Research article
Journal of Business and Trade (JOINBAT) 6(1), 20-33, 2025
Recieved: 25-Oct-2024 Accepted: 7-Jun-2025
https://doi.org/10.58767/joinbat.1556001

SAKARYA UNIVERSITY
OF APPLIED SCIENCES

The Importance of Market Returns in Financial Return Analysis: US Air Carriers

Olcay ÖLÇEN[1]

[1] Aviation Consulting Group, ACG

ABSTRACT

A financial return can be examined under two different segments: the market dimension and the idiosyncratic dimension. This paper mainly concentrates on this issue in the United States Air Carrier Market. The purpose of this research is to analyse the different financial contexts for air carriers regarding risk (standard deviation). To realize them, after segmenting financial returns as market and idiosyncratic, three forms of simulations, which are uniform (platycurtic), laplace (leptokurtic) and normal (mesocurtic), were utilized, and results were taken. Then, these results were added to the air carriers' idiosyncratic returns, and the new financial returns were formed and interpreted. In all three forms, the returns showed leptocurtic character and three hypotheses of the research were confirmed. On the other side, according to Value-at-Risk (VaR) calculations, standard deviations are indicators of the risk. This research shows that the risk formulation of the financial returns changed depending on the changes in these three market forms. Therefore, the research proves the importance of market returns statistically.

Keywords: Value at Risk, Financial Returns, USA Air carriers market, Standard deviation.

Corresponding Author e-mail: olcay.olcen@gmail.com

Cite as: Ölçen, O. (2025). The Importance of Market Returns in Financial Return Analysis: US Air Carriers, *Journal of Business and Trade*, 6(1), 20-33. https://doi.org/10.58767/joinbat.1556001

Introduction

The concept of the Value at Risk (VaR) is a calculation of the likely losses that might occur from changes in the market prices of particular securities or portfolio positions. The minimum capital risk requirement (MCRR) or position risk requirement is then defined as the minimum amount of capital required to absorb all but a prespecified proportion of expected future losses (Brooks and Persand, 2003: 29). With this side, VAR is one of the major instruments in financial risk management (Peng et al, 2023). VAR estimates are not purposed only to serve as summary statistics for decision-makers but it is a beneficial tool to manage and control risk in individual management of stocks or financial portfolio management (Basak and Shapiro, 2001; Jorion, 1996). On the other side, companies and investors give great importance to the communication of VAR. Jorion (2002:911) confirms this relationship by stating empirically that VAR disclosures are informative in that they predict the variability of trading revenues. Essentially, VAR is the measure of variability in an asset price or return. Therefore, it is expressed with only one standard deviation value (scaled version of variance) and includes a lot of information regarding calculation methodology which can be equally weighted moving average (EWMA) approach and general autoregressive and conditional heteroskedasticity models (GARCH (1,1) models), historical simulation or simulation models (Hendricks, 1996; Linsmeier and Pearson, 1996; Giot and Laurent, 2003). Manganelli and Engle (2001) classify them as parametric, nonparametric and semiparametric models. Moreover, Kuester et al. (2006:53) maintain that a hybrid method, combining a heavy-tailed generalized autoregressive conditionally heteroskedastic (GARCH) filter with an extreme value theory-based approach, performs best overall. Maciel (2018) confirms the relationship between GARCH models and VAR by attending to the importance of desired information in different GARCH models. The financial risk subject is a major concern for regulators and owners of financial institutions as a catastrophic market risk and the adequacy of capital to meet such risks (Danielsson and De Vries, 2000). Besides these, Berkowitz et al. (2011) underline another important financial risk calculation method as profit and loss (P/L) analysis by comparing it with VAR. Nevertheless, VAR overcomes P/L according to their analysis. The main features of VAR analysis can be explained as follows; i) It is recognized by practitioners, ii) It measures the downside risk which is interesting for a risk-averse investor like a pension fund, iii) Many academic studies have been done on the subject, iv) it can be measured risk with just one easily understandable number, v)It can be used for non-normally distributed assets. It will adjust the Value-at-Risk method by using an empirical VAR and an analytical VAR, which takes the skewness and the kurtosis into account (Favre and Galeano, 2002). A disadvantage of VAR approaches can be determined as they are extremely sensitive to errors in data. (El Ghaoui et al., 2003). VAR approaches are so general and vital in financial risk measurement, therefore, they are one of the important subjects in the Bank for International Settlements (BIS) statements. On the other side, continuously monitoring procedures of VAR processes is problematic not only for companies but also for regulators because of instant feedback problems (Hoga and Demetrescu, 2022). One of the main development stages of this research is the VAR analysis.

