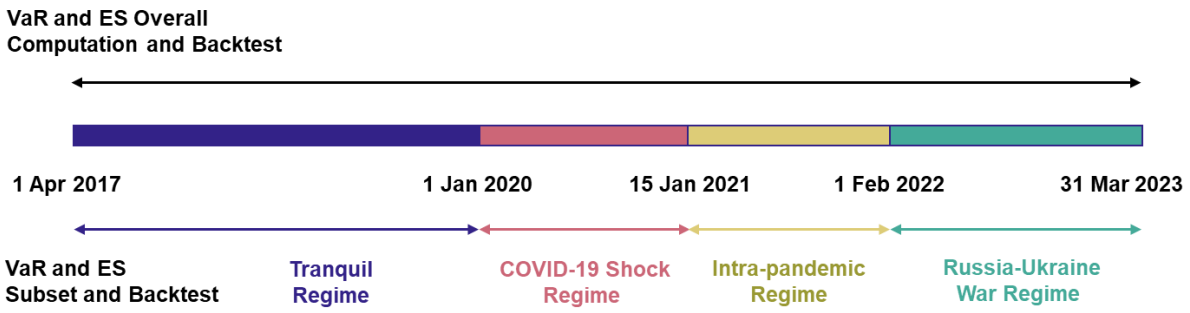

Figure 3.4 The time horizon of the risk level computation and discussion (Source: Author's elaboration)

Additionally, the Basel Committee recommends using varying levels of significance (α) to assess the robustness of the model, e.g., 1% and 5%. However, we will employ a significance level of 5% to concentrate on the sensitivity of distribution choices allegedly to the volatile nature of the shipping industry. Hence, we designed four scenarios to incorporate this thought. As previously described, the output of each of the scenarios will yield a pair of VaR and ES values. However, the subsequent analysis will follow the time regimes. Furthermore, the eight scenarios are developed by combining two distribution assumptions on residuals and value-at-risk quantile (normal and Student's *t*), and two volatility models (GARCH and GJR-GARCH). We integrate different approaches in our study to observe the sensitivity of our model. Nevertheless, we will focus on analyzing the most optimal output from the combination in the discussion chapter while presenting the sensitivity analysis in the backtest chapter, and the detailed records will be provided in the Annex.

Table 3.2 The four scenarios detail

Scenario	Volatility Model	Distribution	Scenario	Volatility Model	Distribution
1	GARCH(1,1)	Normal	**3**	GJR-GARCH(1,1,1)	Normal
2	GARCH(1,1)	Student's *t*	**4**	GJR-GARCH(1,1,1)	Student's *t*

To concisely illustrate the statistical concept employed inside the experimental framework, we offer the following visual representations.

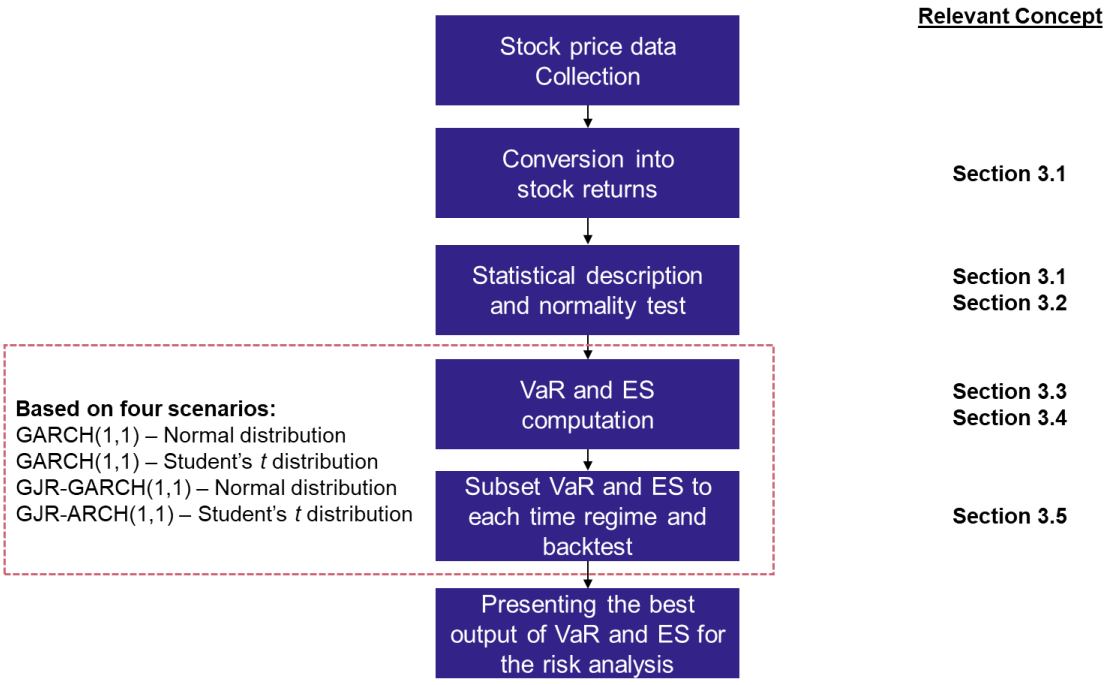

Figure 3.5 Experimental framework and relevant concepts

Chapter 4. Public Listed Maritime Transportation Companies

In the pursuit of acquiring maritime transportation stocks, our study commences by examining the presence of maritime public companies in global stock markets. This chapter presents a comprehensive examination of the existing shipping stocks from market and sub-sector perspectives. Furthermore, this chapter concludes with a summary of the investigation.

4.1 Identification of Publicly Listed Companies

To enhance comprehension of maritime transportation stocks' performance, we conducted a thorough preliminary investigation aimed at identifying publicly traded stocks. The chapter starts with the identification process of publicly traded maritime companies, followed by a summary of the data. Moreover, the stocks will be categorized into several sub-sectors, and the process of this categorization will be elaborated on in this section.

Initially, we employed a common industry classification filter on each exchange market website to find the listed maritime transportation firms. We only concentrated on stocks that were traded on the primary market as a representation of the share price of publicly listed companies while avoiding the influence of currency rate differences for dual-listed (or multi-listed) companies. Recognizing the variability in industry classification conventions and features across different exchange markets, we also included the TradingView sector classification in our approach. TradingView is a widely used charting platform that is utilized by experts, traders, and investors to effectively identify and analyze potential trading opportunities across global markets.

Following the initial identification of listed maritime transportation companies, we proceeded to a comprehensive classification into seven sub-sectors. These sub-sectors were established according to the company's expertise in handling specific types of commodities. To ensure the reliability of our classification, we implemented a cross-validation process of a listed company with its corresponding business page. This validation process encompassed a detailed assessment of the company profiles, fleet list information, annual reports, and other relevant data obtained from reliable business sources.

The seven sub-sectors in our definition are (1) dry bulk, (2) liquid bulk, (3) container, (4) passenger, (5) vehicle and project, (6) diversified fleet, and (7) assorted port. The dry bulk sub-sector refers to the transportation service of substantial parcels of unpacked goods or raw materials, including coal, iron ore, mineral, grain, or other solid agricultural products. The liquid bulk sub-sector refers to the transportation service of enclosed tank products, including crude

oil, petroleum, gasoline, liquid natural gas (LNG), liquid petroleum gas (LPG), chemicals, or other product tankers. The container sub-sector is defined as the transportation service for standardized and specialized ocean containers, aboard liner ships. The passenger sub-sector includes ferry transportation services and cruise lines. The vehicle and project sub-sector refers to the ro-ro (roll-on/roll-off) services designed to carry wheeled cargo such as automobiles, motorbikes, trucks, or other heavy equipment and machinery projects that may be loaded into specialized carriers with wheels.

Additionally, corporations that own portfolios of managing a diverse range of products through their fleet operations, such as a company that operates both dry bulk and liquid bulk vessels, are considered into diversified fleet sub-sectors. In the present study, we further define ports and terminals as a sub-sector in the shipping industry, acknowledging their crucial role as an integral part of maritime transportation activities. Hence, port and terminal companies that exclusively handle a single type of commodity are assigned into the preceding five sub-sectors, e.g., a company exclusively operating a coal terminal would fall into the dry bulk. Whereas, companies that own a diverse portfolio of multiple commodities and those engaged in port area development activities are classified under the distinct assorted port sub-sector. Figure 4.1 below provides a visual representation of our classification approach.

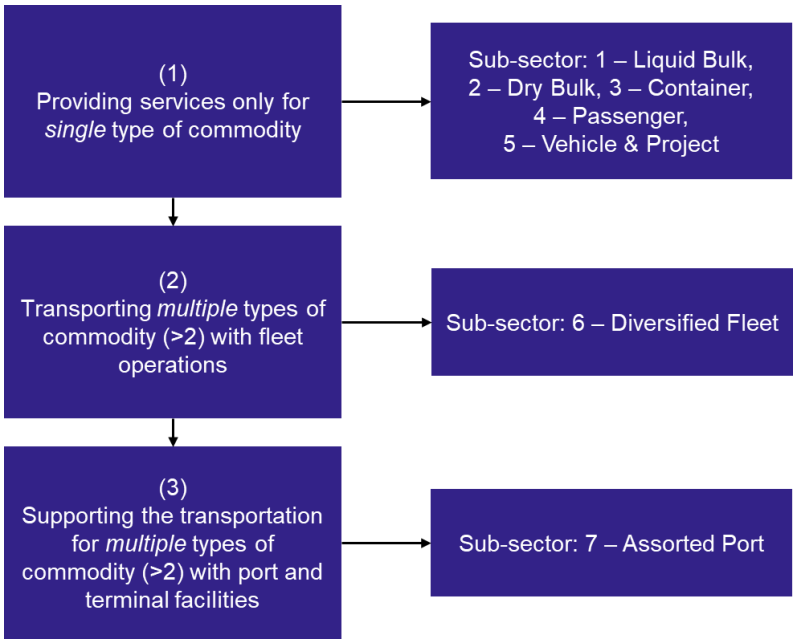

Figure 4.1 Schematic overview of maritime public companies' sub-sector identification

Acknowledging the limitations in the valuation of companies listed on stock exchanges that are solely based on the analysis of available stock number information, we also recorded the market capitalization of each listed firm. Gaining insights into market capitalization is

important in comprehending the size of a business and its growth potential, hence providing essential guidance to evaluate investment strategies. Market capitalization is determined by the multiplication of the total outstanding shares and the corresponding stock value at a certain point in time. In this study, we obtained these data points from Yahoo! Finance, to capture the prevailing market condition in the early period of 2023. This approach was adopted to augment the comprehensiveness of our research for both stock exchanges and maritime transportation sub-sectors.

4.2 Overview of Publicly Listed Companies

According to our preliminary investigation, we have identified a collective count of 216 firms that are publicly listed on 36 worldwide main exchange markets and actively traded since 1 January 2018. These findings are shown in Figure 4.2, accompanied by the sub-sector classification. This comprehensive depiction showcases the scope of our research, which enhances our comprehension of the business landscapes by delineating the presence of these maritime transportation corporations in the international financial market. Furthermore, detailed information regarding publicly traded maritime transportation companies is presented in Annex.

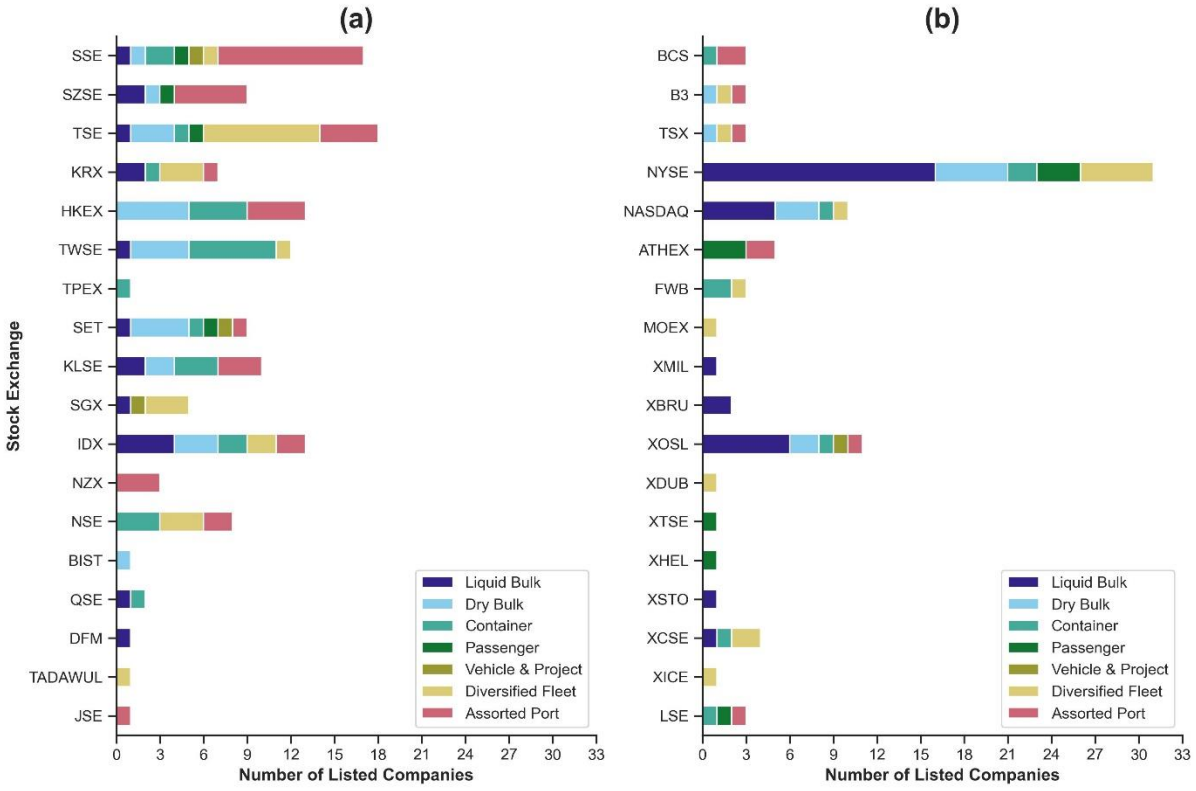

Figure 4.2 The number of identified publicly listed maritime transportation firms across global stock exchanges (Source: Author's findings)

We discovered that the majority of maritime transportation companies are publicly listed on the New York Stock Exchanges (NYSE) as the biggest market, with a collective count of 31 firms. The Tokyo Stock Exchange (TSE) has the next highest representation of listed shipping companies, with a total of 18 firms. Following closely is the Shanghai Stock Exchange (SSE) with 17 firms, while the Hong Kong Exchange (HKEX) and Indonesia Stock Exchange (IDX) both have 13 companies listed in this sector. From a regional market perspective, the US market comprises 41 shipping corporations that are primarily listed on the NYSE and NASDAQ exchanges. Meanwhile, the Chinese market contains a total of 26 companies, aggregated from the SSE and SZSE (Shenzhen Stock Exchange) market.

It is worth noting that East Asia as a regional market is characterized by an abundant presence of maritime transportation firms, with a total of 77 firms originating from China, Hong Kong, Taiwan, Japan, and Korea. Additionally, the European regional market has served as a domicile for 35 companies, including those from Greece, Germany, London, Russia, Belgium, Denmark, Finland, Iceland, Italy, Norway, Sweden, and Estonia. These European companies' shares are being traded in country-based exchange (ATHEX, FWB, MOEX, and LSE) or pan-region exchange group (Euronext and Nasdaq Nordic).

While numerous domestic shipping companies are primarily listed in the US market, there is also a notable presence of foreign cross-border-listed shipping companies. These include companies that have their origins in nations situated in transatlantic countries, such as Greece, the UK, and Norway. This prevalence of foreign cross-listings is influenced by various motivations, such as enhancing external funding for capital-intensive investments, expanding operational sales, diversifying the shareholder base to foster an international network, and attracting substantial trading activity, resulting in higher turnover of stock sales compared to the domestic market (Pagano et. al., 2002; Lins et. al., 2005; Halling et. al., 2008).

However, this situation differs in other regional markets, for instance, the East Asia, Southeast Asia, Oceania, India, the Middle-East, and Africa. The stock exchanges in these regions are predominantly featured by domestic shipping businesses. Hence, the domestic market remains preferable since investors can get a more in-depth knowledge and comprehensive information to effectively assess the company's business strategy (Gehrig, 1993; Yang et. al., 2023).

Despite the majority of shipping companies' stock being traded on the NYSE market, this may not apply to market capitalization in 2023. As seen in Figure 4.3a, the total market capitalization of the listed companies in NYSE placed as number three worldwide with an estimation of 69.8 billion USD. Additionally, the liquid bulk sub-sector is observed to be dominating the NYSE market, comprised of 16 tanker businesses. Therefore, this situation highlights the dynamic relationship between market trading and capitalization in the maritime transportation industry.

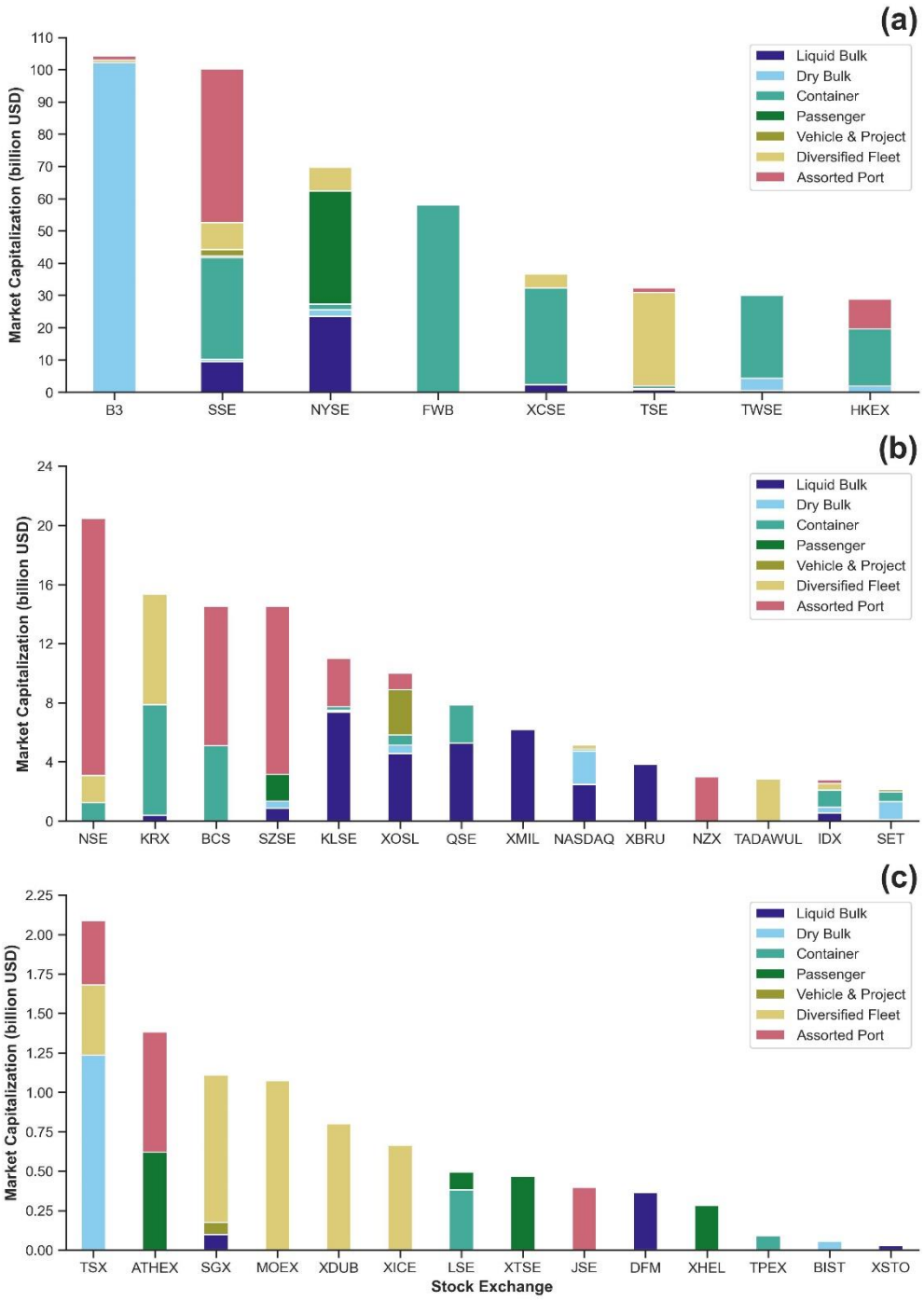

Figure 4.3 The market capitalization of listed maritime transportation firms grouped by the stock exchanges and classified into sub-sectors (Source: Author's calculation)

Table 4.1 Exchange markets and the corresponding abbreviation

Exchange Markets	Abbr.	Exchange Markets	Abbr.
Shanghai Stock Exchange	SSE	Santiago Stock Exchange	BCS
Shenzhen Stock Exchange	SZSE	Brasil, Bolsa, Balcão	B3
Tokyo Stock Exchange	TSE	Toronto Stock Exchange	TSX

Exchange Markets	Abbr.	Exchange Markets	Abbr.
Korea Exchange	KRX	New York Stock Exchange	NYSE
Hong Kong Exchange	HKEX	Nasdaq Stock Market	NASDAQ
Taiwan Stock Exchange	TWSE	Athens Stock Exchange	ATHEX
Taipei Exchange	TPEX	Frankfurt Stock Exchange	FWB
Stock Exchange of Thailand	SET	Moscow Exchange	MOEX
Bursa Malaysia	KLSE	Borsa Italiana	XMIL
Singapore Exchange	SGX	Euronext Brussels	XBRU
Indonesia Stock Exchange	IDX	Oslo Børs	XOSL
New Zealand's Exchange	NZX	Euronext Dublin	XDUB
National Stock Exchange of India	NSE	Nasdaq Tallinn	XTSE
Borsa Istanbul	BIST	Nasdaq Helsinki	XHEL
Qatar Stock Exchange	QSE	Nasdaq Stockholm	XSTO
Dubai Financial Market	DFM	Nasdaq Copenhagen	XCSE
Saudi Stock Exchange	TADAWUL	Nasdaq Iceland	XICE
Johannesburg Stock Exchange	JSE	London Stock Exchange	LSE

On the contrary, the B3 (Brasil, Bolsa, Balcão) market has the greatest capitalization, amounting to a total of 104.3 billion USD from the three listed companies, with the dry bulk sector making the most significant contribution. Furthermore, the SSE market is recognized as the second largest market capitalization on a global scale, with an approximate valuation of 100.2 billion USD, dominated by assorted port companies. This variation is also exhibited on the Frankfurt Stock Exchange (FWB, 58.3 billion USD) and the Nasdaq Copenhagen (XCSE, 36.7 billion USD) as the next highest market capitalization, which is mostly driven by the container business. The remaining biggest market of the shipping stocks are TSE (Tokyo Stock Exchange, 32.4 billion USD), TWSE (Taiwan Stock Exchange, 30.2 billion USD), and HKEX (28.8 billion USD). To briefly present the size of the specific maritime transportation stocks, Table 4.1 provides a representative of each market size (large, medium, and small) from the ten largest markets.

In general, Figure 4.3a presents an overview of the top ten worldwide stock exchanges ranked by total capitalization, while Figure 4.3b and Figure 4.3c illustrate the remaining market capitalization distribution. The total market capitalization of the maritime transportation stocks globally is estimated at around 589.7 billion USD. As a comparison, the total market capitalization of all sector stocks listed on the New York Stock Exchange was almost 24.3 trillion USD in May 2023, while the NASDAQ market followed closely with 20.1 trillion USD, and the SSE market with 6.9 trillion USD (Statista Research Department, 2023). Having considered the aforementioned data, it can be emphasized that the global maritime transportation sector comprises a mere 2.4% of the largest stock market worldwide.

To provide a concise summary of the market size of the maritime transportation stocks, Table 4.2 has been complied to showcase a selection from various markets, encompassing large, medium, and small-cap stocks. This table presents a comprehensive cross-section, illustrating the diverse sizes of stocks traded within the eight most prominent markets for maritime transportation companies as explained above.

Table 4.2 Shipping stock selection and market size representation based on the biggest market (Source: Author's findings)

Exchange Markets – Companies	Ticker	Sub-sectors	Cap. (mln. USD)
Brasil, Bolsa, Balcão (B3)			
Porto Sudeste VM S.A.	PSVM11.SA	Dry Bulk	102,127.2
Santos Brasil Participações S.A.	STBP3.SA	Assorted Port	1,373.5
Log-In Logística Intermodal S.A.	LOGN3.SA	Diversified Fleet	785.6
Shanghai Stock Exchange (SSE)			
COSCO SHIPPING Holdings Co., Ltd.	601919.SS	Container	26,718.1
Guangzhou Port Company Ltd.	601228.SS	Assorted Port	3,374.7
Bohai Ferry Group Co., Ltd.	603167.SS	Passenger	491.2
New York Stock Exchanges (NYSE)			
Royal Caribbean Cruises Ltd.	RCL	Passenger	16,551.0
Danaos Corporation	DAC	Container	1,089.6
Dynagas LNG Partners L.P.	DLNG	Liquid Bulk	104.5
Frankfurt Stock Exchange (FWB)			
Hapag-Lloyd AG	HLAG.F	Container	57,138.2
Hamburger Hafen und Logistik AG	HHFA.F	Container	949.4
Ernst Russ AG	HXCK.F	Diversified Fleet	184.6
Nasdaq Copenhagen (XCSE)			
A.P. Møller - Mærsk A/S	MAERSK-A.CO	Container	29,959.2
TORM PLC.	TRMD-A.CO	Liquid Bulk	2,361.4
Dampskibsselskabet Norden A/S	DNORD.CO	Diversified Fleet	2,146.4
Tokyo Stock Exchange (TSE)			
Nippon Yusen Kabushiki Kaisha	9101.T	Diversified Fleet	12,309.2
Meiji Shipping Co., Ltd.	9115.T	Diversified Fleet	162.9
Hyoki Kaiun Kaisha, Ltd.	9362.T	Dry Bulk	19.5
Hong Kong Exchange (HKEX)			
Orient Overseas (International) Ltd.	0316.HK	Container	11,760.7
Tianjin Port Development Holdings Ltd.	3382.HK	Assorted Port	447.1
Courage Investment Group Ltd.	1145.HK	Dry Bulk	10.9
Taiwan Stock Exchange (TWSE)			
Evergreen Marine Corp. (Taiwan) Ltd.	2603.TW	Container	10,958.0
Sincere Navigation Corp.	2605.TW	Dry Bulk	469.0
China Container Terminal Corp.	2613.TW	Container	98.9

From a sectoral perspective, as shown in Figure 4.4, the liquid bulk companies constitute the largest proportion of corporations that are listed on global stock markets, with a total of 49 companies. However, these figures are different from the features of the market capitalization, in which the container sub-sector has the biggest value (185.3 billion USD) from 34 stocks, whilst the liquid bulk market was only valued at as much as 68.5 billion USD. This makes the

container business considered to the biggest market and more favored when compared to the liquid bulk market, hence, other sub-sectors. In addition, the number of liquid bulk stocks is closely followed by the number of assorted port sub-sectors, which comprises a total of 44 companies.

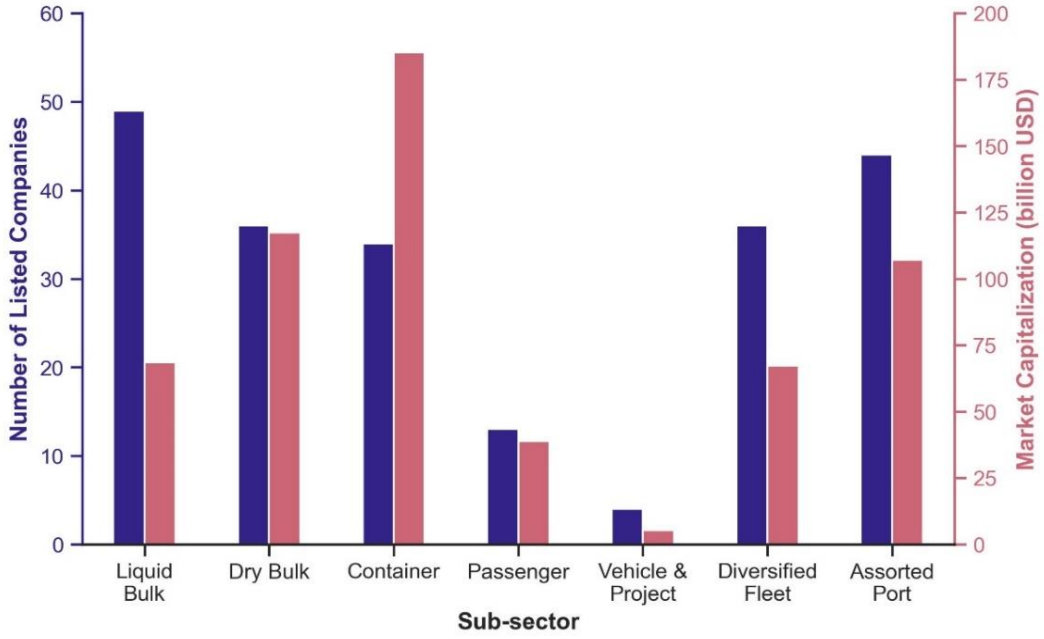

Figure 4.4 The number of listed companies and market capitalization summarized into maritime transportation sub-sectors (Source: Author's calculation)

Furthermore, the assorted port and dry bulk sub-sectors have a similar figure of the overall market capitalization, with an estimation of 107.2 and 117.4 billion USD respectively. In contrast to the number of assorted port markets, the dry bulk market comprises a smaller number of 36 companies listed. Nevertheless, in comparison to other sub-sectors, the vehicle and project sub-sector exhibits the fewest companies listed (totaling only 4 companies) and possesses the smallest market size (5.2 billion USD). Moreover, the passenger sub-sector markets have a somewhat bigger scale than the vehicles and projects, with a total of 38.8 billion USD and represented by a total of 13 companies listed in the global exchange markets.

Similarly, we also present Table 4.3 to illustrate the varying market size of each sub-sector (large, medium, and small). However, it is important to note that to avoid redundancy, we carefully select varying sizes, to present them in a manner that is both diverse and impactful. Therefore, we select stocks from additional exchanges, such as Nasdaq Stockholm (XSTO), NASDAQ US, Indonesia Stock Exchange (IDX), Nasdaq Tallinn (XTSE), Athens Stock Exchange (ATHEX), Oslo Børs (XOSL), Stock Exchange of Thailand (SET), Singapore

Exchange (SGX), Moscow Exchange (MOEX), National Stock Exchange of India (NSE), Santiago Stock Exchange (BCS), and New Zealand's Exchange (NZX).

Table 4.3 Shipping stock selection and market size representation based on the sub-sectors (Source: Author's findings)

Sub-sectors – Companies	Ticker	Exchange Markets	Cap. (mln. USD)
Liquid Bulk			
COSCO SHIPPING Energy Trans.	600026.SS	Shanghai Stock Exchange (SSE)	9,492.2
Teekay Corporation	TK	New York Stock Exchange (NYSE)	584.8
Concordia Maritime AB	CCOR-B.ST	Nasdaq Stockholm (XSTO)	27.6
Dry Bulk			
Star Bulk Carriers Corp.	SBLK	NASDAQ	2,130.6
Diana Shipping Inc.	DSX	New York Stock Exchange (NYSE)	408.7
Courage Investment Group Ltd.	1145.HK	Hong Kong Exchange (HKEX)	10.9
Container			
Yang Ming Marine Transport Corp.	2609.TW	Taiwan Stock Exchange (TWSE)	7,243.7
PT Temas Tbk.	TMAS.JK	Indonesia Stock Exchange (IDX)	1,139.2
Ever Harvest Group Holdings Ltd.	1549.HK	Hong Kong Exchange (HKEX)	38.3
Passenger			
Carnival Corporation & PLC.	CCL	New York Stock Exchange (NYSE)	12,821.9
AS Tallink Grupp	TAL1T.TL	Nasdaq Tallin (XTSE)	466.8
Kiriacoulis Mediterranean Cruises	KYRI.AT	Athens Stock Exchange (ATHEX)	9.0
Vehicle & Project			
Wallenius Wilhelmsen ASA	WAWI.OL	Oslo Børs (XOSL)	3,054.1
Namyong Terminal PCL.	NYT.BK	Stock Exchange of Thailand (SET)	137.9
Singapore Shipping Corp.	S19.SI	Singapore Exchange (SGX)	77.3
Diversified Fleet			
Mitsui O.S.K. Lines, Ltd.	9104.T	Tokyo Stock Exchange (TSE)	9,441.0
Far-Eastern Shipping Company	FESH.ME	Moscow Exchange (MOEX)	1,074.1
Essar Shipping Ltd.	ESSARSHPNG	National Stock Exchange of India (NSE)	20.3
Assorted Port			
Ningbo Zhoushan Port Co., Ltd.	601018.SS	Shanghai Stock Exchange (SSE)	10,199.6
Sociedad Matriz SAAM S.A.	SMSAAM.SN	Santiago Stock Exchange (BCS)	1,086.1
South Port New Zealand Ltd.	SPN.NZ	New Zealand's Exchange (NZX)	130.7

4.3 Summary of the Initial Investigation

In summary, our research identified a total of 216 marine transportation businesses that are listed on 36 global exchange platforms, actively traded since 1 January 2018. Hence, it is possible to categorize these stocks based on the firms' business scope, which includes liquid bulk, dry bulk, container, passenger, vehicle (and project), diversified fleet, and assorted port. The New York Stock Exchange (NYSE) is home to the highest number of listed marine firms, while the Brasil, Bolsa, Balcão (B3) stock exchange has the largest cumulative market capitalization.

Chapter 5. The Risk Level of Maritime Transportation Stocks

This chapter presents our findings of the downside risk associated with the selected maritime transportation stocks, as determined by the analysis of exchange markets, sub-sectors, and the representative market size (i.e., large, medium, and small). In this chapter, we discuss how the risk has evolved during the crisis period, as well as its difference compared to the pre-crisis period. We only showcase the most optimal results derived from our four scenarios, in which the robustness of these outcomes is elucidated by the end of this chapter, while comprehensive details can be found in the Appendix. Before delving into the risk analysis, we examine the descriptive statistics of the retrieved stock data. This preliminary step allows us to gain a comprehensive understanding of the maritime transportation stock returns.

5.1 Descriptive Statistics of Stocks Data

As mentioned earlier, we performed a statistical measurement before engaging in risk modeling to enhance comprehension of the data. The data is collected from Yahoo! Finance (215 stocks) and TradingView (1 stock), with a price that is available from 1 January 2018 – 31 March 2023. The stock price retrieved from TradingView corresponds to Far-Eastern Shipping Company PLC (FESH.ME), as Yahoo! Finance has stopped recording this stock since May 2022. Due to the large volume of data, we present the full details of the descriptive statistics in the Appendix. Nevertheless, we present a concise overview of the previously selected stocks return descriptive statistics for the whole determined time horizon based on the exchange markets and sub-sectors, as shown in Table 5.1.

Table 5.1 Statistics of shipping stocks selection (Source: Author's calculation)

Ticker	Exchange Market	Sub-sector	μ (%)	σ (%)	S	K	JB (in thousand)
PSVM11.SA	B3	Dry Bulk	0.13	7.58	3.11	55.93	153.97
STBP3.SA	B3	Assorted Port	0.07	3.15	-0.59	11.65	4.13
LOGN3.SA	B3	Diversified Fleet	0.20	3.83	0.77	13.91	6.59
601919.SS	SSE	Container	0.06	3.00	-0.05	5.77	0.41
601228.SS	SSE	Assorted Port	-0.05	1.75	-0.16	9.92	2.54
603167.SS	SSE	Passenger	-0.04	2.28	-0.05	8.73	1.74
RCL	NYSE	Passenger	-0.05	4.09	-0.69	16.46	10.07
DAC	NYSE	Container	0.07	4.72	-0.41	8.55	1.73
NM	NYSE	Dry Bulk	-0.15	5.92	0.36	6.66	0.77
HLAG.F	FWB	Container	0.16	3.94	0.18	7.21	0.99
HHFA.F	FWB	Container	-0.05	2.31	-0.90	15.32	8.61

Ticker	Exchange Market	Sub-sector	μ (%)	σ (%)	S	K	JB (in thousand)
HXCK.F	FWB	Diversified Fleet	0.09	4.09	0.76	9.46	2.44
MAERSK-A.CO	XCSE	Container	0.02	2.47	-1.21	15.65	9.07
TRMD-A.CO	XCSE	Liquid Bulk	0.10	2.75	0.00	6.09	0.52
DNORD.CO	XCSE	Diversified Fleet	0.10	2.85	0.07	8.42	1.61
9101.T	TSE	Diversified Fleet	0.09	2.46	-0.34	7.09	0.93
9115.T	TSE	Diversified Fleet	0.02	3.07	1.22	9.53	2.63
9362.T	TSE	Dry Bulk	0.02	2.39	0.89	22.46	20.68
0316.HK	HKEX	Container	0.05	3.62	-1.08	14.89	7.87
3382.HK	HKEX	Assorted Port	-0.05	2.00	0.16	5.54	0.35
1145.HK	HKEX	Dry Bulk	-0.19	5.93	1.24	14.11	6.98
2603.TW	TWSE	Container	0.10	3.26	-0.38	6.68	0.75
2605.TW	TWSE	Dry Bulk	0.01	2.79	0.32	6.18	0.56
2613.TW	TWSE	Container	0.04	2.70	0.34	7.64	1.17
600026.SS	SSE	Liquid Bulk	0.06	3.16	0.20	4.67	0.16
TK	NYSE	Liquid Bulk	-0.04	3.92	0.63	12.27	4.81
CCOR-B.ST	XSTO	Liquid Bulk	-0.05	2.63	0.60	9.06	2.10
SBLK	NASDAQ	Dry Bulk	0.04	3.66	-0.16	4.61	0.15
DSX	NYSE	Dry Bulk	-0.01	3.59	0.43	7.61	1.21
1145.HK	HKEX	Dry Bulk	-0.19	5.93	1.24	14.11	6.98
2609.TW	TWSE	Container	0.13	3.32	0.14	5.57	0.36
TMAS.JK	IDX	Container	0.20	4.39	1.49	10.79	3.81
1549.HK	HKEX	Container	-0.02	5.29	1.05	14.23	7.03
CCL	NYSE	Passenger	-0.14	4.46	-1.14	18.39	13.31
TAL1T.TL	XTSE	Passenger	-0.06	1.43	-2.20	30.01	41.64
KYRI.AT	ATHEX	Passenger	0.05	4.59	0.02	12.23	4.62
WAWI.OL	XOSL	Vehicle & Project	0.02	3.07	-0.12	12.53	4.99
NYT.BK	SET	Vehicle & Project	-0.04	1.83	-0.48	14.70	7.33
S19.SI	SGX	Vehicle & Project	-0.01	1.94	0.65	12.79	5.36
9104.T	TSE	Diversified Fleet	0.07	2.58	-0.03	5.68	0.39
FESH.ME	MOEX	Diversified Fleet	0.14	3.13	-1.54	43.28	88.82
ESSARSHPNG.NS	NSE	Diversified Fleet	-0.11	3.42	1.55	9.39	2.73
601018.SS	SSE	Assorted Port	-0.03	1.79	-0.51	16.12	9.18
SMSAAM.SN	BCS	Assorted Port	0.02	1.99	5.40	109.45	623.45
SPN.NZ	NZX	Assorted Port	0.02	1.18	-0.42	8.82	1.89

The table above provides a summary of the selected stocks' returns, as shown by their central position (mean, μ), dispersion (standard deviation, σ), skewness (S), kurtosis (K), and Jarque–Bera test statistics (JB). It is observed that the mean of the stock returns exhibit values that are close to zero across all stocks. This suggests that the influence of the stock returns mean (μ) may not have a significant influence on risk modeling. Therefore, we could assume to set the mean equal to zero to simplify the volatility model and concentrate on the degree of return variation. The volatility of the selected stock returns, as measured by the standard

deviation, ranges from 1.18% – 7.58% (0.82 – 9.56% for the entire dataset). Furthermore, it is seen that PSVM11.SA has the most volatile return (7.58%) compared to the selected stocks, while PDZ Holdings Bhd (6254.KL, 9.56%) has the highest volatility of the entire data set.

From the statistics above, the stock returns' skewness values exhibit a range of values but with modest proximity to zero. The PSVM11.SA and SMSAAM.SN returns distributions are characterized by an elongated tail on the right side, indicated by a slightly larger skewness than other stocks. This suggests an extent possibility of positive returns when compared to normal distribution. Moreover, the majority of the kurtosis values exceed three, indicating that the return distribution is concentrated around the mean value. It is important to acknowledge that the high value of kurtosis indicates that the distribution is leptokurtic. Hence, the Jarque–Bera test statistics show quite large values and are statistically significant at a significance level of 1% ($JB \gg \chi^2_{0.99,2} = 9.2$). The null hypothesis of the test is rejected, implying there is ample evidence to suggest that the maritime transportation stock returns distribution does not follow a normal distribution.

5.2 Risk Level: Exchange Market Perspectives

The risk estimation results presented in this chapter are obtained through the GJR-GARCH(1,1,1) model with the Student's *t* distribution. The selected results are because the corresponding model yields the most optimum output when considering the entire dataset. As explained in the research methodology chapter, we generate a pair of Value-at-Risk (VaR) and Expected Shortfall (ES) time series for each stock return. To establish a common understanding, we refer to the VaR and ES as the risk level in this study. To distinguish the specific value to which we refer, we use italics when we are referring to the ES values, which are utilized to discuss the greatest maximum possible losses. Meanwhile, we use VaR estimation to discuss the average maximum possible losses in adherence to the VaR concept, without employing any additional writing formats.

To begin our comprehensive analysis, we outline the risk profile of the selected maritime transportation stocks. These equities are being traded in eight exchange markets that possess the highest cumulative market capitalization of the maritime transportation companies traded within those markets. This discussion will provide an overview of how the risk of the stock evolved throughout the pre-crisis and crisis periods. With this exploration, we intend to gain valuable insights into the dynamics of risk within the maritime transportation sector across different market exchanges.

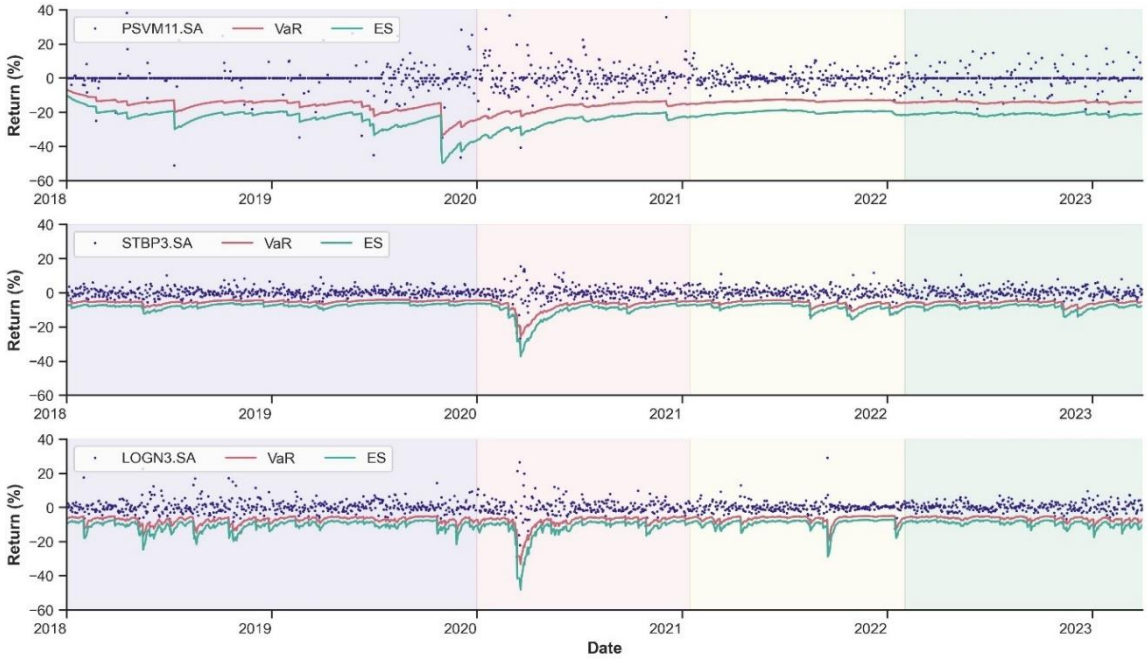

Figure 5.1 The stock returns, VaR and ES of the selected stocks in the Brasil, Bolsa, Balcão (Source: Author's calculation)

From Figure 5.1, we found that PSVM11 (Porto Sudeste VM S.A), STBP3 (Santos Brasil Participações S.A.), and LOGN3 (Log-In Logística Intermodal S.A.), traded in the Brasil, Bolsa, Balcão (B3), have a risk level of -16.00%, -5.21%, and -7.35% during tranquil period (Regime 1). We found that STBP3 and LOGN3 stocks were impacted the most by the COVID-19 shock in March 2020, at a maximum of *-37.26%* and *-48.15%*. On average, the COVID-19 shock raised the downside risk in Regime 2 to -7.68% and -8.40%. Our observations indicate that the risk level decreased in the following month after the shock until the intra-pandemic period (Regime 3) to around -6.08% and -6.50%. However, there is a resurgence of spikes towards the end of Regime 3, resulting in the highest possible losses of around *-15.63%* and *-28.87%*. Particularly on the LOGN3 risk profile, the stock risks exhibit a high degree of variation during Regime 1. We could see that the risk profiles of the medium and small capitalization on these exchanges are rather similar, represented by the selected securities.

On the other hand, PSVM11 (Porto Sudeste VM S.A.) as the biggest market size demonstrates the greatest level of risk relative to other securities across all regimes. Hence, the risk variation is higher during Regime 1, implying that another external factor affected this fluctuation, and reached its maximum level before the pandemic started. After the pandemic started, the PSVM11 risk level moved to the initial risk level, albeit with little influence from the COVID-19 pandemic in March 2020. The COVID-19 pandemic raised the risk level of this

stock to -17.15%. At a later period, it appeared that the risk level of PSVM11 had not undergone significant changes, which account to a level of around -13.45%.

Additionally, the Rusia-Ukraine conflict shock event appears to be minimal in these stocks, as indicated by their risk profiles. Nonetheless, the selected shocks indicate an increase in both the risk level and volatility towards the end of Regime 4. Meanwhile, the risk level has changed from the COVID-19 risk levels, with an average of -14.12%, -5.86%, and -6.43% for PSVM11, STBP, and LOGN3 respectively.

In comparison to the tranquil period, the average risk exposure of the selected stocks found on this exchange exhibited a significant level of risk exposure during the pandemic shock, which rose 7.19% (PSVM11, -16.00 to -17.15), 47.41% (STBP3, -5.21 to -7.68), and 14.29% (-7.35 to -8.40). During the intra-pandemic, the risk level is more relaxed, which is shown by a decrease of -15.94% (PSVM11, -16.0 to -13.45) and -11.56% (LOGN3, -7.35 to -6.50). However, STBP3 stock's risk level is still higher than the tranquil period by around 16.70% (-5.21 to -6.08). Similarly, the effects of the Russia-Ukraine war on these stocks are various, which account for a difference of -11.75% (PSVM11, -16.00 to -14.12), 12.48% (STBP3, -5.21 to -5.86), and -12.52% (LOGN3, -7.35 to -6.43).

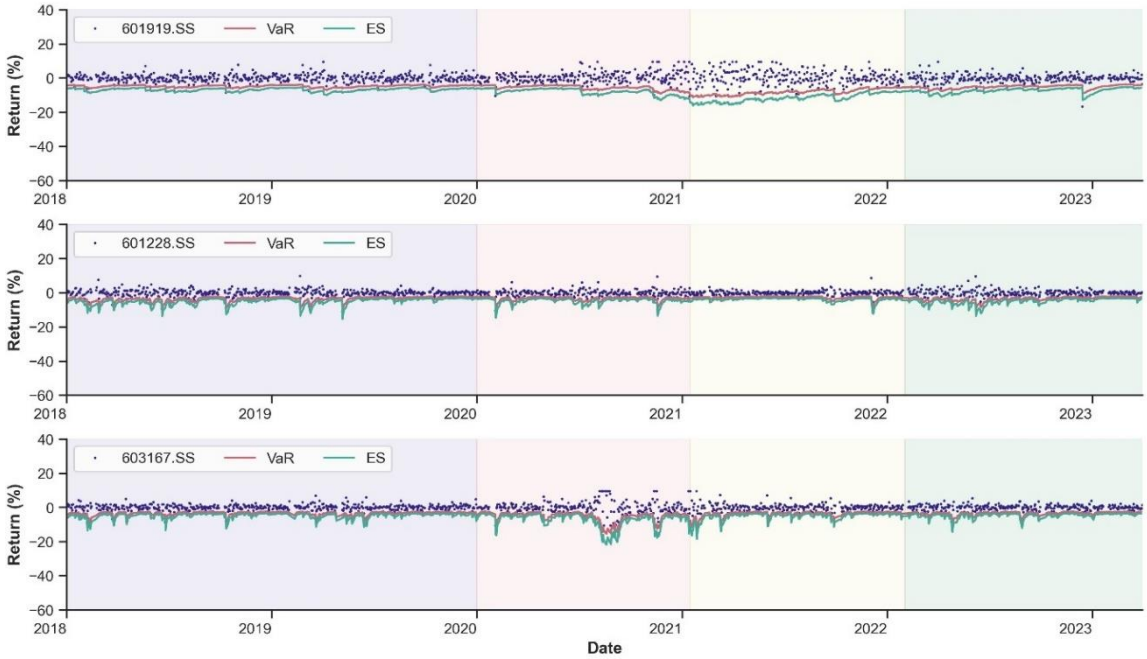

Figure 5.2 The stock returns, VaR and ES of the selected stocks in the Shanghai Stock Exchange (Source: Author's calculation)

Compared to the stocks listed in B3, the stocks selected in the Shanghai Stock Exchange (SSE) exhibit lower levels of risk, as shown in Figure 5.2. Although the selected stocks

demonstrate volatility, especially before the shock period, the average risk levels of 601919 (COSCO SHIPPING Holdings Co., Ltd.), 601228 (Guangzhou Port Company Ltd.), 603167 (Bohai Ferry Group Co., Ltd.), were around -4.83%, -3.58%, and -3.47%. There was a spike that occurred in the early phase of COVID-19 in these stocks, before March 2020. However, the greatest increase in risk occurred at a later time towards the end of Regime 2. Hence, it can be shown that 603167 stocks experienced the highest risk of around *-21.76%*, while 601919 and 601228 stocks also encountered considerable losses of *-14.32%* and *-14.67%.*

In terms of the average risk levels of 601919 and 603167, their stocks experienced a surge to a level of -5.75% and -5.37%. On the opposite, the average risk of stocks 601228 declined during the pandemic shock to -3.38% and further fell to -2.74% during the intra-pandemic. This suggests a reevaluation or appraisal of the market value of this company in the market. This feature was also found in the 603167 stocks in Regime 3, exhibiting a greater reduction in risk level from the pandemic shock to -3.75%. In contrast, the 601919 stock experienced a greater risk, with an average of -8.14%.

Similar to the circumstance observed in Regime 2, the highest risk level is encountered by 603167 stocks during the initial phase of Regime 3, amounting to *-18.49%*. During this particular regime, the potential upper limits of losses for 601919 and 601228 stocks are around *-16.18%* and *-12.4%*. Upon closer examination, it can be seen that the risk profile of 601919 stocks endured a slow and gradual recovery following the downturn during the beginning of the intra-pandemic period, in contrast to other stocks.

In Regime 4, the average risk level of 601919 and 603167 securities saw a decrease to a level of -5.17% and -3.36%. However, 601228 stocks experienced more risks during Regime 4, with an average of -3.47%. Moreover, we can observe that there exists an instability of risk level throughout Regime 4 across all equities. The maximum possible losses are still experienced by 603167 at a maximum of *-14.38%,* while 601919 and 601288 stocks experienced a maximum of *-12.89%* and *-13.67%*. Although there are occasional fluctuations in the regime, the level of risk exposure for all equities remains reduced compared to the period of the pandemic, but not significantly different from the initial level of the tranquil period.

In comparison to the tranquil period, the average risk exposure of 601919 and 603167 stocks exhibited a significant level of risk during the pandemic shock, which increased 19.05% (601919, -4.83 to -5.75) and 54.76% (603167, -3.47 to -3.75). However, the 601228 stock saw a slight decrease by -5.59% (-3.58 to -2.74). During the intra-pandemic, the risk level of 601919 was significantly increased by 68.53% (-4.83 to -8.14). In comparison, the 603167 also saw an increase of 8.07% (-3.47 to -3.75). Although there were occasional fluctuations during the Russia-Ukraine war, the various stocks reacted differently by 7.04% (601919, -483 to -5.17), -3.07% (601228, -3.58 to -3.47), and -3.17% (603167, -3.47 to -3.75).

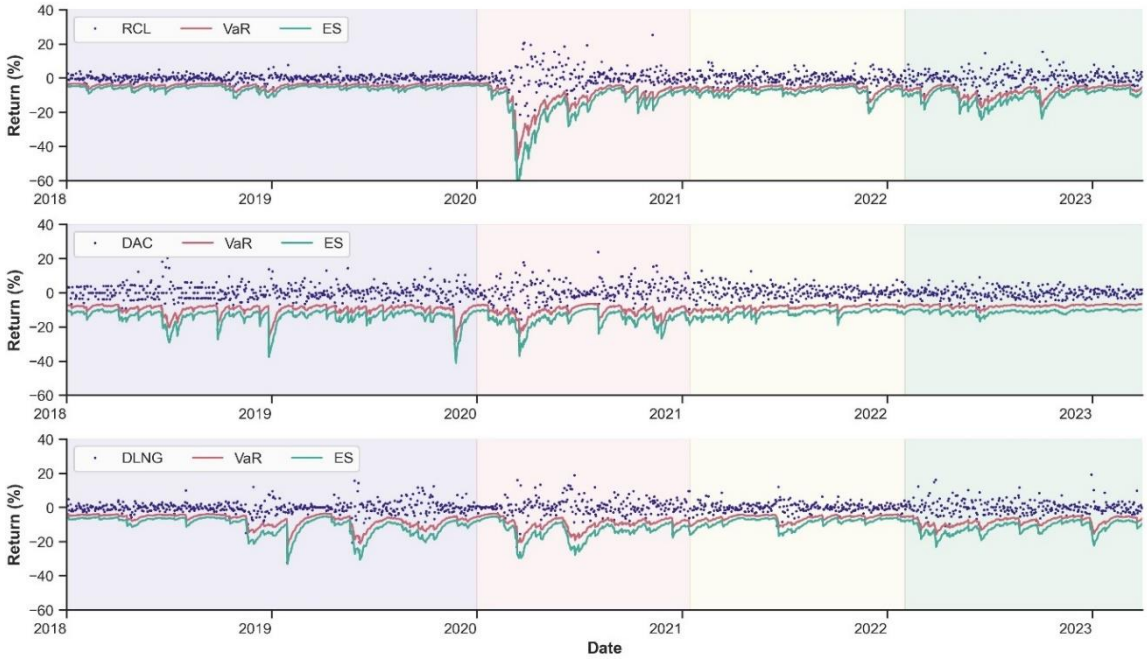

Figure 5.3 The stock returns, VaR and ES of the selected stocks in the New York Stock Exchange (Source: Author's calculation)

Figure 5.3 shown above demonstrates the risk profile of the selected companies in the New York Stock Exchange (NYSE). The estimation reveals that in Regime 1, the average risk levels for RCL (Royal Caribbean Cruises Ltd.), DAC (Danaos Corporation), and DLNG (Dynagas LNG Partners L.P.) were -4.19%, -9.66%, and -7.31%. It is worth noting that before the COVID-19 pandemic, DAC and DLNG stocks had a significant degree of variability in their risk profile. It can be inferred that the passenger sub-sector traded in this market has a lower level of volatility than the container and liquid bulk business during Regime 1. Moreover, the COVID-19 pandemic has resulted in a notable escalation in the average risk of these equities, with a value of -11.29% (the highest), -10.69%, and -9.48% respectively. The greatest risk profile occurred in March 2020, at around *-67.33%* (RCL, the highest), *-37.05%*, and *-29.66%*. Hence, DLNG experienced another period of high volatility incurring losses of a similar magnitude to the preceding shock in June 2020. Additionally, the risk profile of DAC and DLNG in Regime 2 showed a trend that was quite comparable to one another. Meanwhile, RCL as a passenger sub-sector showed the greatest downside risk.