Besides these, there is another reality: the decomposition of a stock return. Essentially, it is a matter of mathematical transformation. There are two important steps in the determination of stock returns. One of them is the distillation of returns from the asset prices, which is an easy process with today's financial market communication with the formula $R_t = (P_t)\text{-}(P_{t-1}) / (P_{t-1})$. It is an expression of price (P_t) change and the change algorithm if it is considered in a time series (P_{t1}, P_{t2}, P_{tn}). On the other side, a stock return (R_t) includes a lot of information for a specific time that is summarized as idiosyncratic information (a_t) and market information (b_t). This work mainly concentrates on market information and information structure. Therefore $R_t = a_t + b_t$.

Statistically, the tail features of a distribution can change depending on the variability (σ^2) of the values and are defined under the concept of kurtosis. There are three tail structures of the simulation distribution of this research: fat-tailed (heavy-tailed), thin-tailed (light-tailed) and medium-tailed. They are formed with different distribution simulations.

In light of these arguments, this paper examines the VAR behaviours of ten air carriers of the United States under normality, leptokurtic and platykurtic conditions of the United States financial markets. By doing so, it aims to analyze different VAR structures by variability(σ^2), stress and different information structures of financial markets (b_t) under the assumption that there will be no change in the idiosyncratic (a_t) structure of company financial returns. The selected period has special importance for companies regarding a crisis and the impacts of the crisis on the financial market. At the end of the analysis, there are some policy implications for states and air carrier companies.

Literature Review and Hypothesis Development

The financial management of civil aviation has multiple dimensions because of its characteristic industrial form as it is exampled in the triangle of Taneja (1990) that consists of economic, political and technological sides. Therefore, the financial stress structure of civil aviation is open to the impacts that come from these sides. Sudden, unexpected and unforecasted events or small, medium and large changes that occur on managerial and operational sides of the cumulative industrial chain and stakeholder climate often hit the financial structure of the aviation industry positively or negatively and the economic structure of the aviation industry demand and supply side. Debnath et al. (2020) state that the financial structure of airlines is under pressure, especially in crisis times. These crisis structures should be followed by also rule-makers and investors because they can cause other important items such as the mobility of human force (O'Regan, 2011).

Akyıldırım et al. (2024) underline the propensity of air carriers toward financial problems even small events in environmental, social and governance sustainability structures by examining 6288 events and emphasizing the importance of reputation. On the other side, safety and security-related operational accidents and incidents (disasters) also have a considerable impact on the financial structure of air carriers by creating volatilities in balanced financial indicators (Akyıldırım et al., 2020). Besides these, in parallel with idiosyncratic industrial structure, there is no exact definition of economic resilience for air carriers depending on different and explained pressures financially (Cook et al., 2023). Reaching finance and economic resources is not easy for air carriers in instantaneous and uninterrupted changes. Faizuloyeva and Olechowska (2021) examine this negativity in the Aeroflot of Russia. In particular, Z scores follow a downward trend because of demand in times of international, regional, national or company catastrophic crisis time as in the case of Aeroflot. In a crisis time, states can nourish all of the closed veins of large air carriers with financial and economic support or can create opportunities for resources, nevertheless, small air carriers suffer from the absence of financial and economic resources (Yu, 2021). For this reason, the financial stimulus and response reflexes, financial awareness and perception levels of air carriers toward micro, macro and international changes and crises should be well-trained. Lanne et al. (2023) state that the stocks give different responses to different economic shocks. Therefore, investors and analysts should concentrate on the tail structure in portfolio analysis (Glasserman et al., 2002).

On the other side, the second important element is the statistical structure of this literature review. In financial epistemology, statistical distributions carry a lot of information. Skewness and kurtosis describe the impacts of the changes on stock returns (Doan, 2011). A thin-tailed probability distribution is one for which the upper tail declines to zero exponentially or faster. Such a distribution has a moment-generating function, and all moments exist. Conversely, A fat-tailed probability distribution is one for which the upper tail declines towards zero more slowly than exponentially, so there is no moment-generating function (Pindyck, 2010). Besides these, while fat-tailed probability distributions are known as leptokurtic (high kurtosis), thin-tailed probability distributions are platykutic (low kurtosis) as in the following figures.