Hence, it can be emphasized that all of these securities experienced fluctuations in their risk profile throughout Regimes 2 and 3 as shown in Figure 5.3, implying a challenge posed by turbulent market conditions within the COVID-19 pandemic. Furthermore, the risk level during Regime 3 showed a modest decrease compared to the pandemic shock condition, as indicated by the average risk value of -5.76%, -8.47%, and -6.04%. The risk levels of DAC

and DLNG exhibit a slight decrease in comparison to Regime 1. In the aftermath of the Russia-Ukraine conflict in February 2022, RCL and DLNG stocks saw a subsequent period of high volatility, reaching a peak at *-24.45%* and *-23.11%*. Under this regime, both RCL and DLNG risk levels have experienced an increase to -7.6% and -8.12%, while DAC has dropped to -7.65%. Hence, the greatest maximum possible losses of DAC in Regime 4 (*-16.87%*) is lower than in Regime 3 (*-18.94%*). Therefore, it can be inferred that the ongoing conflict between Russia and Ukraine has had an impact on RCL and DLNG, whilst the COVID-19 shocks have had a disruptive effect on all securities.

In comparison to the tranquil period, the risk exposure of the selected stocks found on this exchange exhibited an increase during the pandemic shock, which rose 169.45% (RCL, -4.19 to -11.29), 10.66% (DAC, -9.66 to -10.69), 29.69% (DLNG, -7.31 to -9.58). During the intra-pandemic, RCL stock still experienced an increase of 37.47% (-4.19 to -5.76), while other stocks experienced a decrease of -12.32% (DAC, -7.31 to -6.04) and -17.37% (-7.31 to -6.04). During the Russia-Ukraine war, the risk level of RCL and DLNG has increased compared to the tranquil period by 81.38% (-4.19 to -7.60) and 11.08% (-7.31 to -8.12). Meanwhile, the DAC stock risk level decreased by -20.81% (-9.66 to -7.65).

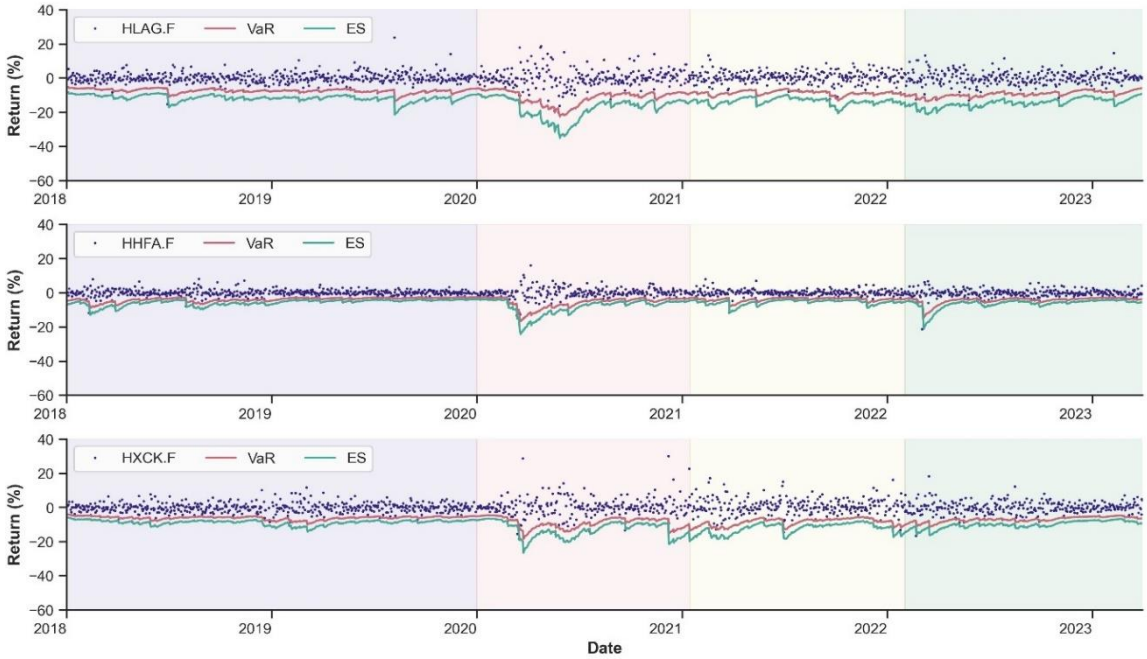

Figure 5.4 The stock returns, VaR and ES of the selected stocks in Frankfurt Stock Exchange (Source: Author's calculation)

Similar to the SSE market, the equities listed in Frankfurt Stock Exchange (FWB) demonstrate risk profiles that are relatively comparable to one another as shown in Figure 5.4. Unlike any other exchange markets explained earlier, there are only a few notable downside

risks in Regime 1. The HLAG (Hapag-Lloyd AG), HHFA (Hamburger Hafen und Logistik AG), and HXCK (Ernst Russ AG) average risk exposures were around -7.49%, -3.95 (the lowest), and -6.13% in this regime. However, as anticipated with the COVID-19 pessimistic sentiment, these stock's risks encountered a surge in risk exposure to -11.3% (the highest by HLAG), -5.63%, and -9.02. The highest downturn risk of HHFA and HXCK also occurred around March 2020, with a value of *-24.27%* and *-26.52%*, whilst the HLAG continuously declined and reached its lowest point of *-35.19%* around June 2020.

Once again, another risk turbulence was seen in Regime 3 as illustrated in Figure 5.4, but at a smaller magnitude compared to Regime 2, with average values of -8.77%, -3.85%, and -8.59%. Hence, the risk profiles are distinct for HLAG and HXCK. Likewise, these stocks also experienced another volatile period since the beginning of Regime 4. Additionally, it is observed that HHFA experienced a substantial downturn around March 2023, reaching its lowest point at *-21.07%*. Whereas, HLAG and HXCK encountered a maximum possible loss of around *-20.67%* and *-18.64%*. Furthermore, it can be seen that the risk exposure of HLAG and HHFA has witnessed a rise of 0.58% and 6.58% (the highest) in Regime 4, while HXCK has a lessened of 1.49%. Therefore, it can be deduced that the stock listed in the FWB market has been impacted to varied extents by the conflict between Russia and Ukraine.

In comparison to the tranquil period, the risk exposure of the selected stocks found on this exchange exhibited a significant increase during the pandemic shock, which rose 50.87% (HLAG, -7.49 to -11.3), 42.53% (HHFA, -3.95 to -5.63), and 47.15% (HXCK, -6.13 to -9.02). During the intra-pandemic, HLAG and HXCK still experienced an increase of 17.09% (-7.49 to -8.77) and 40.13% (-6.13 to -8.59), while HHFA slightly decreased by -2.53% (-3.95 to -3.85). Furthermore, the effect of the Russia-Ukraine war was pronounced in this stock exchange, which accounts for an increase of 24.83% (HLAG, -7.49 to -9.35), 11.90% (HHFA, -3.95 to -4.42), and 15.82% (HXCK, -6.13 to -7.10).

Compared to the examined exchange markets earlier, the stocks listed in the Nasdaq Copenhagen (XCSE) performed a rather stable performance to risk exposure in Figure 5.5 below. For instance, the average risk levels of MAERSK (A.P. Møller - Mærsk A/S), TRMD (TORM PLC.), and DNORD (Dampskibsselskabet Norden A/S) were -4.35%, -4.11%, and -4.91%. When the pandemic struck, the average risk level only increased to -4.98%, -4.89%, and -5.01% respectively. Hence, the greatest maximum downturn risk level of these stocks only reached *-14.11%*, *-11.75%*, and *-14.93%* respectively. In contrast to other exchanges, it is evident that the biggest risk of a downturn in March 2020 is characterized by gradual variation rather than a sudden and drastic fluctuation.

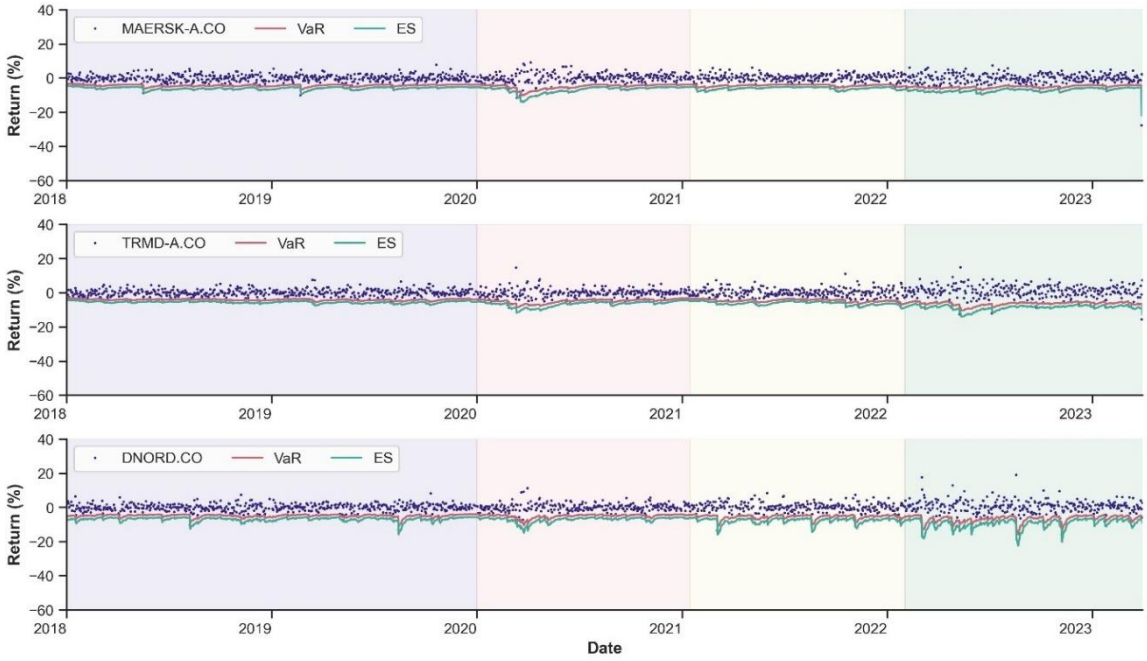

Figure 5.5 The stock returns, VaR and ES of the selected stocks in Nasdaq Copenhagen (Source: Author's calculation)

During Regime 3, the risk level of MAERSK and TRMD stocks moved to a lower level at -4.37% and -4.60%, while DNORD continuously increased to -5.47%. Surprisingly, the Russia-Ukraine war has brought severe risk levels on these stocks the most. This shock increased the average risk of MAERSK, TRMD, and DNORD to a level of -5.17%, -6.38%, and -6.63%. It can be observed the MAERSK stock outperforms other stocks in terms of stability. Additionally, a high volatile period is observed during Regime 4 in DNORD stock, compared to Regime 2. Both TRMD and DNORD experienced the impact of the Russia and Ukraine conflict as indicated by a drop near March 2023 and followed by another drop in the subsequent time. The maximum risk levels in Regime 4 for TRMD and DNORD were -*13.95%* and -*22.45%*.

In comparison to the tranquil period, the risk exposure of the selected stocks found on this exchange exhibited a slight increase in their risk exposure during the pandemic shock, which rose 14.48% (MAERSK, -4.25 to -4.98), 18.98% (TRMD, -4.11 to -4.89), and 2.44% (DNORD, -4.91 to -5.03). Comparatively, these stocks still experienced an increase in Regime 3, which accounts for 0.46% (MAERSK, -4.35 to -4.37), and 11.92% (-4.11 to -4.60). As expected, the Russia-Ukraine war has an impact on the increase of the stocks' risk level by 18.85% (MAERSK, -4.25 to -5.17), 55.23% (TRMD, -4.11 to -6.48), and 35.03% (DNORD, -4.91 to -6.63).

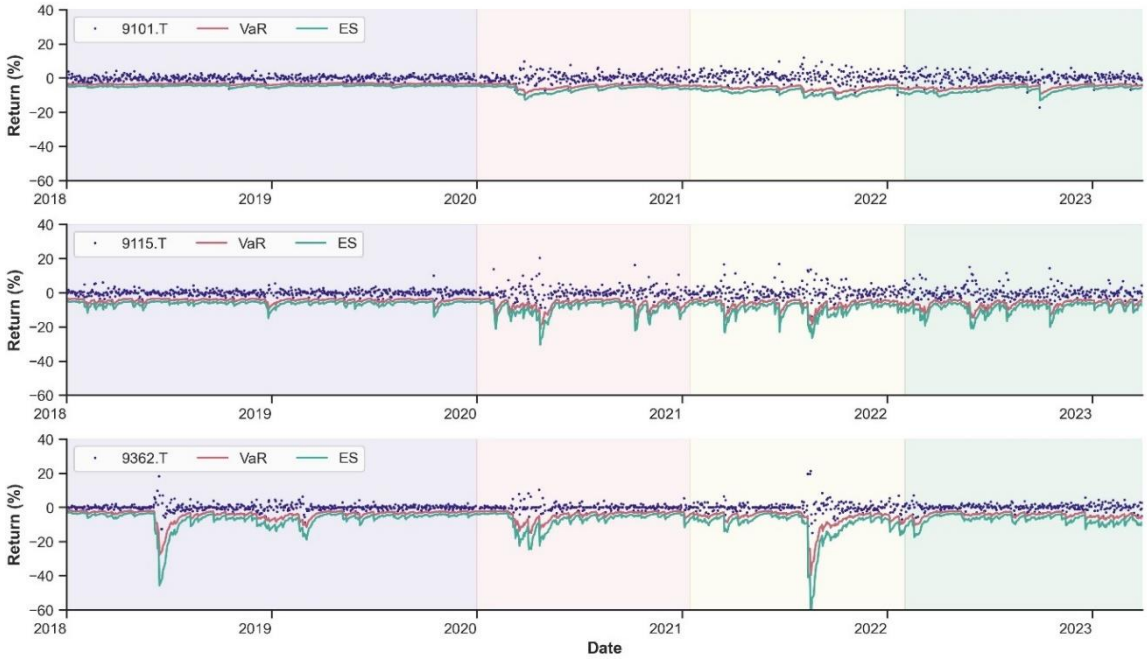

Figure 5.6 The stock returns, VaR and ES of the selected stocks in Tokyo Stock Exchange (Source: Author's calculation)

Figure 5.6 elucidates the risk profile associated with the selected securities in the Tokyo Stock Exchange (TSE). For instance, the stocks with the tickers 9101 (Nippon Yusen Kabushiki Kaisha), 9115 (Meiji Shipping Co., Ltd.), and 9362 (Hyoki Kaiun Kaisha, Ltd.) exhibited an average level of risk of around -3.375, -4.37%, and -4.26% during the tranquil period (Regime 1). The study revealed that the COVID-19 shock has had a discernible effect on the risk levels of the aforementioned equities, resulting in an average decline to a level of -4.66%, -6.36%, and -4.51% respectively. During Regime 2, the 9101 stocks experienced a gradual and prolonged pattern of volatility, reaching a maximum risk level of *-12.75%*. In line with their respective risk profiles, the stock 9115 saw the greatest possible loss, reaching around *-30.41 %* in April 2020. Conversely, the 9362 stocks showed successive sharp fluctuations, with its highest recorded risk at *-24.6%*. Entering the intra-pandemic period in Regime 3, these stocks exhibited more severe risks, as shown by an average risk of -5.83%, -6.63%, and -6.32%. Hence, they reached their maximum risk level at around *-12.74%*, *-26.56%*, and *-64.66%* during the latter part of July 2021. In Regime 4, the average risk levels of these stocks experienced a decline, to -5.04%, -6.32%, and -4.39%. Based on our empirical findings, it can be inferred that the maritime transportation shares listed in this market exchange exhibit a moderate degree of susceptibility to the ramifications stemming from the Russia-Ukraine geopolitical tension, as shown by the risk profiles.

In comparison to the tranquil period, the risk exposure of the selected stocks found on this exchange exhibited an increase during the pandemic shock, which elevated 38.28% (9101, -3.37 to -4.66), 45.54% (9115, -4.37 to -6.63), and 5.87% (9362, -4.26 to -4.51). In Regime 3, it is shown that their risk exposure has a higher degree of risk, which accounts for an increase of 73.00% (9101, -3.37 to -5.83), 51.72% (9115, -4.37 to -6.63), and 48.36% (9362, -4.26 to -6.32). It is observed that their risk levels during the Russia-Ukraine war have increased by 49.55% (9101, -3.37 to -5.04), 44.62% (9115, -4.37 to -6.32), and 3.05% (9362, -4.26 to -6.32).

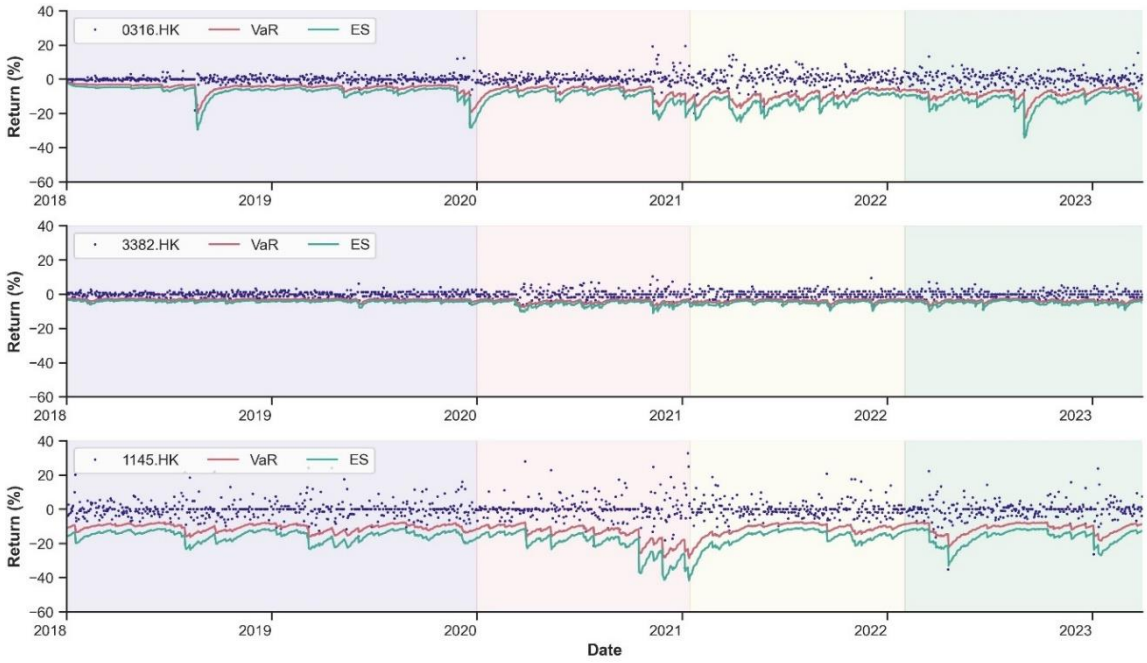

Figure 5.7 The stock returns, VaR and ES of the selected stocks in Hong Kong Exchange (Source: Author's calculation)

Figure 5.7 illustrates the risk level assessment of the selected stocks in the Hong Kong Exchange (HKEX), which includes 0316 (Orient Overseas (International) Ltd.), 3382 (Tianjin Port Development Holdings Ltd.), and 1145 (Courage Investment Group Ltd.). The average risks of the selected shares in Regime 1 were seen to be -4.72%, -3.13%, and -10.63%. It is observed that 1145 stocks have a higher degree of volatility as a dry bulk company in the market. Entering Regime 2, it is seen that the average risk level has experienced an increase to levels of around -6.67%, -4.25%, and -14.23% due to the COVID-19 shock. The 0316 stocks were subject to COVID-19 shocks earlier than the remaining stocks, which occurred around late December 2019 – January 2020. However, the volatility of these stocks persists over this period and is still fluctuating during this period and is more noticeable during the last Regime

2, reaching its greatest maximum possible loss of around *-23.67%*. Likewise, the 1145 stocks exhibited a heightened level of risk during the end of Regime 2, reaching its peak at *-41.62%*. The stock with the ticker symbol 3382, belonging to the port sub-sector, demonstrated somewhat lower risk when compared to other equities.

In line with patterns observed in other exchange markets, the average risk of 3382 and 1145 securities in Regime 3 exhibited a reduction, reaching levels of -3.74% and -11.37% respectively. However, the stock 0316 exhibited the highest degree of risk during the intra-pandemic period, with an average risk level of -9.31% and the most significant potential loss reaching around *-25.05%*. In Regime 4, it is observed that 0316 and 1145 stocks have seen a decline to -8.21% and -11.08%. Nevertheless, the risk level of 3382 stocks was quite steady, hovering at around -3.75%. It can be noticed that the fluctuations of the risk level associated with stocks 0316 and 1145 had more prominence in Regime 4 compared to Regime 1. Hence, the estimation indicated a significant decline at around *-34.26%* and *-33.07%*.

In comparison to the tranquil period, the risk exposure of the selected stocks found on this exchange exhibited a moderate to high increase during the pandemic shock, which rose 41.31% (0316, -4.72 to -6.67), 35.78% (3382, -3.13 to -4.25), and 33.87% (1145, -10.63 to -14.23). During the intra-pandemic period, the increase risk magnitudes are various, which accounts for 97.25% (0316, -4.72 to -9.31), 19.49% (-3.13 to -3.74), 6.96% (-10.63 to -11.37). It is seen that the risk exposure during the Russia-Ukrain war was increased by 73.94% (-4.72 to -8.21), 19.81% (-3.13 to -3.74), and 4.23% (-10.63 to -11.08).

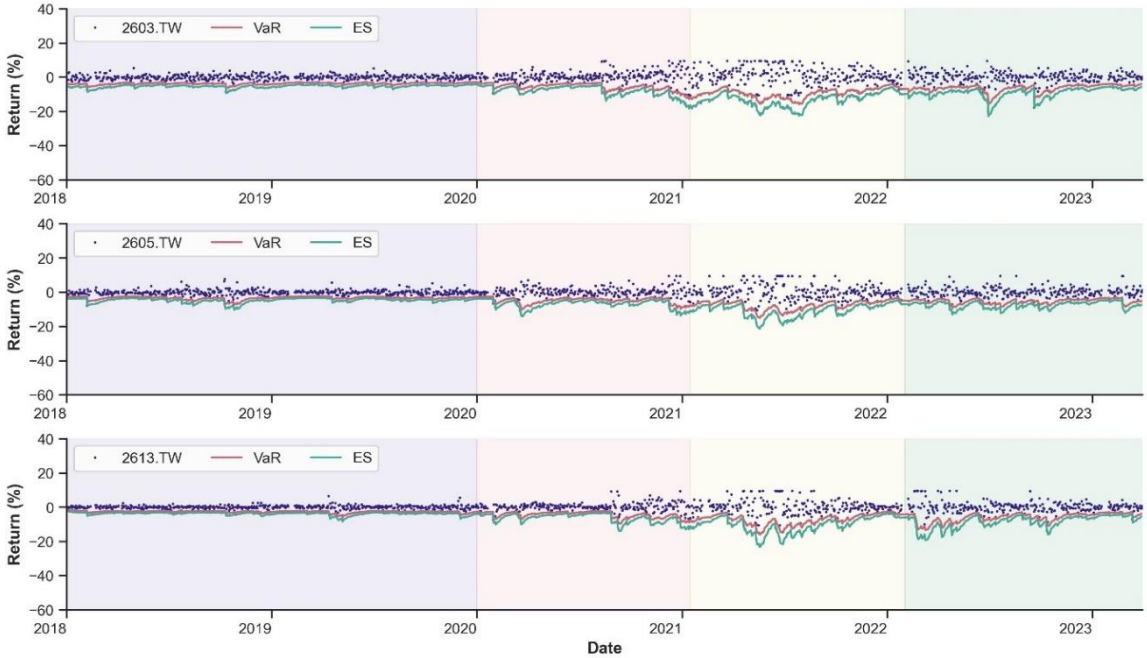

Figure 5.8 The stock returns, VaR and ES of the selected stocks in Taiwan Stock Exchange (Source: Author's calculation)

In comparison to the risk profiles observed in other stock exchanges, the selected securities traded on the Taiwan Stock Exchange (TWSE) demonstrated a similar pattern to one another, which was observed in the stocks 2603 (Evergreen Marine Corp. Ltd), 2605 (Sincere Navigation Corp), and 2613 (China Container Terminal Corp). The average risk level associated with these equities in Regime 1 was shown to be -3.75%, -3.38%, and -2.66%. During Regime 2, the level of risk associated with these stocks experienced a rise, with values of -5.73%, -4.93%, and -4.46%. The highest risk due to COVID-19 was observed in Regime 3, to which the average level of risk was increased to -9.45%, -7.75%, and -7.37% respectively. In terms of the greatest maximum possible loss, it is noteworthy that 2603 stocks had the largest decline at *-18.33%*, followed by 2605 (*-14.06%*) and 2613 (*-13.98%*). It is observed that the risk profiles of these stocks continued to exhibit volatility during Regime 4. During this period, there has been a marginal decline in the average risk level to -6.49%, -5.38%, and -5.99%. It is observed that stock 2613 experienced the most severe risks close to the war announcement period at around *-19.36%*.

In comparison to the tranquil period, the risk exposure of the selected stocks found on this exchange exhibited a high increase during the pandemic shock, which elevated 52.80% (2603, -3.75 to -5.73), 45.86 (2605, -3.38 to -4.93), and 67.67% (2613, -2.66 to -4.46). It is estimated that an even greater degree of risk has been exposed to these stocks, which accounts for an increase of 152.00% (2603, -3.75 to -9.35), 129.29% (2605, -3.38 to -7.75), and 177.07% (2613, -2.66 to -7.37). Furthermore, the effect of the Russia-Ukraine war was pronounced in this stock exchange, which accounts for an increase of 73.07% (2603, -3.75 to -6.49), 59.17% (2605, -3.38 to -7.75), and 125.19% (2613, -2.66 to -7.37).

In this section, we examined the risk evolution of the selected stocks from the pre-crisis to the crisis condition, as well as, the subsequent increase of risk exposure. To close this chapter, it is important to highlight a few observations in our analysis. Through an examination of the stocks' risk profiles of the mentioned stock exchanges, it has been determined that the influence of COVID-19 shock is substantial, as indicated by a pronounced surge in stock risk and a simultaneous effect on the majority of stocks. During the intra-pandemic period, the impacts exhibit a range of variations, mostly characterized by a modest rise in comparison to the tranquil period. Despite the global crisis triggered by the Russia-Ukraine conflict, as evidenced by heightened risk, we suggest that the impact on the stock exchanges is lower and transient rather than enduring, as opposed to the prolonged effects observed during the COVID-19 turmoil. Nevertheless, the various effects seen during the crisis period might not solely be attributed to the external impacts of the crisis in the mentioned exchange market, but rather inherent to the type of business. Therefore, we also explore the diverse risk exposures associated with maritime transportation stocks across their respective sub-sectors.

5.3 Risk Level: Sub-sector Perspectives

In this section, we focus on the assessment of the risk profile associated with the selected maritime transportation stocks. This assessment is determined based on the analysis of maritime business sub-sectors and the representative market size (i.e., large, medium, and small). Likewise, we provide the results from the GJR-GARCH(1,1,1) model to examine the risk level of the selected stocks.

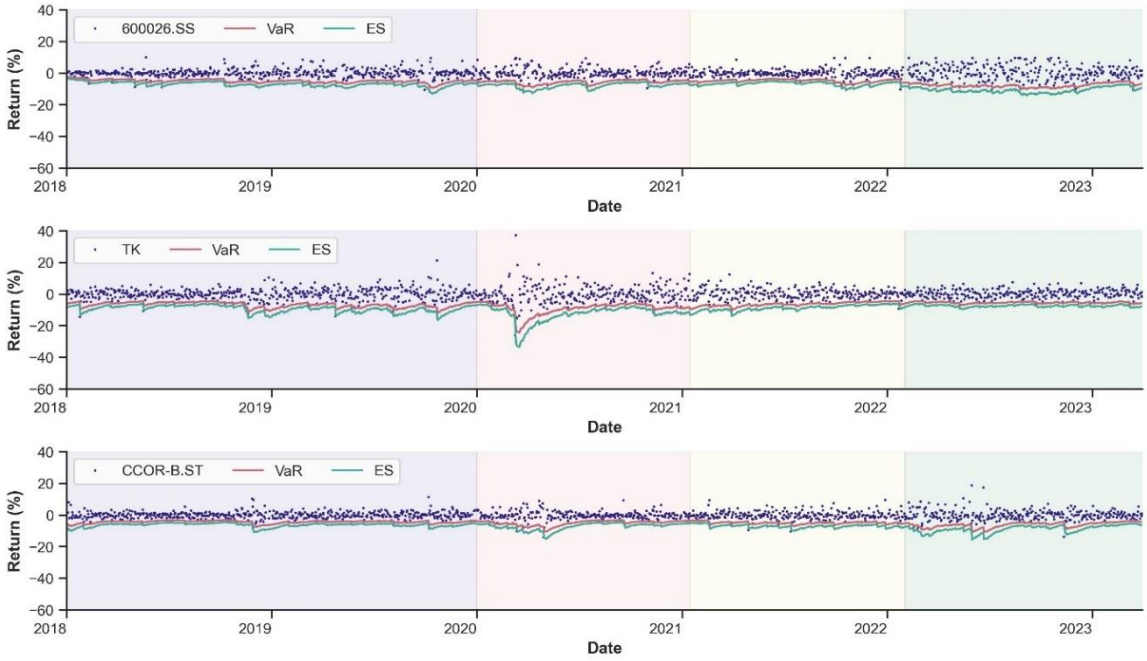

Figure 5.9 The stock returns, VaR and ES of the selected stocks in the liquid bulk sub-sector (Source: Author's calculation)

Figure 5.9 illustrates the risk levels of the selected securities in the liquid bulk sub-sector, comprised of 600026 (COSCO SHIPPING Energy Transportation), TK (Teekay Corporation), and CCOR (Concordia Maritime AB). The average risk level of these stocks in Regime 1 was -5.13%, -6.83%, and -4.45%. We observed that TK stocks displayed a rather volatile market in this regime, compared to another market. As predicted, the COVID-19 pandemic has resulted in an increase in the average risk levels to -5.78%, -9.25% (the highest increase by TK), and -5.09% respectively. Likewise, TK experienced the worst possible losses at around -*33.51%*, although 600026 and CCOR had comparable greatest maximum losses at approximately -*12.82%* and -*15.01%*. Furthermore, the 600026 stocks demonstrated a series of fluctuations throughout Regime 2.

Similarly, the CCOR stocks encountered successive fluctuations in Regime 3. In this particular regime, the selected stocks exhibited a drop in their risk levels to -4.95%, -6.43%, and -5.01%. Hence, it can be shown that the stocks 600026 and TK had a lower risk in Regime 3, compared to the tranquil period. Moreover, it can be noticed that during the time of geopolitical tension, both the 600026 and CCOR stocks had greater downside risks compared to the pandemic period. In Regime 4, the average risk levels of stocks 600026 and CCOR experienced a significant increase, reaching -7.82% and -6.2% respectively. The CCOR stocks exhibited significant volatility throughout this period, characterized by several spikes, with the most notable drop reaching a maximum value of *-15.66%* in June 2020. Moreover, the 600026 stocks showed a gradual pattern of fluctuations that persisted during the whole period of Regime 4, with its highest risk level at *-14.20%*.

In comparison to the tranquil period, the risk exposure of the selected stocks found in this sub-sector exhibited a moderate increase during the pandemic shock, which rose 12.67% (600026, -5.13 to -5.78), 35.43% (TK, -6.83 to -9.25), and 14.38 (CCOR, -4.45 to -5.09). Various impacts are observed during the intra-pandemic, which accounts for a difference of -3.51% (600026, -5.13 to -4.95), -5.86% (TK, -6.83 to -6.43), and 12.58% (CCOR, -4.45 to -5.01). We observed that the 600026 and CCOR stocks were substantially impacted by the Russia-Ukraine war, which rose 52.44% (-5.13 to -7.82) and 39.33% (-4.45 to -6.20). Meanwhile, the TK stock has decreased by -19.62% (-6.83 to -5.49) during this period.

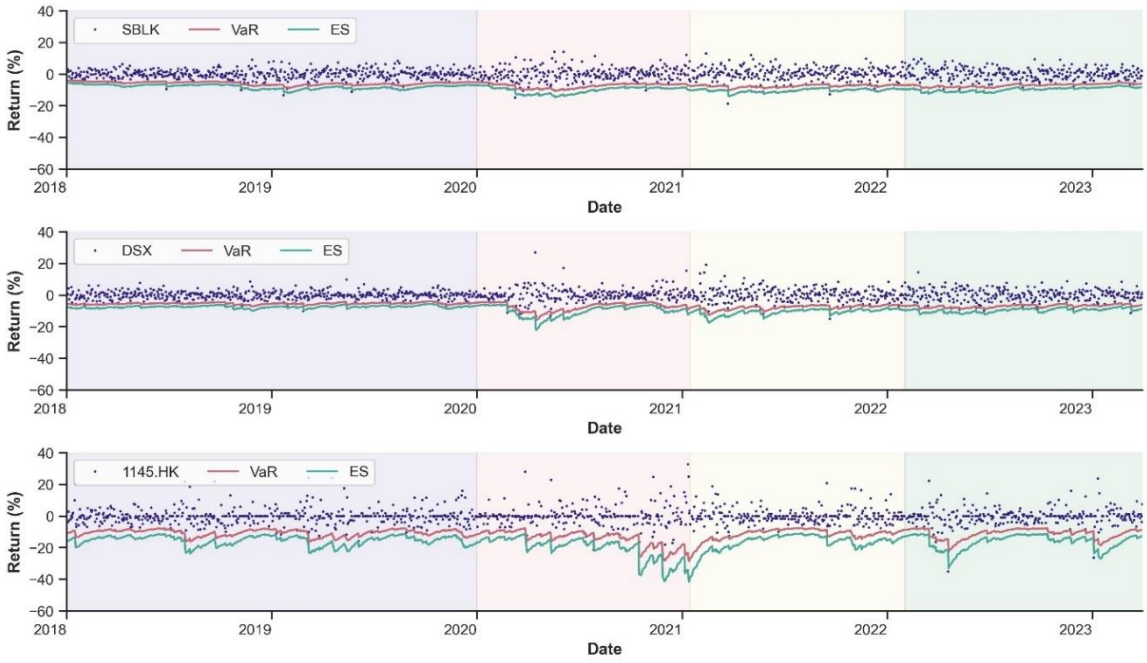

Figure 5.10 The stock returns, VaR and ES of the selected stocks in the dry bulk sub-sector (Source: Author's calculation)

The risk profile of the representative dry bulk market from 2018 to 2023 is depicted in Figure 5.10 above. This profile includes the performance of three companies: SBLK (Star Bulk Carriers Corp.), DSX (Diana Shipping Inc.), and 1145 (Courage Investment Group Ltd.). Initially, the average risk levels in Regime 1 were recorded as 5.90%, -5.43%, and -10.63% (the highest). The similarity in risk profiles and price fluctuations of dry bulk equities within a certain geographic market are comparable, such as the NYSE (for DSX) and NASDAQ (for SBLK) in the US. In Regime 2, there was an observed rise in the average risk level, specifically to levels of -7.54%, -7.42%, and -14.23%. The period of highest risk for SBLK and DSX was observed in early April 2020, with SBLK seeing a decline to *-14.65%* and DSX facing a decline to *-22.15%*. Subsequently, the 1145 stocks declined to around *-20%* and continued to decrease until the end of Regime 2, reaching the lowest point at *-41.62%*.

It appeared that the impact of the pandemic manifested at a later stage of Regime 2 for 1145 stocks. Moreover, the risk levels of SBLK and DSX exhibited a prolonged period of difficulty from March to July 2020 as opposed to seeing abrupt fluctuations. Furthermore, the risk level of these equities had increased to an average level of -7.63% (SBLK), -7.79% (DSX), and -11.37% (1145) during Regime 3. Furthermore, it is observed that the average risk level in Regime 4 for the dry bulk sector showed a decline to -7.14%, -7.02%, and 11.08% respectively. Additionally, it is worth noting that the stock 1145 saw the greatest maximum possible loss, amounting to around *-37.54%*, during the latter part of March 2022. The influence of the war on the dry bulk sector traded in the US market seems to be rather inconsequential when juxtaposed with the ramifications of the COVID-19 pandemic.

In comparison to the tranquil period, the risk exposure of the selected stocks found in this sub-sector exhibited a moderate increase during the pandemic shock, which rose 27.80% (SBLK, -5.90 to -7.54), 36.65% (DSX, -5.43 to -7.42), and 33.87 (1145, -10.63 to -14.23). We estimated that during the intra-pandemic, the risk levels were still higher by 29.32% (SBLK, -5.9 to -7.63), 43.46% (DSX, -5.43 to -7.79), and 6.96% (1145, -10.63 to -11.37). Furthermore, the effect of Russia-Ukraine war was pronounce in this sub-sector, which accounts for an increase of 21.02% (SBLK, -5.90 to -7.14), 29.28% (DSX, -5.43 to -7.02), and 4.23% (1145, -10.63 to -11.08).

Figure 5.11 below provides potential insights into the risk levels associated with three specific securities in the container sub-sector, which are 2609 (Yang Ming Marine Transport Corp.), TMAS (PT Temas Tbk.), and 1549 (Ever Harvest Group Holdings Ltd.). The risk levels of the representative stocks in Regime 1 were estimated to be around -3.60%, -5.81%, and -8.18% respectively. It can be reported that there is a correlation between market size and risk levels in the container sector, whereby larger market sizes tend to be associated with somewhat lower levels of risk compared to smaller market sizes. Moreover, the risk levels of these equities had increased to a level of -6.34%, -6.63%, and -8.34% correspondingly during

the COVID-19 shock period. In March 2020, a significant downturn was observed in the value of these equities, resulting in the greatest possible decline of around *-14%*, *-24.61%*, and *-24.51% respectively*. Nevertheless, the most substantial decrease of 2609 occurred during the latter part of December 2020, reaching a level of *-21.04%*.

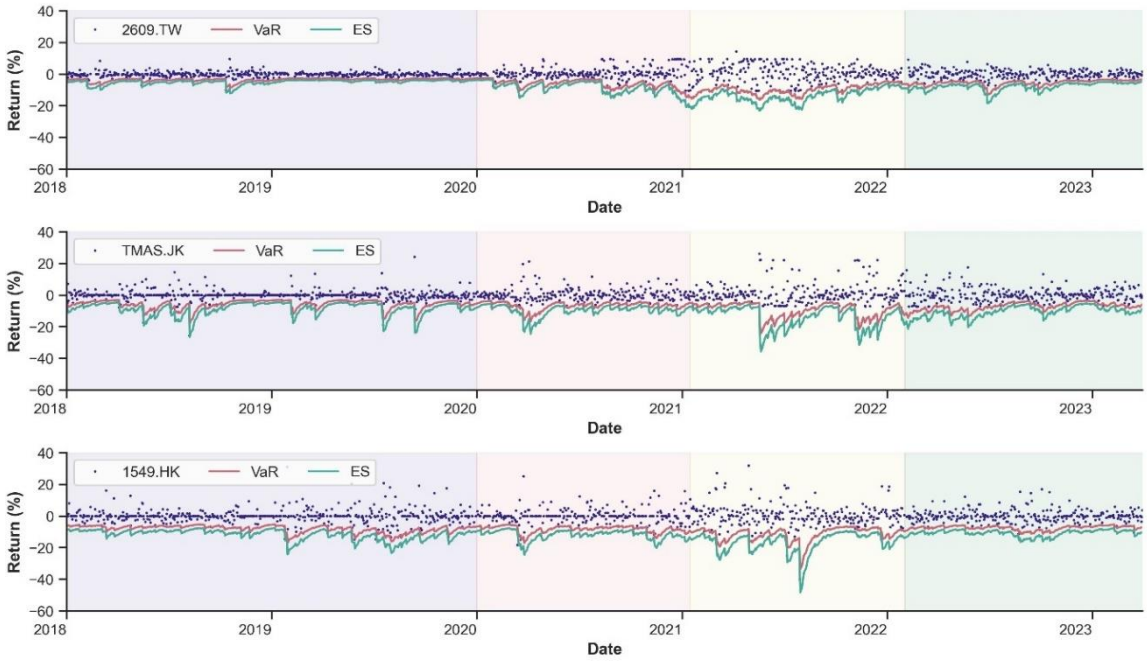

Figure 5.11 The stock returns, VaR and ES of the selected stocks in the container sub-sector (Source: Author's calculation)

In accordance with the described trends, the 2609 stocks exhibited various oscillations throughout Regime 3, culminating in a significant decline of *-23.1%* in May 2021. Remarkably, it is evident that the impact of COVID-19 is more pronounced throughout the intra-pandemic phase compared to the previous shock period. The TMAS and 1549 stocks incurred significant maximum possible losses, reaching around *-35.78%* and *-48.33%*. As previously described, the average risk levels during Regime 3 for these equities exhibited greater magnitudes compared to Regime 2, with values of -9.76% (2609), -9.61% (TMAS), and -11.63% (1549). Additionally, it is seen that the risk levels of these equities experienced a modest decline to a level -5.62%, -7.2%, and -7.56% during the Russia-Ukraine war period. In the middle of Regime 4, it is observed that both 2609 and TMAS exhibited significant fluctuations, potentially resulting in greatest maximum losses of around *-18.59%* and *-21.38%*. In our observation, we indicate that the impact of geopolitical tensions on stock 1549 was insignificant concerning to its market size and business specialization, which primarily centers on regional container feeder operations in East Asia as opposed to global services.

In comparison to the tranquil period, the risk exposure of the selected stocks found in this sub-sector exhibited a various degree of increase during the pandemic shock, which rose 76.11% (2609, -3.60 to -6.34), 14.11% (TMAS, -5.81 to -6.63), and 1.96% (1549, -8.18 to -8.34). Subsequently, the risk levels during the intra-pandemic were increased greatly by 171.11% (2609, -3.6 to -9.76), 65.40% (TMAS, -5.81 to -9.61), and 42.18% (1549, -8.18 to -11.63). We estimated that the 2609 and TMAS stocks risk increased by 56.11% (-3.60 to -5.62) and 23.92% (-5.81 to -7.20) during the Russia-Ukraine war, while the 1549 stocks experienced a decrease by -7.58% (-8.18 to -7.56).

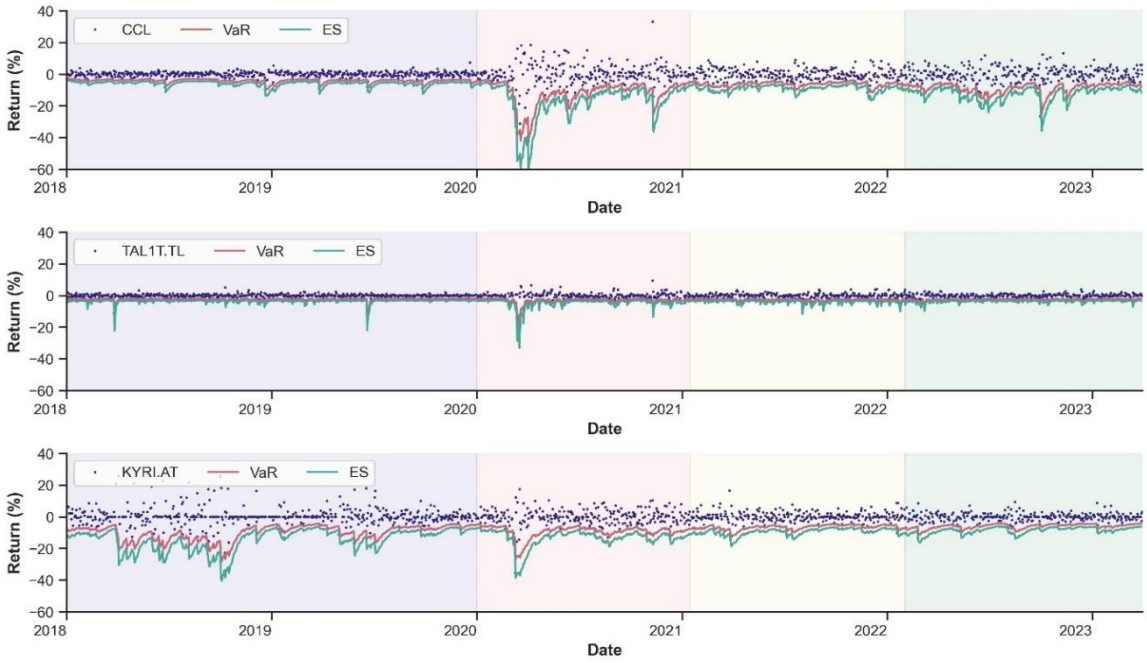

Figure 5.12 The stock returns, VaR and ES of the selected stocks in the passenger sub-sector (Source: Author's calculation)

Figure 5.12 illustrates the risk level estimations for stocks in the passenger sub-sector from January 2018 to March 2023. The companies included in this analysis are CCL (Carnival Corporation & PLC), TAL1T (AS Tallink Grupp), and KYRI (Kiriacoulis Mediterranean Cruises). The calculation indicates that CCL exhibits an average risk level of -4.13% during the tranquil period and TAL1T has a comparatively lower risk level of around -2.52%. It is evident that KYRI has a higher risk level of around -10.19%, owing to its greater volatility in company stocks before the occurrence of the shock period. In contrast to the aforementioned sub-sectors discussed before, the passenger sub-sector has seen a simultaneous effect from the COVID-19 shocks, resulting in risk levels reaching their most severe points at *-61.75%*, *-33.18%*, and *-38.53%*. The equities TAL1T and KYRI have exhibited a rapid recovery, although

CCL has continued to face the possibility of additional slumps until the end of Regime 2. Hence, the average risk levels observed in Regime 2 were -12.11%, -3.30%, and -9.32% respectively. Despite the decrease in the average risk level of KYRI stock, we contend that the influence of COVID-19 is significant but constrained by the heightened volatility observed during Regime 1.

Subsequently, the average risk levels of these stocks exhibit a decline to -6.31%, -2.82%, and -6.61% in the intra-pandemic period. Nevertheless, the passenger sub-sectors encountered a range of fluctuations over the intra-pandemic period. Additionally, the stocks of CCL exhibited a gain in its average risks to a level of around -8.73% during Regime 4, while TAL1T and KYRI had a modest decrease to a level of -2.61% and -6.03% respectively. Hence, CCL continues to encounter a greater degree of volatility in its risk levels, culminating in a peak decline of *-35.87%* around late 2022.

In comparison to the tranquil period, the risk exposure of the selected stocks found in this sub-sector exhibited a various impact during the pandemic shock, which elevated 193.22% (CCL, -4.13 to -12.11), 30.95% (TAL1T, -2.52 to -3.30), and declined -8.54% (KYRI, -10.19 to -9.32). The risk levels during the intra-pandemic were observed to differ around 52.78% (CCL, -4.13 to -6.31), 11.90% (TAL1T, -2.52 to -2.82), and -35.13% (KYRI, -10.19 to -6.61). We observed that the pattern of risk levels during the Russia-Ukraine war was in accordance with the previous period, which accounts for 111.38% (CCL, -4.13 to -8.73), 3.57% (-2.52 to -2.61), and -40.82% (-10.19 to -6.03).

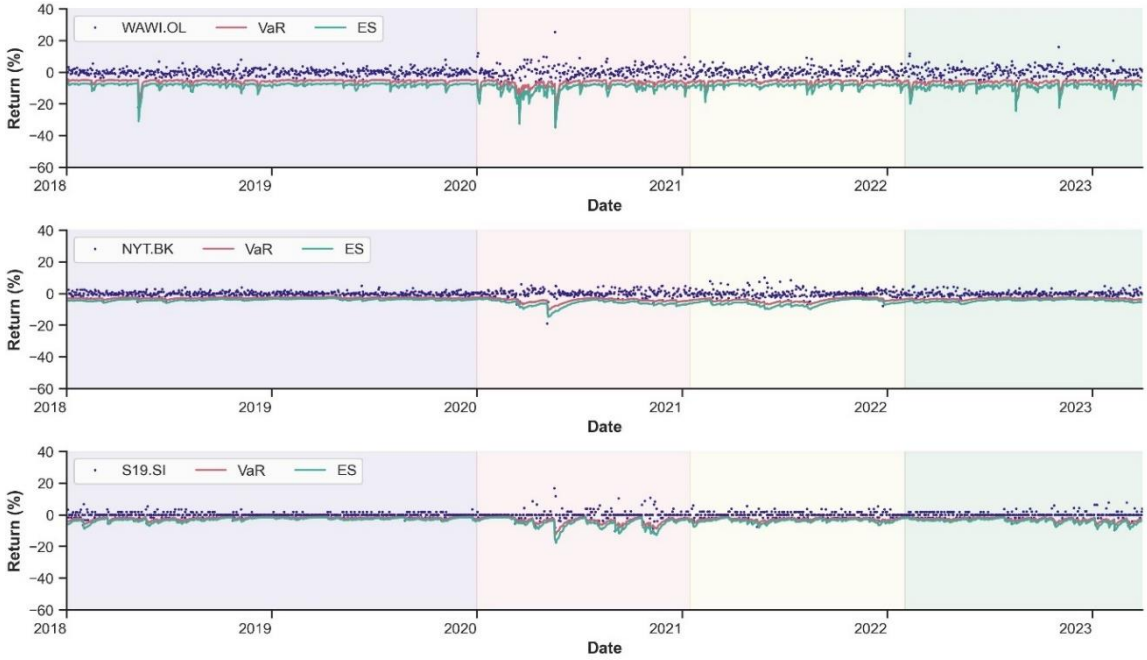

Figure 5.13 The stock returns, VaR and ES of the selected stocks in the vehicle and project sub-sector (Source: Author's calculation)

Figure 5.13 depicts the risk level assessment of the vehicle and project sub-sectors, which include WAWI (Wallenius Wilhelmsen ASA), NYT (Namyong Terminal PCL), and S19 (Singapore Shipping Corporation Ltd). In general, WAWI stocks exhibit distinct fluctuations that are more pronounced when compared to other stocks in the same sub-sectors. Nevertheless, it may be argued that the average levels or risk are rather low than other sub-sectors. For example, WAWI exhibited a risk level of -5.58% in Regime 1. In a comparative analysis, it is seen that the NYT and S19 stocks exhibit average risk levels of -2.85% and -2.14%. It is evident that smaller market sizes demonstrate a corresponding decrease in risk levels.

Furthermore, throughout the COVID-19 shock period, there has been an observed rise in the average risk levels to around -6.99%, -4.41%, and -3.74%. During the middle of the Regime 2 period, it was seen that the aforementioned equities exhibited the highest level of downturn risk, which accounted for *-35.06%*, *-14.81%*, and *-17.86*%. Moreover, it is worth noting that the average levels of risk throughout the intra-pandemic period showed a drop of -5.87%, -4.28%, and -2.75%. There is no discernible likelihood of a significant decline in economic conditions during Regime 3. In Regime 4, the risk level of WAWI is noted to have increased to -6.28%, with a greater occurrence of turbulent times in comparison to the tranquil period. On the other hand, NYT and S19 had a drop in their risk levels to -3.20% and -6.74% respectively.

In comparison to the tranquil period, the risk exposure of the selected stocks found in this sub-sector exhibited a similar pattern during the crisis period. In the COVID-19 shock situation, the risk level of these equities was elevated by 25.27% (WAWI, -5.58 to -6.99), 54.74% (NYT, -2.85 to -4.41), and 74.77% (S19, -2.14 to -3.74). Similarly, the risk levels during the intra-pandemic were observed to increase around 5.20% (WAWI, -5.58 to -5.87), 50.18% (NYT, -2.85 to -4.28), and 28.50% (S19, -2.14 to -2.75). Furthermore, the risk level during the Russia-Ukraine war was accounted to be increased by 12.54% (WAWI, -5.58 to -6.28), 12.28% (NYT, -2.85 to -3.20), and 33.18% (S19, -2.14 to -2.85).

Figure 5.14 below depicts the risk levels associated with three selected equities, which are 9104 (Mitsui O.S.K. Lines, Ltd), FESH (Far-Eastern Shipping Company PLC), and ESSARSHIPNG (Essar Shipping Ltd), as representative stocks in the diversified fleet sub-sector. The 9104 stocks, which hold a significant market capitalization in the Tokyo Stock Exchange (TSE), had a stable performance during the observed time. In Regime 1, the average risk levels observed were around -3.89%, -5.65%, and -6.46%. As expected, the COVID-19 pandemic has resulted in a notable increase in the risk levels to around -5.37%, -5.97%, and -6.99% respectively. During the pandemic shock in March 2020, it was noted that the 9104 and FESH equities saw their highest level of risk, with declines to around -

13.01% and *-23.37%* respectively. Meanwhile, ESSARSHIPNG encountered its most significant possible loss of around *-29.68%* in August 2020.

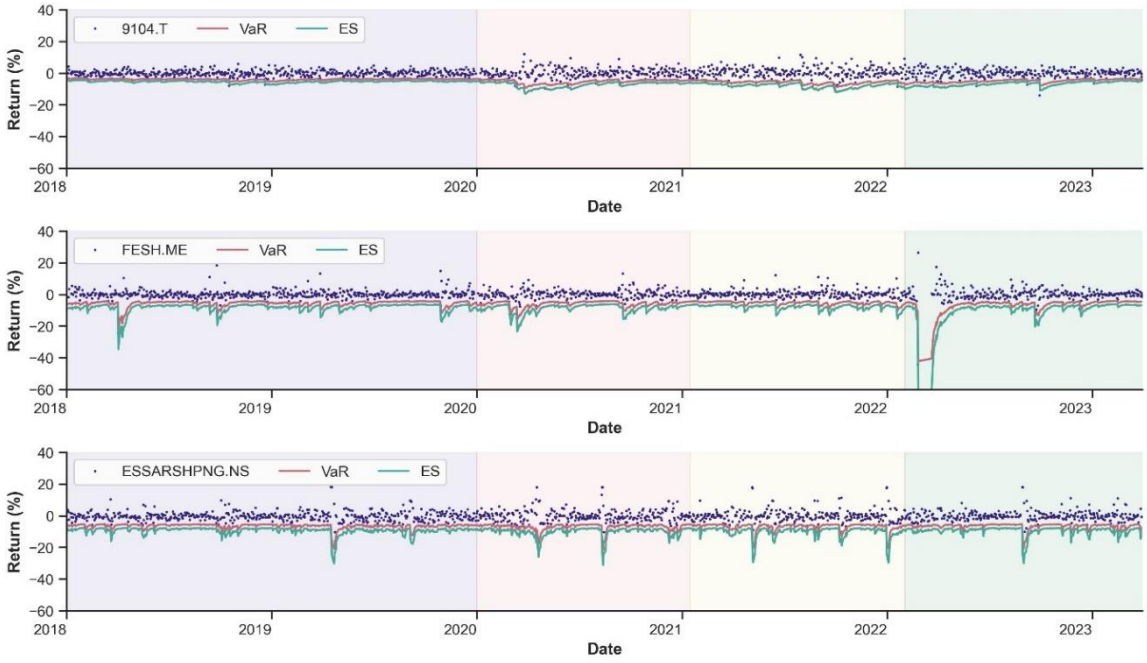

Figure 5.14 The stock returns, VaR and ES of the selected stocks in the diversified fleet sub-sector (Source: Author's calculation)

During the intra-pandemic period, there was an observed rise in the average risk level of 9104 stocks, albeit by a modest percentage of -5.79%. Conversely, both FESH and ESSARSHIPNG had a little drop in their risk levels, with FESH declining to -5.34% and ESSARSHIPNG to -6.94%. Under Regime 4, the risk levels of the aforementioned stocks have experienced a rise to levels of -4.94%, -6.84%, and -6.56% respectively. It may be inferred that the selected equities are influenced by the Russia-Ukraine war. Hence, it can be shown that FESH, a stock traded in the Moscow Exchange (MOEX), saw a significant decline over the period from late February to April 2022, reaching a great decrease to a level of *-62.21%.*

In comparison to the tranquil period, the risk exposure of the selected stocks found in this sub-sector exhibited a various increase during the pandemic shock, which rose 38.05% (9104, -3.89 to -5.37), 5.66% (FESH, -5.65 to -5.97), and 8.20% (ESSARSHIPNG, -6.46 to -6.99). Various impacts are observed during the intra-pandemic, which accounts for a difference of 48.84% (9104, -3.89 to -5.79), -5.49% (FESH, -5.65 to -5.34), and 7.43% (ESSARSHIPNG, -6.46 to -6.94). During the Russia-Ukraine war, the risk level has increased by 26.99% (9104, -3.89 to -4.94), 21.06% (FESH, -5.65 to -6.84), and 1.55% (ESSARSHIPNG, -6.46 to -6.56).