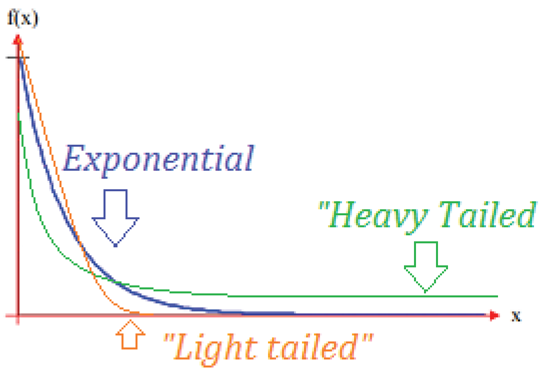

Figure 1. Distributions according to Kurtosis (https://www.statisticshowto.com/heavy-tailed-distribution/, Access time, 06.09.2024.

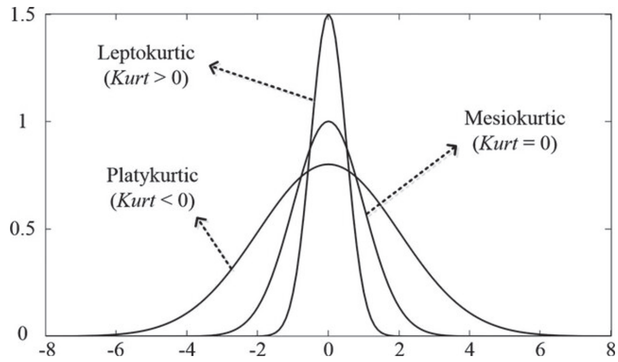

Figure 2. Distributions according to Kurtosis (Zhong et al., 2016)

The severity and largeness of the deviations (σ_t) are another subject. For example, in a large tail distribution (Z_L) such as a financial time series, large deviations are subject to a jump in the series; on the other side in thin tail distributions, these deviations are subjected to changes in the structure of the distribution (Filiasi et al., 2012). In the analysis of Moser (2017), this situation is explained with the concept of tail risk. Some examples of the distributions are given in the following Table 1.

Table 1: Distributions and their features (Moser, 2017)

Distribution	Parameters	Mean	Standard Deviation	Risk (approximately)
Uniform U[a,b]	a,b ϵ R, a<b	(a+b)/2	$\frac{(b-a)}{2\sqrt{e}}$	0
Exponential $\varepsilon(\Theta)$	$\Theta > 0$	$1/\Theta$	$1/\Theta$	1.83
Laplace L (μ, b)	μ ϵ R, b>0	μ	$\sqrt{2b}$	1.44
Normal N(μ,σ)	μ ϵ R, σ^2	μ	σ	0.27

Fama (1965) showed that empirical distributions of daily returns are usually highly peaked and heavy-tailed when compared with normal distribution. Lau et al. (1990) prove that the distribution of stock returns is leptokurtic. Also, according to Stoyanov et al. (2011) and Hall et al. (1989), fat tails are specific characteristics of asset returns because of volatility, mostly time-varying volatility, and secondly, other factors ensure non-linearity in asset returns. On the other side, Praetz (1972) describe the subject of changing tails as the change in investor expectations. Perry (1983) observes that fat tails of security return distributions are not an infinite variance but a finite variance that changes in a complex fashion over time. Haas and Pigorsch (2007) define leptokurtosis's fat-tailedness by emphasising that they are deviations from normal distribution. Because of the tail features of the financial assets, they can be classified as risky or non-risky. Moreover, for Gay (2005), thin tails mean relatively less risk; on the other hand, fat or heavy tails are indicators of high risk in asset evaluation.

Under these circumstances, it is considered that a stock price includes systematic information (risk) and idiosyncratic information (risk), and the returns have these two dimensions, which are market returns and exceptional returns. The air carriers subjected to these papers represent approximately 95% of the total market. The following hypotheses can be developed in light of these arguments.

H1: *As other variables are constant (such as time (period) and amount of volatility (magnitude)of idiosyncratic return), if an idiosyncratic return (at) is leptokurtic (fat-tailed), and if a market return (bt) is leptokurtic (fat-tailed), the company return (Rt) is leptokurtic (fat-tailed).*

H2: *As other variables are constant (such as time (period) and amount of volatility (magnitude)of idiosyncratic return), if an idiosyncratic return (a_t) is leptokurtic (fat-tailed), and if a market return (b_t) is platykurtic (thin-tailed), the company return (R_t) is leptokurtic (fat-tailed).*

H3: *As other variables are constant (such as time (period) and amount of volatility (magnitude)of idiosyncratic return), if an idiosyncratic return (at) is leptokurtic (fat-tailed), and if a market return (bt) is mesocurtic (generally normal-tailed), the company return (Rt) is leptokurtic (fat-tailed).*

The outliers principle should be considered in the second and third hypotheses. An outlier can be defined as extraordinary values in a time series or an observation that lies outside the overall pattern of distribution (Moore and McCabe 1999). Therefore, Fat-tailed distributions tend to have more outliers than thin-tailed distributions. In this condition, the outliers of the Z distribution of a variable is Z_a and outliers are ($a_{1, t}$, $a_{2, t-1}$, $a_{n, t-n}$) and if Z_a is leptokurtic, logically it will insist on preserving its outliers structure when it is added to a platycurtic Z_b distribution with outliers ($b_{1, t}$, $b_{2, t-1}$, $b_{n, t-n}$), in total, the company return outliers are going to be ($a_{1, t}$, $a_{2, t-1}$, $a_{n, t-n}$, $b_{1, t}$, $b_{2, t-1}$, $b_{n, t-n}$). There will be many outliers in the return; the Z_R will have many outliers and will be leptocurtic.

Data, Methodology and Findings

The research data is taken from investing.com for the period of 1.02.2018 and 29.12.2023 as the daily closing stock price for ten air carriers, NASDAQ and NYSE randomly. The full names and their stock market are in Appendix 1, and their statistics are in Tables 2.1, 2.2, and 2.3.

Table 2.1: The descriptive statistics of the price variables are given in the following tables.

Statistics	*NASDAQ*	*NYSE*	*AAL*	*ALGT*	*ALK*
Mean	0.000595265	0.000233169	23.19053015	139.2493307	53.49059642
Standard Error	0.000402197	0.000321461	0.28974651	1.115847828	0.298048645
Median	0.001141586	0.000698226	18.8	138.75	55.42
Mode	#N/A	#N/A	13.98	142	43.46
Standard Deviation	0.015514574	0.012396065	11.25544924	43.34605646	11.57795272
Sample Variance	0.000240702	0.000153662	126.6851376	1878.880611	134.0489892
Kurtosis	6.303584542	15.80051049	0.374634611	-0.203766677	-0.931168615
Skewness	-0.411692474	-0.78039549	1.073006739	0.345659229	-0.357580889
Range	0.216673274	0.218725294	49.43	211.75	51.45
Minimum	-0.123213306	-0.118365278	9.04	57.06	23.56
Maximum	0.093459968	0.100360015	58.47	268.81	75.01
Sum	0.885754248	0.346722534	34994.51	210127.24	80717.31
Observation	1482	1482	1482	1482	1482

Table 2.2: The descriptive statistics of the variables are given in the following tables.

Statistics	*DAL*	*HA*	*JBLU*	*LU*	*SAVE*
Mean	43.57813121	21.5780053	13.90270378	45.48075547	29.90507621
Standard Error	0.264113688	0.251554764	0.130183225	0.271015922	0.344214435
Median	42.2	19.91	14.95	47.25	24.61
Mode	52.95	13.77	7.1	54.98	16.5
Standard Deviation	10.25972048	9.771858416	5.057077909	10.52784363	13.37130202
Sample Variance	105.2618643	95.48921691	25.57403698	110.8354915	178.7917177
Kurtosis	-1.067361581	-0.853935717	-1.241387029	-1.056997468	-0.69869527
Skewness	-0.04058469	0.334407245	-0.311108174	-0.217407265	0.62178313
Range	43.97	40.04	19.24	44.06	56.58
Minimum	19.19	3.91	3.69	22.23	8.01
Maximum	63.16	43.95	22.93	66.29	64.59
Sum	65759.4	32561.21	20979.18	68630.46	45126.76
Observation	1482	1482	1482	1482	1482

Table 2.3: The descriptive statistics of the variables are given in the following tables.