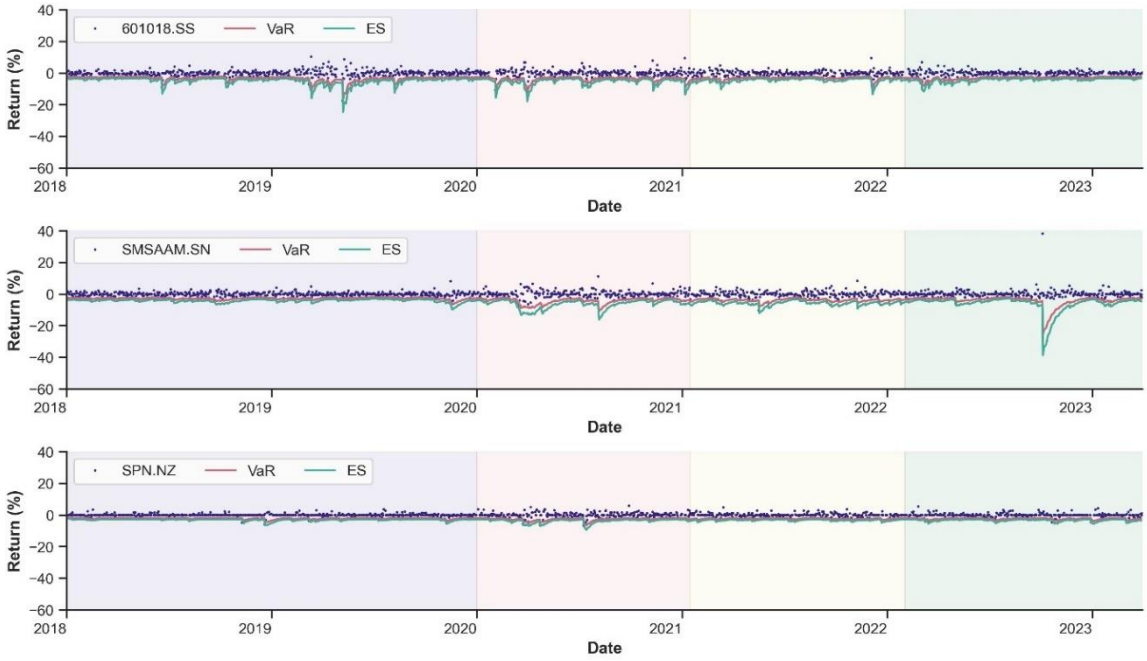

Figure 5.15 The stock returns, VaR and ES of the selected stocks in the assorted port sub-sector (Source: Author's calculation)

The graphical representation in Figure 5.15 above illustrates the risk profile of a selection of assorted port stocks from 2018 to 2023. In contrast to the previously analyzed sub-sectors, the assorted port sub-sector stocks exhibited a relatively low degree of risk, as shown by their risk profile. In the tranquil period, the risk levels for 601018 (Ningbo Zhoushan Port Co., Ltd.), SMSAAM (Sociedad Matriz SAAM S.A.), and SPN (South Port New Zealand Ltd.) stocks were evaluated to be -3.48%, -2.83%, and -2.16% respectively. As anticipated, the stocks' performance has been affected by the COVID-19 pandemic, albeit with a marginal rise. For instance, the risk levels were increased to -3.81%, -4.34%, and -2.67%. A notable drop is observed in 601018 and SMSAAM to a level of *-17.9%* and *-16.29%* in Regime 2. Furthermore, it can be noticed that the average risk levels saw a decline to a level of -3.15%, -3.92%, and -2.33% during Regime 3. The 601018 stocks had a consistent downward trend in Regime 4, which declined to -3.02%. In contrast, it is noteworthy that certain equities, including SMSAAM and SPN, had raised to -4.17% and -2.39% respectively. Hence, SMASSAM saw the greatest maximum possible losses around *-38.65%* in late 2022.

In comparison to the tranquil period, the risk exposure of the selected stocks found in this sub-sector exhibited an increase during the pandemic shock, which rose 9.48% (601018, -3.48 to -3.81), 53.36% (SMSAAM, -2.83 to -4.34), and 23.61% (SPN, -2.16 to -2.67). A decrease by -9.48% is expecetd by the 601018 stocks during the intra-pandemic period, while SMSAAM and SPN still experienced an increase of 38.52% (-2.83 to -3.92) and 7.87% (-2.16

to -2.33) respectively. Similarly, the 601018 stocks expected a decrease of -13.22% during the Russia-Ukraine war, while SMSAAM and SPN still experienced an increase of 47.35% (-2.83 to -4.17) and 10.65% (-2.16 to -2.39).

To end this section, we also encompassed highlights of the risk evolution of the selected equities and their subsequent increase of risk exposure within their respective sub-sectors. We suggest that the type of maritime company has exerted varied degrees of influence on the impact of both the COVID-19 pandemic and the Russia-Ukraine conflict, although to a certain extent. For example, the container industry experienced a heightened level of risk during the intra-pandemic period, distinguishing it from other stocks that reached their maximum level during the shock period. Moreover, it can be observed that the assorted port sub-sector had a relatively consistent performance in comparison to other sub-sectors during the crisis period. Furthermore, the dry bulk sector is characterized by a high level of risk throughout all periods of crisis. Additionally, it was noted that the FESH equities, which are traded on the Moscow Exchange (MOEX), have a strong correlation with negative sentiments against the war situation and experienced significant repercussions as a result of this occurrence. Therefore, the analysis conducted in this part serves to complement the preceding section's analysis.

5.4 Risk Level: Total Sub-sector Comparative Analysis

The risk profiles of the selected equities have been assessed from both market and sub-sector perspectives. In this section, we will assess the overall stocks' average risk levels in a comparative manner, with a particular emphasis on the sub-sector. This section will present a general overview of the corresponding sub-sectors, which may offer recommendations on investment possibilities within the specific market. The primary visual representation is portrayed by a categorized boxplot, as seen in Figure 5.16 below.

It has been revealed that throughout the tranquil period before the crisis period (Regime 1), the market risk within the various sub-sectors of maritime transportation stocks remained relatively consistent and closely aligned, with a few notable exceptions. Notably, the dry bulk, vehicle, and port sub-sectors displayed deviations from the remaining sub-sectors. The average risk levels of the liquid bulk, container, passenger, and diversified fleet sub-sectors are recorded as -5.89%, -6.08%, -5.60%, and -4.75%. The dry bulk sub-sectors have an average risk level of -7.12% and displayed a considerable range in risk levels, suggesting considerable heterogeneity within this segment in comparison to other sub-sectors. In contrast, the vehicle, project, and assorted port sub-sectors exhibited relatively lower risk levels and variation, as indicated by the average risk rates of -3.76% and -3.84%. In general,

the average risk level of all maritime transportation sectors was -5.46%, accounting for the whole sub-sectors.

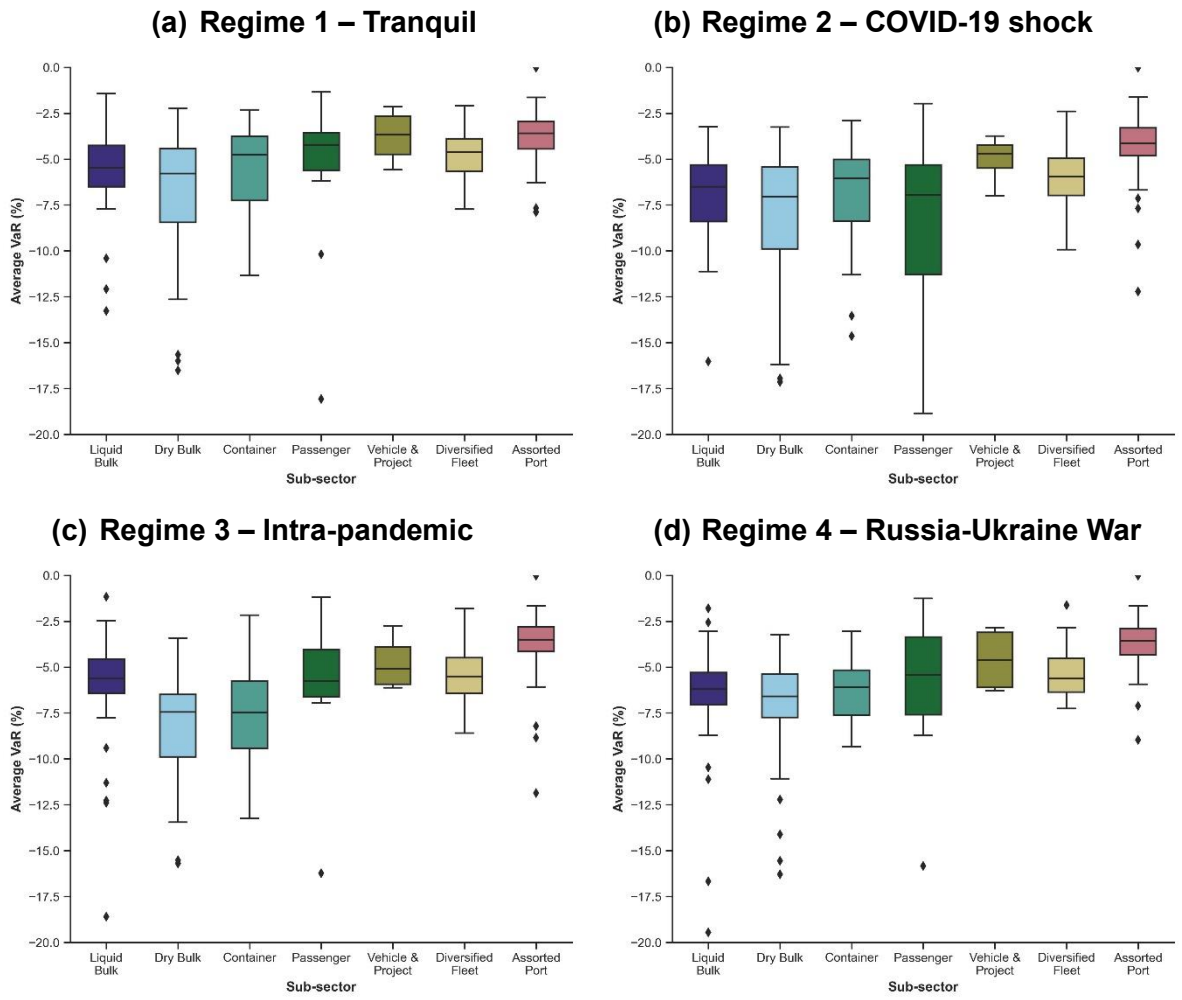

Figure 5.16 A summary of the comprehensive comparative analysis of maritime transportation stocks classified by subsector (Source: Author's calculation)

However, the emergence of the COVID-19 pandemic (Regime 2) had a profound impact across all sub-sectors, increasing their risk levels. The average risk estimation for the liquid bulk, dry bulk, container, passenger, and diversified fleet turned into -7.36%, -8.36%, -7.54%, -8.17%, and -6.11% respectively. Although the dry bulk sector's continued display of high-risk traits, it is crucial to emphasize that the passenger sub-sector saw the most significant negative impact during this period of disruption. The passenger sub-sector has witnessed a drastic and unparalleled increase in its market risk compared to other sub-sectors, as evidenced by the substantial variations observed in the market. It can be argued that the heightened risk was largely attributed to the extensive disruptions in worldwide travel and

tourism caused by the pandemic, which subsequently generated significant negative sentiments within the market. Similar to the previous condition, the risk levels associated with the vehicle, project, and assorted ports average exhibited a drop, with the average levels at -5.03% and -4.37%. While the assorted port sub-sector exhibited some outliers within their risk distributions, collectively, it had demonstrated a pretty consistent performance during the initial phases of the pandemic. This observation suggests that several port industries showed more resilience characteristics during the volatile market sentiments. In light of the COVID-19 shocks, it can be observed that the market risk of the whole marine transportation equities had a negative value of -6.74 %.

During the transition into the intra-pandemic period (Regime 3), we observed that the average risk level of the liquid bulk, passenger, and diversified fleet have recovered slightly, reaching -6.03%, -5.82%, and -5.51% respectively. The dry bulk sector still exhibited the highest risk level in comparison to other segments, with an average risk level of -8.38%. However, it's noteworthy to recognize that the container sub-sector saw a higher level of risk in this period than the earlier shocks, which decreased to -8.04%. Furthermore, the average risk level of vehicle and project sub-sector has experienced a decline to a level of -4.76%. In comparison, the assorted port sub-sector demonstrated a commendable recovery to -3.85%, which is close to the pre-shock average level. Moreover, it is seen that the market risk associated with the whole marine transportation equities had a decline of -6.17% in the intra-pandemic of COVID-19.

During the regime of the Russia-Ukraine war (Regime 4), there was a marginal decline in risk levels seen across several sub-sectors from the previous level. This trend suggests a gradual recovery of stock performance, but at levels that remain elevated compared to the tranquil period. The average risk level of dry bulk, container, passenger, vehicle, and diversified fleet has seen a decline, with values of -7.38%, -6.72%, -6.07%, -4.60%, and -5.35% respectively. Nevertheless, it is observed that the liquid bulk sector had a decline in its average risk level, reaching -6.90%. Hence, this trend was accompanied by the presence of several outliers, implying diverse and severe market reaction to the war sentiment. Furthermore, the assorted port sub-sector had a lower degree of risk at -3.81%. In aggregate, the market risk associated with marine transportation equities during the Russia-Ukraine conflict was recorded at -5.97%.

In comparison to the tranquil period, the analysis of maritime transportation stocks reveals that the average risk level had notable increases during three distinct crisis periods: the COVID-19 shock, the intra-pandemic, and the Russia-Ukraine war. Particularly, the risk level rose by 23.45%, 12.98%, and 9.33% respectively. In the liquid bulk sub-sector as a whole, the average risk level experienced a rise of 25.03%, 2.40%, and 17.25%. The average risk level for the whole dry had increased by 17.28%, 17.59%, and 3.59%. The average risk level for

the whole container sub-sector had increased by 23.95%, 32.17%, and 10.41%. In the passenger sub-sector, there was an observed rise in the average risk level of 45.81%, 3.90%, and 8.32%. In the vehicle and project sub-sector, there was a rise in the average risk level by 33.93%, 26.61%, and 22.29%. The average risk level for the whole diversified fleet sub-sector experienced an increase of 28.58%, 15.85%, and 12.54%. In addition, the average risk level for the whole assorted port sub-sector experienced a change of 13.74%, 0.34%, and -0.80%.

5.5 Backtesting Result

In this section, we will briefly examine the result of backtesting procedure, which was conducted to assess the robustness of the model. To obtain out backtest result, we applied the Kupiec's Proportion of Failure (POF) on four scenarios for calculating the value-at-risk (VaR) and expected shortfall (ES) from 1 January 2018 – 31 March 2023, as well as their subsets according to each time regime. The four scenarios encompass the following models: (1) GARCH(1,1) with normal distribution, (2) GARCH(1,1) with Student's *t* distribution, (3) GJR-GARCH(1,1,1) with normal distribution, and (4) GJR-GARCH(1,1,1) with Student's *t* distribution. The backtesting procedure was implemented at a significance level of 5%.

In general, it was shown that the GJR-GARCH(1,1,1) model had the most favorable performance compared to other estimations. To elaborate our explanation, we compared the test statistic of Kupiec's POF (L_{UC}) to the critical value at a significance level of 5%. The null hypothesis of the Kupiec's POF test, indicating that the failure rate is the same as the significance level, is rejected if the test statistics is greater than the critical value of 3.84 ($\chi^2_{k=1,\alpha=0.05}$). Therefore, we can infer that the model accuracy as reliable if the test statistics is significant.

To briefly provide the comparison, we select three stocks that we've examined in this chapter. These stocks include PSVM11.SA (Porto Sudeste VM S.A from Brasil, Bolsa, Balcão), 601919.SS (COSCO SHIPPING Holdings Co., Ltd from Shanghai Stock Exchange, and RCL (Royal Caribbean Cruises Ltd from New York Stock Exchange). Additionally, these stocks were selected as a representative of distinct sub-sectors, which are the dry bulk, liquid bulk, and passenger sub-sector respectively. In this part, we aim to provide a concise explanation, while a more details can be found in the Annex.

Based on the Kupiec's POF test on overall VaR and ES dataset (1 January 2018 – 31 March 2023), we found that the utilization of the Student's *t* distribution in the volatility model and quantile assumption resulted in the rejection of the null hypothesis. This rejection implies that the model exhibits a higher level of reliability. This response is anticipated as we've

observed in Section 5.1 that the maritime transportations stocks do not follow a normal distribution. Subsequently, we also applied the backtest on the VaR and ES subsets within each regime. As we can see, the remaining reliable models, which employ the Student's *t* distribution, still has some failure in addressing the market risk during the crisis periods. Furthermore, we suggest that the VaR estimation on overall dataset obtained through GJR-GARCH(1,1,1) is comparable with the GARCH(1,1) model using the *t* distribution. However, the GARCH(1,1) model with Student's *t* distribution has proven to be ineffective in estimating the ES estimation during the Regime 2. Therefore, we suggests that the GJR-GARCH(1,1,1) is more reliability compared to alternative models. The incorporation of an asymmetric impact in the GJR-GARCH volatility model has been shown to be beneficial in addressing the challenges associated with assessing risk levels.

Table 5.2 Kupiec's POF test statistics of the selected stocks (Source: Author's calculation)

Ticker	Test Stat	VaR					ES				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
GJR-GARCH(1,1,1) – Student's *t* distribution											
PSVM11.SA	L_{UC}	9.94	11.44	19.25	8.81	44.55	18.33	19.25	26.47	29.96	83.16
601919.SS	L_{UC}	7.89	11.05	0.22	3.27	17.29	23.42	14.39	18.69	16.93	72.46
RCL	L_{UC}	14.28	0.06	5.03	2.64	14.66	37.18	6.89	11.76	17.90	69.38
GJR-GARCH(1,1,1) – Normal distribution											
PSVM11.SA	L_{UC}	4.60	6.57	14.82	1.02	20.13	9.94	11.44	19.25	8.81	44.55
601919.SS	L_{UC}	2.51	2.06	0.01	1.39	4.36	6.51	6.26	1.20	6.19	18.62
RCL	L_{UC}	3.09	1.09	0.84	0.38	0.41	21.78	0.00	9.04	2.64	22.58
GARCH(1,1) – Student's *t* distribution											
PSVM11.SA	L_{UC}	9.94	11.44	26.47	11.24	49.62	18.33	19.25	26.47	29.96	83.16
601919.SS	L_{UC}	7.89	11.05	0.22	3.27	17.29	23.42	18.78	18.69	16.93	76.35
RCL	L_{UC}	8.85	0.11	5.03	0.54	10.49	42.95	3.62	11.76	14.27	62.71
GARCH(1,1) – Normal distribution											
PSVM11.SA	L_{UC}	4.60	8.75	14.82	1.71	23.08	9.94	11.44	26.47	8.81	47.03
601919.SS	L_{UC}	3.30	2.06	3.91	2.22	1.95	7.89	11.05	0.22	3.27	17.29
RCL	L_{UC}	4.97	2.42	1.51	0.38	0.59	32.46	1.54	11.76	2.64	36.83

Note: R.1 – Tranquil period, R.2 – The COVID-19 shock, R.3 – Intra-pandemic, R.4 – The Russia-Ukraine war, and O. – Overall period (1 January 2018 – 31 March 2023)

Chapter 6. Conclusions

The objective of this last chapter is to provide a summary, comprehensive overview of the primary research findings, and business implications. In addition, we also provide the limitation on this study, along with an exploration of potential recommendation for future research that are linked to the identified constraints.

6.1 Summary

The main objective of this study is to assess the market risk in maritime transportation stocks amid two global crises: the COVID-19 pandemic and the Russia-Ukraine war. The COVID-19 pandemic, which began in early 2020, had a profound impact on financial stability, resulting in widespread downturns in stock markets worldwide. The maritime transportation industry, which plays a crucial role in driving international trades, had notable challenges during this period. The sentiment among investors shifted to a gloomy outlook, subsequently exerting downward pressure on maritime transportation stock returns. Less than two years after the pandemic, the Russia-Ukraine war further exacerbated the prevailing pessimism and added another intricacy in maritime transportation stock investments. This research holds significance as it provides investors with information to make well-informed decisions to minimize possible losses, drawing on the lessons derived from the preceding global crisis.

6.2 Key Takeaways

Our primary investigations gravitate to the estimation of risk level using the value-at-risk (VaR) and expected shortfall (ES). Based on our findings, the key takeaways from this study to answer the addressed research questions are provided in the following.

Key takeaway 1: Maritime transportation stocks' risk during the pre-crisis period

Out of the 216 marine transportation equities that were traded across 36 worldwide exchange marketplaces, the average maximum potential loss (average VaR) seen during the pre-crisis period was around -5.46%. From a comparative perspective, it was observed that different sub-sectors of the market exhibited a close risk level, particularly the average risk level of the liquid bulk sub-sectors (-5.89%), container (-6.08%), passenger (-5.60%), and diversified fleet (-4.75%). The dry bulk sub-sector has a notable spectrum of risk levels, with an average of -

7.12%. On the other hand, the vehicle and project (-3.75%), and assorted port (-3.85%) sub-sectors had comparatively lower levels of risk and variability.

Key takeaway 2: Maritime transportation stocks' risk during the COVID-19 pandemic

Overall, the average maximum potential loss (average VaR) of maritime transportation stocks during the COVID-19 shock and intra-pandemic has increased by 23.45% and 12.98%. The COVID-19 pandemic has had a severity on the majority of maritime transportation stocks across all global exchange markets, resulting in both momentarily and prolonged effects. As an illustration, the greatest maximum possible loss (ES) encountered by RCL (Royal Caribbean Cruises Ltd.) traded in the New York Stock Exchange (NYSE) occurred around March 2020, reaching its lowest level at *-67.33%*. Furthermore, the passenger sub-sector experienced the greatest disruption during the COVID-19 shock period, as indicated by the huge rise in the average sub-sector risk level by 45.81%. The remaining sub-sectors also experienced an increase, particularly in the vehicle and project (by 33.93%), diversified fleet (by 28.58%), liquid bulk (by 25.03%), container (by 23.95%), dry bulk (by 17.28%), and assorted port (by 13.74%) sub-sectors. Nevertheless, the container sub-sector experienced the prolonged impact of COVID-19 in the intra-pandemic period, as shown by the increased risk level of 32.17%, compared to the tranquil period. To a certain degree, the average risk level of various sub-sectors during the intra-pandemic remained greater than during the tranquil period. For instance, the vehicle and project (by 26.61%), dry bulk (by 17.59%), diversified fleet (by 15.85%), passenger (3.90%), liquid bulk (2.40%), and assorted port (by 0.34%).

Key takeaway 3: Maritime transportation stocks' risk the Russia-Ukraine war

In light of the ongoing Russia-Ukraine war and its worldwide ramifications, our analysis indicates that the influence on stock markets is rather limited, smaller scale, and temporary, in contrast to the persistent consequences seen during the COVID-19 pandemic. For instance, FESH (Far-Eastern Shipping Company PLC, traded in the Moscow Exchange) and HLAG (Hapag-Lloyd AG, traded in the Frankfurt Stock Exchange) reached their lowest level (ES) at *-62.21%* and *-20.67%* respectively, close to the war announcement. However, as the risk transmitted, the negative sentiments still increased various sub-sectors risk level (VaR) by 22.29% (vehicle and project), 17.25% (liquid bulk), 12.54% (diversified fleet), 10.41% (container), passenger (8.32%), and dry bulk (3.59%) market, compared to the tranquil period. However, the risk level of the assorted port sub-sector has decreased by -0.80 during this period, hence, this sub-sector performed a rather stable performance across all crisis periods. Overall, the average risk level of maritime transportation stocks increased by 9.33% during the Russia-Ukraine conflict, compared to the tranquil period.

Key takeaway 4: Risk modeling option for maritime transportation stocks

As indicated by the Jarque–Bera test, the maritime transportation stock returns distribution does not follow a normal distribution. Given this particular attribute, it is recommended to consider employing risk modeling utilizing the Student's *t* distribution. In comparison to the four scenarios provided, GJR-GARCH(1,1,1) with the Student's *t* assumption generated the most optimal output to estimate the risk level of maritime transportation stocks. This output is assessed by Kupiec's Proportion of Failure (POF) test on the overall time horizon (1 January 2018 - 31 March 2023), with a perspective on each time regime subset.

6.3 Business Implications

The findings of this research have business implications for various market participants, especially investors and financial institutions. In essence, the volatility observed in maritime transportation stocks underscores the demand for investors to carefully assess the risk profile of their portfolios that contain (or potentially contain) these assets that can impact investment returns, particularly during periods of crisis such as the COVID-19 pandemic and the Russia-Ukraine war.

In this situation, diversification continues to be an invaluable measure for reducing risk and exposure to excessive volatility in investment portfolios. Given the varying levels of riskiness in the maritime transportation sub-sectors, investors can diversify their portfolios by incorporating a variety of stocks from different sub-sectors. It is important to acknowledge that not all maritime transportation sub-sectors have the same level of risk. For instance, the passenger sub-sector can be vulnerable to various forms of crises, whereas the dry bulk sub-sector may exhibit higher risk level variations. Based on the risk tolerance and financial objectives, investors can adjust or modify the weighting of their portfolios, incorporating companies from sub-sectors that match their risk profiles.

Moreover, while considering maritime transportation stocks, investors should conduct thorough research and practice due diligence. They should stay well-informed about the business trends, potential geopolitical risks, and the financial health of companies in this sector. Financial institutions that offer investing services should provide reports, market insights, historical volatility, and other measures, to advise and monitor clients on selecting maritime transportation stocks that correspond with their risk tolerance and investment objectives. Hence, this research also suggests risk modeling options as a tool for measuring the asset's riskiness.

6.4 Research Limitations

The findings of this study provide a risk level assessment of marine transportation stocks in both the pre-crisis and crisis periods, with a focus on market exchanges and sub-sectors. Nevertheless, it is important to recognize some limitations in this study to evaluate the findings.

First and foremost, it is important to address the issue of limited representation of market risk. A noteworthy constraint of our study is restricted to the quantity of marine transportation stocks accessible for the evaluation of market risk. Given that the study relies on publicly listed businesses, it is important to note that the sample size may not fully encompass the complete range of market risks present in the global industry during real-world operations. This constraint suggests that the risk assessment may not comprehensively capture the complexities of the wider market and instead concentrate solely on the selected equities.

Second, it is important to consider the data volume and selection. The primary objective of the experimental framework is to embrace a comprehensive range of worldwide stocks. Despite this approach might provide insights into company-specific perspectives, this endeavor has faced significant difficulty in effectively managing a huge number of data points. As a result, we decided to concentrate on specific equities to adequately analyze the broad results. This approach has the potential to limit the extent of investigation and may lead to an inadequate assessment of risk levels across all equities within the sector.

Third, we are limited to the risk model and backtesting procedure. The study primarily focuses on a certain risk model (GJR-GARCH) and utilizes a singular degree of significance (at 5%). Although this particular methodology offers useful procedures in risk assessment, it may not adequately consider risk perceptions or the effectiveness of alternative models or the efficacy of alternate models and significance levels across different situations. The exploration of various models and significance levels has the potential to enhance the robustness of the study. In addition, our organization exclusively utilizes a single backtesting approach (Kupiec's POF test), despite the existence of other procedures that might be employed to evaluate the robustness.

Fourth, the selection of a time horizon is a crucial factor to consider. Another limitation arises from the consideration of different time horizons, particularly in times of crisis. The selection of a time horizon can have a substantial influence on the outcomes of risk assessments. Hence, the use of a single time horizon for research may fail to encompass the complete range of risk dynamics observed across many timeframes, particularly in different times of crisis or other highly volatile periods.

6.5 Recommendations for Future Research

In this section, we provide several recommendations for future research. As explained earlier, we employ a risk assessment to the company-specific maritime transportation stocks, resulting in a very large of data points. To further enhance the focus of the output, it is recommended to develop a hypothetical portfolio approach. This approach could involve the construction of a portfolio composed of specific sub-sectors or stocks from particular exchange markets. This approach allows for a holistic assessment of risk interactions among specific sub-sectors or particular exchange markets. However, this endeavor has to be in line with the research objectives and scope. Another approach that is recommended is using the rolling-window approach to enrich the understanding of risk dynamics. In this study, we utilize a single time horizon due to the limited stock data. However, as time evolved and stock price data might be available in the future, it was suggested to use a rolling window to investigate the volatility evolution of the selected stocks. Hence, this approach may enhance the robustness of risk estimation by considering multiple time windows. Furthermore, we also suggest using different volatility models, e.g., EGARCH, and different significance levels, e.g., 1% or 2.5%, to assess the model's robustness.

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Appendix I. Publicly Listed Maritime Company Details

Name	Ticker	Exchange Markets	Sub-sector	Market Cap. (USD)
Anonimi Naftiliaki Etairia Kritis S.A.	ANEK.AT	Athens Stock Exchange (ATHEX)	Passenger	50,216,018.28
Attica Holdings S.A.	ATTICA.AT	Athens Stock Exchange (ATHEX)	Passenger	561,629,170.01
Kiriacoulis Mediterranean Cruises Shipping S.A.	KYRI.AT	Athens Stock Exchange (ATHEX)	Passenger	9,018,136.21
Thessaloniki Port Authority S. A.	OLTH.AT	Athens Stock Exchange (ATHEX)	Assorted Port	247,164,179.10
Piraeus Port Authority S.A.	PPA.AT	Athens Stock Exchange (ATHEX)	Assorted Port	514,530,458.20
Log-In Logística Intermodal S.A.	LOGN3.SA	Brazil Stock Exchange (B3)	Diversified Fleet	785,611,493.10
Porto Sudeste VM S.A.	PSVM11.SA	Brazil Stock Exchange (B3)	Dry Bulk	102,127,239,330.12
Santos Brasil Participações S.A.	STBP3.SA	Brazil Stock Exchange (B3)	Assorted Port	1,373,460,112.22
Portuaria Cabo Froward S.A.	FROWARD.SN	Santiago Stock Exchange (BCS)	Assorted Port	8,350,317,277.65
Sociedad Matriz SAAM S.A.	SMSAAM.SN	Santiago Stock Exchange (BCS)	Assorted Port	1,086,075,090.72
Compañía Sud Americana de Vapores S.A.	VAPORES.SN	Santiago Stock Exchange (BCS)	Container	5,089,070,849.65
GSD Denizcilik Gayrimenkul Insaat Sanayi ve Ticaret A.S.	GSDDE.IS	Borsa Istanbul (BIST)	Dry Bulk	54,995,847.74
Gulf Navigation Holding PJSC	GULFNAV.AE	Dubai Financial Market (DFM)	Liquid Bulk	364,406,264.09
Hamburger Hafen und Logistik AG	HHFA.F	Frankfurt Stock Exchange (FWB)	Container	949,413,560.86
Hapag-Lloyd AG	HLAG.F	Frankfurt Stock Exchange (FWB)	Container	57,138,197,630.12
Ernst Russ AG	HXCK.F	Frankfurt Stock Exchange (FWB)	Diversified Fleet	184,643,786.60
Jinhui Holdings Company Ltd.	0137.HK	Hong Kong Exchange (HKEX)	Dry Bulk	66,878,064.06
China Merchants Port Holdings Company Ltd.	0144.HK	Hong Kong Exchange (HKEX)	Assorted Port	5,803,704,378.16
Orient Overseas (International) Ltd.	0316.HK	Hong Kong Exchange (HKEX)	Container	11,760,678,150.72
Asia Energy Logistics Group Ltd.	0351.HK	Hong Kong Exchange (HKEX)	Dry Bulk	33,684,009.41
Courage Investment Group Ltd.	1145.HK	Hong Kong Exchange (HKEX)	Dry Bulk	10,907,261.72
COSCO SHIPPING Ports Ltd.	1199.HK	Hong Kong Exchange (HKEX)	Assorted Port	2,726,263,014.58
SITC International Holdings Company Ltd.	1308.HK	Hong Kong Exchange (HKEX)	Container	5,918,663,486.33
Ever Harvest Group Holdings Ltd.	1549.HK	Hong Kong Exchange (HKEX)	Container	38,306,221.59
China Infrastructure & Logistics Group Ltd.	1719.HK	Hong Kong Exchange (HKEX)	Assorted Port	215,361,430.45

Xiangxing International Holding Ltd.	1732.HK	Hong Kong Exchange (HKEX)	Container	24,204,129.69
Pacific Basin Shipping Ltd.	2343.HK	Hong Kong Exchange (HKEX)	Dry Bulk	1,755,769,731.84
Tianjin Port Development Holdings Ltd.	3382.HK	Hong Kong Exchange (HKEX)	Assorted Port	447,147,091.80
Great Harvest Maeta Holdings Ltd.	3683.HK	Hong Kong Exchange (HKEX)	Dry Bulk	21,021,453.04
PT Buana Lintas Lautan Tbk.	BULL.JK	Indonesia Stock Exchange (IDX)	Liquid Bulk	124,632,816.62
PT Humpuss Intermoda Transportasi Tbk.	HITS.JK	Indonesia Stock Exchange (IDX)	Liquid Bulk	123,875,406.98
PT Jasa Armada Indonesia Tbk.	IPCM.JK	Indonesia Stock Exchange (IDX)	Assorted Port	95,484,929.12
PT ICTSI Jasa Prima Tbk.	KARW.JK	Indonesia Stock Exchange (IDX)	Container	2,070,259.72
PT Mitrabahtera Segara Sejati Tbk.	MBSS.JK	Indonesia Stock Exchange (IDX)	Dry Bulk	119,334,575.72
PT Pelayaran Nelly Dwi Putri Tbk.	NELY.JK	Indonesia Stock Exchange (IDX)	Diversified Fleet	48,154,672.52
PT Nusantara Pelabuhan Handal Tbk.	PORT.JK	Indonesia Stock Exchange (IDX)	Assorted Port	171,290,751.42
PT IMC Pelita Logistik Tbk.	PSSI.JK	Indonesia Stock Exchange (IDX)	Dry Bulk	220,732,615.51
PT Sillo Maritime Perdana Tbk.	SHIP.JK	Indonesia Stock Exchange (IDX)	Liquid Bulk	199,033,296.74
PT Samudera Indonesia Tbk.	SMDR.JK	Indonesia Stock Exchange (IDX)	Diversified Fleet	407,442,663.74
PT Soechi Lines Tbk.	SOCI.JK	Indonesia Stock Exchange (IDX)	Liquid Bulk	84,060,872.17
PT Temas Tbk.	TMAS.JK	Indonesia Stock Exchange (IDX)	Container	1,139,151,125.44
PT Trans Power Marine Tbk.	TPMA.JK	Indonesia Stock Exchange (IDX)	Dry Bulk	69,023,064.90
Grindrod Ltd.	GND.JO	Johannesburg Stock Exchange (JSE)	Assorted Port	397,061,392.62
Harbour-Link Group Berhad	2062.KL	Bursa Malaysia (KLSE)	Container	101,900,949.82
MISC Bhd.	3816.KL	Bursa Malaysia (KLSE)	Liquid Bulk	7,352,218,786.97
Bintulu Port Holdings Bhd.	5032.KL	Bursa Malaysia (KLSE)	Assorted Port	520,373,764.11
Malaysian Bulk Carriers Bhd.	5077.KL	Bursa Malaysia (KLSE)	Dry Bulk	75,793,571.88
Shin Yang Group Bhd.	5173.KL	Bursa Malaysia (KLSE)	Container	136,590,797.85
Westports Holdings Bhd.	5246.KL	Bursa Malaysia (KLSE)	Assorted Port	2,746,577,932.73
E.A. Technique (M) Bhd.	5259.KL	Bursa Malaysia (KLSE)	Liquid Bulk	22,804,814.30
PDZ Holdings Bhd.	6254.KL	Bursa Malaysia (KLSE)	Container	5,261,358.74
Hubline Bhd.	7013.KL	Bursa Malaysia (KLSE)	Dry Bulk	38,817,057.96
Perak Corporation Bhd.	8346.KL	Bursa Malaysia (KLSE)	Assorted Port	6,561,234.23
Heung-A Shipping Co., Ltd.	003280.KS	Korea Exchange (KRX)	Liquid Bulk	251,453,581.51
Korea Line Corporation	005880.KS	Korea Exchange (KRX)	Diversified Fleet	521,896,249.80
KCTC Co. Ltd.	009070.KS	Korea Exchange (KRX)	Assorted Port	98,837,850.86

HMM Company Ltd.	011200.KS	Korea Exchange (KRX)	Container	7,482,637,534.14
Pan Ocean Co., Ltd.	028670.KS	Korea Exchange (KRX)	Diversified Fleet	2,384,264,074.73
KSS Line Ltd.	044450.KS	Korea Exchange (KRX)	Liquid Bulk	139,001,713.68
Hyundai Glovis Co., Ltd.	086280.KS	Korea Exchange (KRX)	Diversified Fleet	4,552,913,635.22
Global Ports Holding PLC.	GPH.L	London Stock Exchange (LSE)	Passenger	113,144,301.81
Mercantile Ports & Logistics Ltd.	MPL.L	London Stock Exchange (LSE)	Assorted Port	4,190,529.30
Ocean Wilsons Holdings Ltd.	OCN.L	London Stock Exchange (LSE)	Container	381,599,770.92
Far-Eastern Shipping Company PLC.	FESH.ME	Moscow Exchange (MOEX)	Diversified Fleet	1,074,124,923.95
Capital Product Partners L.P.	CPLP	Nasdaq Stock Market (NASDAQ)	Diversified Fleet	271,358,239.36
Euroseas Ltd.	ESEA	Nasdaq Stock Market (NASDAQ)	Container	131,774,276.42
StealthGas Inc.	GASS	Nasdaq Stock Market (NASDAQ)	Liquid Bulk	100,448,455.96
Globus Maritime Ltd.	GLBS	Nasdaq Stock Market (NASDAQ)	Dry Bulk	24,904,220.79
Golar LNG Ltd.	GLNG	Nasdaq Stock Market (NASDAQ)	Liquid Bulk	2,304,373,581.96
Performance Shipping Inc.	PSHG	Nasdaq Stock Market (NASDAQ)	Liquid Bulk	9,576,000.14
Pyxis Tankers Inc.	PXS	Nasdaq Stock Market (NASDAQ)	Liquid Bulk	52,118,098.98
Star Bulk Carriers Corp.	SBLK	Nasdaq Stock Market (NASDAQ)	Dry Bulk	2,130,573,495.00
Seanergy Maritime Holdings Corp.	SHIP	Nasdaq Stock Market (NASDAQ)	Dry Bulk	100,455,219.62
Top Ships Inc.	TOPS	Nasdaq Stock Market (NASDAQ)	Liquid Bulk	13,177,599.71
Adani Ports and Special Economic Zone Ltd.	ADANIPORTS.NS	National Stock Exchange of India (NSE)	Assorted Port	16,719,298,028.92
Allcargo Logistics Ltd.	ALLCARGO.NS	National Stock Exchange of India (NSE)	Container	1,074,718,715.13
Essar Shipping Ltd.	ESSARSHPNG.NS	National Stock Exchange of India (NSE)	Diversified Fleet	20,255,896.14
The Great Eastern Shipping Company Ltd.	GESHIP.NS	National Stock Exchange of India (NSE)	Diversified Fleet	1,128,609,693.10
Gujarat Pipavav Port Ltd.	GPPL.NS	National Stock Exchange of India (NSE)	Assorted Port	682,061,159.21
Navkar Corporation Ltd.	NAVKARCORP.NS	National Stock Exchange of India (NSE)	Container	97,259,086.69
The Shipping Corporation of India Ltd.	SCI.NS	National Stock Exchange of India (NSE)	Diversified Fleet	683,221,406.26
Shreyas Shipping and Logistics Ltd.	SHREYAS.NS	National Stock Exchange of India (NSE)	Container	67,324,546.87
Ardmore Shipping Corporation	ASC	New York Stock Exchange (NYSE)	Liquid Bulk	603,915,251.23
Carnival Corporation & PLC.	CCL	New York Stock Exchange (NYSE)	Passenger	12,821,919,807.43
Costamare Inc.	CMRE	New York Stock Exchange (NYSE)	Diversified Fleet	1,138,526,047.24
Danaos Corporation	DAC	New York Stock Exchange (NYSE)	Container	1,089,577,880.99
DHT Holdings Inc.	DHT	New York Stock Exchange (NYSE)	Liquid Bulk	1,721,142,788.39

Dynagas LNG Partners L.P.	DLNG	New York Stock Exchange (NYSE)	Liquid Bulk	104,517,676.84
Diana Shipping Inc.	DSX	New York Stock Exchange (NYSE)	Dry Bulk	408,718,070.86
Eagle Bulk Shipping Inc.	EGLE	New York Stock Exchange (NYSE)	Dry Bulk	589,884,769.94
Frontline PLC.	FRO	New York Stock Exchange (NYSE)	Liquid Bulk	3,633,207,292.06
GasLog Ltd.	GLOG-PA	New York Stock Exchange (NYSE)	Liquid Bulk	2,298,874,936.39
Genco Shipping & Trading Ltd.	GNK	New York Stock Exchange (NYSE)	Dry Bulk	650,797,497.84
Global Ship Lease Inc.	GSL	New York Stock Exchange (NYSE)	Container	657,293,336.25
International Seaways Inc.	INSW	New York Stock Exchange (NYSE)	Liquid Bulk	2,018,469,512.49
Kirby Corporation	KEX	New York Stock Exchange (NYSE)	Liquid Bulk	4,096,799,926.76
KNOT Offshore Partners L.P.	KNOP	New York Stock Exchange (NYSE)	Liquid Bulk	185,520,778.00
Dorian LPG Ltd.	LPG	New York Stock Exchange (NYSE)	Liquid Bulk	788,276,178.49
Matson Inc.	MATX	New York Stock Exchange (NYSE)	Diversified Fleet	2,137,794,301.70
Nordic American Tankers Ltd.	NAT	New York Stock Exchange (NYSE)	Liquid Bulk	822,656,251.95
Norwegian Cruise Line Holdings Ltd.	NCLH	New York Stock Exchange (NYSE)	Passenger	5,628,590,124.16
Navios Maritime Holdings Inc.	NM	New York Stock Exchange (NYSE)	Dry Bulk	40,858,539.13
Navios Maritime Partners L.P.	NMM	New York Stock Exchange (NYSE)	Diversified Fleet	714,455,282.30
Navigator Holdings Ltd.	NVGS	New York Stock Exchange (NYSE)	Liquid Bulk	1,026,987,500.00
Overseas Shipholding Group Inc.	OSG	New York Stock Exchange (NYSE)	Liquid Bulk	299,820,325.50
Royal Caribbean Cruises Ltd.	RCL	New York Stock Exchange (NYSE)	Passenger	16,550,975,352.17
Safe Bulkers Inc.	SB	New York Stock Exchange (NYSE)	Dry Bulk	436,285,939.07
SFL Corporation Ltd.	SFL	New York Stock Exchange (NYSE)	Diversified Fleet	1,188,078,505.49
Scorpio Tankers Inc.	STNG	New York Stock Exchange (NYSE)	Liquid Bulk	3,279,579,750.00
Tidewater Inc.	TDW	New York Stock Exchange (NYSE)	Diversified Fleet	2,265,340,440.99
Teekay Corporation	TK	New York Stock Exchange (NYSE)	Liquid Bulk	584,804,444.65
Teekay Tankers Ltd.	TNK	New York Stock Exchange (NYSE)	Liquid Bulk	1,435,664,948.27
Tsakos Energy Navigation Ltd.	TNP	New York Stock Exchange (NYSE)	Liquid Bulk	565,039,888.74
Marsden Maritime Holdings Ltd.	MMH.NZ	New Zealand's Exchange (NZX)	Assorted Port	147,559,737.74
Port of Tauranga Ltd.	POT.NZ	New Zealand's Exchange (NZX)	Assorted Port	2,706,866,979.96
South Port New Zealand Ltd.	SPN.NZ	New Zealand's Exchange (NZX)	Assorted Port	130,692,186.51
Qatar Gas Transport Company Ltd.	QGTS.QA	Qatar Stock Exchange (QSE)	Liquid Bulk	5,266,219,782.60
Qatar Navigation Q.P.S.C.	QNNS.QA	Qatar Stock Exchange (QSE)	Container	2,566,440,396.64

Ama Marine PCL.	AMA.BK	Stock Exchange of Thailand (SET)	Liquid Bulk	83,363,871.82
Bio Green Energy Tech PCL.	BIOTEC.BK	Stock Exchange of Thailand (SET)	Dry Bulk	71,483,805.57
Namyong Terminal PCL.	NYT.BK	Stock Exchange of Thailand (SET)	Vehicle & Project	137,898,739.86
Sahathai Terminal PCL	PORT.BK	Stock Exchange of Thailand (SET)	Assorted Port	26,477,260.92
Precious Shipping PCL.	PSL.BK	Stock Exchange of Thailand (SET)	Dry Bulk	629,740,412.57
Regional Container Lines PCL.	RCL.BK	Stock Exchange of Thailand (SET)	Container	660,914,179.10
Raja Ferry Port PCL.	RP.BK	Stock Exchange of Thailand (SET)	Passenger	12,223,849.71
Thai Sugar Terminal PCL.	TSTE.BK	Stock Exchange of Thailand (SET)	Dry Bulk	92,550,417.03
Thoresen Thai Agencies PCL.	TTA.BK	Stock Exchange of Thailand (SET)	Dry Bulk	424,015,112.74
Marco Polo Marine Ltd.	5LY.SI	Singapore Exchange (SGX)	Diversified Fleet	121,431,622.39
First Ship Lease Trust	D8DU.SI	Singapore Exchange (SGX)	Liquid Bulk	97,102,190.87
COSCO SHIPPING International (Singapore) Co., Ltd.	F83.SI	Singapore Exchange (SGX)	Diversified Fleet	300,010,506.90
Singapore Shipping Corporation Ltd.	S19.SI	Singapore Exchange (SGX)	Vehicle & Project	77,253,372.77
Samudera Shipping Line Ltd.	S56.SI	Singapore Exchange (SGX)	Diversified Fleet	514,074,819.24
Rizhao Port Co., Ltd.	600017.SS	Shanghai Stock Exchange (SSE)	Assorted Port	1,268,568,766.12
Shanghai International Port Group Co., Ltd.	600018.SS	Shanghai Stock Exchange (SSE)	Assorted Port	18,835,350,825.92
COSCO SHIPPING Energy Transportation Co., Ltd.	600026.SS	Shanghai Stock Exchange (SSE)	Liquid Bulk	9,492,220,037.48
Jinzhou Port Co., Ltd.	600190.SS	Shanghai Stock Exchange (SSE)	Assorted Port	988,700,039.35
COSCO SHIPPING Specialized Carriers Co., Ltd.	600428.SS	Shanghai Stock Exchange (SSE)	Vehicle & Project	1,979,672,598.65
Tianjin Port Co., Ltd.	600717.SS	Shanghai Stock Exchange (SSE)	Assorted Port	1,702,205,269.26
Ningbo Marine Co., Ltd.	600798.SS	Shanghai Stock Exchange (SSE)	Dry Bulk	641,326,034.56
TangShan Port Group Co., Ltd.	601000.SS	Shanghai Stock Exchange (SSE)	Assorted Port	2,624,910,417.02
Jiangsu Lianyungang Port Co., Ltd.	601008.SS	Shanghai Stock Exchange (SSE)	Assorted Port	816,209,248.33
Ningbo Zhoushan Port Co., Ltd.	601018.SS	Shanghai Stock Exchange (SSE)	Assorted Port	10,199,596,061.22
Guangzhou Port Company Ltd.	601228.SS	Shanghai Stock Exchange (SSE)	Assorted Port	3,374,746,558.67
Qinhuangdao Port Co., Ltd.	601326.SS	Shanghai Stock Exchange (SSE)	Assorted Port	2,280,211,949.62
COSCO SHIPPING Development Co., Ltd.	601866.SS	Shanghai Stock Exchange (SSE)	Container	4,888,722,008.09
China Merchants Energy Shipping Co., Ltd.	601872.SS	Shanghai Stock Exchange (SSE)	Diversified Fleet	8,343,875,464.01
Liaoning Port Co., Ltd.	601880.SS	Shanghai Stock Exchange (SSE)	Assorted Port	5,573,850,669.79
COSCO SHIPPING Holdings Co., Ltd.	601919.SS	Shanghai Stock Exchange (SSE)	Container	26,718,125,369.17
Bohai Ferry Group Co., Ltd.	603167.SS	Shanghai Stock Exchange (SSE)	Passenger	491,247,744.26

Shenzhen Yan Tian Port Holdings Co., Ltd.	000088.SZ	Shenzhen Stock Exchange (SZSE)	Assorted Port	1,656,101,389.29
Zhuhai Port Co., Ltd.	000507.SZ	Shenzhen Stock Exchange (SZSE)	Assorted Port	745,341,180.12
Chang Jiang Shipping Group Phoenix Co., Ltd.	000520.SZ	Shenzhen Stock Exchange (SZSE)	Dry Bulk	485,051,971.03
Beibu Gulf Port Co., Ltd.	000582.SZ	Shenzhen Stock Exchange (SZSE)	Assorted Port	1,935,264,175.41
Xiamen Port Development Co., Ltd.	000905.SZ	Shenzhen Stock Exchange (SZSE)	Assorted Port	772,449,424.39
China Merchants Port Group Co., Ltd.	001872.SZ	Shenzhen Stock Exchange (SZSE)	Assorted Port	6,257,123,914.84
Nanjing Port Co., Ltd.	002040.SZ	Shenzhen Stock Exchange (SZSE)	Liquid Bulk	483,646,119.88
Hainan Strait Shipping Co., Ltd.	002320.SZ	Shenzhen Stock Exchange (SZSE)	Passenger	1,809,535,234.42
Zhuhai Winbase International Chemical Tank Terminal Co., Ltd.	002492.SZ	Shenzhen Stock Exchange (SZSE)	Liquid Bulk	372,908,687.96
The National Shipping Company of Saudi Arabia	4030.SR	Saudi Stock Exchange (TADAWUL)	Diversified Fleet	2,843,373,688.95
Taiwan Allied Container Terminal Corp.	5601.TWO	Taipei Exchange (TPEX)	Container	89,929,214.22
Nippon Yusen Kabushiki Kaisha	9101.T	Tokyo Stock Exchange (TSE)	Diversified Fleet	12,309,184,467.78
Mitsui O.S.K. Lines, Ltd.	9104.T	Tokyo Stock Exchange (TSE)	Diversified Fleet	9,440,985,397.06
Kawasaki Kisen Kaisha, Ltd.	9107.T	Tokyo Stock Exchange (TSE)	Diversified Fleet	6,127,014,618.03
NS United Kaiun Kaisha, Ltd.	9110.T	Tokyo Stock Exchange (TSE)	Liquid Bulk	758,123,566.86
Meiji Shipping Co., Ltd.	9115.T	Tokyo Stock Exchange (TSE)	Diversified Fleet	162,888,305.58
Iino Kaiun Kaisha, Ltd.	9119.T	Tokyo Stock Exchange (TSE)	Diversified Fleet	814,822,320.78
Tamai Steamship Co., Ltd.	9127.T	Tokyo Stock Exchange (TSE)	Dry Bulk	21,181,435.55
Kyoei Tanker Co., Ltd.	9130.T	Tokyo Stock Exchange (TSE)	Diversified Fleet	52,899,589.67
Kuribayashi Steamship Co., Ltd.	9171.T	Tokyo Stock Exchange (TSE)	Diversified Fleet	54,289,879.01
Tokai Kisen Co., Ltd.	9173.T	Tokyo Stock Exchange (TSE)	Passenger	40,083,386.13
Tokyo Kisen Co., Ltd.	9193.T	Tokyo Stock Exchange (TSE)	Diversified Fleet	37,214,216.75
Mitsui-Soko Holdings Co., Ltd.	9302.T	Tokyo Stock Exchange (TSE)	Container	732,688,231.66
The Sumitomo Warehouse Co., Ltd.	9303.T	Tokyo Stock Exchange (TSE)	Assorted Port	1,300,667,179.58
Inui Global Logistics Co., Ltd.	9308.T	Tokyo Stock Exchange (TSE)	Dry Bulk	354,641,662.14
Toyo Wharf & Warehouse Co., Ltd.	9351.T	Tokyo Stock Exchange (TSE)	Assorted Port	76,528,602.46
Rinko Corp.	9355.T	Tokyo Stock Exchange (TSE)	Assorted Port	31,869,026.07
Fushiki Kairiku Unso Co., Ltd.	9361.T	Tokyo Stock Exchange (TSE)	Assorted Port	33,686,526.97
Hyoki Kaiun Kaisha, Ltd.	9362.T	Tokyo Stock Exchange (TSE)	Dry Bulk	19,517,642.71
Algoma Central Corp.	ALC.TO	Toronto Stock Exchange (TSX)	Diversified Fleet	444,768,749.11
Logistec Corp.	LGT-A.TO	Toronto Stock Exchange (TSX)	Assorted Port	406,348,890.36

Westshore Terminals Investment Corp.	WTE.TO	Toronto Stock Exchange (TSX)	Dry Bulk	1,235,734,805.44
Evergreen Marine Corp. (Taiwan) Ltd.	2603.TW	Taiwan Stock Exchange (TWSE)	Container	10,958,001,048.63
Sincere Navigation Corp.	2605.TW	Taiwan Stock Exchange (TWSE)	Dry Bulk	468,995,979.05
U-Ming Marine Transport Corp.	2606.TW	Taiwan Stock Exchange (TWSE)	Dry Bulk	1,509,226,373.05
Evergreen International Storage & Transport Corp.	2607.TW	Taiwan Stock Exchange (TWSE)	Container	970,414,299.06
Yang Ming Marine Transport Corp.	2609.TW	Taiwan Stock Exchange (TWSE)	Container	7,243,746,904.43
Chinese Maritime Transport Ltd.	2612.TW	Taiwan Stock Exchange (TWSE)	Diversified Fleet	254,978,021.41
China Container Terminal Corp.	2613.TW	Taiwan Stock Exchange (TWSE)	Container	98,928,570.33
Wan Hai Lines Ltd.	2615.TW	Taiwan Stock Exchange (TWSE)	Container	6,299,023,495.87
Taiwan Navigation Co., Ltd.	2617.TW	Taiwan Stock Exchange (TWSE)	Liquid Bulk	421,177,575.10
Wisdom Marine Lines Co., Ltd. (Cayman)	2637.TW	Taiwan Stock Exchange (TWSE)	Dry Bulk	1,565,414,077.86
Shih Wei Navigation Co., Ltd.	5608.TW	Taiwan Stock Exchange (TWSE)	Dry Bulk	318,250,157.89
Chien Shing Harbour Service Co. , Ltd.	8367.TW	Taiwan Stock Exchange (TWSE)	Container	138,572,632.94
Euronav NV	EURN.BR	Euronext Brussels (XBRU)	Liquid Bulk	3,341,186,046.81
Exmar NV	EXM.BR	Euronext Brussels (XBRU)	Liquid Bulk	488,076,759.06
DFDS A/S	DFDS.CO	Nasdaq Copenhagen (XCSE)	Diversified Fleet	2,250,725,930.00
Dampskibsselskabet Norden A/S	DNORD.CO	Nasdaq Copenhagen (XCSE)	Diversified Fleet	2,146,378,390.27
A.P. Møller - Mærsk A/S	MAERSK-A.CO	Nasdaq Copenhagen (XCSE)	Container	29,959,221,732.10
TORM PLC.	TRMD-A.CO	Nasdaq Copenhagen (XCSE)	Liquid Bulk	2,361,374,779.03
Irish Continental Group PLC.	IR5B.IR	Euronext Dublin (XDUB)	Diversified Fleet	799,480,753.94
Viking Line Abp	VIK1V.HE	Nasdaq Helsinki (XHEL)	Passenger	282,940,800.90
Eimskipafélag Íslands hf.	EIM.IC	Nasdaq Iceland (XICE)	Diversified Fleet	664,258,494.17
d'Amico International Shipping S.A.	DIS.MI	Borsa Italiana (XMIL)	Liquid Bulk	6,186,082,333.93
Avance Gas Holding Ltd.	AGAS.OL	Oslo Børs (XOSL)	Liquid Bulk	508,843,044.79
AMSC ASA	AMSC.OL	Oslo Børs (XOSL)	Liquid Bulk	284,911,794.45
Belships ASA	BELCO.OL	Oslo Børs (XOSL)	Dry Bulk	488,923,573.86
BW Epic Kosan Ltd.	BWEK.OL	Oslo Børs (XOSL)	Liquid Bulk	327,779,167.06
BW LPG Ltd.	BWLPG.OL	Oslo Børs (XOSL)	Liquid Bulk	979,803,229.08
FLEX LNG Ltd.	FLNG.OL	Oslo Børs (XOSL)	Liquid Bulk	1,750,029,521.14
Jinhui Shipping and Transportation Ltd.	JIN.OL	Oslo Børs (XOSL)	Dry Bulk	81,704,066.91
MPC CONTAINER SHIPS ASA	MPCC.OL	Oslo Børs (XOSL)	Container	692,349,491.96

Odfjell SE	ODF.OL	Oslo Børs (XOSL)	Liquid Bulk	713,039,972.35
Wallenius Wilhelmsen ASA	WAWI.OL	Oslo Børs (XOSL)	Vehicle & Project	3,054,149,098.55
Wilh. Wilhelmsen Holding ASA	WWI.OL	Oslo Børs (XOSL)	Assorted Port	1,112,659,831.82
Concordia Maritime AB	CCOR-B.ST	Nasdaq Stockholm (XSTO)	Liquid Bulk	27,642,413.83
AS Tallink Grupp	TAL1T.TL	Nasdaq Tallinn (XTSE)	Passenger	466,847,156.98

Appendix II. Results from GJR-GARCH(1,1,1) Risk Estimation

The below results are expressed in negative values percentage, i.e., 18.07 means -18.07%. The symbols A and M indicate the average and maximum values during the respective time regimes.