Statistics	*DAL*	*HA*
Mean	42.46284957	57.27431412
Standard Error	0.366361561	0.519262327
Median	43.65	49.46
Mode	56.35	67.52
Standard Deviation	14.23162594	20.17118605
Sample Variance	202.5391768	406.8767467
Kurtosis	-1.182253953	-1.202342942
Skewness	-0.288051421	0.465346127
Range	54.13	76.78
Minimum	12.07	19.92
Maximum	66.2	96.7
Sum	64076.44	86426.94
Observation	1482	1482

To calculate total return, the $Rt= p_t-p_{t-1}/p_t$ formula is utilized for the airline price series. Then, to describe a_t the idiosyncratic return in number, the formula of $b_t=R_t-a_t$ (market return) is used. On the other side, to describe new market dynamics, uniform (Z_U), normal (Z_N), and Laplace (Z_L) distributions are derived by the Stata package program under the features described in Table 1. For Z_U, a = 0.001 and b= 0.05; For Z_N, μ=0.001 and σ= 0.05 and; For Z_L, μ=0.001 and b=0.05 and new series are obtained randomly with related parameters. The descriptive features of the new series are given in Table 3.

Table 3: Descriptive statistics of the new series

Statistics	Z_U	Z_N	Z_L
Mean	0.025760594	0.003139598	-0.000436577
Standard Error	0.000366728	0.00129794	0.001847796
Median	0.0258046	0.0025535	0.0002996
Mode	0.0445557	-0.0030742	-0.0722151
Standard Deviation	0.014113065	0.049949619	0.07111014
Sample Variance	0.000199179	0.002494964	0.005056652
Kurtosis	-1.201769832	-0.200077025	3.176802375
Skewness	-0.03315116	0.040730351	0.08673889
Range	0.0489053	0.3380813	0.6874679
Minimum	0.0010714	-0.1684551	-0.3235674
Maximum	0.0499767	0.1696262	0.3639005
Sum	38.1514394	4.649745	-0.6465705
Observation	1482	1482	1482

Z_U, Z_N, and Z_L series are added to a_t values of each air carrier and 3 new series of a_iZ_{Ui}, a_iZ_{Ni}, and a_iZ_{Li} and i=[1,10] are ensured for 10 air carriers. The descriptive statistics of the 40 series (a_t, a_iZ_{Ui}, a_iZ_{Ni}, and a_iZ_{Li}) are in Appendix 2.

Table 4: Standard Deviation Ratio of Airline Companies

Airlines	**Standard Deviation (VaR)**			
	σa_i	σ a_i +ZU_i	σa_i + ZN_i	σa_i + ZL_i
LUV	0.019033	0.023584	0.002703	0.075028
SKYW	0.033667	0.036645	0.059437	0.07868
ALK	0.022479	0.037592	0.096756	0.091956
DAL	0.022617	0.026867	0.055394	0.075026
UAL	0.031356	0.034814	0.059597	0.078237
ALGT	0.027713	0.031576	0.053408	0.031576
AAL	0.033287	0.036539	0.060474	0.078789
JBLU	0.030016	0.033404	0.05876	0.077369
HA	0.062673	0.065003	0.079471	0.095709
SAVE	0.035442	0.038063	0.061022	0.081051

Discussions, Conclusion And Suggestions

The use and utilization of distributions in the risk-oriented analysis are general in financial literature (Arbia et al., 2020; Hagerman, 1978), and their importance is also confirmed by Akgiray and Booth (1988) and Goldie and Grübel (1996**)**. The research is designed on three important hypotheses. According to the results, all of the hypotheses are supported in the air carriers industry of the United States. In probability, fat-tailedness means leptokurtic distribution and high-risk behaviour in time series. Otherwise, thin-tailedness is referred to as platykurtic distribution and low-risk behaviour in the dataset. The hypothesis table is given in Table 6 for idiosyncratic (a_t) and market (systematic) (b_t) components of the stock return (R_t).

Table 5: Hypotheses Table

Condition	**Return component**		**Total Return (R_t)**	**Risk**
	a_t	**b_t**		
0	Leptokurtic	No market return	Leptokurtic	The lowest
Hypothesis 1	Leptokurtic	Leptokurtic (Laplace Distribution)	Leptokurtic	The highest
Hypothesis 2	Leptokurtic	Platykurtic (Uniform Distribution)	Leptokurtic	Higher
Hypothesis 3	Leptokurtic	Mesokurtic (Normal Distribution)	Leptokurtic	Much Higher