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
ANEK.AT	A	18.07	18.85	16.24	15.84	17.36	32.85	34.27	29.53	28.81	31.57	8.89	9.26	8.05	7.87	8.57	11.15	11.62	10.09	9.87	10.74
ANEK.AT	M	41.16	51.34	29.79	32.10	51.34	74.84	93.35	54.16	58.35	93.35	18.12	22.11	13.50	14.35	22.11	22.72	27.72	16.93	18.00	27.72
ATTICAAT	A	4.82	5.32	4.99	5.10	5.02	7.01	7.73	7.26	7.42	7.30	3.86	4.31	4.01	4.10	4.03	4.85	5.40	5.03	5.14	5.06
ATTICAAT	M	8.89	13.94	19.63	12.67	19.63	12.93	20.28	28.55	18.42	28.55	6.68	10.61	12.97	9.66	12.97	8.38	13.31	16.27	12.11	16.27
KYRI.AT	A	10.19	9.32	6.61	6.03	8.38	14.65	13.39	9.51	8.67	12.04	8.47	7.95	5.61	5.20	7.07	10.63	9.98	7.04	6.52	8.86
KYRI.AT	M	28.18	26.80	12.83	11.43	28.18	40.51	38.53	18.44	16.43	40.51	24.00	25.56	10.20	10.13	25.56	30.10	32.05	12.79	12.71	32.05
OLTH.AT	A	2.98	3.52	2.77	2.92	3.03	4.19	4.93	3.89	4.10	4.26	2.47	2.92	2.28	2.42	2.51	3.10	3.67	2.85	3.03	3.15
OLTH.AT	M	4.24	8.63	4.79	4.17	8.63	5.95	12.11	6.72	5.85	12.11	3.97	7.15	3.98	3.49	7.15	4.98	8.96	5.00	4.38	8.96
PPAAT	A	3.15	3.73	2.75	2.83	3.11	4.52	5.35	3.95	4.06	4.47	2.57	3.05	2.25	2.31	2.54	3.23	3.82	2.82	2.90	3.19
PPAAT	M	8.00	12.25	4.53	5.02	12.25	11.47	17.57	6.49	7.20	17.57	6.53	10.00	3.70	4.10	10.00	8.19	12.55	4.63	5.14	12.55
LOGN3.SA	A	7.35	8.40	6.50	6.43	7.18	10.64	12.16	9.40	9.30	10.40	5.97	6.97	5.24	5.22	5.86	7.49	8.74	6.58	6.54	7.34
LOGN3.SA	M	17.08	33.26	19.94	12.13	33.26	24.72	48.15	28.87	17.56	48.15	13.30	29.09	15.14	10.67	29.09	16.68	36.48	18.98	13.38	36.48
PSVM11.SA	A	16.00	17.15	13.45	14.12	15.30	23.90	25.62	20.10	21.09	22.86	12.43	13.32	10.45	10.96	11.89	15.59	16.71	13.11	13.75	14.90
PSVM11.SA	M	33.35	24.35	15.27	15.47	33.35	49.82	36.38	22.81	23.11	49.82	25.90	18.91	11.86	12.02	25.90	32.48	23.72	14.88	15.07	32.48
STBP3.SA	A	5.21	7.68	6.08	5.86	6.02	7.49	11.05	8.75	8.42	8.65	3.99	6.31	4.82	4.64	4.76	5.00	7.91	6.05	5.81	5.97
STBP3.SA	M	8.58	25.91	10.87	9.90	25.91	12.33	37.26	15.63	14.24	37.26	6.80	21.18	8.77	7.96	21.18	8.53	26.55	10.99	9.98	26.55
FROWARD.SN	A	1.70	1.62	1.65	1.65	1.66	2.54	2.43	2.48	2.47	2.49	1.34	1.24	1.30	1.27	1.29	1.68	1.55	1.63	1.59	1.62
FROWARD.SN	M	8.29	7.26	6.47	6.94	8.29	12.42	10.88	9.70	10.40	12.42	8.88	5.13	7.89	4.91	8.88	11.14	6.44	9.89	6.15	11.14
SMSAAM.SN	A	2.83	4.34	3.92	4.17	3.65	4.22	6.48	5.85	6.22	5.45	2.46	3.60	3.27	3.48	3.08	3.09	4.51	4.10	4.36	3.86
SMSAAM.SN	M	6.52	10.91	8.12	25.89	25.89	9.73	16.29	12.13	38.65	38.65	5.22	8.65	6.51	20.27	20.27	6.55	10.84	8.16	25.42	25.42
VAPORES.SN	A	4.60	5.66	4.99	5.42	5.07	6.75	8.29	7.31	7.95	7.44	3.66	4.49	3.97	4.31	4.03	4.59	5.64	4.98	5.41	5.06
VAPORES.SN	M	18.44	38.65	9.20	17.80	38.65	27.02	56.63	13.48	26.08	56.63	14.65	30.72	7.31	14.15	30.72	18.38	38.52	9.17	17.74	38.52

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
GSDDE.IS	A	7.87	8.55	8.96	8.26	8.30	11.78	12.80	13.41	12.37	12.43	6.26	6.98	7.48	6.69	6.73	7.85	8.76	9.38	8.39	8.45
GSDDE.IS	M	18.79	26.59	71.16	20.80	71.16	28.14	39.81	106.54	31.14	106.54	14.75	24.85	66.85	17.09	66.85	18.49	31.16	83.83	21.43	83.83
GULFNAV.AE	A	4.12	6.13	4.21	5.36	4.79	5.90	8.79	6.03	7.68	6.86	3.49	5.08	3.58	4.57	4.04	4.37	6.37	4.49	5.73	5.07
GULFNAV.AE	M	8.37	12.45	6.25	8.71	12.45	11.99	17.83	8.95	12.48	17.83	7.53	11.18	6.09	8.47	11.18	9.44	14.02	7.64	10.63	14.02
HHFAF	A	3.95	5.63	3.85	4.42	4.37	5.72	8.15	5.57	6.40	6.33	3.25	4.60	3.17	3.64	3.59	4.08	5.77	3.98	4.56	4.50
HHFAF	M	8.99	16.77	8.07	14.55	16.77	13.02	24.27	11.68	21.07	24.27	7.48	13.94	6.72	12.13	13.94	9.38	17.49	8.43	15.21	17.49
HLAG.F	A	7.49	11.30	8.77	9.35	8.92	11.67	17.59	13.66	14.56	13.89	5.46	7.63	6.15	6.45	6.25	6.85	9.57	7.71	8.09	7.84
HLAG.F	M	13.78	22.60	13.27	13.70	22.60	21.46	35.19	20.67	21.34	35.19	8.88	13.27	8.02	8.79	13.27	11.14	16.65	10.06	11.03	16.65
HXCK.F	A	6.13	9.02	8.59	7.10	7.41	8.79	12.94	12.33	10.18	10.63	5.22	7.80	7.45	6.12	6.38	6.55	9.78	9.34	7.67	8.00
HXCK.F	M	9.97	18.49	13.00	11.37	18.49	14.29	26.52	18.64	16.31	26.52	8.45	15.42	11.18	9.68	15.42	10.60	19.34	14.02	12.14	19.34
0137.HK	A	6.57	7.50	7.06	7.25	7.00	9.58	10.94	10.30	10.59	10.22	5.20	6.05	5.85	5.78	5.63	6.52	7.59	7.34	7.25	7.06
0137.HK	M	10.02	16.09	11.67	17.22	17.22	14.62	23.48	17.02	25.13	25.13	8.44	11.30	9.95	10.93	11.30	10.59	14.17	12.48	13.71	14.17
0144.HK	A	3.39	4.06	3.85	3.91	3.73	4.98	5.95	5.65	5.74	5.47	2.83	3.52	3.27	3.43	3.19	3.54	4.42	4.10	4.30	4.00
0144.HK	M	3.84	6.72	4.83	4.76	6.72	5.64	9.87	7.09	6.98	9.87	3.38	6.35	4.08	4.70	6.35	4.24	7.97	5.11	5.89	7.97
0316.HK	A	4.72	6.67	9.31	8.21	6.80	6.97	9.85	13.75	12.13	10.04	3.72	5.25	7.33	6.47	5.35	4.66	6.58	9.19	8.11	6.71
0316.HK	M	20.01	16.03	16.97	23.20	23.20	29.55	23.67	25.05	34.26	34.26	15.76	12.62	13.36	18.27	18.27	19.76	15.83	16.75	22.91	22.91
0351.HK	A	16.51	14.72	13.08	15.56	15.26	24.76	22.09	19.62	23.34	22.89	12.77	11.27	9.18	12.46	11.68	16.01	14.13	11.52	15.62	14.65
0351.HK	M	157.58	26.19	15.88	30.63	157.58	236.35	39.29	23.82	45.94	236.35	210.78	31.49	15.40	36.92	210.78	264.33	39.49	19.32	46.29	264.33
1145.HK	A	10.63	14.23	11.37	11.08	11.60	15.49	20.74	16.57	16.15	16.90	8.73	11.37	9.40	8.99	9.45	10.95	14.26	11.78	11.27	11.85
1145.HK	M	16.28	28.56	25.76	22.69	28.56	23.73	41.62	37.54	33.07	41.62	12.81	21.87	19.92	15.98	21.87	16.07	27.42	24.98	20.04	27.42
1199.HK	A	4.20	4.83	4.58	4.72	4.52	5.91	6.79	6.44	6.63	6.35	3.52	4.05	3.84	3.95	3.78	4.41	5.07	4.81	4.96	4.74
1199.HK	M	6.11	10.50	7.00	8.65	10.50	8.59	14.77	9.84	12.16	14.77	5.12	8.80	5.86	7.25	8.80	6.42	11.03	7.35	9.09	11.03
1308.HK	A	4.51	5.14	6.16	6.19	5.34	6.22	7.10	8.50	8.55	7.37	3.81	4.31	5.45	5.47	4.60	4.77	5.41	6.83	6.86	5.77
1308.HK	M	8.03	7.20	9.48	11.45	11.45	11.08	9.94	13.08	15.80	15.80	5.75	5.63	7.37	8.54	8.54	7.21	7.07	9.24	10.71	10.71
1549.HK	A	8.18	8.34	11.63	7.56	8.76	11.76	11.99	16.71	10.86	12.60	7.37	7.54	10.91	6.76	7.98	9.25	9.46	13.68	8.48	10.00
1549.HK	M	16.90	17.05	33.62	11.45	33.62	24.29	24.51	48.33	16.46	48.33	14.45	14.91	28.89	10.07	28.89	18.12	18.70	36.22	12.63	36.22
1719.HK	A	7.88	4.45	5.33	3.54	5.72	11.66	6.58	7.89	5.24	8.48	6.37	3.79	4.43	3.15	4.75	7.98	4.75	5.56	3.95	5.96
1719.HK	M	16.89	8.26	15.19	11.52	16.89	25.01	12.22	22.49	17.06	25.01	13.21	6.83	11.91	9.55	13.21	16.56	8.57	14.93	11.98	16.56
1732.HK	A	9.87	8.50	10.68	8.70	9.50	14.64	12.60	15.84	12.90	14.09	8.07	7.10	9.16	7.36	7.94	10.12	8.91	11.49	9.23	9.95
1732.HK	M	75.43	30.33	60.56	27.81	75.43	111.82	44.96	89.78	41.23	111.82	45.93	27.99	56.00	25.63	56.00	57.59	35.10	70.23	32.15	70.23

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
2343.HK	A	5.21	5.95	6.42	7.25	6.05	7.28	8.31	8.97	10.13	8.45	4.29	4.93	5.51	6.19	5.09	5.38	6.19	6.91	7.77	6.38
2343.HK	M	6.34	8.15	7.85	10.28	10.28	8.86	11.39	10.98	14.37	14.37	5.10	5.94	6.20	7.53	7.53	6.40	7.45	7.78	9.44	9.44
3382.HK	A	3.13	4.25	3.74	3.75	3.62	4.28	5.80	5.11	5.12	4.93	2.84	3.71	3.32	3.32	3.22	3.56	4.66	4.16	4.17	4.03
3382.HK	M	5.78	8.13	7.19	7.26	8.13	7.88	11.10	9.82	9.91	11.10	4.79	6.41	5.86	5.93	6.41	6.00	8.04	7.35	7.44	8.04
3683.HK	A	15.66	15.69	15.70	16.30	15.81	23.51	23.55	23.57	24.48	23.75	12.16	12.18	12.25	12.53	12.26	15.24	15.27	15.36	15.72	15.38
3683.HK	M	15.77	16.07	16.21	69.27	69.27	23.69	24.13	24.34	104.02	104.02	12.71	13.64	16.22	62.66	62.66	15.94	17.11	20.34	78.58	78.58
BULL.JK	A	6.22	5.92	4.56	6.28	5.85	8.91	8.48	6.53	9.00	8.38	5.26	4.98	3.87	5.35	4.96	6.60	6.24	4.86	6.71	6.22
BULL.JK	M	19.22	12.19	9.96	21.34	21.34	27.56	17.48	14.28	30.60	30.60	17.03	10.12	8.83	17.83	17.83	21.35	12.69	11.07	22.37	22.37
HITS.JK	A	6.86	7.07	7.76	8.55	7.44	10.10	10.42	11.44	12.60	10.97	7.06	7.35	8.14	9.05	7.76	8.86	9.22	10.21	11.35	9.73
HITS.JK	M	33.33	25.21	16.04	18.96	33.33	49.12	37.15	23.64	27.95	49.12	35.49	26.63	15.60	17.81	35.49	44.51	33.40	19.57	22.34	44.51
IPCM.JK	A	5.38	5.87	5.65	4.29	5.29	8.19	8.94	8.60	6.54	8.06	4.69	4.87	4.77	3.98	4.59	5.88	6.11	5.98	4.99	5.75
IPCM.JK	M	30.02	26.20	33.43	9.07	33.43	45.72	39.91	50.91	13.82	50.91	18.94	14.42	18.48	6.34	18.94	23.75	18.09	23.17	7.95	23.75
KARW.JK	A	9.38	7.69	9.60	8.27	8.86	13.81	11.32	14.13	12.17	13.04	7.64	6.34	8.02	6.75	7.27	9.58	7.95	10.06	8.46	9.12
KARW.JK	M	31.86	20.87	19.08	17.61	31.86	46.91	30.73	28.09	25.92	46.91	27.99	18.40	17.59	15.35	27.99	35.10	23.08	22.06	19.25	35.10
MBSS.JK	A	6.39	6.49	6.91	6.46	6.53	9.36	9.50	10.11	9.45	9.55	5.37	5.42	5.82	5.42	5.48	6.73	6.79	7.30	6.80	6.87
MBSS.JK	M	21.37	15.59	22.39	15.70	22.39	31.27	22.82	32.77	22.98	32.77	16.76	12.70	18.31	12.56	18.31	21.02	15.92	22.96	15.76	22.96
NELY.JK	A	6.85	8.12	6.20	6.12	6.81	9.99	11.85	9.05	8.92	9.93	5.73	6.93	5.24	5.08	5.72	7.19	8.69	6.57	6.37	7.18
NELY.JK	M	12.48	15.48	17.61	12.58	17.61	18.21	22.59	25.69	18.35	25.69	11.00	13.95	16.23	11.55	16.23	13.80	17.49	20.36	14.49	20.36
PORT.JK	A	7.67	12.21	11.87	8.96	9.65	11.23	17.88	17.37	13.11	14.12	6.40	10.61	10.29	7.61	8.23	8.03	13.30	12.91	9.55	10.33
PORT.JK	M	18.34	23.25	20.43	17.95	23.25	26.84	34.02	29.91	26.27	34.02	16.64	21.13	17.95	15.67	21.13	20.87	26.50	22.52	19.65	26.50
PSSI.JK	A	5.55	5.38	5.06	5.34	5.37	7.92	7.69	7.22	7.63	7.68	4.55	4.42	4.15	4.38	4.41	5.71	5.54	5.21	5.50	5.53
PSSI.JK	M	37.47	15.30	12.99	17.54	37.47	53.51	21.85	18.56	25.05	53.51	30.75	12.56	10.67	14.40	30.75	38.56	15.75	13.37	18.06	38.56
SHIP.JK	A	3.84	4.26	5.46	6.71	4.87	5.49	6.08	7.80	9.58	6.95	3.21	3.61	4.66	5.82	4.14	4.03	4.52	5.84	7.30	5.19
SHIP.JK	M	11.82	9.75	18.75	11.94	18.75	16.88	13.91	26.76	17.05	26.76	10.56	8.60	16.10	10.67	16.10	13.24	10.79	20.19	13.38	20.19
SMDR.JK	A	4.39	5.92	6.34	6.19	5.46	6.47	8.72	9.34	9.11	8.04	4.15	5.63	6.07	5.91	5.19	5.20	7.06	7.61	7.41	6.51
SMDR.JK	M	12.21	10.85	12.07	12.64	12.64	17.98	15.99	17.78	18.62	18.62	9.79	8.75	9.45	10.17	10.17	12.27	10.97	11.85	12.76	12.76
SOCI.JK	A	5.96	8.15	6.07	4.10	6.00	8.61	11.79	8.78	5.93	8.67	4.96	6.79	5.01	3.48	5.00	6.22	8.52	6.28	4.37	6.27
SOCI.JK	M	15.65	22.34	12.57	8.29	22.34	22.63	32.30	18.17	11.98	32.30	14.34	20.62	10.64	7.37	20.62	17.98	25.85	13.34	9.25	25.85
TMAS.JK	A	5.81	6.63	9.61	7.20	7.01	8.55	9.76	14.14	10.60	10.33	5.43	6.17	8.97	6.70	6.54	6.81	7.74	11.25	8.40	8.21
TMAS.JK	M	18.06	16.71	24.29	14.52	24.29	26.60	24.61	35.78	21.38	35.78	15.00	14.41	20.19	12.57	20.19	18.82	18.07	25.32	15.76	25.32

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
TPMAJK	A	6.48	6.36	6.52	5.49	6.25	9.53	9.36	9.59	8.08	9.19	6.43	6.37	6.54	5.32	6.19	8.06	7.99	8.20	6.67	7.77
TPMAJK	M	20.60	19.30	19.54	11.15	20.60	30.30	28.39	28.75	16.40	30.30	19.64	18.70	20.00	10.74	20.00	24.63	23.45	25.08	13.47	25.08
GND.JO	A	5.61	6.20	5.17	5.48	5.61	7.98	8.83	7.36	7.80	7.99	4.62	5.11	4.26	4.51	4.62	5.79	6.41	5.34	5.66	5.80
GND.JO	M	12.16	14.44	7.55	7.83	14.44	17.31	20.57	10.74	11.15	20.57	10.02	11.90	6.22	6.45	11.90	12.57	14.93	7.80	8.09	14.93
2062.KL	A	5.36	5.69	6.21	5.47	5.62	7.86	8.34	9.11	8.02	8.24	4.33	4.70	5.20	4.40	4.59	5.42	5.90	6.52	5.52	5.76
2062.KL	M	10.51	9.67	17.66	9.77	17.66	15.41	14.19	25.91	14.33	25.91	10.00	10.14	20.37	10.10	20.37	12.54	12.72	25.55	12.67	25.55
3816.KL	A	2.83	3.24	2.72	2.56	2.83	4.02	4.61	3.87	3.64	4.02	2.34	2.73	2.24	2.07	2.34	2.93	3.42	2.81	2.60	2.93
3816.KL	M	11.69	9.91	5.60	5.68	11.69	16.62	14.08	7.97	8.08	16.62	10.99	8.85	4.95	5.01	10.99	13.78	11.10	6.20	6.28	13.78
5032.KL	A	2.28	2.62	2.15	2.30	2.33	3.37	3.88	3.18	3.40	3.44	2.24	2.67	2.06	2.26	2.29	2.80	3.35	2.58	2.83	2.88
5032.KL	M	5.03	12.41	3.89	4.53	12.41	7.45	18.36	5.75	6.70	18.36	5.09	13.26	3.52	4.58	13.26	6.38	16.63	4.41	5.74	16.63
5077.KL	A	6.70	8.58	7.13	6.54	7.13	10.38	13.29	11.04	10.12	11.04	4.98	6.14	5.26	4.96	5.26	6.24	7.70	6.59	6.22	6.60
5077.KL	M	18.27	24.35	13.17	22.21	24.35	28.29	37.71	20.40	34.39	37.71	11.19	16.51	9.32	16.37	16.51	14.04	20.71	11.69	20.53	20.71
5173.KL	A	7.45	10.46	8.43	7.84	8.33	11.12	15.63	12.59	11.70	12.45	5.90	8.29	6.71	6.23	6.61	7.39	10.40	8.42	7.82	8.29
5173.KL	M	15.73	32.23	18.55	16.65	32.23	23.49	48.14	27.70	24.87	48.14	11.36	22.77	14.06	13.77	22.77	14.24	28.55	17.64	17.27	28.55
5246.KL	A	3.55	4.39	3.58	3.52	3.72	5.05	6.24	5.10	5.00	5.29	2.93	3.62	2.96	2.90	3.07	3.67	4.54	3.71	3.64	3.85
5246.KL	M	6.97	28.65	8.64	7.32	28.65	9.91	40.75	12.29	10.41	40.75	5.75	23.64	7.13	6.04	23.64	7.21	29.65	8.94	7.57	29.65
5259.KL	A	7.13	7.73	9.41	16.68	9.81	10.40	11.27	13.73	24.34	14.31	6.14	6.67	8.10	14.38	8.45	7.70	8.36	10.16	18.04	10.60
5259.KL	M	13.78	17.71	15.72	46.01	46.01	20.10	25.83	22.94	67.12	67.12	11.54	14.51	13.27	37.76	37.76	14.47	18.20	16.64	47.35	47.35
6254.KL	A	27.23	32.91	29.44	26.10	28.56	51.86	62.68	56.08	49.71	54.39	14.30	18.15	15.69	13.78	15.23	17.94	22.76	19.68	17.28	19.10
6254.KL	M	72.44	197.78	122.40	64.61	197.78	137.99	376.73	233.14	123.06	376.73	22.25	53.53	32.06	20.48	53.53	27.90	67.13	40.20	25.68	67.13
7013.KL	A	10.21	12.26	11.92	7.28	10.32	14.67	17.62	17.13	10.46	14.82	8.60	10.20	9.90	6.26	8.66	10.78	12.79	12.41	7.85	10.86
7013.KL	M	18.64	23.66	18.98	17.34	23.66	26.77	33.99	27.26	24.91	33.99	16.82	22.68	17.51	15.92	22.68	21.10	28.45	21.96	19.96	28.45
8346.KL	A	0.01	0.02	0.01	0.01	0.02	0.02	0.05	0.03	0.03	0.03	8.17	12.84	8.90	9.26	9.49	10.25	16.10	11.16	11.62	11.90
8346.KL	M	0.02	0.05	0.03	0.04	0.05	0.05	0.11	0.07	0.08	0.11	16.29	37.90	16.18	27.14	37.90	20.42	47.53	20.28	34.04	47.53
003280.KS	A	10.40	10.27	11.30	10.46	10.57	16.02	15.83	17.41	16.12	16.28	9.69	9.55	10.30	9.69	9.78	12.15	11.97	12.91	12.15	12.27
003280.KS	M	21.39	19.30	94.01	19.33	94.01	32.94	29.74	144.83	29.78	144.83	25.38	27.06	111.95	21.59	111.95	31.83	33.94	140.39	27.07	140.39
005880.KS	A	5.82	7.10	5.89	5.93	6.11	8.56	10.45	8.66	8.72	8.99	4.61	5.62	4.66	4.69	4.84	5.78	7.05	5.84	5.88	6.07
005880.KS	M	10.65	22.37	10.85	12.04	22.37	15.66	32.89	15.96	17.70	32.89	8.43	17.70	8.59	9.53	17.70	10.57	22.20	10.77	11.95	22.20
009070.KS	A	6.28	6.68	8.21	5.86	6.65	8.99	9.57	11.77	8.40	9.53	5.28	5.62	6.88	4.91	5.58	6.62	7.05	8.63	6.16	7.00
009070.KS	M	20.02	24.82	44.80	13.05	44.80	28.69	35.56	64.20	18.70	64.20	17.96	23.74	40.16	12.11	40.16	22.52	29.78	50.36	15.19	50.36

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
011200.KS	A	5.58	6.78	6.48	5.81	6.05	7.82	9.49	9.08	8.14	8.48	4.70	5.71	5.46	4.89	5.10	5.90	7.16	6.85	6.13	6.39
011200.KS	M	14.54	14.82	12.79	8.67	14.82	20.37	20.76	17.91	12.15	20.76	12.24	12.48	10.77	7.30	12.48	15.35	15.65	13.50	9.16	15.65
028670.KS	A	5.14	6.48	5.81	5.79	5.69	7.38	9.31	8.35	8.32	8.17	4.01	5.66	4.80	4.79	4.67	5.03	7.09	6.01	6.01	5.86
028670.KS	M	8.62	26.73	10.47	11.38	26.73	12.39	38.40	15.04	16.35	38.40	6.29	19.44	7.57	8.25	19.44	7.89	24.38	9.50	10.34	24.38
044450.KS	A	2.96	3.44	3.17	3.05	3.12	4.12	4.80	4.41	4.25	4.34	2.49	3.00	2.71	2.59	2.66	3.13	3.76	3.40	3.24	3.34
044450.KS	M	6.89	12.63	6.30	6.27	12.63	9.60	17.60	8.78	8.73	17.60	5.53	10.36	5.82	5.09	10.36	6.93	13.00	7.30	6.38	13.00
086280.KS	A	4.21	5.90	4.46	3.94	4.54	5.86	8.20	6.20	5.48	6.31	3.58	5.01	3.79	3.35	3.86	4.49	6.28	4.75	4.20	4.83
086280.KS	M	7.38	10.40	9.19	5.04	10.40	10.27	14.47	12.78	7.02	14.47	6.27	8.84	7.81	4.29	8.84	7.87	11.08	9.79	5.38	11.08
GPH.L	A	6.18	9.22	6.95	7.28	7.18	8.90	13.26	9.99	10.48	10.33	5.04	7.77	5.77	6.06	5.95	6.33	9.74	7.23	7.60	7.47
GPH.L	M	12.93	33.61	17.68	22.98	33.61	18.61	48.35	25.43	33.05	48.35	10.67	27.90	14.55	18.95	27.90	13.38	34.99	18.25	23.77	34.99
MPL.L	A	7.89	9.66	8.84	7.11	8.26	11.75	14.38	13.17	10.59	12.30	6.81	8.62	7.98	5.99	7.22	8.54	10.81	10.01	7.51	9.05
MPL.L	M	38.51	26.10	73.73	13.85	73.73	57.36	38.87	109.81	20.62	109.81	28.00	28.84	82.03	12.84	82.03	35.12	36.17	102.87	16.10	102.87
OCN.L	A	2.75	2.90	2.62	3.05	2.82	4.02	4.23	3.83	4.46	4.12	2.40	2.55	2.27	2.70	2.47	3.01	3.20	2.84	3.38	3.10
OCN.L	M	5.91	5.13	3.71	4.74	5.91	8.62	7.49	5.41	6.93	8.62	5.55	4.54	3.26	4.14	5.55	6.96	5.69	4.09	5.19	6.96
FESH.ME	A	5.65	5.97	5.34	6.84	5.90	8.35	8.81	7.88	10.09	8.72	4.55	4.80	4.29	5.49	4.75	5.70	6.02	5.38	6.88	5.95
FESH.ME	M	23.37	15.82	10.43	42.13	42.13	34.51	23.37	15.40	62.21	62.21	19.32	13.02	8.42	34.83	34.83	24.22	16.33	10.56	43.68	43.68
CPLP	A	5.03	6.97	5.32	5.38	5.55	7.51	10.41	7.94	8.04	8.29	3.87	5.63	4.31	4.31	4.40	4.85	7.06	5.40	5.41	5.52
CPLP	M	33.42	23.62	7.90	10.38	33.42	49.93	35.29	11.80	15.51	49.93	28.13	19.21	7.81	11.46	28.13	35.28	24.08	9.79	14.38	35.28
ESEA	A	11.33	13.54	13.25	8.49	11.52	16.69	19.94	19.52	12.51	16.97	9.17	10.98	10.75	6.87	9.33	11.50	13.77	13.49	8.61	11.71
ESEA	M	46.68	28.61	26.74	12.02	46.68	68.75	42.14	39.39	17.71	68.75	41.70	25.03	23.10	10.09	41.70	52.30	31.38	28.97	12.66	52.30
GASS	A	4.85	6.61	5.65	7.05	5.85	6.71	9.16	7.83	9.76	8.10	4.21	5.69	4.85	6.11	5.06	5.28	7.14	6.09	7.67	6.34
GASS	M	10.12	16.89	16.20	19.13	19.13	14.02	23.39	22.44	26.50	26.50	10.23	16.86	14.24	16.54	16.86	12.83	21.15	17.86	20.75	21.15
GLBS	A	12.65	16.19	10.95	10.31	12.50	18.31	23.43	15.85	14.92	18.09	10.61	13.59	8.68	8.31	10.31	13.31	17.04	10.89	10.42	12.93
GLBS	M	64.14	51.78	30.26	23.99	64.14	92.79	74.92	43.77	34.70	92.79	76.82	56.92	26.90	27.42	76.82	96.34	71.38	33.73	34.38	96.34
GLNG	A	6.74	11.13	6.87	6.83	7.66	9.77	16.15	9.96	9.91	11.11	5.58	9.23	5.69	5.66	6.35	7.00	11.58	7.14	7.09	7.96
GLNG	M	26.90	38.40	10.36	12.14	38.40	39.02	55.71	15.03	17.61	55.71	21.78	31.15	8.46	9.89	31.15	27.32	39.06	10.61	12.41	39.06
PSHG	A	13.27	16.03	12.39	19.46	15.02	19.88	24.02	18.57	29.17	22.51	10.51	11.89	9.76	16.36	11.93	13.17	14.91	12.24	20.52	14.97
PSHG	M	35.20	218.51	20.47	137.50	218.51	52.75	327.44	30.68	206.05	327.44	35.50	146.41	20.96	152.81	152.81	44.52	183.61	26.28	191.64	191.64
PXS	A	12.09	10.67	12.28	11.12	11.63	17.53	15.47	17.81	16.13	16.87	9.74	8.59	9.89	8.96	9.36	12.21	10.78	12.40	11.23	11.74
PXS	M	56.28	35.18	62.52	46.70	62.52	81.60	51.01	90.65	67.72	90.65	45.31	28.33	50.34	37.60	50.34	56.82	35.52	63.12	47.15	63.12

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
SBLK	A	5.90	7.54	7.63	7.14	6.85	8.07	10.30	10.43	9.76	9.36	5.09	6.57	6.68	6.21	5.95	6.38	8.24	8.38	7.78	7.46
SBLK	M	8.84	10.72	10.22	9.19	10.72	12.08	14.65	13.96	12.56	14.65	7.40	9.27	8.69	7.93	9.27	9.28	11.62	10.89	9.94	11.62
SHIP	A	10.86	16.95	11.47	9.71	11.94	16.09	25.12	16.99	14.39	17.69	8.83	14.29	9.71	7.92	9.89	11.08	17.92	12.18	9.93	12.41
SHIP	M	90.91	109.86	41.68	18.65	109.86	134.67	162.75	61.74	27.63	162.75	77.80	95.91	37.85	16.05	95.91	97.56	120.28	47.47	20.12	120.28
TOPS	A	21.31	26.64	18.61	24.37	22.51	37.42	46.79	32.68	42.80	39.54	13.52	16.86	11.68	15.57	14.27	16.95	21.15	14.65	19.53	17.90
TOPS	M	127.17	204.94	66.77	125.75	204.94	223.35	359.92	117.27	220.85	359.92	110.70	130.48	40.20	95.35	130.48	138.82	163.63	50.42	119.58	163.63
ADANIPORTS.NS	A	4.35	4.83	4.72	5.13	4.69	6.15	6.83	6.67	7.25	6.63	3.68	4.07	3.99	4.30	3.96	4.61	5.11	5.00	5.39	4.96
ADANIPORTS.NS	M	14.06	22.21	12.76	24.46	24.46	19.87	31.38	18.03	34.56	34.56	12.38	19.30	10.94	21.12	21.12	15.53	24.20	13.72	26.49	26.49
ALLCARGO.NS	A	4.93	5.71	5.37	5.57	5.32	7.07	8.18	7.69	7.98	7.62	4.10	4.69	4.49	4.57	4.40	5.15	5.88	5.63	5.73	5.52
ALLCARGO.NS	M	7.18	17.93	10.17	9.39	17.93	10.30	25.70	14.57	13.46	25.70	6.28	15.34	9.95	8.42	15.34	7.87	19.23	12.48	10.56	19.23
ESSARSHPNG.NS	A	6.46	6.99	6.94	6.56	6.69	9.34	10.11	10.04	9.49	9.67	5.22	5.65	5.61	5.31	5.41	6.55	7.09	7.04	6.65	6.78
ESSARSHPNG.NS	M	20.88	21.52	20.53	20.77	21.52	30.18	31.11	29.68	30.03	31.11	16.88	17.40	16.60	16.79	17.40	21.16	21.82	20.81	21.06	21.82
GESHIP.NS	A	4.58	5.25	4.74	4.83	4.80	6.39	7.32	6.61	6.73	6.70	3.90	4.47	4.07	4.15	4.11	4.89	5.61	5.11	5.21	5.15
GESHIP.NS	M	9.10	15.56	13.85	9.94	15.56	12.69	21.70	19.31	13.86	21.70	8.57	14.06	13.22	9.40	14.06	10.74	17.63	16.58	11.79	17.63
GPPL.NS	A	4.35	4.73	4.39	4.42	4.45	6.16	6.69	6.21	6.25	6.29	3.62	3.94	3.65	3.67	3.70	4.54	4.94	4.58	4.61	4.64
GPPL.NS	M	8.01	12.71	7.28	8.34	12.71	11.32	17.97	10.29	11.79	17.97	6.66	10.57	6.05	6.94	10.57	8.35	13.25	7.59	8.70	13.25
NAVKARCORP.NS	A	8.15	9.05	7.50	8.57	8.30	12.13	13.48	11.17	12.76	12.36	6.01	6.72	5.48	6.32	6.12	7.54	8.43	6.87	7.92	7.67
NAVKARCORP.NS	M	23.33	22.42	18.40	20.92	23.33	34.74	33.38	27.40	31.15	34.74	15.82	16.42	12.59	15.04	16.42	19.84	20.59	15.79	18.85	20.59
SCI.NS	A	5.54	6.33	5.53	5.44	5.68	7.81	8.92	7.79	7.66	8.00	4.77	5.55	4.77	4.66	4.90	5.98	6.96	5.99	5.84	6.15
SCI.NS	M	10.60	17.87	12.60	11.92	17.87	14.93	25.17	17.75	16.79	25.17	9.77	15.53	11.63	10.88	15.53	12.25	19.48	14.58	13.65	19.48
SHREYAS.NS	A	6.43	7.15	7.84	6.51	6.87	9.04	10.07	11.03	9.16	9.67	5.38	5.99	6.56	5.44	5.75	6.74	7.51	8.22	6.83	7.21
SHREYAS.NS	M	12.12	10.45	16.25	12.81	16.25	17.06	14.70	22.86	18.03	22.86	10.14	8.74	13.59	10.72	13.59	12.72	10.96	17.05	13.44	17.05
ASC	A	5.62	8.58	6.80	6.68	6.68	7.53	11.51	9.11	8.96	8.95	5.01	7.70	6.07	5.95	5.97	6.28	9.66	7.62	7.47	7.48
ASC	M	8.11	16.02	8.87	10.88	16.02	10.88	21.48	11.90	14.58	21.48	7.43	14.70	8.06	9.88	14.70	9.32	18.43	10.10	12.39	18.43
CCL	A	4.13	12.11	6.31	8.73	7.18	5.90	17.28	9.01	12.46	10.24	3.60	10.39	5.39	7.50	6.17	4.52	13.02	6.75	9.41	7.74
CCL	M	9.63	43.27	11.59	25.13	43.27	13.75	61.76	16.54	35.87	61.76	8.12	36.84	9.66	20.99	36.84	10.18	46.20	12.11	26.32	46.20
CMRE	A	4.65	7.98	5.41	5.41	5.63	6.54	11.22	7.61	7.61	7.92	3.89	6.68	4.53	4.53	4.72	4.88	8.38	5.68	5.68	5.92
CMRE	M	6.99	15.70	7.05	7.74	15.70	9.83	22.08	9.91	10.89	22.08	5.85	13.14	5.90	6.48	13.14	7.34	16.48	7.40	8.13	16.48
DAC	A	9.66	10.69	8.47	7.65	9.18	13.90	15.38	12.19	11.01	13.21	7.90	8.78	6.92	6.23	7.51	9.91	11.01	8.68	7.81	9.42
DAC	M	28.54	25.75	13.16	11.73	28.54	41.05	37.05	18.94	16.87	41.05	23.83	21.48	10.94	9.71	23.83	29.89	26.93	13.71	12.18	29.89

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
DHT	A	4.78	6.16	4.76	5.30	5.17	6.46	8.32	6.43	7.15	6.98	4.30	5.39	4.26	4.74	4.61	5.39	6.76	5.35	5.95	5.78
DHT	M	8.26	14.81	7.08	9.11	14.81	11.14	19.98	9.56	12.29	19.98	7.44	12.31	6.09	7.87	12.31	9.33	15.44	7.63	9.87	15.44
DLNG	A	7.31	9.48	6.04	8.12	7.67	10.60	13.75	8.76	11.78	11.12	6.15	8.11	5.05	6.94	6.50	7.71	10.17	6.33	8.70	8.15
DLNG	M	22.85	20.45	11.53	15.94	22.85	33.13	29.66	16.73	23.11	33.13	22.46	19.65	11.19	15.20	22.46	28.17	24.64	14.04	19.07	28.17
DSX	A	5.43	7.42	7.79	7.02	6.65	7.51	10.26	10.77	9.71	9.19	4.65	6.36	6.68	6.02	5.70	5.84	7.98	8.37	7.55	7.15
DSX	M	7.29	16.02	12.70	8.99	16.02	10.08	22.15	17.56	12.42	22.15	6.25	13.73	10.88	7.70	13.73	7.84	17.21	13.65	9.66	17.21
EGLE	A	6.87	9.36	7.55	7.58	7.66	9.60	13.08	10.55	10.60	10.71	5.70	7.83	6.40	6.29	6.39	7.15	9.82	8.03	7.88	8.02
EGLE	M	14.53	23.93	12.50	12.65	23.93	20.32	33.47	17.48	17.69	33.47	11.79	21.49	13.23	10.24	21.49	14.79	26.95	16.59	12.84	26.95
FRO	A	6.50	8.23	6.29	7.31	6.98	9.15	11.58	8.85	10.28	9.82	5.24	7.05	4.93	6.16	5.74	6.57	8.84	6.18	7.73	7.20
FRO	M	11.24	17.53	9.34	12.96	17.53	15.81	24.65	13.14	18.23	24.65	9.80	15.46	7.68	11.11	15.46	12.29	19.39	9.63	13.94	19.39
GLOG-PA	A	1.41	4.57	1.17	1.80	2.08	2.06	6.67	1.70	2.62	3.03	1.21	3.99	1.00	1.56	1.80	1.52	5.00	1.25	1.95	2.26
GLOG-PA	M	4.88	35.91	3.12	7.96	35.91	7.12	52.40	4.55	11.61	52.40	4.17	30.33	2.66	6.75	30.33	5.23	38.04	3.34	8.47	38.04
GNK	A	6.26	7.93	6.83	6.50	6.76	8.55	10.84	9.34	8.88	9.24	5.45	7.24	6.09	5.72	5.99	6.84	9.07	7.63	7.17	7.51
GNK	M	8.23	15.21	8.73	8.48	15.21	11.24	20.79	11.93	11.59	20.79	7.49	14.44	8.00	7.74	14.44	9.39	18.11	10.03	9.70	18.11
GSL	A	6.70	8.38	7.44	6.32	7.10	9.49	11.86	10.53	8.95	10.05	5.53	6.90	6.12	5.22	5.85	6.93	8.65	7.67	6.54	7.33
GSL	M	21.99	21.34	13.99	8.95	21.99	31.13	30.19	19.80	12.66	31.13	17.70	16.94	11.36	7.19	17.70	22.20	21.25	14.25	9.02	22.20
INSW	A	5.03	7.20	5.85	5.68	5.77	6.76	9.68	7.87	7.63	7.76	4.53	6.40	5.23	5.13	5.18	5.69	8.02	6.56	6.43	6.49
INSW	M	8.61	16.04	8.75	9.00	16.04	11.58	21.57	11.76	12.10	21.57	7.37	14.23	7.82	7.74	14.23	9.24	17.84	9.80	9.71	17.84
KEX	A	4.18	6.07	4.36	4.53	4.67	5.78	8.38	6.03	6.26	6.45	3.51	5.20	3.66	3.81	3.94	4.40	6.52	4.60	4.78	4.95
KEX	M	9.19	24.80	7.39	8.91	24.80	12.71	34.28	10.21	12.32	34.28	7.30	19.88	5.71	7.04	19.88	9.15	24.93	7.16	8.83	24.93
KNOP	A	3.45	6.51	4.59	7.30	5.14	5.13	9.68	6.83	10.87	7.65	2.69	5.07	3.58	5.70	4.01	3.37	6.36	4.49	7.14	5.03
KNOP	M	5.04	20.31	13.68	29.38	29.38	7.51	30.23	20.36	43.73	43.73	3.94	15.84	10.67	22.92	22.92	4.94	19.87	13.38	28.74	28.74
LPG	A	5.48	7.05	5.62	6.01	5.94	7.69	9.89	7.88	8.43	8.33	4.68	5.97	4.79	5.11	5.05	5.87	7.48	6.01	6.41	6.34
LPG	M	12.41	20.01	7.35	10.82	20.01	17.41	28.07	10.31	15.18	28.07	11.82	18.54	6.62	10.27	18.54	14.83	23.26	8.30	12.88	23.26
MATX	A	4.71	6.42	4.71	5.90	5.31	6.86	9.35	6.86	8.60	7.74	4.00	5.25	3.95	4.95	4.45	5.01	6.58	4.95	6.20	5.58
MATX	M	9.89	12.66	5.87	9.72	12.66	14.41	18.45	8.56	14.17	18.45	7.66	9.63	4.62	7.51	9.63	9.61	12.08	5.79	9.41	12.08
NAT	A	7.69	8.91	7.47	8.71	8.11	10.61	12.30	10.31	12.01	11.20	6.60	7.66	6.41	7.48	6.97	8.28	9.60	8.04	9.38	8.74
NAT	M	16.71	22.55	13.20	17.25	22.55	23.06	31.13	18.21	23.81	31.13	14.35	19.37	11.33	14.82	19.37	17.99	24.29	14.21	18.58	24.29
NCLH	A	4.23	12.79	6.73	8.44	7.37	5.82	17.59	9.26	11.61	10.14	3.65	11.04	5.81	7.29	6.36	4.58	13.84	7.29	9.14	7.98
NCLH	M	7.75	50.33	13.48	18.50	50.33	10.65	69.23	18.53	25.45	69.23	6.68	43.44	11.63	15.97	43.44	8.38	54.47	14.58	20.02	54.47

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
NM	A	12.35	11.46	15.53	9.80	12.24	18.30	16.98	23.01	14.52	18.13	9.57	8.91	11.92	7.63	9.48	12.01	11.18	14.95	9.57	11.88
NM	M	27.28	24.77	31.91	19.80	31.91	40.42	36.70	47.27	29.33	47.27	21.59	19.10	24.73	16.05	24.73	27.07	23.95	31.02	20.13	31.02
NMM	A	6.28	8.93	8.21	6.33	7.20	8.72	12.41	11.41	8.79	10.01	5.27	7.61	6.97	5.32	6.09	6.61	9.55	8.73	6.68	7.63
NMM	M	12.65	18.35	11.94	9.14	18.35	17.59	25.51	16.59	12.71	25.51	10.95	16.65	10.44	7.80	16.65	13.73	20.88	13.09	9.79	20.88
NVGS	A	4.52	8.41	5.72	5.76	5.81	6.25	11.64	7.92	7.97	8.04	3.87	7.20	4.90	4.93	4.97	4.85	9.02	6.14	6.18	6.23
NVGS	M	7.28	25.16	9.36	9.25	25.16	10.08	34.83	12.95	12.80	34.83	6.23	21.53	8.00	7.91	21.53	7.81	26.99	10.04	9.92	26.99
OSG	A	7.71	8.20	7.48	7.01	7.61	11.39	12.13	11.06	10.36	11.25	5.95	6.39	5.91	5.58	5.95	7.47	8.01	7.41	7.00	7.46
OSG	M	18.79	19.61	16.15	9.58	19.61	27.77	28.99	23.88	14.16	28.99	10.50	14.33	14.91	6.55	14.91	13.16	17.97	18.70	8.21	18.70
RCL	A	4.19	11.29	5.76	7.60	6.68	5.91	15.91	8.12	10.72	9.41	3.50	9.42	4.81	6.35	5.57	4.39	11.82	6.03	7.96	6.99
RCL	M	8.43	47.77	14.71	17.34	47.77	11.88	67.33	20.73	24.45	67.33	7.03	39.87	12.28	14.48	39.87	8.82	50.00	15.40	18.16	50.00
SB	A	6.87	7.68	7.64	6.64	7.13	9.39	10.51	10.45	9.09	9.76	5.97	6.66	6.61	5.78	6.19	7.48	8.35	8.29	7.25	7.76
SB	M	11.08	22.06	12.82	8.70	22.06	15.15	30.18	17.54	11.90	30.18	10.42	20.86	11.73	7.73	20.86	13.07	26.16	14.71	9.69	26.16
SFL	A	3.20	6.88	4.41	4.09	4.37	4.59	9.88	6.33	5.87	6.27	2.65	5.47	3.64	3.36	3.57	3.32	6.86	4.57	4.21	4.47
SFL	M	6.01	31.94	7.25	7.60	31.94	8.63	45.81	10.39	10.90	45.81	5.24	26.70	6.04	6.17	26.70	6.58	33.48	7.57	7.74	33.48
STNG	A	6.29	9.12	7.06	6.26	7.00	8.43	12.23	9.46	8.39	9.38	5.72	8.11	6.35	5.73	6.32	7.17	10.17	7.97	7.19	7.93
STNG	M	9.97	18.69	9.83	9.99	18.69	13.36	25.04	13.17	13.39	25.04	8.29	15.25	8.32	8.39	15.25	10.40	19.13	10.43	10.53	19.13
TDW	A	5.75	9.59	6.42	7.26	6.98	7.98	13.29	8.91	10.07	9.69	4.97	8.28	5.55	6.27	6.03	6.23	10.39	6.96	7.86	7.56
TDW	M	9.76	16.38	9.40	10.04	16.38	13.53	22.71	13.03	13.92	22.71	8.37	14.04	8.09	8.63	14.04	10.50	17.60	10.14	10.82	17.60
TK	A	6.83	9.25	6.43	5.49	6.94	9.38	12.70	8.82	7.54	9.52	5.87	7.87	5.55	4.81	5.97	7.37	9.87	6.96	6.03	7.49
TK	M	11.98	24.41	10.19	7.01	24.41	16.45	33.51	13.99	9.63	33.51	10.64	21.26	8.90	6.13	21.26	13.35	26.66	11.16	7.69	26.66
TNK	A	6.56	8.75	6.30	6.85	7.01	8.94	11.93	8.58	9.33	9.55	5.74	7.63	5.48	6.03	6.13	7.20	9.57	6.87	7.56	7.69
TNK	M	10.15	18.30	8.30	9.27	18.30	13.84	24.95	11.31	12.64	24.95	9.93	16.40	7.75	8.52	16.40	12.46	20.57	9.72	10.69	20.57
TNP	A	5.51	10.13	6.39	8.54	7.28	8.08	14.84	9.37	12.50	10.66	4.40	7.54	4.98	6.43	5.59	5.52	9.46	6.24	8.07	7.01
TNP	M	9.48	26.85	11.05	15.42	26.85	13.88	39.34	16.19	22.59	39.34	7.26	19.78	8.40	11.43	19.78	9.10	24.80	10.53	14.33	24.80
MMH.NZ	A	1.63	2.40	2.06	1.87	1.92	2.37	3.48	2.98	2.70	2.78	1.32	1.93	1.66	1.50	1.55	1.65	2.42	2.08	1.89	1.94
MMH.NZ	M	4.46	4.48	3.03	3.26	4.48	6.47	6.49	4.40	4.73	6.49	3.60	3.61	2.45	2.63	3.61	4.51	4.53	3.07	3.30	4.53
POT.NZ	A	2.39	3.27	2.73	2.61	2.68	3.32	4.56	3.80	3.63	3.73	2.03	2.78	2.31	2.21	2.27	2.54	3.48	2.90	2.78	2.85
POT.NZ	M	4.26	14.47	3.86	4.37	14.47	5.93	20.15	5.37	6.08	20.15	3.61	12.28	3.27	3.71	12.28	4.53	15.40	4.11	4.65	15.40
SPN.NZ	A	2.16	2.67	2.33	2.39	2.35	3.11	3.84	3.36	3.45	3.38	1.75	2.16	1.89	1.94	1.90	2.20	2.71	2.37	2.44	2.39
SPN.NZ	M	4.52	6.55	3.43	3.91	6.55	6.51	9.44	4.94	5.64	9.44	3.66	5.31	2.78	3.17	5.31	4.60	6.66	3.49	3.98	6.66

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
QGTS.QA	A	2.95	3.42	2.47	3.14	2.99	4.25	4.93	3.56	4.53	4.31	2.44	2.83	2.03	2.59	2.47	3.06	3.54	2.55	3.25	3.10
QGTS.QA	M	6.60	11.75	5.10	7.27	11.75	9.52	16.93	7.35	10.48	16.93	5.64	9.55	4.13	5.79	9.55	7.07	11.97	5.17	7.26	11.97
QNNS.QA	A	3.05	2.89	2.16	3.21	2.88	4.35	4.11	3.08	4.58	4.10	2.68	2.54	1.90	2.82	2.53	3.36	3.19	2.38	3.53	3.17
QNNS.QA	M	7.73	8.72	6.35	6.56	8.72	11.02	12.43	9.05	9.35	12.43	6.56	7.44	5.34	5.51	7.44	8.23	9.33	6.70	6.90	9.33
AMABK	A	5.49	6.46	5.24	5.01	5.52	8.02	9.43	7.65	7.31	8.07	4.40	5.21	4.30	4.04	4.46	5.51	6.53	5.39	5.07	5.59
AMABK	M	13.70	12.40	10.23	8.64	13.70	20.02	18.11	14.94	12.63	20.02	9.72	8.00	7.25	5.95	9.72	12.19	10.03	9.09	7.46	12.19
BIOTEC.BK	A	12.14	13.75	13.26	12.22	12.70	18.18	20.60	19.86	18.31	19.02	9.50	11.05	10.54	9.62	10.04	11.91	13.86	13.22	12.06	12.59
BIOTEC.BK	M	35.93	30.63	97.87	22.24	97.87	53.81	45.88	146.58	33.30	146.58	29.40	25.15	80.09	18.89	80.09	36.87	31.53	100.43	23.69	100.43
NYT.BK	A	2.85	4.41	4.28	3.20	3.52	4.10	6.34	6.15	4.61	5.06	2.32	3.59	3.48	2.61	2.87	2.91	4.50	4.37	3.27	3.59
NYT.BK	M	4.25	10.30	6.98	4.75	10.30	6.11	14.81	10.03	6.84	14.81	3.46	8.38	5.68	3.87	8.38	4.34	10.51	7.12	4.85	10.51
PORT.BK	A	4.92	7.14	4.16	4.27	5.07	6.89	10.00	5.83	5.99	7.10	4.14	6.01	3.50	3.60	4.27	5.20	7.54	4.39	4.51	5.35
PORT.BK	M	11.87	12.44	7.28	8.84	12.44	16.63	17.43	10.20	12.38	17.43	9.99	10.48	6.13	7.44	10.48	12.53	13.14	7.69	9.33	13.14
PSL.BK	A	5.50	8.17	7.21	5.57	6.38	7.42	11.02	9.73	7.52	8.61	4.89	7.25	6.40	4.95	5.67	6.13	9.09	8.03	6.20	7.11
PSL.BK	M	7.95	14.53	10.50	8.59	14.53	10.72	19.60	14.16	11.59	19.60	7.06	12.90	9.32	7.63	12.90	8.85	16.17	11.69	9.56	16.17
RCL.BK	A	4.38	7.29	7.34	5.62	5.82	6.21	10.33	10.40	7.97	8.24	3.63	6.04	6.08	4.66	4.82	4.55	7.57	7.63	5.84	6.04
RCL.BK	M	8.04	12.21	10.77	7.77	12.21	11.40	17.31	15.27	11.01	17.31	6.66	10.12	8.92	6.44	10.12	8.35	12.69	11.19	8.07	12.69
RP.BK	A	4.53	6.96	6.18	5.42	5.53	6.58	10.12	8.98	7.88	8.04	3.62	6.17	5.52	4.62	4.72	4.54	7.73	6.92	5.79	5.92
RP.BK	M	13.73	21.10	16.21	17.72	21.10	19.96	30.67	23.56	25.76	30.67	14.16	16.69	16.28	18.61	18.61	17.76	20.93	20.41	23.34	23.34
TSTE.BK	A	4.02	5.71	3.42	3.22	4.06	5.90	8.39	5.03	4.73	5.96	3.18	4.52	2.71	2.55	3.21	3.99	5.67	3.39	3.20	4.03
TSTE.BK	M	8.40	11.57	4.40	4.55	11.57	12.35	17.01	6.47	6.68	17.01	6.65	9.16	3.49	3.60	9.16	8.34	11.49	4.37	4.51	11.49
TTABK	A	3.92	6.69	7.35	4.47	5.26	5.60	9.56	10.50	6.38	7.52	3.31	5.61	6.14	3.76	4.42	4.15	7.03	7.70	4.72	5.55
TTABK	M	8.18	15.09	19.77	12.43	19.77	11.69	21.56	28.25	17.76	28.25	6.60	12.28	15.53	10.34	15.53	8.28	15.40	19.48	12.97	19.48
5LY.SI	A	7.73	9.94	8.56	6.73	8.11	10.66	13.71	11.81	9.27	11.19	6.68	8.64	7.44	5.82	7.03	8.38	10.83	9.33	7.30	8.82
5LY.SI	M	11.29	14.94	16.74	10.66	16.74	15.57	20.60	23.09	14.70	23.09	9.99	13.28	15.43	9.94	15.43	12.53	16.65	19.35	12.47	19.35
D8DU.SI	A	4.46	7.06	4.45	4.52	4.99	6.77	10.72	6.75	6.87	7.57	4.51	8.79	4.59	4.60	5.40	5.66	11.03	5.76	5.77	6.77
D8DU.SI	M	20.03	35.40	13.95	12.51	35.40	30.41	53.75	21.18	18.99	53.75	22.12	31.69	15.18	13.69	31.69	27.74	39.74	19.03	17.17	39.74
F83.SI	A	4.73	5.18	4.50	4.28	4.67	6.95	7.62	6.62	6.30	6.87	3.97	4.29	3.83	3.68	3.94	4.98	5.38	4.80	4.61	4.94
F83.SI	M	9.14	12.26	10.30	6.16	12.26	13.45	18.03	15.14	9.06	18.03	6.81	8.97	7.58	4.77	8.97	8.54	11.25	9.51	5.98	11.25
S19.SI	A	2.14	3.74	2.75	2.85	2.74	3.12	5.44	4.01	4.15	3.99	2.28	4.34	3.05	3.13	3.03	2.86	5.44	3.82	3.93	3.80
S19.SI	M	6.14	12.27	5.55	6.74	12.27	8.94	17.86	8.08	9.81	17.86	5.24	10.25	5.07	6.03	10.25	6.57	12.86	6.35	7.56	12.86

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
S56.SI	A	6.76	6.82	6.51	6.87	6.75	9.74	9.84	9.38	9.91	9.73	5.48	5.53	5.28	5.57	5.47	6.87	6.94	6.62	6.99	6.86
S56.SI	M	16.11	11.13	9.81	15.76	16.11	23.23	16.05	14.15	22.72	23.23	13.07	9.03	7.96	12.78	13.07	16.38	11.32	9.98	16.02	16.38
600017.SS	A	3.29	3.36	2.84	3.53	3.27	4.75	4.86	4.10	5.10	4.72	2.75	2.82	2.33	2.99	2.73	3.45	3.54	2.92	3.74	3.43
600017.SS	M	8.79	8.80	4.50	7.11	8.80	12.70	12.72	6.50	10.27	12.72	7.77	7.79	3.90	6.46	7.79	9.74	9.77	4.89	8.11	9.77
600018.SS	A	4.22	3.68	4.14	3.60	3.96	6.13	5.34	6.00	5.22	5.75	3.44	3.01	3.45	2.95	3.25	4.32	3.78	4.32	3.70	4.07
600018.SS	M	9.03	6.29	6.58	6.01	9.03	13.11	9.13	9.56	8.73	13.11	8.66	5.10	5.92	5.67	8.66	10.86	6.39	7.42	7.11	10.86
600026.SS	A	5.13	5.78	4.95	7.82	5.82	7.11	8.01	6.87	10.83	8.07	4.36	4.96	4.24	6.71	4.98	5.47	6.22	5.32	8.41	6.24
600026.SS	M	9.45	9.25	7.78	10.24	10.24	13.10	12.82	10.78	14.20	14.20	7.69	8.57	7.20	9.47	9.47	9.64	10.75	9.03	11.88	11.88
600190.SS	A	4.77	4.80	3.95	5.94	4.87	7.12	7.17	5.89	8.86	7.27	3.71	3.74	3.07	4.62	3.79	4.65	4.69	3.85	5.79	4.75
600190.SS	M	19.68	9.76	5.09	14.31	19.68	29.36	14.56	7.60	21.36	29.36	15.31	7.59	3.96	11.13	15.31	19.19	9.52	4.97	13.96	19.19
600428.SS	A	4.46	4.99	6.13	6.05	5.25	6.20	6.94	8.53	8.42	7.30	3.79	4.24	5.21	5.14	4.46	4.75	5.32	6.54	6.45	5.59
600428.SS	M	9.46	12.65	14.13	13.87	14.13	13.16	17.60	19.65	19.29	19.65	8.04	10.75	12.00	11.78	12.00	10.08	13.48	15.05	14.77	15.05
600717.SS	A	2.86	2.75	2.66	2.94	2.82	4.09	3.93	3.81	4.20	4.03	2.45	2.31	2.20	2.56	2.40	3.08	2.90	2.76	3.21	3.01
600717.SS	M	10.70	11.94	8.92	7.77	11.94	15.30	17.08	12.76	11.12	17.08	9.41	10.38	8.43	6.91	10.38	11.80	13.01	10.57	8.67	13.01
600798.SS	A	3.62	4.49	5.21	4.63	4.33	5.21	6.48	7.51	6.67	6.24	3.32	3.99	4.75	4.23	3.94	4.16	5.00	5.96	5.31	4.94
600798.SS	M	8.74	14.87	11.07	14.07	14.87	12.59	21.42	15.95	20.28	21.42	7.00	11.79	10.27	11.34	11.79	8.78	14.79	12.88	14.22	14.79
601000.SS	A	3.65	3.47	3.51	3.60	3.57	5.24	4.98	5.04	5.16	5.13	3.08	2.90	2.96	3.04	3.01	3.87	3.63	3.71	3.81	3.78
601000.SS	M	7.94	7.95	6.70	7.93	7.95	11.40	11.41	9.61	11.38	11.41	7.87	7.92	7.40	7.88	7.92	9.87	9.93	9.28	9.88	9.93
601008.SS	A	4.74	4.75	3.78	5.13	4.64	6.75	6.76	5.37	7.29	6.60	4.00	4.02	3.17	4.35	3.92	5.01	5.04	3.98	5.46	4.91
601008.SS	M	19.37	14.82	5.85	11.18	19.37	27.54	21.08	8.32	15.90	27.54	17.71	13.02	5.05	10.19	17.71	22.20	16.32	6.33	12.77	22.20
601018.SS	A	3.48	3.81	3.15	3.02	3.38	5.07	5.55	4.60	4.40	4.93	2.90	3.20	2.63	2.50	2.82	3.64	4.02	3.30	3.14	3.54
601018.SS	M	16.88	12.27	9.17	8.02	16.88	24.63	17.90	13.38	11.70	24.63	13.96	10.50	8.53	7.02	13.96	17.50	13.16	10.70	8.80	17.50
601228.SS	A	3.58	3.38	2.74	3.47	3.35	5.18	4.90	3.97	5.02	4.85	2.88	2.73	2.21	2.79	2.70	3.62	3.42	2.77	3.50	3.38
601228.SS	M	10.65	10.13	8.56	9.43	10.65	15.43	14.67	12.40	13.67	15.43	8.59	8.16	6.90	7.60	8.59	10.77	10.24	8.65	9.54	10.77
601326.SS	A	3.87	3.33	3.03	3.29	3.47	5.53	4.76	4.33	4.71	4.96	3.30	2.80	2.51	2.76	2.92	4.14	3.51	3.14	3.46	3.67
601326.SS	M	11.23	9.72	5.81	7.23	11.23	16.04	13.89	8.30	10.34	16.04	10.66	9.25	5.25	6.78	10.66	13.37	11.60	6.59	8.50	13.37
601866.SS	A	3.78	4.83	5.65	4.01	4.41	5.43	6.94	8.11	5.75	6.33	3.09	3.94	4.61	3.27	3.60	3.87	4.94	5.78	4.10	4.51
601866.SS	M	10.23	12.08	10.63	7.23	12.08	14.69	17.34	15.27	10.38	17.34	8.34	9.85	8.67	5.89	9.85	10.46	12.35	10.87	7.39	12.35
601872.SS	A	4.54	5.37	4.67	6.06	5.07	6.23	7.37	6.41	8.31	6.96	4.00	4.72	4.09	5.36	4.46	5.02	5.91	5.13	6.73	5.60
601872.SS	M	10.21	8.83	6.95	9.01	10.21	14.02	12.12	9.54	12.37	14.02	9.44	8.08	6.10	7.90	9.44	11.84	10.13	7.64	9.91	11.84

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
601880.SS	A	3.15	3.20	2.84	2.79	3.02	4.60	4.67	4.15	4.07	4.41	2.52	2.55	2.27	2.23	2.41	3.15	3.20	2.85	2.79	3.02
601880.SS	M	14.10	14.31	13.85	10.12	14.31	20.59	20.89	20.21	14.77	20.89	11.26	11.43	11.06	8.08	11.43	14.13	14.33	13.87	10.14	14.33
601919.SS	A	4.83	5.75	8.14	5.17	5.74	6.88	8.20	11.60	7.37	8.19	3.81	4.81	6.90	3.99	4.66	4.78	6.03	8.65	5.00	5.84
601919.SS	M	7.02	10.05	11.35	9.05	11.35	10.00	14.32	16.18	12.89	16.18	5.71	8.32	8.87	5.72	8.87	7.16	10.43	11.13	7.18	11.13
603167.SS	A	3.47	5.37	3.75	3.36	3.88	4.90	7.58	5.30	4.74	5.48	3.03	4.69	3.26	2.93	3.38	3.80	5.88	4.09	3.68	4.24
603167.SS	M	9.64	15.41	13.09	10.18	15.41	13.61	21.76	18.49	14.38	21.76	8.52	13.20	10.55	9.20	13.20	10.69	16.55	13.23	11.54	16.55
000088.SZ	A	4.48	5.56	3.49	3.78	4.34	6.47	8.02	5.03	5.45	6.27	3.70	4.70	2.81	3.08	3.58	4.64	5.89	3.52	3.86	4.49
000088.SZ	M	14.28	15.01	5.83	9.79	15.01	20.60	21.65	8.41	14.12	21.65	8.55	11.23	4.23	6.94	11.23	10.73	14.08	5.31	8.71	14.08
000507.SZ	A	4.21	3.86	4.03	4.08	4.08	5.95	5.45	5.69	5.77	5.76	3.66	3.24	3.45	3.51	3.50	4.59	4.06	4.33	4.40	4.39
000507.SZ	M	11.25	11.12	9.42	9.63	11.25	15.89	15.70	13.29	13.60	15.89	10.74	10.56	9.45	9.67	10.74	13.46	13.25	11.84	12.12	13.46
000520.SZ	A	4.48	4.16	4.34	4.69	4.44	6.42	5.95	6.21	6.71	6.35	3.82	3.46	3.69	4.03	3.77	4.79	4.34	4.63	5.06	4.73
000520.SZ	M	15.23	15.50	16.19	14.96	16.19	21.79	22.17	23.16	21.41	23.16	12.36	12.71	13.36	13.12	13.36	15.49	15.94	16.76	16.46	16.76
000582.SZ	A	3.98	4.22	3.34	3.96	3.90	5.65	6.00	4.75	5.64	5.54	3.63	3.90	3.12	3.69	3.60	4.55	4.89	3.92	4.63	4.51
000582.SZ	M	7.66	6.15	6.04	11.21	11.21	10.89	8.74	8.59	15.94	15.94	6.24	5.16	5.02	8.62	8.62	7.82	6.47	6.29	10.81	10.81
000905.SZ	A	4.43	4.50	3.76	4.47	4.32	6.29	6.39	5.34	6.35	6.13	3.81	3.91	3.18	3.90	3.72	4.78	4.91	3.98	4.89	4.67
000905.SZ	M	13.31	10.58	9.07	13.30	13.31	18.89	15.02	12.87	18.87	18.89	12.51	8.73	8.05	11.44	12.51	15.69	10.95	10.10	14.34	15.69
001872.SZ	A	3.83	4.23	3.54	3.51	3.78	5.69	6.28	5.25	5.21	5.61	3.23	3.53	3.00	2.96	3.19	4.06	4.43	3.76	3.71	4.00
001872.SZ	M	15.91	12.17	10.89	9.92	15.91	23.63	18.07	16.18	14.72	23.63	8.95	7.92	6.76	6.14	8.95	11.22	9.93	8.48	7.69	11.22
002040.SZ	A	5.04	4.21	2.97	4.55	4.36	7.21	6.03	4.25	6.52	6.23	4.31	3.62	2.60	3.90	3.74	5.40	4.54	3.26	4.89	4.69
002040.SZ	M	11.53	8.49	6.11	8.98	11.53	16.50	12.15	8.74	12.85	16.50	9.61	7.03	5.18	7.40	9.61	12.05	8.82	6.50	9.28	12.05
002320.SZ	A	5.61	5.72	4.09	4.02	4.98	7.77	7.93	5.67	5.57	6.90	4.80	4.92	3.56	3.50	4.29	6.02	6.17	4.47	4.38	5.38
002320.SZ	M	13.33	12.09	8.83	10.35	13.33	18.47	16.76	12.24	14.34	18.47	9.93	9.01	6.66	7.69	9.93	12.45	11.30	8.35	9.64	12.45
002492.SZ	A	6.31	6.24	5.36	6.33	6.12	9.89	9.78	8.40	9.91	9.58	4.47	4.38	3.98	4.45	4.35	5.61	5.50	4.99	5.58	5.46
002492.SZ	M	45.32	19.66	15.33	16.45	45.32	71.00	30.79	24.01	25.77	71.00	24.03	11.72	8.57	9.61	24.03	30.13	14.69	10.74	12.06	30.13
4030.SR	A	2.88	3.39	1.90	3.22	2.86	4.11	4.84	2.71	4.59	4.08	2.37	2.79	1.56	2.64	2.35	2.97	3.49	1.96	3.32	2.95
4030.SR	M	7.16	8.25	3.12	5.69	8.25	10.21	11.77	4.46	8.11	11.77	5.88	6.78	2.57	4.67	6.78	7.37	8.50	3.22	5.86	8.50
5601.TWO	A	3.75	3.18	5.33	4.13	4.03	5.42	4.60	7.71	5.98	5.84	3.13	2.59	4.61	3.51	3.40	3.93	3.25	5.78	4.40	4.26
5601.TWO	M	9.58	7.33	14.61	8.84	14.61	13.88	10.61	21.15	12.80	21.15	8.44	6.33	12.84	7.73	12.84	10.59	7.94	16.11	9.70	16.11
9101.T	A	3.37	4.66	5.83	5.04	4.47	4.72	6.52	8.15	7.04	6.25	2.95	4.04	5.00	4.39	3.88	3.70	5.06	6.28	5.51	4.86
9101.T	M	4.42	9.12	9.11	9.35	9.35	6.18	12.75	12.74	13.07	13.07	3.81	7.68	7.82	8.00	8.00	4.78	9.63	9.81	10.04	10.04

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
9104.T	A	3.89	5.37	5.79	4.94	4.78	5.37	7.41	7.98	6.81	6.59	3.34	4.62	4.97	4.26	4.11	4.19	5.79	6.24	5.34	5.15
9104.T	M	5.44	9.43	8.82	7.94	9.43	7.50	13.01	12.17	10.95	13.01	4.61	7.86	7.43	6.58	7.86	5.78	9.86	9.31	8.25	9.86
9107.T	A	5.14	6.57	7.49	6.60	6.20	7.11	9.10	10.37	9.14	8.58	4.34	5.63	6.47	5.64	5.29	5.44	7.06	8.12	7.08	6.64
9107.T	M	8.56	11.12	12.16	11.05	12.16	11.85	15.40	16.83	15.30	16.83	7.42	9.87	10.61	9.69	10.61	9.30	12.38	13.30	12.15	13.30
9110.T	A	4.38	4.85	6.32	5.47	5.09	6.15	6.81	8.89	7.69	7.15	3.73	4.10	5.30	4.61	4.30	4.67	5.14	6.64	5.78	5.39
9110.T	M	6.96	8.26	11.26	9.00	11.26	9.78	11.61	15.83	12.65	15.83	5.69	6.73	9.11	7.34	9.11	7.13	8.44	11.43	9.21	11.43
9115.T	A	4.37	6.36	6.63	6.32	5.63	6.26	9.11	9.49	9.05	8.05	3.58	5.21	5.42	5.18	4.61	4.49	6.53	6.80	6.49	5.78
9115.T	M	10.45	21.25	18.56	14.63	21.25	14.96	30.41	26.56	20.94	30.41	8.55	17.39	15.19	11.97	17.39	10.73	21.80	19.04	15.01	21.80
9119.T	A	4.07	4.35	4.46	4.68	4.33	5.63	6.02	6.18	6.48	6.00	3.46	3.73	3.83	4.06	3.72	4.33	4.67	4.81	5.09	4.66
9119.T	M	7.79	8.05	9.96	13.89	13.89	10.79	11.15	13.79	19.23	19.23	6.34	6.55	8.22	11.53	11.53	7.95	8.22	10.31	14.46	14.46
9127.T	A	5.13	5.76	9.25	6.88	6.44	8.18	9.18	14.75	10.96	10.27	3.43	3.91	6.83	4.88	4.51	4.30	4.90	8.57	6.12	5.65
9127.T	M	21.56	27.14	46.18	27.83	46.18	34.38	43.27	73.64	44.38	73.64	13.28	14.85	33.10	17.23	33.10	16.66	18.63	41.51	21.61	41.51
9130.T	A	3.86	5.01	5.01	4.60	4.47	5.70	7.38	7.38	6.78	6.59	3.11	4.13	4.17	3.77	3.66	3.90	5.18	5.23	4.72	4.59
9130.T	M	17.96	15.27	19.07	14.60	19.07	26.48	22.51	28.11	21.53	28.11	12.84	11.46	13.95	8.91	13.95	16.10	14.37	17.49	11.17	17.49
9171.T	A	3.89	4.80	5.78	4.13	4.49	5.71	7.05	8.48	6.06	6.59	3.08	3.81	4.59	3.28	3.56	3.87	4.78	5.75	4.11	4.47
9171.T	M	19.65	20.00	25.57	9.96	25.57	28.84	29.35	37.53	14.62	37.53	15.59	15.86	20.29	7.90	20.29	19.55	19.89	25.44	9.91	25.44
9173.T	A	1.34	1.98	1.20	1.25	1.41	1.95	2.89	1.74	1.82	2.06	1.07	1.59	0.96	1.00	1.13	1.34	1.99	1.20	1.25	1.42
9173.T	M	6.43	7.39	3.91	8.38	8.38	9.37	10.77	5.70	12.22	12.22	5.14	5.91	3.13	6.71	6.71	6.45	7.42	3.92	8.41	8.41
9193.T	A	2.07	2.40	1.81	1.62	1.98	3.01	3.50	2.64	2.36	2.89	2.10	2.51	1.77	1.57	2.00	2.63	3.15	2.22	1.97	2.51
9193.T	M	5.03	6.78	3.25	2.89	6.78	7.33	9.88	4.73	4.21	9.88	5.22	7.42	3.42	2.91	7.42	6.54	9.30	4.29	3.65	9.30
9302.T	A	3.64	4.10	3.77	3.56	3.74	5.17	5.82	5.35	5.05	5.30	3.02	3.41	3.13	2.96	3.10	3.79	4.28	3.92	3.71	3.89
9302.T	M	6.87	10.71	8.26	7.12	10.71	9.75	15.21	11.73	10.11	15.21	5.85	8.97	7.11	6.44	8.97	7.33	11.25	8.91	8.07	11.25
9303.T	A	2.99	3.29	3.02	2.79	3.01	4.13	4.54	4.16	3.85	4.15	2.56	2.81	2.58	2.39	2.57	3.21	3.52	3.24	3.00	3.23
9303.T	M	8.31	8.24	6.86	7.30	8.31	11.47	11.37	9.47	10.07	11.47	7.32	7.19	6.05	6.42	7.32	9.18	9.01	7.59	8.05	9.18
9308.T	A	4.89	4.99	5.98	5.43	5.24	7.06	7.21	8.64	7.84	7.57	3.94	4.03	4.88	4.40	4.24	4.94	5.05	6.12	5.52	5.32
9308.T	M	11.05	11.00	13.92	15.13	15.13	15.96	15.89	20.10	21.84	21.84	9.36	9.24	11.75	12.72	12.72	11.74	11.58	14.73	15.95	15.95
9351.T	A	2.10	2.82	2.26	2.57	2.38	2.90	3.89	3.12	3.55	3.28	1.79	2.41	1.93	2.19	2.02	2.24	3.02	2.42	2.75	2.54
9351.T	M	5.66	8.36	7.34	5.53	8.36	7.81	11.52	10.13	7.62	11.52	4.68	6.96	6.22	4.69	6.96	5.87	8.73	7.80	5.89	8.73
9355.T	A	2.76	4.30	3.50	3.51	3.37	4.01	6.23	5.08	5.10	4.89	2.53	4.04	3.28	3.26	3.13	3.17	5.07	4.11	4.09	3.93
9355.T	M	8.20	10.30	6.20	7.09	10.30	11.89	14.95	9.00	10.29	14.95	7.21	9.10	5.55	6.22	9.10	9.04	11.42	6.96	7.81	11.42

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
9361.T	A	3.23	3.28	3.12	3.26	3.22	4.90	4.98	4.74	4.95	4.89	3.01	3.05	2.91	3.06	3.01	3.78	3.83	3.64	3.83	3.77
9361.T	M	20.25	10.32	7.51	16.09	20.25	30.74	15.67	11.39	24.43	30.74	20.69	10.28	6.89	16.41	20.69	25.94	12.89	8.64	20.57	25.94
9362.T	A	4.26	4.51	6.32	4.39	4.74	6.98	7.38	10.36	7.18	7.76	2.82	2.99	4.11	2.87	3.12	3.54	3.74	5.16	3.59	3.91
9362.T	M	27.90	15.02	39.48	10.61	39.48	45.69	24.60	64.66	17.37	64.66	18.15	10.82	23.44	6.96	23.44	22.76	13.57	29.39	8.73	29.39
ALC.TO	A	2.61	3.97	3.04	2.84	3.02	3.71	5.63	4.31	4.03	4.28	2.16	3.39	2.57	2.36	2.53	2.70	4.26	3.22	2.96	3.17
ALC.TO	M	5.68	14.12	6.07	11.36	14.12	8.06	20.03	8.61	16.11	20.03	5.31	12.83	5.49	10.06	12.83	6.66	16.10	6.89	12.61	16.10
LGT-ATO	A	2.81	3.31	2.82	2.77	2.90	4.19	4.94	4.20	4.13	4.33	2.19	2.58	2.19	2.16	2.26	2.74	3.23	2.75	2.70	2.83
LGT-ATO	M	5.89	10.09	5.61	4.78	10.09	8.78	15.04	8.36	7.12	15.04	4.59	7.86	4.37	3.72	7.86	5.76	9.86	5.48	4.67	9.86
WTE.TO	A	4.05	5.46	4.75	4.48	4.56	5.95	8.02	6.98	6.58	6.71	3.21	4.32	3.76	3.55	3.62	4.03	5.42	4.72	4.45	4.54
WTE.TO	M	11.11	12.94	16.98	8.01	16.98	16.32	19.01	24.95	11.77	24.95	8.80	10.25	13.46	6.35	13.46	11.03	12.86	16.88	7.96	16.88
2603.TW	A	3.75	5.73	9.45	6.49	5.88	5.35	8.17	13.48	9.25	8.38	3.05	4.68	7.71	5.27	4.79	3.82	5.87	9.67	6.61	6.00
2603.TW	M	6.56	12.85	15.83	16.06	16.06	9.36	18.33	22.58	22.91	22.91	5.37	10.53	12.91	13.17	13.17	6.73	13.20	16.18	16.51	16.51
2605.TW	A	3.38	4.93	7.75	5.38	4.99	4.78	6.97	10.96	7.61	7.06	2.81	4.10	6.44	4.47	4.15	3.52	5.14	8.07	5.61	5.20
2605.TW	M	7.26	9.94	15.12	9.27	15.12	10.27	14.06	21.39	13.12	21.39	6.04	8.26	12.57	7.71	12.57	7.57	10.36	15.76	9.67	15.76
2606.TW	A	3.23	3.86	6.85	4.93	4.45	4.50	5.37	9.54	6.87	6.19	2.74	3.27	5.80	4.18	3.77	3.43	4.10	7.28	5.24	4.73
2606.TW	M	5.52	8.72	14.88	8.35	14.88	7.69	12.14	20.73	11.63	20.73	4.68	7.39	12.61	7.08	12.61	5.87	9.27	15.82	8.88	15.82
2607.TW	A	2.32	3.37	6.88	4.88	4.00	3.32	4.81	9.84	6.97	5.72	1.90	2.76	5.64	4.00	3.27	2.39	3.46	7.07	5.01	4.11
2607.TW	M	7.49	10.87	17.18	13.48	17.18	10.72	15.54	24.57	19.28	24.57	6.14	8.91	14.08	11.05	14.08	7.70	11.17	17.66	13.85	17.66
2609.TW	A	3.60	6.34	9.76	5.62	5.81	5.11	9.02	13.88	7.99	8.26	2.97	5.23	8.05	4.64	4.79	3.72	6.56	10.10	5.81	6.01
2609.TW	M	8.62	14.80	16.25	13.07	16.25	12.26	21.04	23.10	18.59	23.10	7.11	12.21	13.41	10.79	13.41	8.92	15.31	16.81	13.53	16.81
2612.TW	A	3.50	4.72	8.52	5.78	5.24	5.25	7.07	12.77	8.66	7.85	2.59	3.48	6.25	4.27	3.86	3.25	4.37	7.84	5.35	4.84
2612.TW	M	10.23	14.91	19.03	14.09	19.03	15.33	22.35	28.52	21.12	28.52	7.28	10.69	13.50	10.64	13.50	9.13	13.41	16.93	13.35	16.93
2613.TW	A	2.66	4.46	7.37	5.99	4.69	3.85	6.46	10.67	8.67	6.79	2.15	3.60	5.95	4.84	3.78	2.70	4.51	7.46	6.07	4.75
2613.TW	M	5.80	9.66	15.96	13.38	15.96	8.40	13.98	23.10	19.36	23.10	4.68	7.79	12.88	10.80	12.88	5.87	9.77	16.15	13.54	16.15
2615.TW	A	2.90	5.66	9.66	6.38	5.56	4.18	8.16	13.93	9.19	8.01	2.42	4.58	7.74	5.14	4.50	3.04	5.75	9.70	6.44	5.65
2615.TW	M	7.76	13.23	17.46	13.06	17.46	11.18	19.07	25.16	18.82	25.16	6.27	10.61	13.96	10.49	13.96	7.87	13.31	17.50	13.16	17.50
2617.TW	A	3.61	3.97	7.74	4.64	4.72	5.13	5.64	11.00	6.59	6.71	2.97	3.29	6.42	3.82	3.90	3.72	4.13	8.05	4.79	4.89
2617.TW	M	8.10	7.37	16.16	8.12	16.16	11.51	10.48	22.97	11.54	22.97	7.60	6.41	13.86	7.19	13.86	9.53	8.04	17.38	9.01	17.38
2637.TW	A	2.23	3.26	7.21	5.28	4.09	3.10	4.54	10.04	7.34	5.70	1.89	2.77	6.12	4.48	3.48	2.37	3.48	7.68	5.62	4.36
2637.TW	M	5.89	11.36	16.20	10.55	16.20	8.20	15.81	22.54	14.69	22.54	5.00	9.64	13.75	8.96	13.75	6.27	12.09	17.25	11.24	17.25

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
5608.TW	A	3.44	5.81	9.53	5.87	5.65	4.92	8.31	13.64	8.40	8.09	2.81	4.75	7.80	4.80	4.62	3.53	5.96	9.78	6.02	5.80
5608.TW	M	10.94	13.23	17.63	10.15	17.63	15.66	18.94	25.24	14.53	25.24	8.95	10.83	14.43	8.31	14.43	11.23	13.58	18.09	10.42	18.09
8367.TW	A	4.04	4.28	6.82	4.32	4.70	5.82	6.18	9.84	6.23	6.78	3.27	3.47	5.53	3.50	3.81	4.10	4.35	6.93	4.39	4.77
8367.TW	M	12.64	10.01	12.51	8.84	12.64	18.23	14.43	18.04	12.75	18.23	10.24	8.11	10.14	7.17	10.24	12.84	10.17	12.71	8.99	12.84
EURN.BR	A	3.95	5.27	4.07	5.66	4.62	5.39	7.20	5.56	7.74	6.31	3.43	4.67	3.55	5.01	4.05	4.30	5.86	4.45	6.29	5.08
EURN.BR	M	6.13	11.27	5.18	10.87	11.27	8.37	15.39	7.08	14.85	15.39	5.41	9.92	4.58	9.78	9.92	6.79	12.44	5.74	12.27	12.44
EXM.BR	A	4.78	6.38	5.12	5.68	5.37	7.08	9.45	7.59	8.41	7.95	3.78	7.80	4.67	5.41	5.12	4.74	9.78	5.86	6.78	6.42
EXM.BR	M	5.84	13.99	6.21	8.43	13.99	8.64	20.73	9.19	12.49	20.73	5.39	18.30	6.14	8.11	18.30	6.76	22.95	7.70	10.18	22.95
DFDS.CO	A	3.89	4.70	3.77	4.69	4.21	5.46	6.60	5.29	6.58	5.90	3.28	3.98	3.17	3.95	3.55	4.11	4.99	3.97	4.95	4.45
DFDS.CO	M	7.80	10.33	5.16	6.21	10.33	10.95	14.50	7.24	8.71	14.50	6.12	8.06	4.18	4.98	8.06	7.67	10.11	5.25	6.25	10.11
DNORD.CO	A	4.91	5.03	5.47	6.63	5.43	6.95	7.12	7.74	9.38	7.69	4.05	4.19	4.60	5.78	4.58	5.08	5.26	5.77	7.24	5.74
DNORD.CO	M	11.12	10.55	11.25	15.86	15.86	15.74	14.93	15.92	22.45	22.45	8.54	9.25	8.63	13.64	13.64	10.71	11.60	10.82	17.11	17.11
MAERSK-ACO	A	4.35	4.98	4.37	5.17	4.66	6.03	6.91	6.07	7.17	6.47	3.83	4.18	3.86	4.31	4.02	4.81	5.25	4.83	5.41	5.04
MAERSK-ACO	M	6.74	10.17	6.02	15.79	15.79	9.35	14.11	8.35	21.91	21.91	5.97	8.31	5.18	13.78	13.78	7.49	10.42	6.49	17.29	17.29
TRMD-ACO	A	4.11	4.89	4.60	6.38	4.87	5.56	6.62	6.22	8.63	6.59	3.64	4.37	4.09	5.73	4.34	4.56	5.48	5.13	7.18	5.45
TRMD-ACO	M	5.59	8.69	6.85	10.31	10.31	7.57	11.75	9.27	13.95	13.95	5.03	7.93	6.26	9.43	9.43	6.30	9.94	7.86	11.82	11.82
IR5B.IR	A	3.53	5.19	3.95	4.12	4.07	4.84	7.11	5.41	5.64	5.59	3.02	4.47	3.38	3.53	3.50	3.79	5.60	4.24	4.43	4.38
IR5B.IR	M	6.50	29.97	7.60	9.15	29.97	8.91	41.09	10.43	12.55	41.09	5.40	23.04	6.05	7.61	23.04	6.77	28.89	7.58	9.55	28.89
VIK1V.HE	A	3.56	3.98	4.05	3.22	3.67	5.26	5.88	5.98	4.75	5.41	2.87	3.25	3.33	2.50	2.95	3.59	4.07	4.17	3.13	3.70
VIK1V.HE	M	5.58	6.56	12.02	5.57	12.02	8.23	9.69	17.74	8.21	17.74	4.98	5.91	11.45	4.53	11.45	6.25	7.42	14.36	5.68	14.36
EIM.IC	A	3.66	3.98	3.76	3.91	3.80	5.34	5.82	5.49	5.71	5.55	2.99	3.25	3.07	3.19	3.11	3.75	4.08	3.86	4.01	3.89
EIM.IC	M	7.60	6.49	6.43	5.75	7.60	11.11	9.48	9.40	8.40	11.11	6.12	5.25	5.18	4.64	6.12	7.67	6.58	6.50	5.82	7.67
DIS.MI	A	5.73	6.44	4.34	6.01	5.66	8.28	9.31	6.27	8.68	8.17	4.65	5.27	3.46	4.87	4.59	5.83	6.60	4.34	6.11	5.75
DIS.MI	M	13.67	12.95	7.08	8.08	13.67	19.76	18.71	10.23	11.68	19.76	11.84	11.22	5.82	6.63	11.84	14.85	14.07	7.30	8.32	14.85
AGAS.OL	A	6.26	7.98	5.62	6.60	6.55	8.68	11.08	7.80	9.16	9.09	5.38	6.75	4.86	5.65	5.61	6.74	8.47	6.10	7.09	7.04
AGAS.OL	M	10.46	16.35	8.96	8.82	16.35	14.51	22.69	12.43	12.24	22.69	9.06	14.17	7.78	7.72	14.17	11.36	17.76	9.76	9.68	17.76
AMSC.OL	A	3.46	4.57	3.34	3.66	3.70	4.92	6.48	4.74	5.19	5.25	2.85	3.81	2.75	3.02	3.06	3.58	4.78	3.45	3.79	3.84
AMSC.OL	M	6.33	19.22	8.47	7.43	19.22	8.98	27.28	12.02	10.55	27.28	4.98	15.43	6.77	6.06	15.43	6.25	19.35	8.49	7.59	19.35
BELCO.OL	A	5.54	5.34	6.15	5.96	5.72	8.21	7.92	9.12	8.84	8.48	4.58	4.41	5.33	5.14	4.82	5.75	5.53	6.68	6.45	6.05
BELCO.OL	M	39.97	19.97	16.82	13.18	39.97	59.26	29.60	24.95	19.54	59.26	38.68	23.80	20.56	15.90	38.68	48.50	29.84	25.78	19.94	48.50

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
BWEK.OL	A	6.11	5.88	5.88	6.67	6.14	9.03	8.69	8.69	9.86	9.08	4.80	4.62	4.62	5.25	4.83	6.02	5.79	5.80	6.58	6.06
BWEK.OL	M	14.72	10.79	11.87	13.50	14.72	21.76	15.95	17.54	19.96	21.76	11.58	8.48	9.33	10.62	11.58	14.52	10.64	11.70	13.32	14.52
BWLPG.OL	A	5.57	6.78	5.49	5.54	5.79	7.46	9.09	7.36	7.42	7.76	4.95	6.10	4.85	4.91	5.15	6.20	7.65	6.08	6.15	6.46
BWLPG.OL	M	8.21	12.65	8.03	8.06	12.65	11.00	16.95	10.76	10.80	16.95	7.40	11.40	7.13	7.09	11.40	9.28	14.29	8.94	8.90	14.29
FLNG.OL	A	5.05	6.29	5.54	6.01	5.61	6.95	8.66	7.63	8.28	7.73	4.26	5.44	4.68	5.19	4.79	5.34	6.82	5.87	6.51	6.01
FLNG.OL	M	7.88	13.67	9.67	9.30	13.67	10.86	18.83	13.32	12.81	18.83	5.96	11.01	7.80	7.58	11.01	7.47	13.81	9.78	9.51	13.81
JIN.OL	A	5.68	6.52	8.04	6.66	6.54	8.27	9.49	11.70	9.70	9.52	4.67	5.44	7.09	5.55	5.51	5.86	6.82	8.89	6.97	6.90
JIN.OL	M	19.61	25.06	22.85	22.22	25.06	28.56	36.49	33.28	32.35	36.49	13.67	16.88	16.17	12.02	16.88	17.14	21.17	20.27	15.07	21.17
MPCC.OL	A	5.67	14.65	8.98	7.08	8.43	8.76	22.64	13.87	10.94	13.03	4.03	10.54	5.88	5.14	5.94	5.06	13.22	7.37	6.44	7.45
MPCC.OL	M	16.26	54.02	19.02	11.45	54.02	25.12	83.46	29.39	17.68	83.46	16.12	54.57	19.15	11.77	54.57	20.22	68.44	24.02	14.76	68.44
ODF.OL	A	4.26	5.31	4.18	4.51	4.51	6.06	7.56	5.96	6.42	6.42	3.66	4.54	3.58	3.78	3.85	4.59	5.70	4.50	4.73	4.83
ODF.OL	M	8.84	18.48	6.70	8.83	18.48	12.58	26.31	9.54	12.57	26.31	6.50	15.39	4.63	6.65	15.39	8.15	19.30	5.80	8.34	19.30
WAWI.OL	A	5.58	6.99	5.87	6.28	6.08	8.11	10.17	8.53	9.13	8.83	4.45	5.81	4.77	5.14	4.94	5.58	7.29	5.99	6.44	6.19
WAWI.OL	M	21.39	24.12	13.04	16.88	24.12	31.09	35.06	18.96	24.53	35.06	15.42	21.44	9.81	13.69	21.44	19.34	26.88	12.30	17.16	26.88
WWI.OL	A	3.61	5.13	3.49	4.05	3.99	5.05	7.18	4.88	5.67	5.58	3.04	4.33	2.94	3.42	3.36	3.82	5.43	3.69	4.29	4.22
WWI.OL	M	6.96	20.91	5.34	7.00	20.91	9.73	29.24	7.47	9.79	29.24	5.87	17.64	4.51	5.90	17.64	7.36	22.12	5.65	7.40	22.12
CCOR-B.ST	A	4.45	5.09	5.01	6.20	5.08	6.36	7.28	7.15	8.87	7.27	3.73	4.25	4.18	5.15	4.24	4.68	5.33	5.24	6.46	5.32
CCOR-B.ST	M	7.58	10.50	7.03	10.96	10.96	10.83	15.01	10.05	15.66	15.66	6.29	8.66	5.81	9.07	9.07	7.88	10.86	7.29	11.38	11.38
TAL1T.TL	A	2.52	3.30	2.82	2.61	2.75	3.72	4.87	4.16	3.85	4.06	1.98	2.67	2.26	2.09	2.20	2.48	3.35	2.84	2.63	2.75
TAL1T.TL	M	15.09	22.49	7.92	6.60	22.49	22.27	33.18	11.69	9.73	33.18	12.22	17.69	6.36	5.21	17.69	15.33	22.18	7.98	6.54	22.18

Appendix III. Results of GJR-GARCH(1,1,1) Backtesting

The values below are provided from Kupiec's Proportion of Failure (POF) test statistics to backtest the results from the GJR-GARCH(1,1,1) model at a 5% significance level. The results are significant the test statistic is greater than the critical value of 3.84 ($\chi^2_{k=1,\alpha=0.05}$).

Ticker	Student's *t* distribution										Normal distribution									
	Kupiec's POF test: value-at-risk (VaR)					Kupiec's POF test: expected shortfall (ES)					Kupiec's POF test: value-at-risk (VaR)					Kupiec's POF test: expected shortfall (ES)				
	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
ANEK.AT	31.74	14.82	26.67	29.85	97.50	50.68	26.47	26.67	29.85	133.67	4.03	3.55	0.79	0.99	1.81	4.64	0.10	15.00	11.17	17.53
ATTICA.AT	18.41	0.74	8.89	6.73	29.90	31.74	11.44	26.67	14.10	79.18	1.00	0.10	2.33	0.99	2.54	24.24	0.74	11.60	6.73	35.72
KYRI.AT	10.00	2.25	6.70	11.17	28.11	24.24	11.44	19.44	17.72	71.50	1.50	0.31	0.34	0.99	2.99	11.77	2.25	6.70	14.10	31.76
OLTH.AT	4.64	0.07	15.00	5.06	16.27	36.43	6.57	19.44	22.40	79.18	0.07	1.90	6.70	1.67	0.63	4.64	0.74	15.00	6.73	20.24
PPA.AT	21.15	8.75	15.00	6.73	49.77	42.16	19.25	19.44	29.85	108.90	3.67	0.31	11.60	0.99	10.79	24.24	8.75	15.00	6.73	52.47
LOGN3.SA	21.08	3.38	8.75	6.79	37.69	42.07	11.44	19.25	22.49	92.28	6.95	0.74	6.57	3.73	16.18	24.16	4.81	14.82	6.79	47.03
PSVM11.SA	9.94	11.44	19.25	8.81	44.55	18.33	19.25	26.47	29.96	83.16	4.60	6.57	14.82	1.02	20.13	9.94	11.44	19.25	8.81	44.55
STBP3.SA	24.16	2.25	3.38	8.81	33.57	50.58	11.44	14.82	17.81	87.58	3.63	0.00	0.00	0.01	1.09	15.88	2.25	3.38	6.79	26.29
FROWARD.SN	6.90	19.54	19.54	17.90	52.78	18.26	19.54	19.54	17.90	71.84	8.31	19.54	15.08	17.90	52.78	9.89	19.54	19.54	17.90	58.56
SMSAAM.SN	15.81	0.81	2.37	6.85	21.89	50.47	15.08	15.08	17.90	92.84	11.65	0.09	0.00	2.64	8.26	24.08	3.53	2.37	11.32	35.98
VAPORES.SN	31.56	6.77	1.48	17.90	47.47	36.24	11.68	6.77	22.59	71.84	21.00	1.48	0.36	0.54	14.09	31.56	6.77	1.48	17.90	47.47
GSDDE.IS	44.73	5.03	6.70	6.79	52.09	53.35	15.17	19.44	29.96	111.94	38.89	1.51	2.33	2.60	29.96	44.73	9.04	6.70	6.79	57.72
GULFNAV.AE	6.96	2.79	3.97	7.84	20.39	29.99	12.48	27.70	13.70	79.45	2.18	2.06	0.52	1.00	0.89	9.84	4.02	3.97	10.42	26.57
HHFA.F	10.46	1.58	7.09	5.61	23.28	28.43	5.14	12.08	23.36	63.77	2.34	0.00	0.94	0.31	2.70	14.28	1.58	7.09	5.61	26.46
HLAG.F	19.00	6.96	5.26	4.16	33.64	42.95	27.08	20.01	30.88	118.52	10.46	0.00	0.01	0.00	3.65	19.00	5.14	0.44	2.97	21.79
HXCK.F	12.27	3.67	3.77	5.61	24.84	37.18	5.14	20.01	18.61	74.08	6.11	1.58	0.94	1.26	9.16	16.51	5.14	9.33	9.43	39.85
0137.HK	13.55	0.74	6.57	0.41	15.81	50.37	6.57	14.82	13.69	74.37	0.09	0.34	0.07	0.51	0.45	13.55	0.31	8.75	0.41	15.81
0144.HK	20.92	0.74	3.38	1.51	19.72	41.87	6.57	19.25	10.79	70.65	2.02	0.00	0.74	1.51	3.26	20.92	1.38	6.57	8.41	33.06
0316.HK	13.55	11.44	1.38	1.51	22.64	31.47	11.44	11.44	13.69	67.11	5.61	1.38	0.34	0.01	2.78	11.59	11.44	1.38	1.51	21.15
0351.HK	20.92	14.82	26.47	3.45	54.52	41.87	19.25	26.47	13.69	96.56	11.59	3.38	19.25	0.21	18.36	18.18	11.44	26.47	0.87	41.61
1145.HK	13.55	6.57	14.82	8.41	41.61	50.37	14.82	26.47	13.69	96.56	4.51	0.31	11.44	2.37	13.49	18.18	8.75	19.25	8.41	51.71
1199.HK	15.74	1.38	2.25	1.51	17.06	41.87	11.44	19.25	10.79	78.29	3.56	0.34	0.07	0.04	0.74	18.18	2.25	3.38	1.51	21.15
1308.HK	18.18	4.81	0.07	0.01	12.41	36.14	11.44	8.75	8.41	60.52	3.56	0.74	0.00	2.14	0.53	24.00	4.81	1.38	0.87	22.64

1549.HK	4.51	0.07	1.38	8.41	10.41	20.92	6.57	8.75	21.92	54.52	0.57	0.00	1.38	3.45	3.26	9.83	1.38	4.81	13.69	25.83
1719.HK	3.56	4.81	8.75	13.69	25.83	13.55	14.82	11.44	13.69	51.71	0.80	2.25	8.75	13.69	7.78	3.56	6.57	8.75	13.69	27.52
1732.HK	18.18	19.25	3.38	4.79	39.33	27.48	26.47	19.25	21.92	91.53	6.85	14.82	0.00	0.87	12.41	13.55	26.47	6.57	8.41	46.44
2343.HK	24.00	3.38	6.57	2.37	31.14	41.87	14.82	19.25	10.79	82.44	2.73	0.34	0.74	0.13	1.59	24.00	2.25	11.44	3.45	35.07
3382.HK	8.26	0.00	0.07	2.37	6.27	27.48	19.25	11.44	17.28	74.37	1.43	1.90	0.34	2.14	0.85	15.74	2.25	2.25	6.43	24.20
3683.HK	50.37	26.47	26.47	10.79	101.98	50.37	26.47	26.47	21.92	122.20	50.37	26.47	26.47	8.41	96.56	50.37	26.47	26.47	21.92	122.20
BULL.JK	9.72	4.48	2.25	3.50	19.45	26.23	25.85	14.82	17.37	80.24	2.83	2.02	0.00	0.03	2.35	15.35	14.30	3.38	3.50	32.51
HITS.JK	0.05	0.61	1.38	3.50	2.35	6.86	10.97	26.47	29.44	53.39	0.03	0.61	2.25	6.49	4.91	3.64	4.48	4.81	13.78	22.32
IPCM.JK	8.21	0.22	11.44	10.87	23.84	23.04	14.30	26.47	29.44	84.43	1.53	0.03	8.75	10.87	12.27	9.72	3.10	19.25	17.37	40.84
KARW.JK	8.21	14.30	19.25	17.37	50.66	38.70	18.69	26.47	29.44	110.08	1.04	8.33	11.44	4.85	18.11	11.41	14.30	19.25	22.02	59.20
MBSS.JK	20.20	8.33	6.57	17.37	50.66	38.70	14.30	26.47	29.44	104.11	9.72	6.20	2.25	4.85	22.32	29.82	8.33	14.82	17.37	68.96
NELY.JK	5.65	18.69	19.25	17.37	48.05	33.92	18.69	26.47	29.44	104.11	0.15	10.97	11.44	10.87	19.45	6.86	18.69	19.25	22.02	53.39
PORT.JK	11.41	8.33	26.47	29.44	59.20	33.92	18.69	26.47	29.44	104.11	6.86	4.48	26.47	8.47	34.47	13.28	10.97	26.47	29.44	65.55
PSSI.JK	29.82	6.20	14.82	8.47	56.23	44.53	18.69	26.47	29.44	116.73	9.72	2.02	11.44	0.89	19.45	29.82	6.20	14.82	8.47	56.23
SHIP.JK	26.23	4.48	6.57	4.85	38.63	53.14	10.97	19.25	17.37	93.58	15.35	0.03	3.38	0.14	11.26	29.82	4.48	8.75	10.87	50.66
SMDR.JK	9.72	2.02	11.44	3.50	23.84	26.23	14.30	26.47	17.37	80.24	8.21	1.20	11.44	4.85	22.32	20.20	6.20	19.25	13.78	56.23
SOCI.JK	9.72	2.02	11.44	13.78	32.51	26.23	10.97	26.47	22.02	80.24	2.12	0.61	8.75	10.87	15.61	11.41	3.10	11.44	13.78	36.51
TMAS.JK	3.64	4.48	14.82	3.50	20.85	17.65	18.69	26.47	29.44	80.24	2.12	2.02	11.44	1.55	12.27	8.21	8.33	19.25	13.78	43.15
TPMA.JK	0.05	2.02	3.38	22.02	9.39	17.65	10.97	26.47	29.44	72.53	0.05	1.20	1.38	17.37	6.22	3.64	8.33	8.75	22.02	32.51
GND.JO	16.23	5.03	11.68	14.18	45.41	32.10	15.17	19.54	29.96	93.40	0.37	0.00	2.37	6.79	4.85	16.23	6.83	15.08	17.81	53.24
2062.KL	6.71	11.36	6.38	3.32	25.26	31.20	26.36	26.16	21.63	101.02	0.01	1.35	2.14	2.25	3.54	6.71	14.73	6.38	4.64	28.69
3816.KL	9.66	0.06	11.21	6.25	20.63	20.69	8.68	18.97	13.45	59.72	1.94	1.94	0.05	0.36	0.29	11.40	0.06	8.54	6.25	20.63
5032.KL	2.63	0.00	4.64	0.05	3.04	8.10	0.72	8.54	8.21	22.10	1.94	0.00	1.29	0.05	1.44	4.39	0.29	6.38	2.25	10.99
5077.KL	35.86	4.75	11.21	10.57	56.66	50.06	19.16	26.16	21.63	113.54	8.10	0.11	1.29	3.32	8.26	27.22	2.21	6.38	10.57	40.91
5173.KL	15.53	6.51	11.21	10.57	43.26	50.06	26.36	26.16	17.01	113.54	1.94	0.29	4.64	0.00	4.09	15.53	8.68	11.21	10.57	45.71
5246.KL	11.40	0.36	6.38	4.64	14.18	41.57	4.75	18.97	10.57	66.27	0.09	3.61	2.14	0.10	0.00	13.35	0.11	6.38	4.64	16.58
5259.KL	20.69	8.68	3.24	3.32	32.43	35.86	14.73	18.97	10.57	77.41	15.53	4.75	0.05	0.57	8.26	20.69	8.68	4.64	6.25	38.65
6254.KL	41.57	6.51	14.56	21.63	77.41	50.06	19.16	26.16	29.03	121.19	0.11	0.00	0.13	0.24	0.38	8.10	2.21	4.64	17.01	26.94
7013.KL	0.89	3.33	2.14	6.25	10.03	23.75	11.36	18.97	10.57	62.91	5.95	0.76	2.82	1.42	4.82	2.63	2.21	2.14	6.25	12.00
8346.KL	147.17	114.76	87.47	11.25	inf	147.17	114.76	87.47	11.25	inf	4.39	1.94	3.24	0.00	1.78	9.66	3.33	8.54	0.10	16.58
003280.KS	27.30	8.75	19.16	22.02	74.19	31.29	19.25	19.16	29.44	96.37	23.83	8.75	14.73	22.02	66.94	27.30	11.44	19.16	29.44	82.26
005880.KS	15.60	4.81	19.16	17.37	51.56	50.16	14.82	19.16	22.02	101.79	4.43	0.07	1.35	3.50	7.72	15.60	4.81	19.16	17.37	51.56
009070.KS	20.76	8.75	8.68	8.47	46.30	41.67	14.82	26.36	22.02	101.79	1.96	1.38	2.21	1.55	6.94	27.30	11.44	11.36	8.47	57.29

011200.KS	20.76	3.38	4.75	6.49	32.93	35.95	11.44	14.73	22.02	82.26	8.15	1.38	0.72	2.41	11.30	23.83	4.81	4.75	6.49	37.02
028670.KS	27.30	2.25	14.73	8.47	46.30	35.95	14.82	19.16	17.37	86.66	13.42	0.07	0.06	2.41	9.41	27.30	2.25	14.73	8.47	46.30
044450.KS	13.42	0.74	4.75	6.49	22.54	41.67	14.82	26.36	17.37	96.37	3.48	0.31	0.29	0.14	3.22	20.76	4.81	14.73	8.47	46.30
086280.KS	11.46	1.38	11.36	1.55	21.05	41.67	14.82	26.36	17.37	96.37	0.91	0.07	3.33	0.91	0.97	18.04	2.25	14.73	4.85	34.94
GPH.L	13.21	0.03	2.79	0.70	10.02	38.60	2.66	9.69	11.92	53.83	2.10	0.94	1.07	0.00	0.75	13.21	0.48	2.79	1.26	14.02
MPL.L	3.61	0.99	2.79	2.97	10.02	22.97	5.37	9.69	9.43	46.13	0.34	0.99	0.02	0.00	0.75	13.21	2.66	4.02	2.97	21.60
OCN.L	8.16	0.48	5.54	0.26	7.52	17.58	5.37	12.48	14.92	48.59	3.61	0.19	2.79	2.98	0.55	13.21	0.99	5.54	1.26	17.56
FESH.ME	21.78	11.52	15.52	10.28	58.48	37.18	11.52	27.29	10.28	79.45	8.85	3.43	9.33	4.43	24.93	21.78	11.52	15.52	10.28	58.48
CPLP	32.46	5.09	15.17	11.32	59.60	42.95	9.11	26.88	30.06	99.12	10.46	0.86	9.04	1.74	18.36	28.43	3.62	15.17	11.32	53.77
ESEA	4.97	9.11	11.76	14.27	34.79	32.46	19.73	19.63	22.59	94.05	0.42	0.11	3.57	0.54	2.88	4.97	9.11	15.17	14.27	36.83
GASS	12.27	0.11	0.84	0.13	5.69	42.95	5.09	11.76	11.32	62.71	6.11	0.61	0.10	3.39	0.06	21.78	0.11	2.41	0.20	13.54
GLBS	14.28	1.54	6.83	17.90	34.79	51.50	5.09	15.17	30.06	84.88	2.34	0.00	0.06	11.32	5.04	14.28	1.54	6.83	17.90	34.79
GLNG	19.00	0.11	5.03	11.32	27.38	32.46	3.62	26.88	17.90	69.38	7.40	3.26	3.57	2.64	5.04	21.78	0.39	6.83	11.32	32.82
PSHG	28.43	19.73	15.17	6.85	65.97	37.18	26.98	26.88	8.88	89.32	12.27	9.11	6.83	0.54	24.12	21.78	15.26	9.04	5.17	48.42
PXS	8.85	11.84	19.63	14.27	48.42	32.46	26.98	26.88	22.59	104.59	4.97	3.62	5.03	3.78	17.07	8.85	11.84	26.88	14.27	51.04
SBLK	10.46	2.45	2.41	0.54	13.54	21.78	5.09	15.17	11.32	51.04	0.42	0.00	0.63	0.20	0.06	14.28	2.45	9.04	1.74	24.12
SHIP	12.27	1.54	19.63	14.27	38.97	32.46	6.89	26.88	30.06	84.88	8.85	0.61	6.83	2.64	10.49	14.28	2.45	19.63	14.27	43.50
TOPS	32.46	11.84	26.88	11.32	76.72	32.46	19.73	26.88	22.59	99.12	8.85	0.00	9.04	2.64	14.66	19.00	6.89	26.88	5.17	48.42
ADANIPORTS.NS	8.10	2.41	6.51	0.17	13.66	23.75	11.76	8.68	8.68	52.01	1.94	0.10	2.21	0.43	1.66	9.66	3.57	8.68	0.97	19.93
ALLCARGO.NS	17.96	6.83	6.51	5.01	35.33	35.86	15.17	19.16	17.63	87.21	9.66	0.84	2.21	0.48	10.56	17.96	5.03	8.68	5.01	35.33
ESSARSHPNG.NS	23.75	19.63	11.36	11.09	64.07	50.06	26.88	26.36	29.75	133.05	9.66	3.57	2.21	6.67	21.36	23.75	26.88	19.16	14.02	78.65
GESHIP.NS	15.53	0.06	11.36	3.64	19.93	50.06	6.83	19.16	17.63	82.80	1.36	1.74	0.72	0.48	0.57	23.75	0.10	11.36	6.67	31.39
GPPL.NS	27.22	2.41	19.16	5.01	44.26	50.06	9.04	19.16	22.30	91.90	17.96	0.37	2.21	0.48	13.66	27.22	2.41	19.16	6.67	46.74
NAVKARCORP.NS	23.75	9.04	11.36	14.02	57.77	41.57	19.63	26.36	22.30	108.31	1.36	0.10	4.75	0.48	4.44	17.96	9.04	11.36	8.68	46.74
SCI.NS	11.40	3.57	6.51	1.64	21.36	35.86	9.04	19.16	17.63	78.65	3.45	0.37	1.35	0.02	3.87	17.96	6.83	6.51	3.64	33.32
SHREYAS.NS	4.39	26.88	6.51	11.09	35.33	35.86	26.88	14.73	29.75	102.37	0.52	15.17	3.33	5.01	14.80	6.71	26.88	8.68	17.63	46.74
ASC	3.96	0.00	5.03	6.85	11.46	24.90	15.26	19.63	14.27	72.96	3.09	0.61	0.37	2.64	2.88	14.28	0.39	11.76	11.32	30.93
CCL	12.27	0.39	5.03	0.01	10.49	21.78	3.62	15.17	14.27	51.04	10.46	1.09	0.37	1.86	0.81	14.28	1.54	11.76	0.54	21.11
CMRE	8.85	2.45	2.41	5.17	18.36	28.43	6.89	9.04	17.90	59.60	3.96	0.00	0.28	0.54	1.68	12.27	2.45	3.57	8.88	25.72
DAC	1.70	3.62	6.83	22.59	22.58	21.78	11.84	19.63	30.06	76.72	0.61	0.26	5.03	6.85	1.68	3.96	5.09	6.83	22.59	29.12
DHT	10.46	0.39	11.76	1.74	18.36	24.90	5.09	19.63	14.27	59.60	3.09	0.61	5.03	0.20	3.36	14.28	2.45	11.76	3.78	29.12
DLNG	7.40	0.39	9.04	2.64	15.84	21.78	9.11	19.63	17.90	65.97	3.09	1.09	1.51	0.01	1.06	8.85	1.54	9.04	5.17	22.58
DSX	10.46	0.39	2.41	1.04	11.46	32.46	15.26	19.63	14.27	80.69	2.34	0.26	0.10	0.13	0.41	16.51	3.62	3.57	1.04	21.11