For the period of 1.02.2018 to 29.12.2023, it can be said that the idiosyncratic nature of the company returns is especially high because of the COVID-19 process. This paper hypotetically tries to change the market financial structure with the data derived from uniform, Laplace and normal distributions. They can be the examples of the utmost form of Platy, Lepto and Meso kurtosis. The returns are the riskiest form in the third condition, and one of the causes of it can be the outlier principle. According to the literature, these findings show conformity with the analysis of Lu and Chen (2010), which states that the leptokurtic distributions include high risks in the oil price risk in transportation services. Mahmoud and Naoui (2018) and Ha (2022) state that leptokurtic distributions reflect higher losses and profits than a normal distribution. Therefore, the higher the kurtosis is, the higher the probability of having significant losses or profits. It should be not forgotten that market risks carry systematic characteristics (Hedström et al., 2022). Sarraj and Mabrouk (2021) and Duan and Wei (2009) underline that systematic risk models can carry leptokurtic characteristics. Gradojevic and Caric (2017) state that the description of systematic risks and their detection of them are important for market participants.

This research is designed to detect the correct financial structure for companies and investors. In particular, the situation of institutional and individual investors can change depending on the financial market conditions. This research proves the impacts of market returns on stock returns. For this cause, financial market participants should follow the market-based risk to yield more profit or to benefit from volatile structures.

References

Akgiray, V., & Booth, G. G. (1988). The stable-law model of stock returns. *Journal of Business & Economic Statistics*, *6*(1), 51-57.

Akyildirim, E., Corbet, S., Efthymiou, M., Guiomard, C., O'Connell, J. F., & Sensoy, A. (2020). The financial market effects of international aviation disasters. *International Review of Financial Analysis*, *69*, 101468.

Akyildirim, E., Corbet, S., Nicolau, J. L., & Oxley, L. (2025). Understanding reputational disaster during economic crises: Evaluating aviation sector response differentials. *Tourism Management*, *106*, 105028.

Arbia, G., Bramante, R., & Facchinetti, S. (2020). Least quartic regression criterion to evaluate systematic risk in the presence of co-skewness and co-kurtosis. *Risks*, *8*(3), 95.

Athanasiadis, T. (2015). Volatility Forecasting in Futures Markets: A Statistical and Value-at-Risk Evaluation. *Available at SSRN 2694314*.

Basak, S., & Shapiro, A. (2001). Value-at-risk-based risk management: optimal policies and asset prices. *The review of financial studies*, *14*(2), 371-405.

Berkowitz, J., Christoffersen, P., & Pelletier, D. (2011). Evaluating value-at-risk models with desk-level data. *Management Science*, *57*(12), 2213-2227.

Brooks, C., & Persand, G. (2003). The effect of asymmetries on stock index return value-at-risk estimates. *The Journal of Risk Finance*, *4*(2), 29-42.

Chen, T. and Huang, C. (2019). A two-tier scenario planning model of environmental sustainability policy in Taiwan. Sustainability, 11(8), 2336. https://doi.org/10.3390/su11082336,

Cook, D., Mayer, R., & Doy, G. (2023). Crises and the resilience of the aviation industry: A literature review of crises and airline responses. *Transportation Research Procedia*, *75*, 33-42.

Danielsson, J., & De Vries, C. G. (2000). Value-at-risk and extreme returns. *Annales d'Economie et de Statistique*, 239-270.

Debnath, P., Shantharam, S. A., Dwarampudi, A. R., & Vidya, D. S. (2020). A study on the causes of the financial crisis in the Indian aviation industry with special reference to–Kingfisher Airlines. Journal of Management (JOM), 7(1).

Doan, M. P. (2011). *The roles of systematic skewness and systematic kurtosis in asset pricing* (Doctoral dissertation, RMIT University).

Duan, J. C., & Wei, J. (2009). Systematic risk and the price structure of individual equity options. *The Review of Financial Studies*, *22*(5), 1981-2006.

Faizuloyeva N., Olechowska K. (2021) Financial condition and bankruptcy likelihood in aviation on the example of the Aeroflot company. *Financial Internet Quarterly* 17 (4), pp. 50-69.

Fama, E.F., "The Behavior of Stock-Market Prices," Journal of Business, 38 (January 1965), 34-105.

Favre, L., & Galeano, J. A. (2002). Mean-modified value-at-risk optimization with hedge funds. *Journal of Alternative Investments*, *5*(2), 21-25.