EGLE	19.00	0.39	5.03	1.04	18.36	32.46	5.09	19.63	8.88	59.60	8.85	1.70	1.51	0.38	1.68	19.00	0.86	5.03	1.74	21.11
FRO	12.27	0.11	9.04	1.74	17.07	37.18	11.84	19.63	14.27	80.69	1.17	5.26	1.51	0.01	0.00	12.27	0.11	9.04	3.78	19.71
GLOG-PA	3.09	0.26	3.57	0.75	1.35	21.78	9.11	11.76	3.78	43.50	0.34	5.26	2.41	5.31	3.80	6.11	0.11	6.83	0.01	7.10
GNK	8.85	3.62	0.84	0.54	11.46	32.46	6.89	11.76	11.32	59.60	4.97	0.00	0.00	0.20	2.44	10.46	3.62	5.03	1.74	19.71
GSL	6.11	1.54	3.57	6.85	17.07	32.46	19.73	11.76	22.59	84.88	0.19	0.26	0.06	0.54	0.06	7.40	2.45	3.57	8.88	21.11
INSW	14.28	0.26	1.51	2.64	10.49	37.18	9.11	11.76	11.32	65.97	3.96	3.26	0.00	0.75	0.02	24.90	3.62	3.57	5.17	32.82
KEX	7.40	0.39	2.41	2.64	11.46	32.46	5.09	19.63	22.59	72.96	0.42	1.70	0.00	0.01	0.06	8.85	0.39	5.03	5.17	17.07
KNOP	28.43	2.45	3.57	1.74	27.38	42.95	15.26	11.76	14.27	80.69	12.27	0.06	0.06	0.01	2.88	28.43	2.45	1.51	1.04	22.58
LPG	14.28	0.86	6.83	2.64	21.11	32.46	11.84	19.63	11.32	72.96	3.96	1.09	0.06	0.38	0.06	14.28	1.54	9.04	5.17	27.38
MATX	19.00	6.89	6.83	0.20	25.72	32.46	11.84	26.88	11.32	76.72	8.85	1.54	1.51	1.25	5.04	16.51	5.09	11.76	0.54	27.38
NAT	14.28	6.89	15.17	5.17	38.97	42.95	19.73	26.88	11.32	94.05	4.97	0.86	6.83	0.54	10.49	19.00	9.11	15.17	5.17	45.91
NCLH	19.00	1.09	3.57	0.20	8.70	32.46	15.26	15.17	5.17	62.71	14.28	3.26	0.37	0.13	1.68	19.00	0.11	5.03	1.04	17.07
NM	19.00	5.09	9.04	8.88	41.19	37.18	19.73	19.63	30.06	104.59	3.09	1.54	0.00	1.74	5.04	16.51	5.09	6.83	6.85	34.79
NMM	12.27	0.11	0.00	6.85	11.46	32.46	11.84	15.17	22.59	80.69	3.09	0.26	2.47	1.04	0.26	16.51	0.86	0.84	8.88	21.11
NVGS	19.00	0.06	2.41	3.78	15.84	42.95	15.26	15.17	11.32	80.69	7.40	2.42	1.51	0.54	2.88	21.78	0.39	3.57	6.85	25.72
OSG	8.85	5.09	19.63	8.88	36.83	42.95	19.73	19.63	22.59	104.59	0.42	1.54	5.03	3.78	7.88	12.27	5.09	19.63	11.32	43.50
RCL	14.28	0.06	5.03	2.64	14.66	37.18	6.89	11.76	17.90	69.38	3.09	1.09	0.84	0.38	0.41	21.78	0.00	9.04	2.64	22.58
SB	1.70	0.86	1.51	3.78	7.10	37.18	15.26	11.76	17.90	80.69	0.03	0.26	0.06	0.54	0.02	7.40	3.62	3.57	6.85	21.11
SFL	14.28	3.62	3.57	3.78	24.12	32.46	9.11	19.63	8.88	65.97	7.40	0.11	0.37	0.03	4.44	16.51	3.62	3.57	3.78	25.72
STNG	6.11	0.11	0.10	3.78	7.10	28.43	6.89	19.63	11.32	62.71	2.34	1.70	1.12	3.78	0.41	19.00	1.54	5.03	5.17	27.38
TDW	8.85	1.54	5.03	0.54	13.54	24.90	15.26	19.63	30.06	84.88	0.74	0.26	0.37	1.25	0.00	19.00	5.09	5.03	6.85	34.79
TK	0.74	5.09	6.83	6.85	14.66	32.46	19.73	15.17	30.06	94.05	0.61	0.06	2.41	1.74	0.41	3.96	5.09	11.76	14.27	29.12
TNK	3.96	3.62	5.03	6.85	18.36	37.18	15.26	15.17	22.59	89.32	0.74	0.26	1.51	1.74	2.04	10.46	5.09	11.76	14.27	38.97
TNP	12.27	3.62	15.17	6.85	34.79	32.46	15.26	26.88	14.27	84.88	2.34	0.06	1.51	0.20	2.44	10.46	1.54	19.63	5.17	29.12
MMH.NZ	16.51	1.48	1.48	0.02	12.23	37.18	15.08	15.08	17.63	84.34	4.97	1.15	0.66	1.34	0.03	16.51	3.53	1.48	0.02	14.40
POT.NZ	12.27	2.37	1.48	2.52	16.79	51.50	11.68	26.78	29.75	109.98	3.09	0.00	0.00	0.16	0.74	21.78	4.97	1.48	8.68	32.45
SPN.NZ	8.85	0.81	0.81	2.52	11.22	24.90	6.77	11.68	11.09	53.31	3.96	0.07	0.00	1.34	0.22	8.85	0.81	0.81	2.52	11.22
QGTS.QA	15.48	1.41	15.08	1.61	26.23	29.99	8.82	26.78	17.55	77.51	2.18	0.00	4.97	0.02	3.07	15.48	1.41	15.08	2.49	27.91
QNNS.QA	6.96	3.43	11.68	2.49	21.58	23.20	6.64	15.08	13.94	57.33	2.18	3.43	8.97	0.17	7.39	11.53	4.86	11.68	6.61	33.39
AMA.BK	5.48	0.63	4.42	10.65	17.53	35.86	14.39	25.75	21.73	94.94	0.02	0.15	3.05	4.69	2.04	8.10	0.24	8.26	10.65	21.73
BIOTEC.BK	13.35	2.06	10.89	21.73	40.42	35.86	11.05	18.59	29.13	89.95	3.45	0.15	10.89	21.73	17.53	15.53	2.06	10.89	21.73	42.76
NYT.BK	11.40	0.63	10.89	6.31	24.86	31.20	11.05	18.59	29.13	85.28	2.63	2.12	3.05	0.00	1.05	11.40	0.63	10.89	6.31	24.86
PORT.BK	0.89	1.23	8.26	2.29	8.87	11.40	25.95	18.59	8.27	53.20	0.11	0.86	6.13	0.11	0.24	1.94	4.53	10.89	4.69	17.53

PSL.BK	5.48	0.43	4.42	6.31	9.77	27.22	11.05	14.21	13.53	65.68	0.09	1.43	0.02	0.38	0.02	17.96	2.06	6.13	10.65	33.96
RCL.BK	15.53	3.15	1.98	1.45	18.87	41.57	11.05	18.59	6.31	69.19	2.63	0.63	0.17	0.05	1.05	15.53	3.15	1.98	2.29	20.27
RP.BK	15.53	1.23	8.26	8.27	30.09	27.22	18.78	14.21	13.53	72.89	6.71	1.43	6.13	4.69	8.87	17.96	2.06	6.13	8.27	31.98
TSTE.BK	5.48	0.24	8.26	10.65	18.87	15.53	3.15	18.59	21.73	50.42	0.89	0.01	1.17	4.69	3.91	5.48	0.24	8.26	10.65	18.87
TTA.BK	6.71	0.63	1.98	4.69	12.76	27.22	6.26	8.26	17.10	56.11	1.94	2.12	0.21	2.29	1.05	13.35	0.63	3.05	6.31	20.27
5LY.SI	5.01	0.84	1.58	14.10	15.84	19.08	11.76	19.82	29.85	72.96	0.00	0.06	1.58	6.73	2.44	10.52	3.57	11.92	17.72	38.97
D8DU.SI	5.01	0.06	9.18	3.68	11.46	28.51	6.83	9.18	14.10	56.62	7.45	0.84	6.96	0.99	13.54	14.34	3.57	9.18	6.73	32.82
F83.SI	21.86	11.76	6.96	14.10	53.77	37.28	19.63	27.08	29.85	110.57	5.01	1.51	3.67	2.56	12.47	21.86	19.63	9.18	17.72	65.97
S19.SI	1.72	3.32	0.00	1.31	0.39	14.34	6.83	6.96	2.56	29.12	1.19	1.74	0.89	0.01	0.15	10.52	0.37	6.96	0.18	12.47
S56.SI	7.45	2.41	19.82	8.74	30.93	28.51	19.63	19.82	17.72	84.88	0.00	0.28	3.67	3.68	2.04	10.52	2.41	19.82	8.74	34.79
600017.SS	5.30	4.53	14.30	3.27	22.99	20.38	14.39	18.69	13.37	65.26	0.03	1.23	4.48	0.77	2.79	5.30	6.26	14.30	3.27	24.58
600018.SS	7.89	11.05	10.97	4.58	31.67	35.48	18.78	14.30	28.93	94.47	0.47	3.15	8.33	0.77	7.85	9.43	14.39	10.97	4.58	35.70
600026.SS	7.89	6.26	3.10	3.27	20.01	17.67	18.78	14.30	16.93	65.26	3.30	0.04	2.02	0.77	4.97	13.09	6.26	6.20	6.19	31.67
600190.SS	15.25	8.40	25.85	6.19	47.38	23.42	18.78	25.85	21.54	84.83	9.43	0.63	18.69	0.35	17.29	15.25	6.26	25.85	4.58	42.41
600428.SS	4.23	11.05	3.10	2.22	17.29	23.42	18.78	14.30	16.93	72.46	1.27	4.53	1.20	0.06	3.79	6.51	14.39	8.33	8.14	33.64
600717.SS	2.51	11.05	6.20	2.22	17.29	11.16	18.78	18.69	16.93	58.75	1.36	3.15	2.02	0.35	0.74	1.83	8.40	6.20	3.27	16.02
600798.SS	2.51	11.05	8.33	4.58	21.46	23.42	14.39	14.30	16.93	68.77	1.83	4.53	4.48	1.39	10.52	13.09	11.05	10.97	6.19	40.08
601000.SS	6.51	11.05	10.97	8.14	33.64	23.42	18.78	14.30	10.50	65.26	0.03	3.15	4.48	2.22	4.97	5.30	11.05	10.97	6.19	29.78
601008.SS	4.23	4.53	18.69	3.27	22.99	17.67	18.78	25.85	21.54	76.35	0.03	2.06	14.30	0.77	5.62	6.51	6.26	18.69	6.19	31.67
601018.SS	7.89	4.53	10.97	10.50	31.67	23.42	18.78	25.85	28.93	89.48	2.51	0.63	6.20	2.22	9.58	7.89	4.53	14.30	10.50	33.64
601228.SS	7.89	8.40	14.30	3.27	29.78	20.38	14.39	25.85	16.93	72.46	1.36	0.04	14.30	0.09	0.74	7.89	11.05	14.30	3.27	31.67
601326.SS	0.47	6.26	14.30	6.19	17.29	26.87	18.78	25.85	10.50	76.35	3.04	2.06	6.20	4.58	1.95	2.51	6.26	14.30	6.19	22.99
601866.SS	13.09	14.39	6.20	10.50	42.41	17.67	18.78	10.97	16.93	61.93	2.51	3.15	0.61	2.22	7.85	13.09	14.39	6.20	10.50	42.41
601872.SS	7.89	3.15	10.97	4.58	24.58	20.38	14.39	14.30	21.54	68.77	5.30	0.24	3.10	2.22	9.58	11.16	6.26	14.30	13.37	42.41
601880.SS	5.30	11.05	8.33	21.54	37.84	23.42	18.78	14.30	28.93	80.46	0.03	3.15	4.48	13.37	9.58	5.30	11.05	8.33	21.54	37.84
601919.SS	7.89	11.05	0.22	3.27	17.29	23.42	14.39	18.69	16.93	72.46	2.51	2.06	0.01	1.39	4.36	6.51	6.26	1.20	6.19	18.62
603167.SS	1.83	0.01	6.20	3.27	7.06	17.67	6.26	14.30	21.54	55.71	0.06	1.43	1.20	1.39	0.35	5.30	0.04	6.20	4.58	12.55
000088.SZ	2.51	2.06	25.85	10.50	24.58	13.09	14.39	25.85	21.54	65.26	0.47	0.24	6.20	4.58	7.06	3.30	4.53	25.85	10.50	29.78
000507.SZ	1.27	11.05	6.20	1.39	13.65	9.43	18.78	25.85	10.50	52.81	0.33	6.26	1.20	0.35	1.95	2.51	11.05	6.20	2.22	17.29
000520.SZ	6.51	14.39	14.30	3.27	31.67	26.87	18.78	18.69	21.54	84.83	1.83	8.40	6.20	0.26	7.85	9.43	14.39	14.30	4.58	37.84
000582.SZ	4.23	8.40	2.02	1.39	13.65	13.09	14.39	10.97	16.93	52.81	0.22	4.53	2.02	0.00	3.27	9.43	8.40	6.20	10.50	33.64
000905.SZ	5.30	3.15	10.97	4.58	21.46	20.38	14.39	18.69	21.54	72.46	0.22	0.63	6.20	0.09	3.27	11.16	4.53	18.69	10.50	40.08
001872.SZ	3.30	6.26	3.10	6.19	17.29	20.38	18.78	25.85	28.93	84.83	0.47	0.63	0.22	0.77	1.95	7.89	14.39	10.97	6.19	35.70

002040.SZ	1.27	4.53	4.48	16.93	18.62	17.67	14.39	25.85	28.93	76.35	0.22	1.23	4.48	8.14	8.69	1.83	6.26	10.97	16.93	26.24
002320.SZ	3.30	1.23	8.33	6.19	16.02	23.42	14.39	18.69	21.54	76.35	0.14	0.01	6.20	2.22	1.95	5.30	2.06	14.30	10.50	26.24
002492.SZ	20.38	14.39	25.85	8.14	61.93	35.48	18.78	25.85	28.93	105.77	0.81	0.04	10.97	0.26	2.79	13.09	11.05	25.85	6.19	47.38
4030.SR	5.79	3.53	5.03	5.01	19.05	34.19	15.08	15.17	8.68	70.56	0.04	0.81	2.41	0.17	1.25	8.37	6.77	5.03	6.67	26.51
5601.TWO	3.34	11.21	3.05	0.09	11.59	13.16	14.56	25.75	16.93	62.09	0.00	1.29	0.58	1.62	0.05	4.27	11.21	3.05	1.39	16.11
9101.T	7.70	1.17	0.67	0.84	8.82	43.54	10.89	14.56	6.37	67.61	3.29	0.03	0.13	0.00	1.07	14.68	1.98	4.64	2.33	21.47
9104.T	10.81	0.21	0.26	2.33	9.70	28.95	6.13	14.56	8.34	54.98	3.29	0.17	0.40	0.39	0.81	14.68	1.17	1.29	6.37	20.03
9107.T	14.68	1.98	2.14	4.74	21.47	33.01	10.89	14.56	10.72	67.61	2.52	0.92	0.01	0.84	0.81	19.45	3.05	4.64	4.74	29.66
9110.T	9.17	3.05	8.54	8.34	27.88	28.95	14.21	18.97	10.72	71.16	1.85	0.58	0.67	2.33	5.10	16.94	3.05	11.21	8.34	37.56
9115.T	19.45	6.13	8.54	3.41	35.46	37.75	18.59	26.16	21.82	102.56	4.19	0.21	1.29	0.39	5.10	25.40	6.13	11.21	6.37	46.88
9119.T	12.64	4.42	2.14	2.33	20.03	28.95	18.59	18.97	17.19	82.98	4.19	0.21	0.05	0.04	2.06	16.94	6.13	8.54	4.74	35.46
9127.T	22.25	8.26	8.54	8.34	46.88	37.75	25.75	18.97	21.82	102.56	1.30	0.58	3.24	0.22	2.46	5.22	4.42	4.64	1.48	14.89
9130.T	12.64	4.42	3.24	8.34	27.88	33.01	10.89	26.16	17.19	82.98	1.85	0.21	0.26	0.22	1.07	10.81	3.05	3.24	6.37	22.97
9171.T	16.94	3.05	6.38	13.61	37.56	22.25	14.21	26.16	29.24	82.98	4.19	1.17	1.29	10.72	13.75	16.94	3.05	6.38	13.61	37.56
9173.T	9.17	1.17	11.21	8.34	26.17	22.25	14.21	18.97	13.61	67.61	1.30	3.04	3.24	3.41	2.06	9.17	1.17	11.21	8.34	26.17
9193.T	2.20	0.92	1.29	3.41	0.02	12.64	10.89	18.97	10.72	49.47	2.20	1.50	0.05	1.48	0.78	1.85	1.98	8.54	4.74	13.75
9302.T	12.64	1.98	4.64	17.19	31.51	37.75	18.59	18.97	21.82	97.12	4.19	1.50	0.26	3.41	2.91	14.68	1.98	8.54	17.19	37.56
9303.T	7.70	1.17	1.29	3.41	12.66	19.45	10.89	11.21	17.19	57.93	0.08	1.50	0.05	2.33	0.14	9.17	1.17	4.64	6.37	20.03
9308.T	16.94	10.89	11.21	3.41	39.74	37.75	25.75	26.16	13.61	97.12	4.19	0.58	6.38	0.84	9.70	19.45	14.21	11.21	3.41	44.40
9351.T	6.39	0.58	6.38	0.04	7.98	16.94	6.13	14.56	8.34	44.40	0.85	0.92	0.26	0.53	0.00	7.70	1.17	8.54	0.84	14.89
9355.T	9.17	0.17	0.40	6.37	5.75	25.40	3.05	11.21	13.61	49.47	4.19	0.92	1.36	3.41	1.07	16.94	0.21	0.67	6.37	17.34
9361.T	7.70	0.03	0.67	3.41	8.82	37.75	4.42	11.21	13.61	61.01	5.22	0.02	0.67	1.48	5.10	22.25	1.98	1.29	4.74	24.54
9362.T	19.45	4.42	8.54	10.72	42.02	52.11	14.21	18.97	21.82	102.56	2.52	0.03	0.01	0.53	0.41	7.70	1.98	2.14	2.33	13.75
ALC.TO	12.21	0.10	8.97	6.85	22.42	37.09	9.04	19.54	17.90	80.42	0.16	1.12	0.29	0.20	0.59	12.21	0.37	11.68	6.85	25.55
LGT-A.TO	18.93	3.57	11.68	8.88	40.98	28.34	6.83	19.54	17.90	69.13	8.79	0.84	6.77	6.85	20.96	16.44	3.57	8.97	6.85	34.59
WTE.TO	24.82	0.37	4.97	3.78	25.55	32.37	5.03	8.97	17.90	59.36	6.06	0.00	1.48	0.03	4.36	24.82	0.37	4.97	3.78	25.55
2603.TW	23.50	8.54	4.42	0.77	29.90	35.58	18.97	18.59	10.50	80.64	11.22	0.26	0.92	0.59	1.62	23.50	8.54	8.26	1.39	35.83
2605.TW	23.50	0.67	8.26	1.39	24.69	35.58	11.21	25.75	21.54	89.67	20.45	0.05	0.03	0.06	6.38	23.50	1.29	10.89	2.22	29.90
2606.TW	30.93	4.64	4.42	1.39	31.80	35.58	11.21	25.75	21.54	89.67	7.94	0.26	0.48	1.05	1.01	30.93	11.21	4.42	4.58	44.99
2607.TW	23.50	4.64	8.26	3.27	35.83	41.28	14.56	25.75	16.93	94.66	17.74	1.29	1.17	0.09	12.64	23.50	4.64	8.26	6.19	40.21
2609.TW	26.96	4.64	3.05	3.27	31.80	26.96	14.56	18.59	13.37	72.63	23.50	0.26	0.17	0.06	6.38	26.96	6.38	4.42	4.58	37.97
2612.TW	23.50	3.24	8.26	3.27	33.77	35.58	11.21	25.75	21.54	89.67	9.49	0.01	0.02	1.62	1.01	17.74	2.14	1.98	2.22	20.11
2613.TW	23.50	4.64	6.13	2.22	31.80	41.28	8.54	25.75	10.50	76.52	13.16	0.26	0.92	1.05	1.62	26.96	4.64	6.13	2.22	33.77

2615.TW	23.50	8.54	8.26	0.26	24.69	30.93	14.56	14.21	13.37	72.63	7.94	0.26	0.21	5.01	0.76	23.50	8.54	8.26	0.26	24.69
2617.TW	23.50	4.64	10.89	2.22	35.83	26.96	14.56	18.59	16.93	76.52	11.22	1.29	1.98	0.77	12.64	23.50	3.24	10.89	2.22	33.77
2637.TW	26.96	1.29	6.13	0.35	23.10	30.93	6.38	10.89	10.50	55.87	11.22	0.40	0.21	0.59	1.98	26.96	2.14	6.13	1.39	28.09
5608.TW	17.74	4.64	6.13	2.22	28.09	26.96	11.21	18.59	13.37	68.94	7.94	0.05	0.03	0.59	1.98	17.74	4.64	6.13	4.58	31.80
8367.TW	17.74	3.24	10.89	2.22	29.90	30.93	6.38	25.75	16.93	72.63	7.94	0.67	3.05	0.35	9.66	17.74	3.24	10.89	2.22	29.90
EURN.BR	14.74	0.01	3.92	0.00	9.62	33.10	9.40	12.32	9.43	61.68	4.23	0.03	0.17	1.56	0.45	19.52	0.97	5.43	1.26	21.03
EXM.BR	25.48	0.97	7.28	5.61	32.54	37.84	9.40	12.32	18.61	75.20	3.33	0.46	2.70	0.70	6.45	22.33	2.62	9.54	14.92	45.34
DFDS.CO	8.47	6.70	5.03	2.77	22.21	24.32	11.60	19.63	14.51	68.79	1.52	0.34	0.84	0.10	1.57	11.83	6.70	6.83	3.92	28.71
DNORD.CO	18.48	6.70	2.41	0.24	20.75	36.52	26.67	11.76	9.09	76.11	4.68	0.34	0.10	0.00	2.74	18.48	6.70	2.41	1.12	23.73
MAERSK-A.CO	18.48	1.45	3.57	2.77	22.21	36.52	15.00	19.63	14.51	84.25	8.47	0.08	0.84	1.74	2.31	27.82	2.33	9.04	3.92	36.37
TRMD-A.CO	10.06	0.08	2.41	0.10	6.16	27.82	6.70	11.76	2.77	43.01	2.86	0.31	1.51	3.23	0.11	16.02	2.33	5.03	0.59	19.35
IR5B.IR	10.70	0.94	7.02	0.59	15.24	32.83	12.08	19.92	18.17	81.85	3.22	0.54	1.61	1.74	0.35	19.30	2.58	7.02	1.84	26.46
VIK1V.HE	8.68	3.53	9.11	18.26	34.79	42.66	19.54	19.73	30.47	110.57	0.00	0.00	2.45	9.15	3.88	4.84	6.77	9.11	18.26	32.82
EIM.IC	21.47	2.33	15.17	11.54	45.62	32.10	11.60	26.88	22.88	88.95	14.01	0.34	11.76	0.59	18.16	21.47	2.33	15.17	14.51	48.13
DIS.MI	14.34	1.61	20.11	18.52	44.56	24.98	19.92	27.39	30.78	95.45	4.00	0.00	7.15	4.11	11.06	14.34	2.54	15.61	18.52	44.56
AGAS.OL	10.17	3.57	5.09	2.81	21.06	32.01	11.76	26.98	18.26	84.79	1.06	2.41	0.86	0.25	3.86	16.16	6.83	6.89	7.10	36.77
AMSC.OL	10.17	3.57	5.09	7.10	25.66	36.71	5.03	15.26	18.26	69.29	0.36	0.37	0.86	0.61	2.02	11.96	3.57	5.09	7.10	27.33
BELCO.OL	13.94	6.83	2.45	1.87	22.53	36.71	19.63	19.73	22.97	99.02	1.06	2.41	0.00	0.00	1.66	18.63	3.57	5.09	1.87	25.66
BWEK.OL	7.15	5.03	9.11	1.87	21.06	18.63	15.17	19.73	11.62	62.63	2.92	1.51	9.11	0.31	6.34	7.15	5.03	9.11	1.87	21.06
BWLPG.OL	11.96	3.57	11.84	0.61	22.53	27.99	9.04	15.26	14.59	65.88	2.92	0.00	0.39	0.09	1.34	13.94	3.57	15.26	1.87	29.06
FLNG.OL	13.94	2.41	1.54	0.00	11.42	36.71	9.04	11.84	18.26	72.87	2.92	0.06	0.00	0.66	0.25	13.94	2.41	2.45	1.15	17.02
JIN.OL	8.58	5.03	5.09	5.39	24.06	42.46	19.63	15.26	18.26	93.96	7.15	0.10	2.45	0.25	7.07	11.96	9.04	9.11	5.39	34.72
MPCC.OL	18.63	3.57	9.11	1.87	29.06	42.46	15.17	15.26	18.26	89.23	1.06	1.74	0.00	0.31	0.07	8.58	0.37	2.45	0.05	7.85
ODF.OL	10.17	0.84	6.89	3.97	19.66	32.01	6.83	19.73	30.47	80.60	0.15	0.06	2.45	1.87	2.02	13.94	2.41	11.84	5.39	30.87
WAWI.OL	24.49	1.51	11.84	5.39	36.77	36.71	11.76	19.73	18.26	84.79	5.88	0.28	5.09	0.09	3.86	24.49	1.51	11.84	7.10	38.90
WWI.OL	10.17	0.37	6.89	2.81	17.02	32.01	9.04	19.73	14.59	72.87	2.19	0.06	3.62	0.00	2.42	10.17	2.41	11.84	5.39	27.33
CCOR-B.ST	21.47	3.53	2.49	3.97	27.38	42.56	8.97	15.34	22.97	84.88	12.02	0.81	0.12	1.87	10.49	28.08	4.97	5.14	9.15	43.50
TAL1T.TL	22.89	0.79	0.37	11.54	24.89	33.73	15.00	11.76	30.37	86.15	8.11	1.82	1.12	3.92	1.91	22.89	0.79	0.10	11.54	23.34

Appendix IV. Results from GARCH(1,1,1) Risk Estimation

The below results are expressed in negative values percentage, i.e., 10.33 means -10.33%. The symbols A and M indicate the average and maximum values during the respective time regimes.

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
ANEK.AT	A	10.33	10.71	9.53	9.36	10.03	14.19	14.72	13.10	12.86	13.78	8.93	9.26	8.24	8.09	8.67	11.19	11.61	10.33	10.14	10.87
ANEK.AT	M	19.64	22.34	16.03	17.02	22.34	26.98	30.70	22.03	23.39	30.70	16.97	19.31	13.85	14.71	19.31	21.28	24.21	17.37	18.45	24.21
ATTICAAT	A	4.65	5.11	4.81	4.91	4.83	6.79	7.47	7.03	7.18	7.06	3.86	4.29	4.03	4.11	4.04	4.84	5.39	5.05	5.16	5.06
ATTICAAT	M	8.67	13.37	19.29	12.26	19.29	12.67	19.53	28.18	17.91	28.18	6.56	10.08	14.07	10.36	14.07	8.23	12.64	17.65	12.99	17.65
KYRI.AT	A	10.24	9.30	6.65	6.06	8.40	14.70	13.36	9.55	8.71	12.07	8.41	7.64	5.47	4.99	6.91	10.55	9.58	6.86	6.26	8.67
KYRI.AT	M	27.78	25.63	12.86	11.20	27.78	39.90	36.81	18.47	16.09	39.90	22.24	20.28	10.30	8.98	22.24	27.89	25.43	12.92	11.26	27.89
OLTH.AT	A	3.97	4.90	3.56	3.88	4.05	6.53	8.04	5.84	6.37	6.66	2.49	2.96	2.28	2.44	2.53	3.12	3.72	2.86	3.06	3.17
OLTH.AT	M	7.65	12.80	6.95	6.46	12.80	12.57	21.03	11.42	10.62	21.03	4.39	7.15	3.99	3.75	7.15	5.50	8.97	5.01	4.70	8.97
PPAAT	A	3.19	3.72	2.81	2.89	3.15	4.56	5.32	4.03	4.14	4.51	2.61	3.04	2.30	2.37	2.58	3.27	3.82	2.89	2.97	3.24
PPAAT	M	7.98	11.75	4.60	4.59	11.75	11.43	16.82	6.58	6.56	16.82	6.53	9.62	3.76	3.75	9.62	8.19	12.06	4.72	4.71	12.06
LOGN3.SA	A	7.31	8.26	6.20	6.13	7.02	10.64	12.02	9.03	8.92	10.21	6.11	6.83	5.31	5.23	5.90	7.66	8.57	6.66	6.56	7.40
LOGN3.SA	M	22.82	35.52	27.71	12.31	35.52	33.21	51.68	40.33	17.91	51.68	17.40	27.41	21.01	9.63	27.41	21.82	34.38	26.35	12.07	34.38
PSVM11.SA	A	16.03	17.47	14.16	14.53	15.61	23.94	26.09	21.15	21.69	23.31	12.45	13.57	11.00	11.29	12.13	15.62	17.02	13.80	14.15	15.21
PSVM11.SA	M	32.90	24.50	15.94	15.30	32.90	49.13	36.60	23.80	22.85	49.13	25.56	19.04	12.38	11.89	25.56	32.05	23.87	15.53	14.91	32.05
STBP3.SA	A	5.53	7.37	6.21	5.99	6.13	8.04	10.72	9.04	8.72	8.92	4.50	6.05	5.08	4.89	5.01	5.64	7.58	6.37	6.13	6.28
STBP3.SA	M	8.59	23.81	10.96	9.74	23.81	12.50	34.64	15.94	14.17	34.64	7.83	21.73	9.80	8.86	21.73	9.82	27.25	12.29	11.11	27.25
FROWARD.SN	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.32	1.26	1.28	1.28	1.29	1.65	1.58	1.61	1.60	1.62
FROWARD.SN	M	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.01	0.02	6.32	5.37	5.01	5.14	6.32	7.93	6.74	6.29	6.45	7.93
SMSAAM.SN	A	2.84	4.35	3.92	4.22	3.67	4.25	6.50	5.86	6.30	5.48	2.21	3.38	3.05	3.28	2.85	2.77	4.24	3.83	4.11	3.58
SMSAAM.SN	M	6.49	10.71	7.82	25.89	25.89	9.69	15.99	11.67	38.66	38.66	5.05	8.33	6.07	20.13	20.13	6.33	10.44	7.62	25.24	25.24
VAPORES.SN	A	4.83	5.46	5.31	5.58	5.22	7.12	8.05	7.83	8.23	7.70	3.81	4.31	4.19	4.40	4.12	4.78	5.40	5.26	5.52	5.16
VAPORES.SN	M	17.99	37.50	11.29	17.55	37.50	26.53	55.30	16.64	25.88	55.30	14.20	29.59	8.90	13.85	29.59	17.80	37.10	11.17	17.36	37.10

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
GSDDE.IS	A	7.89	8.56	8.96	8.28	8.31	11.81	12.81	13.41	12.39	12.45	6.28	6.99	7.40	6.70	6.73	7.88	8.77	9.28	8.40	8.44
GSDDE.IS	M	18.80	26.01	69.47	20.78	69.47	28.15	38.94	104.00	31.11	104.00	16.72	23.41	63.00	18.70	63.00	20.97	29.36	79.00	23.45	79.00
GULFNAV.AE	A	3.99	6.10	4.15	5.67	4.78	5.72	8.75	5.96	8.13	6.85	3.47	5.02	3.59	4.71	4.05	4.35	6.30	4.50	5.90	5.08
GULFNAV.AE	M	9.03	12.66	7.56	11.11	12.66	12.94	18.15	10.84	15.93	18.15	7.70	10.65	6.58	9.49	10.65	9.65	13.35	8.25	11.90	13.35
HHFAF	A	3.88	5.54	3.76	4.25	4.27	5.60	8.02	5.45	6.15	6.17	3.13	4.48	3.04	3.43	3.45	3.93	5.61	3.81	4.30	4.32
HHFAF	M	8.92	16.21	8.01	14.49	16.21	12.90	23.44	11.58	20.96	23.44	7.21	13.09	6.47	11.71	13.09	9.04	16.42	8.11	14.68	16.42
HLAG.F	A	6.51	9.60	7.50	7.93	7.64	9.31	13.72	10.72	11.34	10.92	5.47	7.63	6.15	6.45	6.25	6.85	9.57	7.71	8.09	7.84
HLAG.F	M	12.16	17.97	10.56	11.63	17.97	17.39	25.69	15.10	16.63	25.69	8.91	13.24	8.01	8.80	13.24	11.17	16.61	10.04	11.03	16.61
HXCK.F	A	6.27	9.86	9.39	7.44	7.87	9.07	14.26	13.57	10.76	11.38	5.20	8.03	7.66	6.13	6.46	6.52	10.07	9.61	7.69	8.10
HXCK.F	M	11.73	23.27	15.67	13.77	23.27	16.96	33.66	22.67	19.91	33.66	9.32	18.09	12.44	10.89	18.09	11.69	22.68	15.60	13.66	22.68
0137.HK	A	6.73	7.47	7.21	7.21	7.08	9.80	10.88	10.49	10.50	10.31	5.39	5.99	5.77	5.78	5.67	6.76	7.51	7.24	7.25	7.11
0137.HK	M	9.98	12.93	11.87	13.19	13.19	14.53	18.83	17.29	19.21	19.21	7.99	10.36	9.51	10.57	10.57	10.03	12.99	11.93	13.26	13.26
0144.HK	A	3.71	4.36	4.20	4.18	4.04	5.44	6.40	6.16	6.14	5.93	2.94	3.46	3.33	3.32	3.20	3.69	4.34	4.17	4.16	4.02
0144.HK	M	4.10	6.51	5.13	4.69	6.51	6.01	9.55	7.54	6.89	9.55	3.25	5.16	4.07	3.72	5.16	4.07	6.47	5.10	4.66	6.47
0316.HK	A	4.74	6.71	9.30	8.19	6.80	6.99	9.90	13.73	12.08	10.04	3.73	5.28	7.33	6.45	5.36	4.68	6.63	9.19	8.09	6.72
0316.HK	M	19.16	16.13	16.76	22.22	22.22	28.28	23.81	24.73	32.80	32.80	15.10	12.71	13.20	17.51	17.51	18.93	15.94	16.56	21.96	21.96
0351.HK	A	17.42	15.59	13.46	15.59	15.86	26.14	23.39	20.19	23.38	23.79	14.86	13.02	10.30	13.23	13.22	18.64	16.33	12.92	16.59	16.58
0351.HK	M	125.46	51.29	16.81	25.49	125.46	188.22	76.94	25.22	38.24	188.22	155.97	64.23	15.69	28.04	155.97	195.59	80.55	19.67	35.17	195.59
1145.HK	A	10.71	14.28	11.55	11.11	11.68	15.60	20.80	16.82	16.18	17.01	8.73	11.36	9.36	9.03	9.45	10.94	14.24	11.74	11.33	11.85
1145.HK	M	16.21	28.31	25.72	21.43	28.31	23.62	41.24	37.46	31.21	41.24	12.73	21.82	19.88	16.61	21.82	15.96	27.37	24.93	20.83	27.37
1199.HK	A	4.15	4.89	4.65	4.74	4.53	5.88	6.92	6.58	6.72	6.41	3.49	4.09	3.91	3.98	3.80	4.37	5.13	4.90	4.99	4.77
1199.HK	M	8.36	11.18	9.35	10.86	11.18	11.84	15.84	13.23	15.38	15.84	5.88	8.06	6.68	7.77	8.06	7.37	10.11	8.37	9.74	10.11
1308.HK	A	4.50	5.10	6.10	6.12	5.30	6.21	7.05	8.41	8.45	7.31	3.81	4.32	5.44	5.45	4.60	4.78	5.42	6.83	6.83	5.77
1308.HK	M	7.60	7.02	9.04	10.94	10.94	10.49	9.70	12.48	15.10	15.10	5.66	5.69	7.26	8.53	8.53	7.10	7.13	9.10	10.70	10.70
1549.HK	A	9.81	9.92	12.66	9.36	10.30	14.16	14.32	18.26	13.51	14.87	7.95	8.04	10.25	7.59	8.35	9.97	10.08	12.86	9.51	10.47
1549.HK	M	22.75	20.38	38.32	14.33	38.32	32.83	29.40	55.29	20.67	55.29	18.43	16.51	31.04	11.60	31.04	23.11	20.70	38.92	14.55	38.92
1719.HK	A	7.89	4.47	5.37	3.58	5.75	11.67	6.62	7.95	5.30	8.51	6.26	3.67	4.36	3.02	4.65	7.85	4.60	5.47	3.79	5.83
1719.HK	M	16.96	8.12	15.21	11.28	16.96	25.10	12.01	22.51	16.69	25.10	13.30	6.45	11.96	8.91	13.30	16.68	8.08	15.00	11.17	16.68
1732.HK	A	9.89	8.53	10.71	8.74	9.53	14.66	12.65	15.88	12.95	14.13	8.39	6.85	9.40	7.15	8.01	10.53	8.60	11.79	8.97	10.05
1732.HK	M	73.71	30.34	60.56	27.82	73.71	109.27	44.98	89.79	41.25	109.27	57.11	23.25	46.29	21.18	57.11	71.62	29.15	58.04	26.56	71.62

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
2343.HK	A	5.20	5.95	6.44	7.23	6.05	7.27	8.31	9.00	10.11	8.45	4.41	5.03	5.43	6.09	5.11	5.53	6.31	6.81	7.63	6.41
2343.HK	M	6.35	8.10	7.86	10.20	10.20	8.87	11.32	10.98	14.25	14.25	5.50	7.08	6.79	8.95	8.95	6.90	8.88	8.52	11.23	11.23
3382.HK	A	3.27	4.27	3.82	3.83	3.71	4.48	5.85	5.23	5.24	5.07	2.84	3.71	3.32	3.32	3.22	3.57	4.65	4.16	4.17	4.04
3382.HK	M	5.45	7.40	6.57	6.73	7.40	7.46	10.13	9.00	9.22	10.13	4.73	6.43	5.71	5.85	6.43	5.94	8.06	7.16	7.33	8.06
3683.HK	A	12.58	13.23	13.51	21.09	14.78	18.89	19.88	20.29	31.67	22.19	11.34	12.01	12.19	17.78	13.07	14.22	15.07	15.29	22.30	16.39
3683.HK	M	13.13	13.92	14.65	49.50	49.50	19.71	20.90	21.99	74.34	74.34	11.94	12.38	12.82	35.24	35.24	14.97	15.52	16.08	44.19	44.19
BULL.JK	A	7.58	7.43	5.68	7.63	7.19	12.15	11.92	9.11	12.23	11.53	5.11	4.87	3.73	5.14	4.80	6.40	6.11	4.67	6.45	6.02
BULL.JK	M	29.95	20.05	14.43	35.84	35.84	48.03	32.16	23.14	57.47	57.47	15.28	10.00	7.85	17.41	17.41	19.16	12.55	9.84	21.83	21.83
HITS.JK	A	6.84	7.13	8.03	8.97	7.59	10.09	10.51	11.84	13.24	11.20	6.71	7.07	8.08	9.13	7.58	8.42	8.86	10.14	11.45	9.50
HITS.JK	M	27.45	20.92	21.39	25.85	27.45	40.50	30.86	31.55	38.14	40.50	30.07	22.86	23.29	28.15	30.07	37.71	28.66	29.21	35.30	37.71
IPCM.JK	A	5.43	5.66	5.54	4.68	5.33	8.06	8.39	8.23	6.94	7.91	4.54	4.81	4.67	3.72	4.44	5.69	6.03	5.86	4.66	5.57
IPCM.JK	M	20.96	17.35	22.23	7.08	22.23	31.10	25.75	32.98	10.51	32.98	20.49	16.92	21.78	6.44	21.78	25.70	21.22	27.32	8.08	27.32
KARW.JK	A	7.60	6.53	8.29	6.70	7.33	11.36	9.76	12.38	10.01	10.96	8.02	6.66	8.99	6.99	7.72	10.06	8.35	11.27	8.76	9.69
KARW.JK	M	32.72	21.55	22.06	18.39	32.72	48.90	32.20	32.96	27.49	48.90	34.62	23.04	24.21	19.44	34.62	43.41	28.89	30.37	24.38	43.41
MBSS.JK	A	6.41	6.50	6.93	6.48	6.55	9.38	9.52	10.14	9.48	9.58	5.37	5.42	5.82	5.42	5.48	6.74	6.80	7.30	6.80	6.87
MBSS.JK	M	21.37	15.63	22.46	15.72	22.46	31.27	22.87	32.87	23.01	32.87	15.04	12.07	17.02	11.56	17.02	18.85	15.14	21.34	14.50	21.34
NELY.JK	A	6.84	8.40	6.49	6.06	6.90	10.01	12.30	9.50	8.87	10.10	5.44	6.69	5.17	4.82	5.49	6.82	8.39	6.48	6.05	6.89
NELY.JK	M	14.10	19.13	22.44	16.29	22.44	20.64	28.01	32.84	23.85	32.84	11.22	15.23	17.86	12.97	17.86	14.07	19.10	22.39	16.26	22.39
PORT.JK	A	8.13	12.68	12.43	9.58	10.16	11.84	18.47	18.11	13.96	14.80	6.22	10.38	10.16	7.60	8.09	7.80	13.01	12.74	9.53	10.15
PORT.JK	M	16.41	19.57	20.88	18.52	20.88	23.91	28.51	30.42	26.98	30.42	13.47	16.05	17.22	15.08	17.22	16.89	20.13	21.59	18.91	21.59
PSSI.JK	A	5.75	5.52	5.27	5.49	5.56	8.22	7.88	7.53	7.84	7.93	4.72	4.53	4.33	4.51	4.56	5.92	5.69	5.43	5.65	5.72
PSSI.JK	M	38.41	15.13	13.01	17.64	38.41	54.84	21.61	18.58	25.18	54.84	31.54	12.43	10.68	14.48	31.54	39.55	15.58	13.40	18.16	39.55
SHIP.JK	A	3.62	3.93	5.12	6.14	4.52	5.21	5.66	7.37	8.83	6.51	3.27	3.55	4.65	5.56	4.10	4.11	4.46	5.83	6.97	5.14
SHIP.JK	M	10.16	8.72	18.53	10.19	18.53	14.63	12.54	26.66	14.66	26.66	8.79	7.51	15.44	9.05	15.44	11.02	9.41	19.36	11.35	19.36
SMDR.JK	A	4.38	5.86	6.28	6.13	5.42	6.45	8.63	9.25	9.02	7.98	4.18	5.65	6.07	5.91	5.21	5.24	7.08	7.62	7.41	6.53
SMDR.JK	M	12.18	10.82	12.03	12.59	12.59	17.93	15.93	17.72	18.54	18.54	9.99	9.18	10.14	10.78	10.78	12.53	11.51	12.71	13.52	13.52
SOCI.JK	A	5.99	8.19	6.12	4.14	6.03	8.65	11.85	8.84	5.98	8.72	5.00	6.87	5.06	3.46	5.03	6.27	8.62	6.34	4.34	6.31
SOCI.JK	M	15.71	22.35	12.47	8.22	22.35	22.72	32.32	18.03	11.88	32.32	14.35	20.63	10.79	7.40	20.63	18.00	25.87	13.53	9.29	25.87
TMAS.JK	A	6.87	7.82	11.42	8.48	8.29	10.06	11.45	16.72	12.42	12.15	5.84	6.57	9.43	7.10	6.96	7.32	8.24	11.83	8.90	8.73
TMAS.JK	M	18.16	18.23	25.48	15.96	25.48	26.60	26.71	37.33	23.38	37.33	15.09	15.08	21.15	13.21	21.15	18.93	18.91	26.52	16.57	26.52

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
TPMAJK	A	7.94	7.89	8.08	6.84	7.72	11.53	11.45	11.74	9.93	11.21	6.38	6.34	6.50	5.50	6.21	8.01	7.95	8.15	6.90	7.78
TPMAJK	M	22.03	21.12	22.53	12.44	22.53	31.99	30.66	32.71	18.06	32.71	17.71	16.97	18.11	10.00	18.11	22.21	21.28	22.71	12.54	22.71
GND.JO	A	5.40	6.29	4.74	5.31	5.43	7.70	8.97	6.76	7.56	7.74	4.57	5.38	3.98	4.48	4.60	5.74	6.75	4.99	5.62	5.76
GND.JO	M	10.41	11.92	6.53	7.57	11.92	14.84	16.98	9.31	10.78	16.98	8.80	10.01	5.50	6.37	10.01	11.04	12.55	6.90	7.99	12.55
2062.KL	A	5.37	5.70	6.23	5.47	5.63	7.88	8.36	9.14	8.03	8.26	4.36	4.63	5.06	4.44	4.57	5.47	5.81	6.35	5.57	5.74
2062.KL	M	10.36	9.72	17.67	9.53	17.67	15.20	14.26	25.91	13.98	25.91	8.65	8.06	14.93	7.91	14.93	10.85	10.11	18.72	9.92	18.72
3816.KL	A	2.82	3.21	2.71	2.50	2.81	4.03	4.59	3.87	3.58	4.01	2.32	2.65	2.22	2.04	2.30	2.91	3.33	2.78	2.56	2.89
3816.KL	M	14.76	10.06	5.70	5.61	14.76	21.10	14.39	8.16	8.02	21.10	11.31	7.96	4.48	4.32	11.31	14.18	9.98	5.62	5.42	14.18
5032.KL	A	2.83	3.34	2.66	2.88	2.91	4.17	4.92	3.92	4.24	4.29	2.23	2.68	2.09	2.27	2.30	2.79	3.36	2.62	2.85	2.88
5032.KL	M	6.23	13.79	5.36	5.65	13.79	9.18	20.32	7.90	8.33	20.32	4.60	9.90	3.90	4.29	9.90	5.77	12.41	4.89	5.39	12.41
5077.KL	A	6.20	7.63	6.54	6.16	6.54	9.05	11.15	9.55	9.00	9.56	4.92	6.17	5.22	4.89	5.22	6.17	7.74	6.55	6.14	6.55
5077.KL	M	13.93	20.18	11.39	19.67	20.18	20.35	29.48	16.64	28.73	29.48	10.50	15.67	9.11	14.87	15.67	13.17	19.66	11.42	18.64	19.66
5173.KL	A	7.50	10.43	8.44	7.91	8.36	11.23	15.61	12.63	11.84	12.52	5.70	8.11	6.54	6.04	6.42	7.15	10.17	8.20	7.57	8.06
5173.KL	M	14.83	30.50	17.69	17.94	30.50	22.21	45.66	26.49	26.87	45.66	11.05	21.90	13.84	13.21	21.90	13.86	27.46	17.36	16.57	27.46
5246.KL	A	3.49	4.75	3.54	3.41	3.73	5.01	6.82	5.08	4.90	5.36	2.84	3.87	2.88	2.78	3.04	3.56	4.85	3.61	3.48	3.81
5246.KL	M	6.95	24.54	8.43	7.29	24.54	9.98	35.26	12.12	10.47	35.26	5.66	19.99	6.87	5.93	19.99	7.09	25.07	8.62	7.44	25.07
5259.KL	A	7.13	7.70	9.34	16.56	9.76	10.40	11.24	13.63	24.15	14.24	6.20	6.70	8.11	14.39	8.48	7.77	8.40	10.17	18.04	10.64
5259.KL	M	13.76	17.01	15.57	45.24	45.24	20.07	24.82	22.72	66.00	66.00	11.57	14.00	13.20	37.20	37.20	14.50	17.56	16.55	46.64	46.64
6254.KL	A	27.24	32.91	29.46	26.11	28.57	51.89	62.68	56.13	49.74	54.42	14.07	18.75	15.77	13.51	15.22	17.64	23.51	19.77	16.95	19.09
6254.KL	M	72.80	196.84	121.83	64.36	196.84	138.68	374.98	232.07	122.60	374.98	19.73	39.44	24.86	17.54	39.44	24.74	49.46	31.18	21.99	49.46
7013.KL	A	10.19	12.24	11.91	7.33	10.31	14.61	17.55	17.08	10.51	14.78	8.29	9.98	9.69	5.88	8.38	10.40	12.52	12.16	7.37	10.51
7013.KL	M	18.35	23.18	18.72	17.05	23.18	26.31	33.23	26.83	24.44	33.23	15.24	19.45	15.64	14.22	19.45	19.11	24.40	19.61	17.83	24.40
8346.KL	A	10.49	14.97	11.05	11.56	11.74	15.36	21.92	16.17	16.93	17.18	8.19	12.86	8.85	9.30	9.50	10.27	16.12	11.10	11.67	11.91
8346.KL	M	20.06	43.11	19.42	31.24	43.11	29.36	63.10	28.43	45.72	63.10	16.59	36.00	16.13	26.23	36.00	20.81	45.14	20.23	32.89	45.14
003280.KS	A	12.19	12.04	13.25	12.20	12.37	18.30	18.08	19.89	18.31	18.57	9.69	9.55	10.29	9.69	9.78	12.15	11.98	12.90	12.15	12.26
003280.KS	M	25.19	27.58	101.49	21.69	101.49	37.81	41.40	152.33	32.55	152.33	25.94	27.67	110.07	21.29	110.07	32.53	34.70	138.03	26.70	138.03
005880.KS	A	6.11	7.91	6.17	6.24	6.51	9.45	12.23	9.55	9.66	10.07	4.66	5.80	4.69	4.73	4.91	5.84	7.27	5.88	5.94	6.16
005880.KS	M	13.70	24.90	10.63	11.57	24.90	21.19	38.52	16.44	17.90	38.52	9.77	17.45	7.62	8.26	17.45	12.25	21.88	9.55	10.36	21.88
009070.KS	A	6.47	6.89	8.45	6.05	6.85	9.30	9.91	12.15	8.70	9.86	5.26	5.61	6.87	4.92	5.58	6.60	7.03	8.62	6.17	6.99
009070.KS	M	17.07	25.15	41.53	13.19	41.53	24.55	36.17	59.72	18.96	59.72	13.89	20.46	33.79	10.73	33.79	17.42	25.66	42.37	13.45	42.37