Filiasi, M., Livan, G., Marsili, M., Peressi, M., Vesselli, E., & Zarinelli, E. (2014). On the concentration of large deviations for fat-tailed distributions, with application to financial data. *Journal of Statistical Mechanics: Theory and Experiment*, *2014*(9), P09030.

Ghaoui, L. E., Oks, M., & Oustry, F. (2003). Worst-case value-at-risk and robust portfolio optimization: A conic programming approach. *Operations research*, *51*(4), 543-556.

Giot, P., & Laurent, S. (2003). Value-at-risk for long and short trading positions. *Journal of Applied Econometrics*, *18*(6), 641-663.

Glasserman, P., Heidelberger, P., & Shahabuddin, P. (2002). Portfolio value-at-risk with heavy-tailed risk factors. *Mathematical Finance*, *12*(3), 239-269.

Gradojevic, N., & Caric, M. (2017). Predicting systemic risk with entropic indicators. *Journal of Forecasting*, *36*(1), 16-25.

Ha, L. T. (2023). Fat tails and network interlinkages of crude oil and cryptocurrency during the COVID-19 health crisis. *Journal of Economic Studies*, *50*(5), 1087-1104.

Haas, M., & Pigorsch, C. (2009). Financial Economics, Fat-Tailed Distributions. *Encyclopedia of Complexity and Systems Science*, *4*(1), 3404-3435.

Hagerman, R. L. (1978). More evidence on the distribution of security returns. *The journal of finance*, *33*(4), 1213-1221.

Hall, J. A., Brorsen, B. W., & Irwin, S. H. (1989). The distribution of futures prices: A test of the stable Paretian and mixture of normals hypotheses. *Journal of Financial and Quantitative Analysis*, *24*(1), 105-116.

Hedström, A. P., Uddin, G. S., Rahman, M. L., & Sjö, B. (2024). Systemic risk in the Scandinavian banking sector. *International Journal of Finance & Economics*, *29*(1), 581-608.

Hendricks, D. (1996). Evaluation of value-at-risk models using historical data. *Economic policy review*, *2*(1).

Hoga, Y., & Demetrescu, M. (2023). Monitoring value-at-risk and expected shortfall forecasts. *Management Science*, *69*(5), 2954-2971.

Hsu, D. A., Miller, R. B., & Wichern, D. W. (1974). On the stable Paretian behavior of stock-market prices. *Journal of the American Statistical Association*, *69*(345), 108-113.

Jorion, P. (1996). Risk 2: Measuring the risk in value at risk. *Financial Analysts Journal*, *52*(6), 47-56.

Jorion, P. (2002). How informative are value-at-risk disclosures? *The Accounting Review*, *77*(4), 911-931.

Kuester, K., Mittnik, S., & Paolella, M. S. (2006). Value-at-risk prediction: A comparison of alternative strategies. *Journal of Financial Econometrics*, *4*(1), 53-89.

Lanne, M., Liu, K., & Luoto, J. (2023). Identifying structural vector autoregression via leptokurtic economic shocks. *Journal of Business & Economic Statistics*, *41*(4), 1341-1351.

Lau, A. H. L., Lau, H. S., & Wingender, J. R. (1990). The distribution of stock returns: New evidence against the stable model. *Journal of Business & Economic Statistics*, *8*(2), 217-223.

Linsmeier, T. J., & Pearson, N. (1996). *Risk Measurement: An Introduction to Value at Risk*. University Library of Munich, Germany.

Lu, J. R., & Chen, C. C. (2010). Effect of oil price risk on systematic risk from transportation services industry evidence. *The Service Industries Journal*, *30*(11), 1853-1870.

Lu, J. R., & Chen, C. C. (2010). Effect of oil price risk on systematic risk from transportation services industry evidence. *The Service Industries Journal*, *30*(11), 1853-1870.

Maciel, L. (2021). Cryptocurrencies value-at-risk and expected shortfall: Do regime-switching volatility models improve forecasting? *International Journal of Finance & Economics*, *26*(3), 4840-4855.

Mahmoud, I., & Naoui, K. (2017). Measuring systematic and specific risk: Approach mean-entropy. *Asian Journal of Empirical Research*, *7*(3), 42-60.

Mahmoud, I., & Naoui, K. (2017). Measuring systematic and specific risk: Approach mean-entropy. *Asian Journal of Empirical Research*, *7*(3), 42-60.

Manganelli, S., & Engle, R. F. (2001). Value at risk models in finance.