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
011200.KS	A	5.61	6.80	6.50	5.83	6.07	7.86	9.52	9.10	8.16	8.51	4.72	5.72	5.47	4.90	5.11	5.92	7.17	6.86	6.15	6.41
011200.KS	M	14.50	14.25	12.62	8.53	14.50	20.31	19.97	17.69	11.95	20.31	12.20	11.99	10.62	7.18	12.20	15.30	15.04	13.32	9.00	15.30
028670.KS	A	5.18	6.59	5.94	5.96	5.79	7.48	9.51	8.58	8.60	8.36	4.19	5.33	4.81	4.82	4.68	5.26	6.69	6.03	6.04	5.87
028670.KS	M	7.71	25.60	10.11	11.68	25.60	11.14	36.97	14.60	16.87	36.97	6.24	20.72	8.18	9.46	20.72	7.83	25.98	10.26	11.86	25.98
044450.KS	A	3.00	3.54	3.23	3.08	3.17	4.21	4.96	4.54	4.32	4.45	2.52	2.97	2.72	2.58	2.66	3.16	3.73	3.41	3.24	3.34
044450.KS	M	5.96	10.51	7.98	5.39	10.51	8.36	14.74	11.19	7.56	14.74	5.01	8.83	6.70	4.53	8.83	6.28	11.07	8.40	5.68	11.07
086280.KS	A	4.24	5.92	4.50	3.96	4.57	5.90	8.23	6.25	5.52	6.35	3.60	5.03	3.82	3.37	3.88	4.52	6.30	4.79	4.22	4.86
086280.KS	M	7.29	9.99	9.03	4.93	9.99	10.15	13.90	12.56	6.86	13.90	6.20	8.48	7.67	4.19	8.48	7.77	10.64	9.62	5.25	10.64
GPH.L	A	5.94	9.18	6.89	7.21	7.05	8.55	13.22	9.92	10.39	10.15	5.04	7.73	5.83	6.11	5.97	6.32	9.69	7.31	7.67	7.48
GPH.L	M	13.01	32.88	17.62	22.87	32.88	18.74	47.37	25.39	32.95	47.37	10.22	25.70	13.69	17.76	25.70	12.81	32.24	17.16	22.27	32.24
MPL.L	A	5.16	6.27	5.62	4.69	5.37	8.04	9.78	8.75	7.31	8.36	6.87	8.58	7.82	6.12	7.23	8.62	10.76	9.80	7.67	9.07
MPL.L	M	32.39	21.85	64.37	11.34	64.37	50.46	34.05	100.28	17.67	100.28	34.24	23.75	67.11	12.19	67.11	42.93	29.78	84.16	15.28	84.16
OCN.L	A	2.92	3.18	2.70	3.45	3.05	4.28	4.65	3.95	5.04	4.45	2.38	2.55	2.22	2.73	2.46	2.98	3.20	2.78	3.43	3.08
OCN.L	M	8.57	6.81	4.68	6.38	8.57	12.54	9.96	6.84	9.33	12.54	6.02	4.98	3.45	4.57	6.02	7.55	6.24	4.33	5.73	7.55
FESH.ME	A	5.56	5.89	5.33	6.78	5.84	8.22	8.71	7.88	10.02	8.64	4.62	4.89	4.42	5.64	4.85	5.80	6.13	5.55	7.08	6.09
FESH.ME	M	23.34	15.51	12.04	43.06	43.06	34.51	22.93	17.80	63.67	63.67	17.41	11.84	9.06	32.81	32.81	21.83	14.84	11.36	41.15	41.15
CPLP	A	4.67	6.94	5.19	5.23	5.35	6.98	10.37	7.75	7.81	7.99	3.63	5.39	4.03	4.06	4.16	4.55	6.76	5.06	5.09	5.21
CPLP	M	38.44	25.96	9.36	13.80	38.44	57.42	38.78	13.98	20.61	57.42	29.86	20.17	7.27	10.72	29.86	37.45	25.29	9.12	13.44	37.45
ESEA	A	11.37	13.56	13.23	8.52	11.54	16.76	19.99	19.51	12.56	17.02	8.68	10.33	10.08	6.52	8.80	10.88	12.95	12.64	8.18	11.04
ESEA	M	45.00	28.18	26.61	12.25	45.00	66.34	41.54	39.23	18.06	66.34	33.82	21.22	20.06	9.30	33.82	42.41	26.61	25.16	11.66	42.41
GASS	A	4.86	6.61	5.66	7.04	5.85	6.73	9.16	7.84	9.75	8.11	4.17	5.73	4.88	6.13	5.06	5.23	7.19	6.13	7.69	6.34
GASS	M	9.98	16.73	15.90	18.81	18.81	13.82	23.17	22.02	26.06	26.06	9.13	15.39	14.78	17.32	17.32	11.45	19.30	18.54	21.72	21.72
GLBS	A	12.67	16.17	10.97	10.35	12.52	18.33	23.39	15.87	14.97	18.10	9.96	13.10	8.43	7.85	9.82	12.49	16.43	10.57	9.85	12.31
GLBS	M	64.16	51.08	29.61	24.01	64.16	92.80	73.89	42.83	34.72	92.80	56.74	44.70	25.91	20.77	56.74	71.15	56.06	32.49	26.04	71.15
GLNG	A	6.62	11.61	6.89	6.85	7.72	9.58	16.80	9.97	9.91	11.17	5.34	9.37	5.56	5.53	6.23	6.70	11.75	6.98	6.94	7.81
GLNG	M	26.95	38.28	10.59	12.13	38.28	39.00	55.39	15.32	17.55	55.39	21.76	30.90	8.55	9.79	30.90	27.28	38.75	10.72	12.28	38.75
PSHG	A	14.30	18.12	13.47	19.65	16.08	21.45	27.17	20.20	29.47	24.12	11.15	13.57	10.41	15.34	12.41	13.98	17.02	13.05	19.24	15.57
PSHG	M	33.19	218.66	17.82	98.13	218.66	49.79	327.95	26.73	147.17	327.95	42.87	302.46	19.35	134.25	302.46	53.77	379.30	24.27	168.35	379.30
PXS	A	12.76	11.05	13.02	11.65	12.22	19.41	16.80	19.80	17.72	18.59	9.66	8.52	9.80	8.89	9.29	12.12	10.68	12.29	11.15	11.65
PXS	M	62.57	38.85	69.68	51.83	69.68	95.15	59.08	105.98	78.83	105.98	52.68	35.38	68.43	50.99	68.43	66.06	44.37	85.81	63.94	85.81

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
SBLK	A	5.81	7.33	7.43	6.93	6.68	7.85	9.91	10.05	9.37	9.03	5.17	6.52	6.59	6.14	5.94	6.48	8.17	8.27	7.70	7.44
SBLK	M	8.46	10.46	9.94	9.00	10.46	11.43	14.13	13.43	12.17	14.13	7.75	9.56	9.20	8.22	9.56	9.72	11.99	11.54	10.31	11.99
SHIP	A	11.34	16.89	12.16	10.33	12.39	16.88	25.13	18.09	15.37	18.43	8.85	13.18	9.49	8.06	9.67	11.10	16.53	11.90	10.11	12.12
SHIP	M	65.21	83.74	36.61	16.31	83.74	97.03	124.61	54.48	24.26	124.61	50.89	65.35	28.57	12.72	65.35	63.81	81.95	35.83	15.96	81.95
TOPS	A	16.79	20.46	14.76	18.97	17.61	24.93	30.38	21.92	28.16	26.14	13.52	16.88	11.80	15.50	14.29	16.95	21.17	14.80	19.44	17.92
TOPS	M	79.96	121.68	38.16	73.34	121.68	118.71	180.65	56.66	108.87	180.65	101.40	134.94	45.44	88.45	134.94	127.16	169.22	56.98	110.92	169.22
ADANIPORTS.NS	A	5.62	6.10	6.03	6.25	5.94	9.07	9.85	9.75	10.09	9.59	3.68	4.16	4.12	4.31	4.00	4.62	5.22	5.16	5.40	5.02
ADANIPORTS.NS	M	14.00	21.12	12.70	22.86	22.86	22.61	34.12	20.52	36.93	36.93	9.86	15.43	9.21	16.99	16.99	12.37	19.35	11.55	21.30	21.30
ALLCARGO.NS	A	4.92	5.80	5.62	5.62	5.39	7.05	8.31	8.05	8.04	7.72	4.06	4.73	4.61	4.59	4.42	5.09	5.94	5.78	5.76	5.55
ALLCARGO.NS	M	7.60	14.80	12.95	9.34	14.80	10.88	21.19	18.54	13.38	21.19	6.90	13.19	11.84	8.11	13.19	8.65	16.53	14.85	10.17	16.53
ESSARSHPNG.NS	A	6.47	7.00	6.95	6.57	6.70	9.35	10.12	10.04	9.50	9.67	5.04	5.47	5.41	5.12	5.22	6.32	6.86	6.79	6.42	6.54
ESSARSHPNG.NS	M	20.91	21.57	20.56	20.81	21.57	30.21	31.16	29.71	30.06	31.16	18.21	18.45	17.94	18.11	18.45	22.84	23.14	22.49	22.72	23.14
GESHIP.NS	A	5.22	5.98	5.40	5.50	5.47	7.82	8.97	8.10	8.25	8.21	3.91	4.50	4.05	4.13	4.10	4.90	5.64	5.08	5.18	5.15
GESHIP.NS	M	9.58	16.36	14.47	10.46	16.36	14.37	24.55	21.70	15.69	24.55	7.37	12.64	11.18	8.05	12.64	9.24	15.85	14.02	10.10	15.85
GPPL.NS	A	4.37	4.73	4.40	4.43	4.46	6.18	6.69	6.23	6.27	6.31	3.63	3.93	3.66	3.68	3.71	4.55	4.93	4.59	4.61	4.65
GPPL.NS	M	8.03	12.20	7.30	8.36	12.20	11.36	17.26	10.33	11.83	17.26	6.67	10.14	6.07	6.95	10.14	8.37	12.72	7.61	8.71	12.72
NAVKARCORP.NS	A	8.16	9.05	7.49	8.56	8.30	12.15	13.47	11.16	12.75	12.35	6.22	6.85	5.75	6.52	6.32	7.80	8.59	7.20	8.17	7.93
NAVKARCORP.NS	M	22.73	23.69	17.94	21.66	23.69	33.85	35.28	26.71	32.26	35.28	17.28	18.20	13.82	16.59	18.20	21.66	22.82	17.33	20.81	22.82
SCI.NS	A	5.65	6.55	5.71	5.52	5.81	8.05	9.32	8.13	7.86	8.28	4.76	5.58	4.82	4.65	4.92	5.97	6.99	6.05	5.83	6.16
SCI.NS	M	13.33	18.15	16.41	14.59	18.15	18.99	25.85	23.37	20.79	25.85	10.66	14.36	12.85	11.54	14.36	13.36	18.01	16.11	14.47	18.01
SHREYAS.NS	A	6.43	7.16	7.84	6.53	6.88	9.04	10.06	11.03	9.18	9.67	5.29	6.11	6.83	5.41	5.79	6.64	7.67	8.57	6.78	7.26
SHREYAS.NS	M	12.07	10.43	15.66	12.83	15.66	16.97	14.66	22.02	18.04	22.02	11.26	9.59	14.93	12.07	14.93	14.12	12.03	18.72	15.14	18.72
ASC	A	5.66	8.56	6.83	6.74	6.71	7.59	11.49	9.16	9.04	9.00	5.06	7.65	6.11	6.03	6.00	6.35	9.60	7.66	7.56	7.52
ASC	M	8.03	15.42	8.70	10.64	15.42	10.78	20.68	11.68	14.28	20.68	7.18	13.78	7.78	9.51	13.78	9.01	17.29	9.76	11.93	17.29
CCL	A	4.11	12.58	6.58	9.01	7.38	5.91	18.09	9.46	12.96	10.60	3.29	10.89	5.52	7.67	6.22	4.13	13.66	6.92	9.62	7.80
CCL	M	9.33	42.51	12.24	24.54	42.51	13.41	61.12	17.60	35.29	61.12	6.67	33.03	9.44	17.32	33.03	8.37	41.42	11.84	21.72	41.42
CMRE	A	4.68	7.91	5.41	5.40	5.63	6.56	11.10	7.59	7.58	7.90	3.93	6.64	4.54	4.53	4.72	4.93	8.33	5.69	5.68	5.92
CMRE	M	6.82	15.03	6.80	7.60	15.03	9.57	21.09	9.54	10.66	21.09	5.73	12.62	5.71	6.38	12.62	7.18	15.83	7.16	8.00	15.83
DAC	A	9.57	11.16	8.21	6.88	9.02	13.70	15.98	11.75	9.86	12.92	7.95	9.34	6.87	5.71	7.51	9.97	11.71	8.61	7.16	9.42
DAC	M	18.50	19.36	11.58	9.38	19.36	26.50	27.72	16.59	13.43	27.72	14.21	15.37	9.55	7.49	15.37	17.82	19.28	11.98	9.39	19.28

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
DHT	A	4.80	6.00	4.76	5.30	5.14	6.47	8.08	6.41	7.14	6.93	4.32	5.37	4.28	4.76	4.62	5.41	6.74	5.36	5.96	5.79
DHT	M	8.44	13.74	6.82	9.09	13.74	11.37	18.51	9.19	12.24	18.51	7.41	12.02	6.03	7.89	12.02	9.30	15.07	7.56	9.90	15.07
DLNG	A	7.30	9.48	6.07	8.14	7.68	10.58	13.74	8.80	11.79	11.12	6.14	8.11	5.05	6.95	6.49	7.69	10.17	6.33	8.71	8.14
DLNG	M	21.89	20.03	11.38	15.97	21.89	31.71	29.02	16.49	23.14	31.71	22.10	19.53	11.25	15.44	22.10	27.71	24.49	14.11	19.36	27.71
DSX	A	5.47	7.42	7.81	7.01	6.66	7.55	10.24	10.78	9.68	9.20	4.69	6.36	6.70	6.02	5.72	5.88	7.98	8.40	7.54	7.17
DSX	M	7.24	15.75	12.66	8.90	15.75	10.00	21.76	17.49	12.29	21.76	6.21	13.51	10.86	7.64	13.51	7.79	16.95	13.62	9.58	16.95
EGLE	A	6.89	9.32	7.57	7.57	7.66	9.63	13.03	10.57	10.59	10.71	5.82	7.87	6.39	6.40	6.47	7.29	9.87	8.01	8.02	8.11
EGLE	M	14.01	23.43	12.51	12.24	23.43	19.59	32.75	17.49	17.11	32.75	11.83	19.78	10.56	10.34	19.78	14.84	24.81	13.25	12.96	24.81
FRO	A	6.62	8.01	6.29	7.40	7.01	9.33	11.29	8.86	10.43	9.87	5.50	6.78	5.17	6.23	5.85	6.89	8.51	6.49	7.82	7.34
FRO	M	11.54	16.70	8.91	14.18	16.70	16.26	23.53	12.55	19.98	23.53	9.76	14.32	7.42	11.88	14.32	12.24	17.96	9.31	14.90	17.96
GLOG-PA	A	1.50	4.75	1.26	1.88	2.18	2.27	7.22	1.91	2.86	3.32	1.28	3.91	1.10	1.58	1.83	1.60	4.90	1.38	1.99	2.30
GLOG-PA	M	4.33	30.45	2.80	6.87	30.45	6.58	46.25	4.25	10.43	46.25	3.20	21.07	2.09	4.87	21.07	4.01	26.42	2.62	6.10	26.42
GNK	A	6.07	8.08	6.79	6.37	6.68	8.19	10.90	9.16	8.59	9.01	5.41	7.05	5.99	5.65	5.90	6.78	8.84	7.51	7.08	7.40
GNK	M	8.34	16.31	8.89	8.67	16.31	11.24	21.99	11.99	11.69	21.99	7.19	13.71	7.64	7.46	13.71	9.02	17.19	9.58	9.35	17.19
GSL	A	6.68	8.42	7.44	6.28	7.09	9.44	11.90	10.52	8.88	10.02	5.44	6.96	6.13	5.09	5.80	6.82	8.73	7.68	6.38	7.27
GSL	M	21.02	20.75	13.64	8.80	21.02	29.72	29.34	19.29	12.44	29.72	17.23	17.43	11.25	7.15	17.43	21.60	21.86	14.10	8.96	21.86
INSW	A	4.98	7.07	5.77	5.66	5.71	6.68	9.48	7.74	7.58	7.65	4.49	6.32	5.17	5.08	5.12	5.63	7.92	6.48	6.37	6.42
INSW	M	7.87	14.95	8.29	8.22	14.95	10.54	20.03	11.11	11.01	20.03	7.69	14.42	7.90	7.82	14.42	9.64	18.08	9.91	9.81	18.08
KEX	A	4.20	6.33	4.41	4.63	4.76	5.94	8.95	6.24	6.55	6.73	3.55	5.12	3.70	3.87	3.96	4.45	6.43	4.64	4.86	4.97
KEX	M	7.85	19.36	6.19	6.99	19.36	11.10	27.38	8.76	9.89	27.38	7.15	17.71	5.69	6.27	17.71	8.97	22.20	7.14	7.87	22.20
KNOP	A	3.11	6.30	4.27	6.30	4.68	4.64	9.39	6.36	9.38	6.98	2.23	5.26	3.31	5.35	3.74	2.80	6.60	4.16	6.70	4.69
KNOP	M	5.13	19.85	12.83	27.97	27.97	7.65	29.57	19.12	41.67	41.67	3.56	13.44	8.12	17.75	17.75	4.46	16.85	10.18	22.26	22.26
LPG	A	5.77	7.24	5.87	6.25	6.19	8.20	10.29	8.34	8.88	8.80	4.77	5.98	4.84	5.16	5.11	5.98	7.50	6.08	6.47	6.41
LPG	M	12.68	20.61	8.59	11.46	20.61	18.03	29.29	12.21	16.28	29.29	10.48	17.02	7.09	9.46	17.02	13.14	21.35	8.90	11.86	21.35
MATX	A	4.92	7.13	5.03	5.99	5.62	7.19	10.41	7.35	8.75	8.21	3.90	5.65	3.98	4.74	4.45	4.90	7.09	4.99	5.94	5.59
MATX	M	10.33	14.59	6.64	8.69	14.59	15.08	21.30	9.69	12.68	21.30	8.00	11.18	5.18	6.71	11.18	10.03	14.02	6.50	8.42	14.02
NAT	A	7.55	8.78	7.32	8.59	7.98	10.43	12.13	10.11	11.86	11.02	6.47	7.65	6.24	7.49	6.89	8.11	9.60	7.82	9.39	8.64
NAT	M	17.25	22.67	13.27	17.88	22.67	23.83	31.32	18.33	24.70	31.32	16.43	21.59	12.48	17.20	21.59	20.60	27.07	15.65	21.57	27.07
NCLH	A	3.98	12.63	6.66	8.29	7.19	5.48	17.39	9.17	11.41	9.90	3.43	10.88	5.74	7.14	6.19	4.30	13.64	7.20	8.95	7.77
NCLH	M	7.98	49.03	13.67	19.68	49.03	10.99	67.53	18.83	27.10	67.53	6.87	42.24	11.78	16.95	42.24	8.62	52.97	14.77	21.26	52.97

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
NM	A	10.99	10.24	13.58	8.87	10.88	15.39	14.35	19.02	12.42	15.24	9.56	8.91	11.94	7.64	9.48	11.99	11.17	14.97	9.58	11.88
NM	M	23.11	21.12	27.04	16.86	27.04	32.36	29.59	37.88	23.61	37.88	21.42	19.25	24.85	15.69	24.85	26.87	24.14	31.16	19.67	31.16
NMM	A	6.33	8.91	8.24	6.37	7.23	8.82	12.40	11.47	8.86	10.07	5.38	7.56	7.00	5.41	6.14	6.75	9.48	8.77	6.78	7.70
NMM	M	12.62	17.28	11.77	9.23	17.28	17.56	24.05	16.38	12.85	24.05	10.71	14.67	9.99	7.84	14.67	13.43	18.40	12.53	9.83	18.40
NVGS	A	4.48	8.73	5.60	5.69	5.82	6.27	12.23	7.83	7.97	8.14	3.83	7.48	4.79	4.87	4.98	4.80	9.38	6.00	6.11	6.24
NVGS	M	7.98	23.53	9.52	9.24	23.53	11.17	32.94	13.33	12.93	32.94	6.76	19.95	8.07	7.84	19.95	8.48	25.01	10.12	9.83	25.01
OSG	A	7.70	8.21	7.52	7.06	7.62	11.39	12.13	11.12	10.43	11.27	6.08	6.47	5.94	5.58	6.02	7.62	8.11	7.44	6.99	7.54
OSG	M	17.38	18.94	16.18	9.20	18.94	25.69	27.99	23.91	13.60	27.99	13.68	14.87	12.73	7.26	14.87	17.15	18.65	15.96	9.10	18.65
RCL	A	4.16	10.45	5.63	7.11	6.36	5.88	14.79	7.96	10.07	9.00	3.78	9.54	5.12	6.48	5.79	4.73	11.97	6.43	8.12	7.26
RCL	M	7.09	31.01	10.17	13.85	31.01	10.04	43.89	14.39	19.61	43.89	6.26	26.52	8.96	11.96	26.52	7.84	33.25	11.23	15.00	33.25
SB	A	6.77	7.60	7.57	6.52	7.04	9.14	10.27	10.22	8.81	9.50	5.99	6.74	6.71	5.77	6.23	7.51	8.45	8.42	7.23	7.82
SB	M	10.00	20.04	11.80	8.59	20.04	13.50	27.06	15.94	11.60	27.06	8.86	17.81	10.49	7.62	17.81	11.11	22.33	13.16	9.55	22.33
SFL	A	3.07	6.43	4.43	4.00	4.22	4.47	9.34	6.44	5.81	6.13	2.65	5.37	3.75	3.39	3.57	3.32	6.73	4.70	4.26	4.48
SFL	M	6.55	26.90	7.50	7.60	26.90	9.51	39.09	10.90	11.04	39.09	5.82	24.57	6.90	6.97	24.57	7.30	30.81	8.65	8.74	30.81
STNG	A	6.41	9.02	7.15	6.54	7.10	8.59	12.08	9.58	8.76	9.52	5.78	7.78	6.33	5.87	6.31	7.25	9.76	7.94	7.36	7.91
STNG	M	8.77	17.95	9.48	9.62	17.95	11.75	24.05	12.70	12.89	24.05	7.99	15.90	8.43	8.59	15.90	10.02	19.94	10.57	10.77	19.94
TDW	A	5.86	9.70	6.57	7.40	7.11	8.15	13.48	9.13	10.29	9.88	4.99	8.25	5.59	6.30	6.05	6.26	10.35	7.01	7.90	7.59
TDW	M	9.37	15.64	9.58	10.16	15.64	13.01	21.73	13.31	14.11	21.73	7.97	13.31	8.15	8.64	13.31	10.00	16.69	10.22	10.84	16.69
TK	A	6.79	9.45	6.55	5.54	7.00	9.36	13.02	9.02	7.62	9.63	5.83	7.95	5.61	4.86	5.99	7.31	9.97	7.03	6.09	7.51
TK	M	13.29	24.39	10.36	7.00	24.39	18.30	33.60	14.26	9.64	33.60	12.16	22.41	9.12	6.27	22.41	15.25	28.10	11.43	7.86	28.10
TNK	A	6.43	8.79	6.14	6.79	6.92	8.71	11.90	8.31	9.19	9.37	5.74	7.85	5.48	6.06	6.18	7.20	9.85	6.88	7.60	7.75
TNK	M	10.17	17.81	8.26	9.02	17.81	13.78	24.12	11.19	12.21	24.12	9.02	15.84	7.35	8.01	15.84	11.32	19.86	9.22	10.05	19.86
TNP	A	4.94	8.92	5.69	7.51	6.45	6.85	12.36	7.88	10.40	8.94	4.22	7.62	4.86	6.42	5.51	5.29	9.56	6.09	8.05	6.91
TNP	M	8.00	22.83	9.32	13.47	22.83	11.09	31.63	12.91	18.66	31.63	6.84	19.51	7.96	11.51	19.51	8.58	24.46	9.98	14.43	24.46
MMH.NZ	A	1.56	2.39	2.02	1.80	1.87	2.26	3.46	2.93	2.61	2.71	1.26	1.93	1.63	1.45	1.51	1.58	2.41	2.05	1.82	1.89
MMH.NZ	M	5.94	5.19	3.42	4.23	5.94	8.61	7.52	4.96	6.13	8.61	4.79	4.19	2.76	3.41	4.79	6.01	5.25	3.46	4.28	6.01
POT.NZ	A	2.33	3.26	2.67	2.55	2.63	3.23	4.52	3.70	3.54	3.65	2.01	2.81	2.31	2.21	2.27	2.52	3.53	2.89	2.77	2.85
POT.NZ	M	4.17	13.28	4.03	4.65	13.28	5.79	18.42	5.58	6.45	18.42	3.66	11.69	3.52	4.09	11.69	4.58	14.66	4.42	5.13	14.66
SPN.NZ	A	2.23	2.58	2.35	2.38	2.36	3.20	3.70	3.38	3.43	3.39	1.76	2.13	1.90	1.93	1.90	2.20	2.67	2.38	2.42	2.38
SPN.NZ	M	4.37	5.65	3.78	4.14	5.65	6.28	8.12	5.44	5.95	8.12	4.10	5.35	3.48	3.86	5.35	5.14	6.71	4.37	4.84	6.71

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
QGTS.QA	A	2.94	3.41	2.38	3.12	2.96	4.24	4.92	3.43	4.50	4.27	2.38	2.77	1.93	2.53	2.40	2.99	3.47	2.42	3.17	3.01
QGTS.QA	M	7.61	12.08	5.12	7.16	12.08	10.98	17.42	7.38	10.32	17.42	6.17	9.79	4.15	5.80	9.79	7.74	12.28	5.20	7.28	12.28
QNNS.QA	A	3.26	3.09	2.32	3.43	3.08	4.64	4.40	3.30	4.87	4.38	2.75	2.62	2.00	2.88	2.61	3.45	3.29	2.50	3.61	3.27
QNNS.QA	M	7.85	8.75	6.27	6.68	8.75	11.16	12.45	8.93	9.51	12.45	6.49	7.24	5.20	5.54	7.24	8.14	9.08	6.52	6.95	9.08
AMABK	A	5.49	6.44	5.26	5.03	5.53	8.02	9.41	7.68	7.34	8.08	4.44	5.20	4.26	4.07	4.47	5.57	6.52	5.35	5.10	5.61
AMABK	M	13.74	11.98	10.24	8.43	13.74	20.06	17.49	14.95	12.31	20.06	10.16	9.15	7.55	6.40	10.16	12.75	11.48	9.47	8.03	12.75
BIOTEC.BK	A	10.78	12.71	11.84	11.08	11.44	16.36	19.28	17.96	16.82	17.36	9.45	11.04	10.46	9.70	10.02	11.84	13.84	13.12	12.16	12.56
BIOTEC.BK	M	33.86	33.11	94.16	26.44	94.16	51.39	50.24	142.88	40.12	142.88	25.14	27.09	67.35	20.36	67.35	31.52	33.97	84.45	25.53	84.45
NYT.BK	A	2.68	4.39	4.29	3.10	3.43	3.85	6.31	6.17	4.45	4.93	2.32	3.66	3.59	2.64	2.91	2.91	4.58	4.50	3.31	3.64
NYT.BK	M	4.74	12.77	8.17	5.27	12.77	6.81	18.35	11.73	7.57	18.35	3.67	9.30	6.28	4.13	9.30	4.61	11.66	7.87	5.18	11.66
PORT.BK	A	4.79	7.40	4.08	4.10	5.01	6.72	10.39	5.72	5.76	7.04	4.02	6.21	3.42	3.44	4.21	5.04	7.79	4.29	4.32	5.28
PORT.BK	M	13.64	12.39	7.70	8.67	13.64	19.14	17.39	10.81	12.17	19.14	11.44	10.40	6.46	7.27	11.44	14.35	13.04	8.10	9.12	14.35
PSL.BK	A	5.53	8.14	7.27	5.62	6.41	7.47	10.99	9.81	7.58	8.65	4.90	7.21	6.44	4.98	5.68	6.15	9.05	8.08	6.24	7.12
PSL.BK	M	7.61	13.69	10.66	8.39	13.69	10.28	18.48	14.39	11.33	18.48	6.74	12.13	9.44	7.44	12.13	8.46	15.21	11.84	9.33	15.21
RCL.BK	A	4.41	7.33	7.40	5.62	5.85	6.25	10.38	10.49	7.97	8.29	3.66	6.08	6.14	4.66	4.85	4.59	7.62	7.70	5.85	6.08
RCL.BK	M	7.62	12.36	10.73	7.68	12.36	10.79	17.51	15.19	10.88	17.51	6.32	10.25	8.90	6.37	10.25	7.92	12.85	11.15	7.99	12.85
RP.BK	A	4.54	6.97	6.19	5.43	5.55	6.60	10.13	9.00	7.90	8.06	3.71	6.13	5.37	4.61	4.71	4.65	7.68	6.73	5.78	5.91
RP.BK	M	13.74	20.66	15.86	17.76	20.66	19.97	30.03	23.06	25.81	30.03	12.87	19.43	14.89	16.67	19.43	16.14	24.36	18.68	20.90	24.36
TSTE.BK	A	2.43	3.20	2.22	2.17	2.48	3.65	4.82	3.34	3.27	3.74	3.08	4.49	2.66	2.48	3.14	3.86	5.64	3.34	3.11	3.94
TSTE.BK	M	7.27	8.89	3.94	3.96	8.89	10.94	13.38	5.93	5.96	13.38	7.26	8.66	3.91	4.10	8.66	9.11	10.85	4.91	5.14	10.85
TTABK	A	3.98	6.72	7.39	4.53	5.32	5.61	9.48	10.41	6.38	7.50	3.32	5.61	6.17	3.78	4.44	4.17	7.04	7.73	4.74	5.57
TTABK	M	7.89	14.70	18.66	12.20	18.66	11.13	20.71	26.31	17.20	26.31	6.59	12.27	15.58	10.18	15.58	8.27	15.38	19.54	12.77	19.54
5LY.SI	A	7.72	9.90	8.62	6.79	8.13	10.64	13.63	11.87	9.36	11.20	6.68	8.64	7.44	5.82	7.03	8.38	10.83	9.34	7.30	8.82
5LY.SI	M	11.12	14.53	16.47	10.73	16.47	15.32	20.01	22.68	14.78	22.68	10.00	13.27	15.47	9.97	15.47	12.54	16.65	19.40	12.50	19.40
D8DU.SI	A	5.83	11.35	5.91	5.93	6.96	8.68	16.89	8.80	8.83	10.37	4.55	8.85	4.61	4.63	5.43	5.70	11.10	5.78	5.80	6.81
D8DU.SI	M	27.21	40.10	18.72	16.93	40.10	40.51	59.71	27.87	25.21	59.71	21.22	31.27	14.60	13.20	31.27	26.61	39.22	18.30	16.56	39.22
F83.SI	A	5.25	5.91	4.95	4.52	5.16	7.99	8.99	7.53	6.88	7.85	3.97	4.25	3.85	3.73	3.95	4.98	5.33	4.83	4.67	4.95
F83.SI	M	9.78	12.85	10.70	6.56	12.85	14.87	19.54	16.27	9.98	19.54	6.58	8.60	7.31	4.72	8.60	8.25	10.78	9.16	5.92	10.78
S19.SI	A	2.81	5.01	3.61	3.73	3.61	4.05	7.23	5.20	5.37	5.20	2.28	4.35	3.05	3.13	3.03	2.86	5.45	3.82	3.93	3.80
S19.SI	M	6.71	13.45	6.31	7.46	13.45	9.68	19.39	9.11	10.77	19.39	5.27	10.52	5.05	6.01	10.52	6.61	13.19	6.33	7.53	13.19

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
S56.SI	A	6.76	6.83	6.52	6.88	6.75	9.75	9.84	9.40	9.92	9.73	5.49	5.54	5.29	5.58	5.48	6.88	6.95	6.64	7.00	6.87
S56.SI	M	15.59	10.93	9.78	15.62	15.62	22.47	15.75	14.10	22.52	22.52	12.65	8.87	7.93	12.67	12.67	15.86	11.12	9.95	15.89	15.89
600017.SS	A	3.30	3.38	2.91	3.55	3.29	4.78	4.88	4.21	5.14	4.76	2.67	2.73	2.35	2.87	2.66	3.35	3.42	2.95	3.60	3.34
600017.SS	M	7.42	7.37	4.26	7.10	7.42	10.73	10.66	6.16	10.26	10.73	6.00	5.96	3.44	5.73	6.00	7.52	7.47	4.32	7.19	7.52
600018.SS	A	4.24	3.69	4.16	3.63	3.98	6.15	5.36	6.03	5.27	5.77	3.37	2.92	3.33	2.85	3.16	4.23	3.67	4.18	3.58	3.96
600018.SS	M	9.01	5.87	6.37	6.04	9.01	13.07	8.53	9.24	8.76	13.07	7.96	5.21	5.70	5.19	7.96	9.99	6.53	7.14	6.51	9.99
600026.SS	A	5.15	5.80	4.99	7.80	5.83	7.12	8.02	6.90	10.79	8.07	4.41	4.96	4.27	6.67	4.99	5.53	6.22	5.35	8.37	6.26
600026.SS	M	9.19	9.20	7.71	10.19	10.19	12.71	12.73	10.66	14.11	14.11	7.86	7.87	6.59	8.72	8.72	9.86	9.87	8.27	10.94	10.94
600190.SS	A	4.79	4.82	3.98	5.93	4.89	7.14	7.19	5.94	8.85	7.29	3.72	3.75	3.10	4.61	3.80	4.67	4.70	3.88	5.79	4.77
600190.SS	M	19.68	9.77	5.12	14.05	19.68	29.36	14.57	7.64	20.97	29.36	15.31	7.60	3.99	10.93	15.31	19.20	9.53	5.00	13.71	19.20
600428.SS	A	4.16	4.77	6.40	6.22	5.19	5.85	6.70	8.99	8.74	7.28	3.55	4.07	5.47	5.31	4.43	4.46	5.11	6.86	6.66	5.55
600428.SS	M	7.87	11.48	12.38	13.16	13.16	11.05	16.12	17.38	18.48	18.48	6.67	9.73	10.49	11.17	11.17	8.37	12.21	13.16	14.01	14.01
600717.SS	A	3.04	2.86	2.75	3.17	2.98	4.52	4.26	4.09	4.72	4.43	2.31	2.18	2.08	2.42	2.26	2.90	2.73	2.61	3.03	2.84
600717.SS	M	8.31	8.91	8.05	6.83	8.91	12.37	13.25	11.97	10.16	13.25	7.40	8.04	7.26	6.03	8.04	9.28	10.09	9.11	7.56	10.09
600798.SS	A	3.72	4.49	5.27	4.71	4.40	5.34	6.45	7.58	6.77	6.32	3.24	3.97	4.69	4.16	3.88	4.06	4.98	5.88	5.22	4.86
600798.SS	M	7.95	13.62	11.37	13.15	13.62	11.42	19.56	16.33	18.88	19.56	7.40	12.64	10.31	12.31	12.64	9.28	15.85	12.93	15.43	15.85
601000.SS	A	3.83	3.59	3.66	3.77	3.74	5.75	5.39	5.49	5.65	5.60	2.90	2.72	2.77	2.85	2.83	3.64	3.41	3.47	3.58	3.55
601000.SS	M	8.96	8.96	7.82	8.98	8.98	13.45	13.45	11.72	13.47	13.47	8.30	8.38	7.27	8.26	8.38	10.41	10.50	9.12	10.35	10.50
601008.SS	A	4.75	4.76	3.79	5.14	4.65	6.75	6.77	5.39	7.31	6.61	3.91	3.93	3.12	4.24	3.83	4.91	4.92	3.92	5.32	4.81
601008.SS	M	19.42	14.74	5.81	11.21	19.42	27.62	20.97	8.26	15.94	27.62	16.09	12.21	4.80	9.29	16.09	20.18	15.31	6.02	11.64	20.18
601018.SS	A	3.48	3.81	3.16	3.02	3.38	5.08	5.56	4.61	4.41	4.93	2.84	3.12	2.57	2.45	2.75	3.56	3.91	3.22	3.07	3.45
601018.SS	M	16.50	12.10	9.18	7.97	16.50	24.07	17.66	13.39	11.62	24.07	13.41	9.89	7.44	6.52	13.41	16.82	12.41	9.34	8.17	16.82
601228.SS	A	3.58	3.39	2.75	3.47	3.35	5.18	4.91	3.99	5.03	4.86	2.94	2.78	2.24	2.85	2.75	3.69	3.49	2.80	3.58	3.45
601228.SS	M	10.42	9.90	8.51	9.45	10.42	15.09	14.35	12.34	13.69	15.09	9.01	8.57	7.30	8.14	9.01	11.30	10.75	9.15	10.20	11.30
601326.SS	A	4.28	3.56	3.16	3.54	3.75	6.42	5.34	4.74	5.31	5.63	3.11	2.68	2.42	2.66	2.79	3.90	3.36	3.03	3.34	3.49
601326.SS	M	9.19	7.18	6.09	5.97	9.19	13.81	10.79	9.15	8.97	13.81	9.09	7.92	5.03	5.90	9.09	11.40	9.93	6.31	7.40	11.40
601866.SS	A	3.79	4.85	5.67	4.02	4.43	5.45	6.97	8.14	5.77	6.36	3.09	3.96	4.62	3.27	3.61	3.88	4.96	5.80	4.11	4.52
601866.SS	M	9.91	11.99	10.36	7.06	11.99	14.23	17.21	14.87	10.14	17.21	8.08	9.77	8.44	5.76	9.77	10.13	12.25	10.59	7.22	12.25
601872.SS	A	4.56	5.52	4.77	6.12	5.14	6.25	7.56	6.54	8.39	7.04	3.96	4.79	4.14	5.31	4.46	4.96	6.01	5.20	6.66	5.59
601872.SS	M	9.03	8.72	6.54	8.40	9.03	12.37	11.95	8.97	11.51	12.37	7.83	7.57	5.68	7.29	7.83	9.83	9.49	7.12	9.14	9.83

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
601880.SS	A	3.16	3.29	2.70	2.65	2.98	4.65	4.84	3.98	3.90	4.39	2.57	2.67	2.21	2.17	2.43	3.22	3.35	2.78	2.73	3.05
601880.SS	M	10.36	13.29	10.12	10.29	13.29	15.23	19.54	14.89	15.12	19.54	8.24	10.55	8.05	8.17	10.55	10.33	13.24	10.10	10.25	13.24
601919.SS	A	4.85	5.78	8.11	5.17	5.75	6.89	8.22	11.53	7.35	8.18	3.96	4.70	6.56	4.22	4.68	4.97	5.89	8.23	5.29	5.87
601919.SS	M	7.02	9.95	11.08	8.45	11.08	9.98	14.15	15.76	12.02	15.76	5.63	7.95	8.84	6.70	8.84	7.07	9.97	11.08	8.40	11.08
603167.SS	A	3.67	5.54	3.97	3.56	4.08	5.15	7.77	5.56	5.00	5.72	3.09	4.66	3.34	3.00	3.43	3.87	5.85	4.19	3.76	4.30
603167.SS	M	8.55	14.87	11.95	9.33	14.87	11.98	20.85	16.75	13.07	20.85	7.19	12.51	10.05	7.84	12.51	9.02	15.69	12.60	9.84	15.69
000088.SZ	A	4.48	5.56	3.50	3.79	4.35	6.47	8.02	5.05	5.47	6.27	3.74	4.71	2.80	3.08	3.60	4.69	5.91	3.51	3.86	4.52
000088.SZ	M	13.98	14.85	5.78	9.74	14.85	20.16	21.42	8.34	14.05	21.42	9.75	11.57	4.48	6.95	11.57	12.23	14.51	5.61	8.72	14.51
000507.SZ	A	4.22	3.90	4.06	4.11	4.10	5.97	5.51	5.74	5.81	5.80	3.51	3.24	3.38	3.42	3.41	4.40	4.07	4.24	4.28	4.28
000507.SZ	M	10.23	10.09	9.49	9.71	10.23	14.47	14.27	13.42	13.73	14.47	8.51	8.39	7.90	8.08	8.51	10.67	10.53	9.90	10.13	10.67
000520.SZ	A	4.52	4.00	4.30	4.82	4.44	6.50	5.77	6.19	6.94	6.39	3.82	3.42	3.67	4.06	3.77	4.79	4.29	4.61	5.09	4.72
000520.SZ	M	11.49	12.18	13.21	13.98	13.98	16.54	17.53	19.02	20.13	20.13	11.84	12.33	13.04	13.21	13.21	14.85	15.46	16.35	16.56	16.56
000582.SZ	A	5.26	5.54	4.44	5.26	5.15	8.21	8.66	6.94	8.21	8.05	3.69	3.86	3.14	3.70	3.62	4.63	4.85	3.94	4.64	4.54
000582.SZ	M	9.62	7.77	7.69	14.38	14.38	15.03	12.14	12.01	22.47	22.47	6.33	5.15	5.09	9.43	9.43	7.93	6.46	6.38	11.82	11.82
000905.SZ	A	4.44	4.51	3.78	4.48	4.33	6.30	6.40	5.36	6.36	6.15	3.73	3.79	3.19	3.77	3.64	4.68	4.75	4.00	4.72	4.57
000905.SZ	M	13.36	10.37	9.07	13.20	13.36	18.96	14.72	12.88	18.74	18.96	10.93	8.44	7.38	10.79	10.93	13.71	10.59	9.25	13.53	13.71
001872.SZ	A	3.90	4.23	3.61	3.59	3.84	5.73	6.20	5.29	5.26	5.63	3.10	3.36	2.86	2.84	3.05	3.89	4.21	3.59	3.57	3.82
001872.SZ	M	13.52	10.30	9.27	8.44	13.52	19.82	15.10	13.59	12.38	19.82	10.30	7.88	7.02	6.40	10.30	12.92	9.88	8.81	8.02	12.92
002040.SZ	A	5.07	4.22	2.98	4.56	4.37	7.25	6.03	4.26	6.52	6.25	4.31	3.58	2.58	3.88	3.73	5.41	4.48	3.24	4.87	4.67
002040.SZ	M	11.36	8.10	6.12	8.65	11.36	16.24	11.58	8.75	12.37	16.24	9.01	6.37	5.09	6.86	9.01	11.29	7.99	6.38	8.61	11.29
002320.SZ	A	5.72	5.81	4.14	4.07	5.06	7.98	8.10	5.78	5.68	7.06	4.85	4.93	3.45	3.38	4.26	6.08	6.18	4.32	4.24	5.35
002320.SZ	M	13.13	11.18	7.51	9.54	13.13	18.31	15.60	10.47	13.30	18.31	11.41	9.72	6.48	8.26	11.41	14.31	12.18	8.13	10.36	14.31
002492.SZ	A	5.70	5.63	5.13	5.66	5.56	8.47	8.36	7.61	8.40	8.26	4.46	4.41	4.01	4.43	4.35	5.60	5.52	5.03	5.55	5.46
002492.SZ	M	27.75	12.71	10.05	10.91	27.75	41.19	18.87	14.91	16.20	41.19	21.71	9.95	7.86	8.54	21.71	27.23	12.48	9.86	10.71	27.23
4030.SR	A	2.91	3.42	1.78	3.28	2.87	4.17	4.90	2.56	4.70	4.11	2.41	2.82	1.51	2.71	2.38	3.02	3.54	1.90	3.40	2.98
4030.SR	M	8.01	9.02	2.95	6.24	9.02	11.50	12.95	4.23	8.95	12.95	6.55	7.38	2.44	5.11	7.38	8.22	9.25	3.06	6.40	9.25
5601.TWO	A	3.81	3.16	5.53	4.22	4.11	5.52	4.59	8.01	6.12	5.96	3.10	2.56	4.51	3.42	3.34	3.88	3.20	5.65	4.29	4.19
5601.TWO	M	10.30	6.18	13.28	9.45	13.28	14.92	8.96	19.24	13.69	19.24	7.78	4.58	10.19	7.03	10.19	9.76	5.74	12.77	8.82	12.77
9101.T	A	3.54	4.81	5.97	5.19	4.63	4.95	6.75	8.37	7.28	6.48	2.98	4.05	5.03	4.37	3.89	3.73	5.08	6.30	5.48	4.88
9101.T	M	4.39	8.80	8.93	8.85	8.93	6.15	12.33	12.51	12.40	12.51	3.70	7.41	7.52	7.45	7.52	4.63	9.29	9.42	9.34	9.42

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
9104.T	A	3.93	5.38	5.82	4.94	4.80	5.42	7.43	8.03	6.82	6.63	3.37	4.62	5.00	4.26	4.13	4.23	5.80	6.27	5.34	5.18
9104.T	M	5.37	9.14	8.48	7.43	9.14	7.41	12.62	11.70	10.26	12.62	4.55	7.61	7.16	6.17	7.61	5.71	9.54	8.97	7.74	9.54
9107.T	A	5.16	6.58	7.51	6.62	6.22	7.14	9.11	10.40	9.17	8.61	4.41	5.63	6.43	5.66	5.32	5.53	7.06	8.06	7.10	6.67
9107.T	M	8.05	10.84	11.66	10.72	11.66	11.14	15.00	16.15	14.84	16.15	6.88	9.27	9.98	9.17	9.98	8.63	11.63	12.51	11.50	12.51
9110.T	A	4.45	4.87	6.29	5.49	5.12	6.29	6.89	8.89	7.75	7.24	3.66	4.05	5.35	4.66	4.29	4.59	5.07	6.71	5.85	5.37
9110.T	M	6.57	7.73	10.46	8.53	10.46	9.28	10.93	14.79	12.05	14.79	5.27	6.11	8.58	6.74	8.58	6.60	7.67	10.77	8.46	10.77
9115.T	A	4.45	6.43	6.71	6.37	5.70	6.38	9.21	9.61	9.13	8.16	3.64	5.26	5.49	5.21	4.66	4.57	6.60	6.88	6.54	5.85
9115.T	M	9.90	21.39	17.81	15.05	21.39	14.18	30.62	25.49	21.55	30.62	8.10	17.50	14.57	12.32	17.50	10.16	21.94	18.27	15.44	21.94
9119.T	A	4.08	4.37	4.48	4.71	4.35	5.65	6.05	6.21	6.53	6.03	3.46	3.73	3.83	4.06	3.72	4.34	4.67	4.81	5.09	4.66
9119.T	M	7.56	7.74	9.67	13.52	13.52	10.47	10.73	13.40	18.73	18.73	6.30	6.59	8.25	11.44	11.44	7.91	8.26	10.34	14.35	14.35
9127.T	A	4.05	4.61	7.75	5.66	5.24	5.81	6.61	11.11	8.11	7.51	3.31	3.77	6.33	4.62	4.28	4.15	4.73	7.94	5.80	5.37
9127.T	M	14.79	20.29	34.73	18.39	34.73	21.19	29.09	49.78	26.36	49.78	12.08	16.58	28.37	15.03	28.37	15.15	20.79	35.58	18.84	35.58
9130.T	A	3.87	5.01	5.01	4.60	4.48	5.71	7.38	7.39	6.78	6.60	3.10	4.16	4.17	3.80	3.67	3.89	5.22	5.24	4.76	4.60
9130.T	M	17.96	15.29	19.07	14.30	19.07	26.48	22.54	28.10	21.07	28.10	11.77	10.64	12.93	9.52	12.93	14.76	13.35	16.22	11.94	16.22
9171.T	A	3.36	4.14	4.96	3.57	3.87	4.99	6.14	7.37	5.30	5.75	3.09	3.81	4.60	3.29	3.57	3.88	4.78	5.77	4.12	4.48
9171.T	M	18.36	18.45	23.18	9.19	23.18	27.27	27.40	34.43	13.65	34.43	15.24	15.51	20.26	7.79	20.26	19.11	19.45	25.40	9.77	25.40
9173.T	A	1.18	1.69	1.06	1.11	1.24	1.74	2.49	1.57	1.63	1.83	1.10	1.57	0.99	1.03	1.15	1.37	1.97	1.24	1.29	1.45
9173.T	M	5.06	5.83	3.12	6.79	6.79	7.47	8.60	4.61	10.01	10.01	4.38	4.98	2.63	5.71	5.71	5.49	6.24	3.30	7.16	7.16
9193.T	A	2.60	3.08	2.23	1.99	2.49	3.78	4.47	3.25	2.89	3.61	2.09	2.47	1.79	1.59	1.99	2.61	3.10	2.24	1.99	2.50
9193.T	M	5.57	7.74	3.71	3.38	7.74	8.09	11.25	5.40	4.91	11.25	4.59	6.38	3.04	2.75	6.38	5.76	8.00	3.82	3.45	8.00
9302.T	A	3.70	4.10	3.75	3.67	3.78	5.27	5.85	5.35	5.24	5.39	3.05	3.41	3.10	3.03	3.12	3.82	4.28	3.88	3.79	3.92
9302.T	M	7.78	10.47	7.37	10.37	10.47	11.09	14.93	10.51	14.78	14.93	6.67	9.02	6.32	8.92	9.02	8.36	11.31	7.92	11.19	11.31
9303.T	A	2.92	3.15	2.98	2.78	2.95	3.96	4.28	4.04	3.77	4.00	2.55	2.81	2.62	2.39	2.58	3.20	3.52	3.28	3.00	3.23
9303.T	M	7.76	8.60	7.07	5.78	8.60	10.53	11.67	9.60	7.84	11.67	7.68	8.54	6.98	5.64	8.54	9.63	10.70	8.75	7.08	10.70
9308.T	A	4.99	5.07	6.05	5.46	5.32	7.19	7.30	8.72	7.87	7.66	4.05	4.11	4.91	4.43	4.31	5.07	5.15	6.16	5.55	5.41
9308.T	M	11.10	11.16	14.19	14.41	14.41	16.00	16.08	20.46	20.77	20.77	9.01	9.05	11.51	11.69	11.69	11.29	11.35	14.44	14.66	14.66
9351.T	A	2.30	3.12	2.49	2.84	2.62	3.33	4.51	3.60	4.10	3.78	1.80	2.41	1.95	2.20	2.04	2.26	3.03	2.44	2.76	2.55
9351.T	M	6.43	9.80	8.37	6.37	9.80	9.29	14.15	12.09	9.20	14.15	4.65	7.02	5.95	4.54	7.02	5.83	8.80	7.46	5.69	8.80
9355.T	A	3.18	5.01	4.07	4.07	3.90	4.61	7.25	5.89	5.89	5.65	2.56	4.04	3.28	3.28	3.15	3.21	5.06	4.11	4.11	3.95
9355.T	M	8.64	10.96	6.78	7.54	10.96	12.51	15.87	9.82	10.92	15.87	6.97	8.84	5.46	6.08	8.84	8.73	11.08	6.85	7.62	11.08

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
9361.T	A	3.90	3.96	3.77	3.94	3.90	5.75	5.84	5.57	5.81	5.75	3.05	3.12	2.92	3.10	3.05	3.83	3.92	3.67	3.89	3.83
9361.T	M	22.22	11.57	8.18	17.62	22.22	32.78	17.08	12.07	25.99	32.78	18.69	9.85	6.98	14.74	18.69	23.44	12.35	8.75	18.48	23.44
9362.T	A	3.51	3.71	5.12	3.56	3.88	5.08	5.37	7.41	5.16	5.61	2.83	2.99	4.13	2.87	3.13	3.55	3.75	5.17	3.60	3.92
9362.T	M	22.30	13.27	29.10	8.56	29.10	32.29	19.22	42.14	12.40	42.14	17.99	10.71	23.47	6.91	23.47	22.56	13.43	29.43	8.66	29.43
ALC.TO	A	2.62	3.97	3.05	2.85	3.02	3.71	5.63	4.32	4.04	4.29	2.13	3.30	2.51	2.33	2.49	2.68	4.14	3.15	2.93	3.12
ALC.TO	M	5.68	14.03	6.03	11.10	14.03	8.06	19.89	8.56	15.74	19.89	4.74	11.85	5.05	9.30	11.85	5.94	14.86	6.34	11.66	14.86
LGT-ATO	A	2.74	3.13	2.81	2.69	2.82	4.09	4.66	4.19	4.01	4.21	2.14	2.44	2.19	2.10	2.20	2.68	3.06	2.75	2.63	2.76
LGT-ATO	M	9.97	15.06	11.54	8.62	15.06	14.86	22.44	17.19	12.84	22.44	7.76	11.73	8.99	6.71	11.73	9.74	14.71	11.27	8.42	14.71
WTE.TO	A	4.14	5.42	4.85	4.53	4.62	6.08	7.97	7.14	6.65	6.79	3.22	4.32	3.82	3.56	3.63	4.03	5.41	4.79	4.46	4.55
WTE.TO	M	10.38	12.08	17.01	7.20	17.01	15.26	17.76	25.01	10.58	25.01	8.72	10.17	14.57	6.00	14.57	10.93	12.75	18.27	7.53	18.27
2603.TW	A	3.63	5.54	9.06	6.19	5.65	5.18	7.90	12.93	8.84	8.07	3.07	4.68	7.67	5.25	4.78	3.85	5.86	9.62	6.58	6.00
2603.TW	M	6.26	12.33	15.09	15.29	15.29	8.94	17.60	21.55	21.83	21.83	5.21	10.34	12.65	12.69	12.69	6.53	12.97	15.86	15.91	15.91
2605.TW	A	3.40	4.93	7.75	5.38	5.01	4.81	6.97	10.96	7.61	7.07	2.79	4.10	6.47	4.48	4.15	3.50	5.15	8.12	5.62	5.21
2605.TW	M	7.11	9.81	14.82	9.10	14.82	10.05	13.86	20.93	12.86	20.93	6.05	8.38	12.66	7.83	12.66	7.59	10.51	15.87	9.82	15.87
2606.TW	A	3.25	3.87	6.86	4.93	4.46	4.53	5.39	9.56	6.87	6.21	2.64	3.20	5.81	4.16	3.71	3.31	4.02	7.29	5.21	4.66
2606.TW	M	5.46	8.48	14.73	8.33	14.73	7.61	11.82	20.52	11.60	20.52	5.00	8.03	13.30	7.78	13.30	6.27	10.07	16.68	9.75	16.68
2607.TW	A	2.34	3.37	6.89	4.88	4.01	3.34	4.83	9.86	6.98	5.73	1.96	2.83	5.85	4.14	3.38	2.45	3.55	7.33	5.19	4.24
2607.TW	M	7.49	10.89	17.26	13.49	17.26	10.71	15.57	24.67	19.29	24.67	5.98	8.85	14.28	10.98	14.28	7.50	11.10	17.91	13.77	17.91
2609.TW	A	3.73	6.48	9.79	5.60	5.89	5.27	9.17	13.86	7.93	8.34	2.93	5.10	7.67	4.39	4.62	3.67	6.39	9.61	5.50	5.79
2609.TW	M	8.26	14.11	15.60	11.40	15.60	11.69	19.97	22.07	16.13	22.07	6.69	11.27	12.39	9.19	12.39	8.39	14.13	15.54	11.53	15.54
2612.TW	A	3.50	4.71	8.48	5.78	5.23	5.25	7.07	12.70	8.66	7.84	2.60	3.49	6.26	4.27	3.87	3.26	4.38	7.85	5.36	4.85
2612.TW	M	9.86	14.50	18.37	14.27	18.37	14.78	21.73	27.53	21.39	27.53	7.30	10.72	13.57	10.55	13.57	9.15	13.44	17.02	13.23	17.02
2613.TW	A	2.41	4.38	7.37	5.91	4.56	3.52	6.39	10.74	8.61	6.65	1.89	3.60	6.30	5.02	3.80	2.38	4.52	7.91	6.29	4.76
2613.TW	M	6.24	11.27	17.86	16.02	17.86	9.10	16.43	26.03	23.35	26.03	4.26	7.64	12.87	11.15	12.87	5.34	9.58	16.14	13.98	16.14
2615.TW	A	2.92	5.52	9.31	6.17	5.42	4.13	7.80	13.16	8.71	7.66	2.43	4.60	7.75	5.13	4.51	3.05	5.77	9.72	6.44	5.66
2615.TW	M	7.55	12.73	16.88	12.55	16.88	10.67	17.99	23.85	17.73	23.85	6.29	10.60	14.06	10.45	14.06	7.88	13.29	17.63	13.10	17.63
2617.TW	A	3.63	3.98	7.76	4.64	4.74	5.16	5.66	11.02	6.60	6.73	2.89	3.19	6.30	3.74	3.81	3.62	4.00	7.90	4.69	4.78
2617.TW	M	8.09	7.19	15.87	7.99	15.87	11.49	10.22	22.55	11.35	22.55	6.97	6.10	13.40	6.77	13.40	8.74	7.65	16.80	8.49	16.80
2637.TW	A	2.08	3.19	7.26	5.27	4.03	2.93	4.48	10.19	7.40	5.66	1.86	2.76	6.19	4.51	3.48	2.33	3.46	7.77	5.65	4.36
2637.TW	M	6.49	12.82	17.17	11.72	17.17	9.11	18.00	24.10	16.46	24.10	4.79	9.10	13.63	8.60	13.63	6.01	11.41	17.09	10.78	17.09

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
5608.TW	A	3.56	5.88	9.60	5.87	5.72	5.07	8.38	13.67	8.36	8.16	2.93	4.84	7.90	4.83	4.71	3.67	6.07	9.91	6.06	5.91
5608.TW	M	9.16	13.09	16.16	8.86	16.16	13.05	18.65	23.03	12.63	23.03	7.54	10.78	13.31	7.30	13.31	9.46	13.51	16.69	9.15	16.69
8367.TW	A	4.06	4.29	6.84	4.34	4.72	5.85	6.19	9.86	6.25	6.80	3.36	3.54	5.33	3.52	3.82	4.21	4.44	6.69	4.42	4.79
8367.TW	M	12.67	9.98	12.40	8.74	12.67	18.26	14.39	17.86	12.60	18.26	11.08	8.77	10.77	8.03	11.08	13.90	11.00	13.50	10.07	13.90
EURN.BR	A	3.99	5.26	4.11	5.65	4.64	5.45	7.20	5.62	7.73	6.34	3.47	4.58	3.57	4.92	4.03	4.35	5.74	4.48	6.17	5.06
EURN.BR	M	5.96	10.87	5.08	10.20	10.87	8.15	14.86	6.94	13.95	14.86	5.19	9.45	4.42	8.87	9.45	6.50	11.86	5.54	11.13	11.86
EXM.BR	A	5.71	7.32	6.17	6.78	6.36	8.54	10.94	9.22	10.13	9.51	4.45	5.70	4.81	5.28	4.95	5.58	7.15	6.03	6.62	6.21
EXM.BR	M	6.62	12.37	6.95	9.26	12.37	9.89	18.49	10.39	13.83	18.49	5.16	9.63	5.41	7.21	9.63	6.47	12.08	6.79	9.04	12.08
DFDS.CO	A	3.95	4.63	3.96	4.55	4.22	5.54	6.49	5.55	6.38	5.92	3.32	3.89	3.33	3.82	3.55	4.17	4.88	4.17	4.79	4.45
DFDS.CO	M	9.34	10.67	7.09	6.74	10.67	13.09	14.96	9.94	9.45	14.96	7.85	8.97	5.96	5.66	8.97	9.84	11.24	7.47	7.10	11.24
DNORD.CO	A	4.76	4.92	5.49	7.19	5.49	6.77	7.00	7.80	10.23	7.80	3.97	4.11	4.58	6.00	4.58	4.98	5.15	5.75	7.52	5.74
DNORD.CO	M	7.50	9.13	7.49	11.84	11.84	10.66	12.98	10.65	16.83	16.83	6.36	7.71	6.35	10.04	10.04	7.97	9.67	7.96	12.59	12.59
MAERSK-ACO	A	4.31	4.98	4.40	5.04	4.63	5.97	6.89	6.08	6.98	6.40	3.78	4.29	3.84	4.28	4.01	4.74	5.38	4.82	5.37	5.02
MAERSK-ACO	M	7.48	10.49	6.21	17.61	17.61	10.34	14.51	8.59	24.36	24.36	4.76	6.87	4.42	8.90	8.90	5.97	8.62	5.54	11.16	11.16
TRMD-ACO	A	4.15	4.91	4.63	6.39	4.90	5.63	6.65	6.28	8.66	6.64	3.58	4.30	4.04	5.72	4.30	4.49	5.40	5.07	7.17	5.39
TRMD-ACO	M	5.65	8.58	6.69	10.20	10.20	7.65	11.63	9.07	13.82	13.82	5.01	7.76	6.00	9.26	9.26	6.28	9.73	7.52	11.61	11.61
IR5B.IR	A	3.58	5.25	4.00	4.15	4.12	4.96	7.27	5.54	5.75	5.71	3.06	4.47	3.41	3.55	3.52	3.84	5.61	4.28	4.45	4.42
IR5B.IR	M	6.13	27.33	7.05	8.03	27.33	8.49	37.86	9.76	11.12	37.86	5.44	24.21	6.19	7.07	24.21	6.82	30.36	7.76	8.86	30.36
VIK1V.HE	A	3.56	3.97	3.88	3.17	3.62	5.26	5.87	5.75	4.69	5.35	2.93	3.27	3.19	2.64	2.98	3.68	4.10	4.01	3.31	3.74
VIK1V.HE	M	6.13	6.38	11.03	5.14	11.03	9.07	9.43	16.31	7.60	16.31	4.88	5.06	8.53	4.31	8.53	6.12	6.35	10.70	5.40	10.70
EIM.IC	A	3.67	3.99	3.79	3.92	3.81	5.36	5.82	5.54	5.72	5.57	2.93	3.18	3.03	3.13	3.04	3.68	3.99	3.80	3.92	3.82
EIM.IC	M	7.62	6.44	6.47	5.78	7.62	11.12	9.41	9.44	8.44	11.12	6.08	5.15	5.17	4.61	6.08	7.63	6.45	6.48	5.79	7.63
DIS.MI	A	5.76	6.46	4.41	6.07	5.70	8.32	9.32	6.37	8.76	8.23	4.66	5.22	3.57	4.91	4.61	5.84	6.55	4.47	6.16	5.78
DIS.MI	M	13.37	12.33	7.13	8.14	13.37	19.31	17.81	10.30	11.76	19.31	10.81	9.98	5.77	6.59	10.81	13.56	12.51	7.24	8.26	13.56
AGAS.OL	A	6.29	7.97	5.66	6.62	6.57	8.71	11.04	7.83	9.17	9.10	5.38	6.82	4.83	5.66	5.62	6.74	8.55	6.06	7.10	7.04
AGAS.OL	M	10.34	15.84	8.75	8.79	15.84	14.33	21.93	12.12	12.18	21.93	8.84	13.54	7.48	7.51	13.54	11.09	16.97	9.38	9.42	16.97
AMSC.OL	A	3.62	4.56	3.49	3.78	3.82	5.15	6.49	4.97	5.38	5.43	2.98	3.76	2.88	3.12	3.15	3.74	4.72	3.61	3.91	3.95
AMSC.OL	M	6.40	14.07	6.61	6.25	14.07	9.11	20.02	9.40	8.90	20.02	5.28	11.60	5.45	5.16	11.60	6.62	14.55	6.83	6.47	14.55
BELCO.OL	A	5.52	5.06	6.31	6.04	5.70	8.17	7.49	9.34	8.95	8.45	4.59	4.24	5.17	4.97	4.72	5.76	5.31	6.48	6.23	5.92
BELCO.OL	M	39.99	16.76	14.64	10.29	39.99	59.24	24.83	21.69	15.25	59.24	30.00	12.82	11.19	8.03	30.00	37.62	16.08	14.04	10.07	37.62

Ticker		Student's *t* distribution										Normal distribution									
		Value-at-risk (VaR)					Expected shortfall (ES)					Value-at-risk (VaR)					Expected shortfall (ES)				
		R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
BWEK.OL	A	6.13	5.92	5.94	6.66	6.17	9.06	8.74	8.78	9.85	9.12	4.82	4.65	4.67	5.24	4.85	6.05	5.84	5.86	6.57	6.09
BWEK.OL	M	13.64	10.49	11.90	13.28	13.64	20.17	15.51	17.59	19.63	20.17	10.73	8.25	9.36	10.45	10.73	13.46	10.35	11.74	13.10	13.46
BWLPG.OL	A	5.59	6.83	5.40	5.50	5.78	7.50	9.16	7.25	7.38	7.75	5.04	5.93	4.89	4.97	5.17	6.32	7.44	6.14	6.23	6.48
BWLPG.OL	M	8.22	12.19	7.70	7.41	12.19	11.03	16.35	10.34	9.94	16.35	7.04	10.18	6.75	6.54	10.18	8.83	12.77	8.46	8.20	12.77
FLNG.OL	A	5.05	6.28	5.55	6.01	5.61	6.96	8.66	7.64	8.28	7.73	4.15	5.55	4.67	5.26	4.78	5.21	6.96	5.86	6.60	6.00
FLNG.OL	M	7.90	13.68	9.66	9.31	13.68	10.89	18.84	13.30	12.82	18.84	5.61	10.80	7.40	7.27	10.80	7.04	13.54	9.28	9.11	13.54
JIN.OL	A	6.32	7.57	9.89	7.82	7.62	9.85	11.80	15.42	12.18	11.87	4.33	5.20	6.82	5.38	5.24	5.43	6.52	8.56	6.75	6.57
JIN.OL	M	16.03	22.05	20.08	17.02	22.05	24.99	34.38	31.31	26.53	34.38	11.57	15.88	14.32	12.39	15.88	14.51	19.91	17.96	15.53	19.91
MPCC.OL	A	5.21	13.33	8.15	6.50	7.70	7.71	19.70	12.05	9.62	11.38	3.93	10.20	6.27	4.95	5.87	4.92	12.79	7.87	6.21	7.36
MPCC.OL	M	16.16	52.13	19.17	11.66	52.13	23.89	77.06	28.34	17.23	77.06	13.50	44.59	16.24	9.91	44.59	16.93	55.92	20.37	12.43	55.92
ODF.OL	A	4.37	5.37	4.30	4.61	4.61	6.10	7.50	6.01	6.44	6.44	3.69	4.54	3.64	3.90	3.90	4.63	5.69	4.56	4.89	4.89
ODF.OL	M	8.14	16.96	6.26	8.32	16.96	11.36	23.68	8.74	11.61	23.68	6.88	14.34	5.29	7.03	14.34	8.63	17.98	6.63	8.82	17.98
WAWI.OL	A	5.59	6.99	5.88	6.28	6.08	8.12	10.16	8.54	9.13	8.84	4.47	5.79	4.74	5.13	4.94	5.61	7.26	5.95	6.43	6.19
WAWI.OL	M	20.90	24.12	12.81	16.52	24.12	30.37	35.06	18.62	24.01	35.06	16.47	19.14	10.22	13.13	19.14	20.66	24.00	12.81	16.46	24.00
WWI.OL	A	3.69	5.54	3.58	4.26	4.16	5.32	7.99	5.16	6.15	6.01	3.00	4.40	2.92	3.43	3.36	3.76	5.52	3.66	4.30	4.21
WWI.OL	M	8.69	20.02	5.32	8.27	20.02	12.54	28.89	7.68	11.93	28.89	7.00	16.02	4.27	6.62	16.02	8.78	20.10	5.35	8.30	20.10
CCOR-B.ST	A	4.97	5.66	5.65	6.94	5.69	7.59	8.64	8.62	10.59	8.68	3.74	4.17	4.12	4.99	4.18	4.69	5.23	5.17	6.26	5.25
CCOR-B.ST	M	10.33	13.28	8.47	15.13	15.13	15.76	20.26	12.93	23.09	23.09	6.43	8.36	5.56	9.21	9.21	8.06	10.49	6.97	11.55	11.55
TAL1T.TL	A	2.41	3.00	2.62	2.48	2.58	3.60	4.48	3.92	3.70	3.86	2.08	2.59	2.26	2.13	2.23	2.60	3.25	2.83	2.67	2.79
TAL1T.TL	M	10.39	15.62	5.63	4.80	15.62	15.50	23.32	8.40	7.17	23.32	8.53	13.04	4.66	4.02	13.04	10.70	16.36	5.84	5.05	16.36

Appendix V. Results of GARCH(1,1) Backtesting

The values below are provided from Kupiec's Proportion of Failure (POF) test statistics to backtest the results from the GARCH(1,1) model at a 5% significance level. The results are significant the test statistic is greater than the critical value of 3.84 ($\chi^2_{k=1,\alpha=0.05}$).

Ticker	Student's *t* distribution										Normal distribution									
	Kupiec's POF test: value-at-risk (VaR)					Kupiec's POF test: expected shortfall (ES)					Kupiec's POF test: value-at-risk (VaR)					Kupiec's POF test: expected shortfall (ES)				
	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.	R.1	R.2	R.3	R.4	O.
ANEK.AT	3.67	1.25	15.00	5.06	9.85	21.15	6.57	26.67	22.40	67.95	2.67	3.55	2.33	0.99	0.73	7.00	0.00	15.00	11.17	21.68
ATTICA.AT	11.77	0.74	6.70	6.73	23.19	31.74	8.75	19.44	14.10	71.50	1.00	0.00	2.33	0.99	2.99	18.41	0.74	11.60	6.73	31.76
KYRI.AT	10.00	2.25	6.70	11.17	28.11	27.74	11.44	19.44	17.72	75.24	2.82	0.07	0.79	0.50	3.48	11.77	2.25	6.70	14.10	31.76
OLTH.AT	24.24	4.81	19.44	17.72	61.33	50.68	11.44	19.44	29.85	102.95	0.00	1.25	6.70	2.56	1.42	4.64	0.74	19.44	6.73	21.68
PPA.AT	21.15	6.57	15.00	6.73	47.17	42.16	19.25	19.44	29.85	108.90	5.75	0.00	11.60	0.99	10.79	24.24	8.75	15.00	6.73	52.47
LOGN3.SA	11.71	2.25	6.57	6.79	26.29	42.07	8.75	19.25	22.49	87.58	9.94	0.74	6.57	2.60	17.44	18.33	3.38	11.44	8.81	39.88
PSVM11.SA	9.94	11.44	26.47	11.24	49.62	18.33	19.25	26.47	29.96	83.16	4.60	8.75	14.82	1.71	23.08	9.94	11.44	26.47	8.81	47.03
STBP3.SA	27.65	3.38	3.38	11.24	39.88	50.58	8.75	19.25	17.81	87.58	11.71	0.00	0.07	2.60	8.05	27.65	3.38	3.38	11.24	39.88
FROWARD.SN	0.58	15.08	11.68	14.27	26.63	0.58	15.08	11.68	14.27	26.63	6.90	19.54	15.08	17.90	50.07	6.90	19.54	19.54	17.90	52.78
SMSAAM.SN	15.81	0.81	2.37	6.85	21.89	50.47	15.08	15.08	22.59	97.88	1.45	0.07	0.66	1.04	0.47	13.62	0.81	2.37	5.17	19.05
VAPORES.SN	31.56	8.97	3.53	17.90	55.61	41.97	11.68	11.68	22.59	83.70	24.08	0.81	0.09	0.54	12.99	31.56	8.97	3.53	17.90	55.61
GSDDE.IS	44.73	5.03	6.70	6.79	52.09	53.35	15.17	19.44	29.96	111.94	44.73	1.51	2.33	2.60	31.79	44.73	9.04	6.70	6.79	57.72
GULFNAV.AE	5.74	1.07	1.05	4.10	10.91	26.39	9.69	20.39	13.70	68.20	1.58	2.06	0.52	1.00	0.66	8.32	5.54	3.97	10.42	26.57
HHFA.F	10.46	0.89	7.09	5.61	21.79	24.90	5.14	12.08	23.36	60.64	1.17	0.59	0.94	0.00	0.52	12.27	0.89	7.09	5.61	23.28
HLAG.F	16.51	6.96	0.44	2.01	20.36	37.18	15.34	15.52	14.92	81.85	10.46	0.00	0.01	0.06	3.16	19.00	5.14	0.44	2.97	21.79
HXCK.F	14.28	3.67	12.08	5.61	33.64	37.18	6.96	27.29	18.61	81.85	7.40	2.49	0.94	0.70	10.05	14.28	3.67	12.08	9.43	37.69
0137.HK	20.92	0.74	6.57	0.87	21.15	50.37	6.57	14.82	13.69	74.37	0.01	0.73	0.07	0.51	0.30	20.92	0.74	6.57	0.87	21.15
0144.HK	20.92	1.38	8.75	4.79	31.14	41.87	11.44	19.25	13.69	82.44	3.56	0.07	1.38	0.41	4.34	20.92	1.38	8.75	4.79	31.14
0316.HK	13.55	11.44	1.38	1.51	22.64	31.47	11.44	11.44	13.69	67.11	5.61	1.38	0.34	0.13	3.26	13.55	11.44	1.38	1.51	22.64
0351.HK	27.48	19.25	26.47	4.79	67.11	41.87	19.25	26.47	21.92	107.92	24.00	8.75	26.47	0.41	41.61	24.00	19.25	26.47	6.43	67.11
1145.HK	13.55	8.75	19.25	8.41	46.44	50.37	14.82	26.47	13.69	96.56	4.51	0.31	11.44	2.37	13.49	18.18	8.75	19.25	8.41	51.71
1199.HK	15.74	0.74	2.25	0.87	14.62	36.14	14.82	19.25	10.79	78.29	4.51	0.00	0.31	0.21	1.59	18.18	2.25	3.38	2.37	22.64

1308.HK	18.18	4.81	0.31	0.04	12.41	36.14	11.44	6.57	8.41	57.45	3.56	0.74	0.00	2.14	0.53	24.00	4.81	1.38	0.87	22.64
1549.HK	11.59	3.38	6.57	17.28	35.07	36.14	19.25	19.25	29.34	101.98	2.73	0.07	0.74	8.41	7.78	13.55	3.38	8.75	17.28	39.33
1719.HK	3.56	4.81	8.75	13.69	25.83	13.55	14.82	11.44	13.69	51.71	1.65	1.38	8.75	13.69	5.58	3.56	4.81	8.75	13.69	25.83
1732.HK	18.18	19.25	3.38	4.79	39.33	27.48	26.47	19.25	21.92	91.53	5.61	4.81	0.31	0.87	9.48	18.18	19.25	4.81	3.45	39.33
2343.HK	24.00	3.38	6.57	2.37	31.14	41.87	14.82	19.25	10.79	82.44	4.51	0.10	0.74	0.01	2.35	24.00	4.81	8.75	3.45	37.16
3382.HK	11.59	0.31	0.31	2.37	10.41	31.47	19.25	8.75	17.28	74.37	1.43	1.90	0.00	2.14	0.45	15.74	2.25	2.25	6.43	24.20
3683.HK	50.37	26.47	26.47	21.92	122.20	50.37	26.47	26.47	21.92	122.20	50.37	26.47	26.47	17.28	114.54	50.37	26.47	26.47	21.92	122.20
BULL.JK	17.65	25.85	14.82	4.85	53.39	44.53	25.85	26.47	29.44	124.43	2.12	1.20	0.10	0.91	0.54	11.41	8.33	3.38	3.50	25.43
HITS.JK	0.05	0.61	1.38	1.55	1.60	8.21	10.97	26.47	29.44	56.23	0.17	0.22	0.31	1.55	0.54	2.83	4.48	8.75	17.37	25.43
IPCM.JK	4.58	0.61	14.82	13.78	23.84	23.04	18.69	26.47	29.44	88.86	0.65	0.01	8.75	8.47	8.53	9.72	2.02	14.82	13.78	34.47
KARW.JK	0.65	8.33	8.75	3.50	14.44	33.92	18.69	26.47	29.44	104.11	1.53	8.33	11.44	2.41	16.83	11.41	18.69	19.25	17.37	59.20
MBSS.JK	20.20	8.33	6.57	17.37	50.66	38.70	14.30	26.47	29.44	104.11	9.72	4.48	3.38	4.85	22.32	26.23	8.33	14.82	17.37	65.55
NELY.JK	4.58	10.97	19.25	22.02	43.15	29.82	18.69	26.47	29.44	98.64	0.03	4.48	14.82	13.78	16.83	4.58	10.97	19.25	22.02	43.15
PORT.JK	13.28	14.30	26.47	29.44	68.96	29.82	18.69	26.47	29.44	98.64	4.58	6.20	26.47	8.47	32.51	11.41	14.30	26.47	29.44	65.55
PSSI.JK	33.92	8.33	11.44	8.47	59.20	44.53	18.69	26.47	29.44	116.73	15.35	1.20	8.75	0.89	20.85	33.92	8.33	19.25	8.47	65.55
SHIP.JK	26.23	1.20	6.57	0.43	23.84	53.14	10.97	14.82	17.37	88.86	20.20	0.03	3.38	0.03	11.26	33.92	3.10	11.44	8.47	50.66
SMDR.JK	9.72	1.20	11.44	3.50	22.32	26.23	14.30	26.47	17.37	80.24	8.21	1.20	8.75	4.85	20.85	20.20	6.20	19.25	13.78	56.23
SOCI.JK	9.72	2.02	11.44	13.78	32.51	26.23	10.97	26.47	22.02	80.24	1.53	0.61	8.75	10.87	14.44	11.41	3.10	14.82	13.78	38.63
TMAS.JK	9.72	6.20	19.25	13.78	43.15	23.04	18.69	26.47	29.44	88.86	3.64	3.10	14.82	2.41	18.11	13.28	8.33	19.25	22.02	56.23
TPMA.JK	3.64	8.33	14.82	29.44	38.63	33.92	14.30	26.47	29.44	98.64	0.03	1.20	2.25	17.37	8.53	5.65	8.33	14.82	29.44	43.15
GND.JO	5.93	3.57	2.37	8.81	19.35	32.10	15.17	19.54	29.96	93.40	0.00	0.37	0.09	6.79	2.31	10.23	6.83	8.97	11.24	36.37
2062.KL	5.48	11.36	6.38	4.64	25.26	31.20	26.36	26.16	21.63	101.02	0.01	0.72	3.24	1.42	3.04	8.10	14.73	6.38	4.64	30.52
3816.KL	11.40	0.11	4.64	6.25	15.35	20.69	8.68	18.97	13.45	59.72	1.36	2.72	0.26	0.36	0.17	11.40	0.06	4.64	6.25	17.87
5032.KL	6.71	0.29	8.54	4.64	16.58	27.22	11.36	14.56	21.63	73.50	1.94	0.00	1.29	0.00	1.78	5.48	0.29	8.54	3.32	14.18
5077.KL	27.22	2.21	6.38	8.21	38.65	41.57	11.36	18.97	21.63	90.60	8.10	0.36	1.29	3.32	7.45	27.22	2.21	6.38	8.21	38.65
5173.KL	17.96	6.51	11.21	10.57	45.71	50.06	26.36	26.16	17.01	113.54	1.36	0.06	4.64	0.05	2.58	13.35	6.51	11.21	10.57	40.91
5246.KL	8.10	1.35	6.38	2.25	16.58	50.06	8.68	18.97	10.57	77.41	0.01	2.72	1.29	0.05	0.13	8.10	2.21	6.38	4.64	20.63
5259.KL	20.69	8.68	3.24	3.32	32.43	35.86	14.73	14.56	10.57	73.50	15.53	6.51	0.26	0.57	10.03	20.69	8.68	4.64	8.21	40.91
6254.KL	41.57	6.51	14.56	21.63	77.41	50.06	19.16	26.16	29.03	121.19	0.02	1.29	0.26	0.05	0.24	9.66	6.51	4.64	10.57	30.52
7013.KL	0.89	2.21	2.14	8.21	10.03	23.75	11.36	18.97	10.57	62.91	12.29	2.72	2.82	0.80	11.29	0.89	3.33	3.24	8.21	12.00
8346.KL	9.66	0.72	6.38	0.36	13.06	23.75	6.51	18.97	10.57	56.66	5.48	1.29	3.24	0.00	2.58	9.66	3.33	6.38	0.10	15.35
003280.KS	31.29	11.44	19.16	29.44	86.66	41.67	19.25	26.36	29.44	114.34	23.83	8.75	14.73	22.02	66.94	27.30	11.44	19.16	29.44	82.26
005880.KS	23.83	6.57	19.16	17.37	63.57	50.16	14.82	26.36	22.02	107.73	6.76	0.07	2.21	6.49	12.33	15.60	4.81	19.16	17.37	51.56

009070.KS	20.76	4.81	11.36	8.47	43.83	41.67	14.82	26.36	22.02	101.79	3.48	1.38	1.35	1.55	7.72	20.76	4.81	11.36	8.47	43.83
011200.KS	20.76	3.38	4.75	6.49	32.93	35.95	11.44	14.73	22.02	82.26	8.15	1.38	0.72	2.41	11.30	23.83	4.81	4.75	8.47	39.20
028670.KS	27.30	3.38	14.73	6.49	46.30	35.95	14.82	26.36	17.37	91.34	13.42	0.07	0.72	1.55	10.33	27.30	3.38	14.73	8.47	48.87
044450.KS	18.04	6.57	8.68	4.85	37.02	35.95	14.82	26.36	17.37	91.34	3.48	0.31	0.29	0.43	3.73	20.76	6.57	14.73	8.47	48.87
086280.KS	11.46	2.25	11.36	2.41	24.09	35.95	14.82	26.36	22.02	96.37	0.91	0.31	3.33	0.49	1.56	18.04	2.25	14.73	4.85	34.94
GPH.L	9.67	0.19	2.79	0.31	6.78	33.82	2.66	9.69	7.35	46.13	4.55	0.94	1.82	0.08	2.31	13.21	0.16	2.79	1.26	12.95
MPL.L	1.92	7.22	2.06	4.78	14.08	3.61	1.71	2.79	4.16	11.93	0.34	0.99	0.02	0.31	1.27	13.21	3.87	2.79	2.97	21.60
OCN.L	11.35	0.99	5.54	1.26	16.33	15.28	9.47	12.48	23.36	56.62	3.61	0.19	1.82	2.98	0.37	11.35	0.99	5.54	1.26	16.33
FESH.ME	21.78	11.52	15.52	10.28	58.48	28.43	11.52	27.29	10.28	71.76	8.85	2.29	12.08	6.01	26.57	21.78	11.52	15.52	10.28	58.48
CPLP	24.90	3.62	15.17	11.32	51.04	42.95	9.11	26.88	30.06	99.12	10.46	0.11	3.57	0.54	10.49	21.78	2.45	11.76	11.32	43.50
ESEA	4.97	9.11	11.76	14.27	34.79	32.46	19.73	19.63	22.59	94.05	0.42	0.06	3.57	0.20	1.68	3.96	9.11	11.76	11.32	30.93
GASS	14.28	0.11	0.84	0.13	6.37	42.95	5.09	11.76	11.32	62.71	7.40	0.26	0.10	1.86	0.59	21.78	1.54	3.57	1.04	21.11
GLBS	14.28	1.54	6.83	22.59	36.83	51.50	5.09	15.17	30.06	84.88	3.09	0.06	0.06	6.85	3.88	14.28	0.86	3.57	17.90	29.12
GLNG	19.00	0.00	5.03	11.32	25.72	32.46	6.89	26.88	17.90	76.72	4.97	3.26	0.84	2.64	2.44	19.00	0.11	5.03	11.32	27.38
PSHG	28.43	19.73	26.88	6.85	72.96	51.50	26.98	26.88	8.88	99.12	19.00	11.84	9.04	3.78	41.19	28.43	19.73	15.17	6.85	65.97
PXS	14.28	15.26	26.88	14.27	62.71	37.18	26.98	26.88	30.06	117.23	4.97	1.54	2.41	2.64	11.46	8.85	15.26	15.17	6.85	41.19
SBLK	10.46	0.86	1.51	0.54	10.49	21.78	5.09	15.17	11.32	51.04	1.17	0.00	1.74	0.03	0.02	16.51	2.45	6.83	1.04	22.58
SHIP	14.28	2.45	19.63	17.90	45.91	32.46	6.89	26.88	30.06	84.88	8.85	0.26	6.83	2.64	11.46	14.28	2.45	19.63	17.90	45.91
TOPS	24.90	3.62	26.88	5.17	48.42	32.46	11.84	26.88	14.27	80.69	10.46	0.06	15.17	2.64	17.07	19.00	6.89	26.88	5.17	48.42
ADANIPORTS.NS	23.75	6.83	8.68	3.64	39.61	41.57	19.63	26.36	17.63	102.37	1.36	0.10	3.33	0.02	2.42	11.40	5.03	6.51	0.48	19.93
ALLCARGO.NS	17.96	3.57	8.68	5.01	33.32	35.86	15.17	19.16	14.02	82.80	6.71	0.84	2.21	0.48	8.75	20.69	6.83	11.36	6.67	44.26
ESSARSHPNG.NS	23.75	19.63	11.36	11.09	64.07	50.06	26.88	26.36	29.75	133.05	4.39	1.51	2.21	5.01	12.57	23.75	19.63	11.36	11.09	64.07
GESHIP.NS	31.20	1.51	14.73	6.67	44.26	50.06	19.63	19.16	17.63	102.37	1.94	1.74	1.35	0.17	0.79	27.22	0.10	14.73	6.67	35.33
GPPL.NS	27.22	1.51	19.16	5.01	41.89	50.06	11.76	26.36	22.30	102.37	17.96	0.10	2.21	0.48	12.57	27.22	2.41	19.16	5.01	44.26
NAVKARCORP.NS	27.22	9.04	11.36	14.02	60.85	41.57	19.63	26.36	22.30	108.31	2.63	0.06	6.51	1.64	6.39	23.75	6.83	11.36	11.09	52.01
SCI.NS	15.53	3.57	6.51	2.52	26.06	35.86	11.76	19.16	17.63	82.80	2.63	0.37	2.21	0.02	3.35	17.96	6.83	8.68	2.52	33.32
SHREYAS.NS	4.39	26.88	8.68	11.09	37.42	35.86	26.88	14.73	29.75	102.37	0.09	9.04	4.75	3.64	10.56	5.48	26.88	11.36	14.02	44.26
ASC	4.97	0.00	5.03	6.85	12.47	24.90	15.26	19.63	14.27	72.96	2.34	1.09	0.37	3.78	2.44	19.00	0.39	11.76	11.32	34.79
CCL	12.27	0.11	6.83	0.01	10.49	21.78	3.62	15.17	17.90	53.77	6.11	0.26	0.37	0.75	1.06	12.27	1.54	15.17	1.74	24.12
CMRE	8.85	2.45	1.51	5.17	17.07	24.90	6.89	11.76	17.90	59.60	3.96	0.06	0.28	0.54	1.35	14.28	2.45	3.57	8.88	27.38
DAC	1.70	2.45	6.83	14.27	18.36	21.78	15.26	19.63	30.06	80.69	0.61	0.06	5.03	6.85	2.04	2.34	3.62	11.76	14.27	24.12
DHT	10.46	0.00	11.76	1.74	15.84	24.90	5.09	15.17	17.90	59.60	3.96	0.61	5.03	0.20	3.88	16.51	3.62	11.76	3.78	32.82
DLNG	7.40	0.86	9.04	2.64	17.07	21.78	9.11	19.63	17.90	65.97	3.09	1.09	1.51	0.01	1.06	10.46	1.54	9.04	5.17	24.12

DSX	14.28	0.86	2.41	1.04	14.66	32.46	15.26	19.63	17.90	84.88	2.34	0.26	0.10	0.13	0.41	16.51	0.86	3.57	1.04	17.07
EGLE	19.00	0.86	5.03	1.04	19.71	32.46	5.09	19.63	8.88	59.60	10.46	0.61	0.84	0.01	3.36	19.00	0.86	6.83	1.74	22.58
FRO	14.28	0.26	6.83	2.64	14.66	37.18	11.84	19.63	14.27	80.69	2.34	4.21	2.41	0.54	0.81	14.28	0.06	9.04	3.78	18.36
GLOG-PA	6.11	0.00	6.83	0.13	5.69	37.18	9.11	11.76	5.17	56.62	1.70	4.21	5.03	1.86	0.00	8.85	0.11	9.04	1.74	14.66
GNK	7.40	1.54	0.84	0.54	8.70	24.90	6.89	11.76	11.32	53.77	4.97	0.00	0.00	0.01	1.68	10.46	3.62	5.03	1.74	19.71
GSL	7.40	1.54	3.57	8.88	19.71	28.43	19.73	15.17	22.59	84.88	0.05	0.26	0.10	0.20	0.06	7.40	3.62	3.57	8.88	22.58
INSW	14.28	0.26	0.84	1.74	8.70	37.18	9.11	11.76	8.88	62.71	3.96	4.21	0.28	0.75	0.25	24.90	3.62	2.41	5.17	30.93
KEX	6.11	1.54	3.57	5.17	15.84	32.46	11.84	19.63	30.06	89.32	1.70	1.70	0.10	0.38	0.00	7.40	0.86	3.57	6.85	17.07
KNOP	21.78	2.45	0.84	0.20	15.84	42.95	9.11	9.04	8.88	62.71	6.11	0.26	0.00	0.75	0.59	16.51	0.39	0.37	0.54	10.49
LPG	14.28	0.86	9.04	5.17	25.72	32.46	15.26	19.63	11.32	76.72	4.97	0.61	0.37	0.13	1.06	16.51	1.54	11.76	5.17	30.93
MATX	19.00	9.11	11.76	0.54	32.82	37.18	11.84	26.88	11.32	80.69	7.40	0.86	3.57	1.86	4.44	19.00	9.11	11.76	0.20	30.93
NAT	12.27	6.89	11.76	3.78	32.82	32.46	19.73	26.88	11.32	84.88	3.09	0.39	1.51	0.54	5.04	16.51	9.11	19.63	5.17	45.91
NCLH	14.28	0.61	3.57	0.20	7.88	28.43	9.11	9.04	3.78	45.91	8.85	2.42	0.00	0.38	0.41	16.51	0.26	5.03	0.20	10.49
NM	10.46	5.09	3.57	6.85	25.72	32.46	15.26	15.17	17.90	80.69	3.09	1.54	0.10	1.74	5.69	19.00	5.09	5.03	6.85	34.79
NMM	12.27	0.11	0.00	6.85	11.46	37.18	11.84	15.17	22.59	84.88	2.34	0.00	1.74	1.04	0.59	21.78	1.54	1.51	8.88	27.38
NVGS	16.51	0.26	2.41	6.85	15.84	42.95	5.09	11.76	14.27	65.97	4.97	0.26	0.10	0.54	2.44	21.78	0.00	5.03	8.88	25.72
OSG	10.46	5.09	19.63	8.88	38.97	42.95	19.73	19.63	22.59	104.59	1.70	2.45	5.03	3.78	11.46	10.46	5.09	19.63	8.88	38.97
RCL	8.85	0.11	5.03	0.54	10.49	42.95	3.62	11.76	14.27	62.71	4.97	2.42	1.51	0.38	0.59	32.46	1.54	11.76	2.64	36.83
SB	2.34	1.54	1.51	2.64	7.88	37.18	15.26	11.76	14.27	76.72	0.03	0.26	0.28	0.03	0.25	8.85	6.89	3.57	8.88	27.38
SFL	12.27	2.45	3.57	1.74	18.36	32.46	9.11	19.63	11.32	69.38	6.11	0.11	0.37	0.03	3.88	19.00	2.45	5.03	2.64	25.72
STNG	8.85	0.61	0.37	3.78	6.37	32.46	6.89	19.63	11.32	65.97	0.19	3.26	1.12	3.78	0.06	16.51	2.45	5.03	6.85	29.12
TDW	8.85	0.86	5.03	1.74	14.66	24.90	15.26	26.88	30.06	89.32	0.74	0.26	0.84	1.25	0.02	19.00	3.62	6.83	6.85	34.79
TK	1.17	3.62	6.83	6.85	14.66	28.43	19.73	19.63	30.06	94.05	0.95	0.06	2.41	2.64	0.41	3.09	6.89	11.76	14.27	29.12
TNK	3.09	1.54	3.57	6.85	13.54	37.18	15.26	15.17	22.59	89.32	0.74	0.06	1.51	1.74	2.44	7.40	6.89	11.76	14.27	36.83
TNP	8.85	0.86	9.04	2.64	18.36	21.78	11.84	26.88	11.32	65.97	0.74	0.06	0.37	0.20	0.81	10.46	1.54	15.17	5.17	27.38
MMH.NZ	16.51	0.81	1.48	0.43	8.50	32.46	15.08	11.68	8.68	65.47	0.19	1.15	1.78	1.97	2.29	16.51	0.81	1.48	0.43	8.50
POT.NZ	8.85	2.37	1.48	2.52	14.40	51.50	11.68	19.54	29.75	104.01	3.96	0.36	0.00	0.02	1.94	16.51	3.53	1.48	11.09	28.77
SPN.NZ	14.28	0.81	1.48	3.64	16.79	24.90	4.97	26.78	14.02	62.22	3.96	0.29	0.66	0.83	0.01	12.27	0.81	1.48	5.01	16.79
QGTS.QA	11.53	2.29	6.77	1.61	20.16	26.39	8.82	26.78	17.55	73.73	1.58	0.00	4.97	0.02	2.62	13.40	2.29	6.77	1.61	21.58
QNNS.QA	9.84	4.86	11.68	3.59	27.91	23.20	8.82	15.08	17.55	63.44	3.72	3.43	11.68	0.16	12.84	11.53	4.86	15.08	8.61	37.43
AMA.BK	5.48	0.63	4.42	10.65	17.53	35.86	14.39	25.75	21.73	94.94	0.09	0.15	3.05	4.69	2.89	8.10	0.63	6.13	10.65	21.73
BIOTEC.BK	9.66	0.04	14.21	21.73	30.09	31.20	14.39	18.59	29.13	89.95	3.45	0.43	10.89	21.73	16.25	13.35	3.15	14.21	21.73	45.21
NYT.BK	9.66	0.63	10.89	4.69	21.73	31.20	11.05	18.59	21.73	80.91	2.63	0.86	4.42	0.11	2.45	11.40	2.06	10.89	8.27	30.09

PORT.BK	1.36	2.06	6.13	1.45	8.87	8.10	18.78	18.59	8.27	45.21	0.11	0.04	4.42	0.11	0.79	1.36	2.06	8.26	3.36	11.71
PSL.BK	6.71	0.43	3.05	10.65	11.71	27.22	6.26	14.21	13.53	59.15	0.09	1.43	0.02	1.45	0.01	17.96	0.63	6.13	10.65	30.09
RCL.BK	15.53	3.15	1.98	1.45	18.87	41.57	8.40	18.59	8.27	69.19	2.63	0.63	0.02	0.05	1.34	15.53	3.15	4.42	3.36	24.86
RP.BK	17.96	1.23	8.26	8.27	31.98	27.22	18.78	14.21	13.53	72.89	8.10	0.43	3.05	4.69	9.77	17.96	3.15	8.26	8.27	36.03
TSTE.BK	0.02	2.12	0.02	1.45	0.08	2.63	0.15	8.26	10.65	11.71	0.89	0.01	3.05	4.69	5.10	2.63	0.63	8.26	10.65	16.25
TTA.BK	8.10	0.63	3.05	4.69	15.03	27.22	6.26	8.26	17.10	56.11	1.94	2.12	0.58	2.29	1.34	13.35	0.63	3.05	6.31	20.27
5LY.SI	5.01	0.84	1.58	14.10	15.84	19.08	11.76	19.82	29.85	72.96	0.00	0.06	1.58	6.73	2.44	10.52	3.57	11.92	17.72	38.97
D8DU.SI	16.58	3.57	9.18	8.74	36.83	32.55	11.76	11.92	14.10	69.38	7.45	0.84	6.96	1.67	14.66	16.58	3.57	9.18	8.74	36.83
F83.SI	24.98	19.63	9.18	17.72	69.38	43.05	19.63	27.08	29.85	117.23	5.01	1.51	3.67	2.56	12.47	24.98	15.17	9.18	17.72	65.97
S19.SI	12.33	0.10	6.96	0.02	11.46	24.98	15.17	19.82	11.17	69.38	1.72	1.74	0.89	0.02	0.41	12.33	0.84	6.96	0.18	14.66
S56.SI	8.90	2.41	19.82	8.74	32.82	28.51	19.63	19.82	17.72	84.88	0.20	0.28	3.67	3.68	2.88	10.52	2.41	19.82	8.74	34.79
600017.SS	5.30	4.53	14.30	3.27	22.99	20.38	14.39	18.69	16.93	68.77	0.06	2.06	6.20	0.35	4.36	5.30	6.26	14.30	3.27	24.58
600018.SS	9.43	14.39	10.97	3.27	33.64	35.48	18.78	14.30	28.93	94.47	0.06	3.15	8.33	0.77	6.32	6.51	11.05	10.97	4.58	29.78
600026.SS	7.89	6.26	3.10	3.27	20.01	17.67	18.78	14.30	16.93	65.26	1.83	0.24	1.20	0.77	3.79	13.09	6.26	4.48	6.19	29.78
600190.SS	15.25	8.40	25.85	4.58	44.84	23.42	18.78	25.85	21.54	84.83	9.43	0.63	18.69	0.35	17.29	15.25	6.26	25.85	4.58	42.41
600428.SS	3.30	11.05	3.10	3.27	17.29	17.67	18.78	18.69	13.37	65.26	0.47	1.23	1.20	0.09	2.35	3.30	14.39	3.10	8.14	22.99
600717.SS	2.51	14.39	6.20	4.58	21.46	20.38	18.78	25.85	21.54	80.46	1.36	1.23	1.20	0.09	0.11	0.47	8.40	6.20	3.27	12.55
600798.SS	6.51	11.05	8.33	4.58	27.97	23.42	14.39	14.30	16.93	68.77	1.83	4.53	2.02	1.39	8.69	9.43	11.05	8.33	4.58	31.67
601000.SS	5.30	11.05	10.97	8.14	31.67	23.42	18.78	14.30	10.50	65.26	0.94	3.15	4.48	1.39	2.35	3.30	11.05	10.97	4.58	24.58
601008.SS	4.23	4.53	18.69	3.27	22.99	17.67	18.78	25.85	21.54	76.35	0.14	2.06	14.30	1.39	5.62	6.51	6.26	18.69	3.27	27.97
601018.SS	7.89	4.53	10.97	10.50	31.67	23.42	18.78	25.85	28.93	89.48	2.51	0.63	4.48	2.22	8.69	7.89	4.53	10.97	10.50	31.67
601228.SS	7.89	8.40	14.30	3.27	29.78	20.38	14.39	25.85	16.93	72.46	1.36	0.04	14.30	0.09	0.74	9.43	8.40	14.30	3.27	31.67
601326.SS	6.51	6.26	10.97	6.19	27.97	26.87	18.78	25.85	21.54	89.48	5.30	0.24	4.48	0.35	0.03	0.81	6.26	8.33	6.19	16.02
601866.SS	13.09	14.39	6.20	10.50	42.41	20.38	18.78	10.97	16.93	65.26	2.51	3.15	0.61	2.22	7.85	13.09	14.39	6.20	10.50	42.41
601872.SS	9.43	3.15	10.97	8.14	29.78	20.38	18.78	14.30	16.93	68.77	4.23	0.24	1.20	0.77	5.62	13.09	8.40	14.30	10.50	44.84
601880.SS	4.23	14.39	8.33	16.93	35.70	17.67	18.78	14.30	28.93	72.46	0.03	3.15	4.48	16.93	10.52	6.51	14.39	8.33	21.54	42.41
601919.SS	7.89	11.05	0.22	3.27	17.29	23.42	18.78	18.69	16.93	76.35	3.30	2.06	3.91	2.22	1.95	7.89	11.05	0.22	3.27	17.29
603167.SS	4.23	0.04	4.48	6.19	11.51	20.38	11.05	14.30	16.93	61.93	0.47	0.01	4.48	0.77	2.79	6.51	0.24	6.20	6.19	16.02
000088.SZ	2.51	2.06	25.85	10.50	24.58	13.09	14.39	25.85	21.54	65.26	0.47	0.24	10.97	6.19	9.58	2.51	4.53	25.85	10.50	27.97
000507.SZ	1.83	11.05	6.20	1.39	14.81	9.43	18.78	18.69	10.50	50.04	0.14	8.40	0.61	0.00	1.59	3.30	11.05	6.20	2.22	18.62
000520.SZ	7.89	14.39	14.30	3.27	33.64	23.42	18.78	18.69	16.93	76.35	1.27	8.40	8.33	0.06	8.69	11.16	18.78	14.30	4.58	42.41
000582.SZ	11.16	14.39	10.97	10.50	44.84	26.87	14.39	18.69	28.93	84.83	0.06	2.06	0.61	0.35	1.95	6.51	8.40	6.20	8.14	27.97
000905.SZ	6.51	3.15	10.97	4.58	22.99	20.38	14.39	18.69	21.54	72.46	0.03	0.63	8.33	0.06	1.59	9.43	3.15	18.69	8.14	33.64

001872.SZ	6.51	11.05	6.20	6.19	27.97	23.42	18.78	25.85	28.93	89.48	0.00	0.24	0.03	0.35	0.35	6.51	11.05	8.33	6.19	29.78
002040.SZ	1.83	3.15	4.48	13.37	17.29	17.67	14.39	25.85	28.93	76.35	0.47	0.24	4.48	6.19	7.06	3.30	6.26	10.97	13.37	27.97
002320.SZ	2.51	1.23	14.30	6.19	17.29	26.87	18.78	18.69	21.54	84.83	0.00	0.01	3.10	1.39	1.59	4.23	1.23	14.30	8.14	21.46
002492.SZ	13.09	11.05	25.85	6.19	47.38	30.84	14.39	25.85	21.54	89.48	1.83	0.01	8.33	0.06	3.27	13.09	8.40	25.85	4.58	42.41
4030.SR	5.79	4.97	5.03	3.64	19.05	34.19	11.68	15.17	6.67	63.85	0.04	1.48	2.41	0.02	1.25	8.37	4.97	5.03	5.01	23.34
5601.TWO	4.27	11.21	10.89	0.77	20.11	13.16	14.56	25.75	16.93	62.09	0.00	1.29	0.58	2.31	0.01	4.27	11.21	8.26	2.22	21.57
9101.T	14.68	1.17	0.67	1.48	13.75	43.54	10.89	14.56	8.34	71.16	4.19	0.03	0.13	0.04	1.07	16.94	1.98	4.64	2.33	22.97
9104.T	12.64	0.21	0.26	2.33	10.64	28.95	6.13	14.56	8.34	54.98	3.29	0.17	0.40	0.12	0.59	14.68	0.58	2.14	6.37	20.03
9107.T	16.94	1.17	3.24	4.74	22.97	33.01	10.89	14.56	10.72	67.61	5.22	0.48	0.01	0.84	2.06	19.45	4.42	4.64	4.74	31.51
9110.T	12.64	3.05	6.38	8.34	29.66	28.95	14.21	18.97	10.72	71.16	1.30	0.02	0.67	0.84	2.06	14.68	4.42	8.54	8.34	35.46
9115.T	22.25	6.13	11.21	4.74	42.02	37.75	18.59	26.16	21.82	102.56	6.39	0.21	1.29	0.84	7.19	22.25	6.13	11.21	8.34	46.88
9119.T	12.64	4.42	4.64	3.41	24.54	28.95	18.59	18.97	17.19	82.98	4.19	0.21	0.05	0.04	2.06	16.94	6.13	8.54	4.74	35.46
9127.T	4.19	4.42	4.64	0.84	12.66	22.25	10.89	11.21	13.61	57.93	0.85	0.58	0.26	0.53	0.59	5.22	4.42	4.64	0.84	13.75
9130.T	12.64	4.42	3.24	8.34	27.88	33.01	10.89	26.16	17.19	82.98	0.50	0.21	0.26	0.04	0.59	12.64	4.42	4.64	8.34	29.66
9171.T	9.17	1.17	2.14	13.61	21.47	22.25	10.89	18.97	29.24	74.89	4.19	1.17	1.29	10.72	13.75	16.94	3.05	6.38	13.61	37.56
9173.T	3.29	0.17	3.24	8.34	8.82	19.45	6.13	18.97	13.61	54.98	1.85	3.98	3.24	4.74	2.46	10.81	0.58	11.21	10.72	27.88
9193.T	0.50	3.05	11.21	4.74	12.66	28.95	18.59	26.16	21.82	92.09	2.20	0.92	0.26	3.41	0.15	1.30	1.98	11.21	4.74	13.75
9302.T	12.64	1.98	6.38	17.19	33.44	37.75	10.89	26.16	21.82	92.09	7.70	0.48	0.26	4.74	6.45	12.64	3.05	6.38	17.19	35.46
9303.T	6.39	0.21	3.24	4.74	12.66	19.45	8.26	14.56	17.19	57.93	0.25	1.50	0.05	2.33	0.26	9.17	1.98	3.24	6.37	20.03
9308.T	22.25	8.26	11.21	3.41	42.02	37.75	25.75	26.16	17.19	102.56	5.22	4.42	8.54	1.48	17.34	22.25	10.89	11.21	4.74	46.88
9351.T	7.70	1.17	8.54	0.84	14.89	25.40	14.21	18.97	13.61	71.16	0.85	0.48	0.26	0.96	0.00	7.70	1.17	8.54	0.84	14.89
9355.T	16.94	0.21	0.67	6.37	17.34	37.75	8.26	14.56	13.61	71.16	4.19	0.48	1.36	3.41	1.36	16.94	0.21	0.67	6.37	17.34
9361.T	19.45	1.98	2.14	6.37	26.17	43.54	8.26	11.21	21.82	78.82	3.29	0.02	0.05	2.33	3.39	16.94	1.98	1.29	4.74	21.47
9362.T	7.70	1.98	2.14	2.33	13.75	28.95	6.13	14.56	17.19	64.23	1.85	0.03	0.01	0.53	0.26	7.70	1.98	2.14	2.33	13.75
ALC.TO	12.21	0.10	8.97	6.85	22.42	37.09	9.04	19.54	17.90	80.42	0.04	0.63	0.29	0.54	0.16	12.21	0.37	8.97	6.85	23.95
LGT-A.TO	16.44	1.51	8.97	8.88	32.63	24.82	5.03	26.78	17.90	65.72	10.41	0.84	8.97	8.88	25.55	16.44	0.84	8.97	8.88	30.75
WTE.TO	24.82	0.37	4.97	2.64	23.95	32.37	5.03	8.97	22.59	62.47	4.93	0.10	2.37	0.20	5.60	24.82	0.37	4.97	1.74	22.42
2603.TW	20.45	6.38	4.42	0.35	24.69	35.58	18.97	18.59	10.50	80.64	13.16	0.26	0.92	0.59	1.98	23.50	8.54	6.13	1.39	33.77
2605.TW	23.50	0.67	8.26	1.39	24.69	35.58	8.54	25.75	21.54	85.01	20.45	0.05	0.03	0.00	7.13	23.50	2.14	8.26	2.22	29.90
2606.TW	30.93	4.64	4.42	2.22	33.77	35.58	11.21	25.75	21.54	89.67	6.56	0.05	0.02	1.05	1.01	30.93	11.21	4.42	3.27	42.55
2607.TW	23.50	4.64	8.26	3.27	35.83	41.28	14.56	25.75	16.93	94.66	20.45	2.14	1.98	0.35	17.38	26.96	4.64	14.21	6.19	47.53
2609.TW	26.96	4.64	6.13	4.58	37.97	26.96	14.56	18.59	10.50	68.94	23.50	0.01	2.21	1.62	1.29	26.96	4.64	3.05	3.27	31.80
2612.TW	23.50	2.14	8.26	6.19	35.83	35.58	14.56	25.75	16.93	89.67	7.94	0.01	0.02	1.62	0.76	17.74	2.14	1.98	2.22	20.11

2613.TW	20.45	2.14	1.98	2.22	21.57	35.58	8.54	18.59	10.50	68.94	6.56	0.05	0.17	0.59	1.01	17.74	4.64	8.26	3.27	31.80
2615.TW	23.50	8.54	4.42	0.59	20.11	30.93	14.56	14.21	13.37	72.63	9.49	0.26	0.21	5.01	1.01	23.50	8.54	8.26	0.26	24.69
2617.TW	23.50	4.64	10.89	2.22	35.83	26.96	14.56	18.59	16.93	76.52	9.49	0.67	1.98	0.09	8.76	23.50	3.24	10.89	2.22	33.77
2637.TW	20.45	1.29	3.05	0.09	16.11	26.96	6.38	14.21	10.50	55.87	11.22	0.40	0.03	0.26	1.98	26.96	2.14	8.26	2.22	31.80
5608.TW	17.74	2.14	6.13	2.22	24.69	26.96	8.54	18.59	10.50	62.09	7.94	0.01	1.17	0.26	3.32	20.45	3.24	6.13	3.27	29.90
8367.TW	17.74	3.24	10.89	2.22	29.90	30.93	8.54	25.75	16.93	76.52	9.49	1.29	1.17	0.35	9.66	17.74	3.24	8.26	2.22	28.09
EURN.BR	14.74	0.01	5.43	0.00	10.53	33.10	9.40	15.78	9.43	64.83	4.23	0.21	0.50	1.56	0.45	29.03	0.97	5.43	0.70	23.99
EXM.BR	29.03	7.15	12.32	11.92	58.66	52.22	15.61	27.60	23.36	113.12	22.33	0.46	5.43	2.97	23.99	29.03	5.31	12.32	11.92	55.77
DFDS.CO	7.05	4.92	6.83	0.59	16.74	24.32	11.60	19.63	11.54	65.39	2.13	0.00	2.41	0.68	1.25	10.06	6.70	6.83	3.92	26.98
DNORD.CO	16.02	6.70	3.57	1.12	23.73	31.83	19.44	9.04	11.54	68.79	4.68	0.08	0.37	0.00	1.92	18.48	8.89	3.57	2.77	30.51
MAERSK-A.CO	16.02	2.33	2.41	3.92	22.21	36.52	11.60	15.17	14.51	76.11	5.79	0.00	0.84	0.33	2.31	27.82	3.48	5.03	3.92	34.34
TRMD-A.CO	10.06	0.00	2.41	0.00	6.16	27.82	6.70	11.76	2.77	43.01	2.86	1.19	1.51	2.43	0.04	16.02	2.33	5.03	0.59	19.35
IR5B.IR	14.54	0.94	7.02	0.59	17.69	37.56	15.52	19.92	18.17	90.52	5.14	0.54	3.72	0.68	1.89	19.30	2.58	7.02	1.12	24.84
VIK1V.HE	10.29	6.77	6.89	22.97	41.19	36.90	19.54	19.73	30.47	104.59	0.04	0.09	2.45	9.15	5.04	12.08	11.68	9.11	22.97	51.04
EIM.IC	21.47	2.33	15.17	11.54	45.62	32.10	11.60	26.88	22.88	88.95	12.02	0.34	11.76	0.59	16.88	21.47	2.33	15.17	11.54	45.62
DIS.MI	14.34	1.61	20.11	18.52	44.56	24.98	15.43	27.39	30.78	90.70	5.01	0.00	7.15	4.11	12.05	14.34	1.61	20.11	18.52	44.56
AGAS.OL	10.17	3.57	5.09	2.81	21.06	32.01	11.76	26.98	18.26	84.79	0.66	2.41	0.86	0.25	3.34	18.63	6.83	6.89	5.39	36.77
AMSC.OL	13.94	1.51	6.89	7.10	27.33	42.46	6.83	19.73	22.97	84.79	1.57	0.00	1.54	0.25	2.42	18.63	1.51	6.89	7.10	30.87
BELCO.OL	16.16	5.03	5.09	2.81	27.33	32.01	19.63	19.73	22.97	93.96	4.76	2.41	0.11	0.00	4.41	18.63	5.03	5.09	3.97	30.87
BWEK.OL	8.58	5.03	9.11	1.87	22.53	21.39	15.17	19.73	11.62	65.88	2.92	1.51	9.11	0.31	6.34	7.15	5.03	9.11	1.87	21.06
BWLPG.OL	10.17	3.57	9.11	0.25	18.31	32.01	9.04	15.26	14.59	69.29	2.92	0.00	0.86	0.00	2.02	18.63	3.57	15.26	2.81	34.72
FLNG.OL	13.94	2.41	1.54	0.00	11.42	36.71	9.04	11.84	18.26	72.87	0.66	0.00	0.00	0.66	0.01	13.94	2.41	1.54	1.87	17.02
JIN.OL	16.16	11.76	15.26	9.15	50.97	42.46	19.63	19.73	22.97	104.49	3.78	0.00	1.54	0.05	3.34	11.96	9.04	6.89	5.39	32.76
MPCC.OL	10.17	2.41	5.09	0.61	15.79	42.46	11.76	15.26	9.15	72.87	1.06	1.12	0.00	0.31	0.02	8.58	0.84	5.09	0.05	10.45
ODF.OL	10.17	2.41	6.89	3.97	22.53	36.71	9.04	26.98	30.47	93.96	0.36	0.00	5.09	1.87	3.86	13.94	5.03	11.84	5.39	34.72
WAWI.OL	24.49	1.51	11.84	5.39	36.77	36.71	11.76	19.73	18.26	84.79	8.58	0.63	5.09	0.09	4.41	24.49	2.41	11.84	7.10	41.12
WWI.OL	8.58	2.41	11.84	3.97	24.06	36.71	11.76	26.98	22.97	93.96	2.19	0.28	3.62	0.09	1.66	11.96	2.41	11.84	5.39	29.06
CCOR-B.ST	32.10	6.77	6.96	11.62	53.77	51.09	19.54	15.34	22.97	104.59	12.02	0.81	0.12	1.87	10.49	28.08	4.97	5.14	3.97	36.83
TAL1T.TL	20.05	0.00	0.10	9.09	16.48	33.73	11.60	11.76	30.37	81.93	15.21	1.82	0.06	3.92	5.42	22.89	0.34	1.51	11.54	26.51