Moore, D. S. and McCabe, G. P. *Introduction to the Practice of Statistics, 3rd ed.* New York: W. H. Freeman, 1999.

Moser, C. (2018). *Tail event probability for different distribution functions: A comparison* (Bachelor's thesis, Humboldt-Universität zu Berlin).

O'Regan, M. (2011). On the edge of chaos: European aviation and disrupted mobilities. *Mobilities*, *6*(1), 21-30.

Peng, S., Yang, S., & Yao, J. (2023). Improving value-at-risk prediction under model uncertainty. *Journal of Financial Econometrics*, *21*(1), 228-259.

Goldie, C. M., & Grübel, R. (1996). Perpetuities with thin tails. *Advances in Applied Probability*, *28*(2), 463-480.

Perry, P. R. (1983). More evidence on the nature of the distribution of security returns. *Journal of Financial and Quantitative Analysis*, *18*(2), 211-221.

Pindyck, R. S. (2011). Fat tails, thin tails, and climate change policy. *Review of Environmental Economics and Policy*.

Praetz, P. D. (1972). The distribution of share price changes. *Journal of Business*, 49-55.

Rabemananjara, R., & Zakoian, J. M. (1993). Threshold ARCH models and asymmetries in volatility. *Journal of Applied Econometrics*, *8*(1), 31-49.

Sarraj, M., & Ben Mabrouk, A. (2021). The Systematic Risk at the Crisis—A Multifractal Non-Uniform Wavelet Systematic Risk Estimation. *Fractal and Fractional*, *5*(4), 135.

Stoyanov, S. V., Rachev, S. T., Racheva-Iotova, B., & Fabozzi, F. J. (2011). *Fat-tailed models for risk estimation* (No. 30). KIT Working Paper Series in Economics.

Taneja, N. K. (1990). Introduction to Civil Aviation. Journal of Aviation/Aerospace Education & Research, 1(1), 3.

Tri, H. T. and Nga, V. T. (2019). Factors affecting the disparity between Vietnamese gold prices and worldwide gold prices. Journal of Competitiveness, 11(3), 160-172. https://doi.org/10.7441/joc.2019.03.10,

Yu, D. (2021). Divergence of Aviation Finance Markets: Lulls Before the Storm or Growth? *Journal of Structured Finance*, *27*(3), 9-17.

Zhong, L., Cheng, L., Xu, H., Wu, Y., Chen, Y., & Li, M. (2016). Segmentation of individual trees from TLS and MLS data. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, *10*(2), 774-787.

Appendix 1: The list of US air carriers and their markets.

LUV	Southwest Airlines Co (NYSE)
DAL	Delta Air Lines Inc (NYSE)
UAL	United Airlines Holdings Inc (NASDAQ)
ALL	American Airlines Group Inc (NASDAQ)
ALK	Alaska Air Group Inc (NYSE)
JBLU	JetBlue Airways Corp (NASDAQ)
SAVE	Spirit Airlines Inc (NYSE)
ALGT	Allegiant Travel Co (NASDAQ)
SKYW	SkyWest Inc (NASDAQ)
HA	Hawaiian Holdings Inc (NASDAQ)

Appendix 2: The descriptive statistics

	LUV	LUV1P	LUV1L	LUV1M	SKYW	SKYW1P	SKYW1L	SKYW1M	ALK	ALK1P	ALK1L	ALK1M	DAL	DAL1P	DAL1L	DAL1M
Mean	-0.00044	0.025324	-0.00087	0.002703	8.76E-05	0.025848	-0.00035	0.003227	-0.00013	0.026318	0.000893	0.005044	-4.3E-05	0.025717	-0.00048	0.003096
Standard Error	0.000495	0.000613	0.00195	0.001388	0.000875	0.000952	0.002044	0.001544	0.000584	0.000977	0.002389	0.002514	0.000588	0.000698	0.00195	0.001439
Median	-0.00048	0.024815	-0.00078	0.000812	-0.00103	0.025587	-0.00111	0.00263	-0.00023	0.025562	-0.00094	0.002478	-0.00032	0.024976	-0.00082	0.00056
Mode	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Standard Deviation	0.019033	0.023584	0.075028	0.053408	0.033667	0.036645	0.07868	0.059437	0.022479	0.037592	0.091956	0.096756	0.022617	0.026867	0.075026	0.055394
Sample Variance	0.000362	0.000556	0.005629	0.002852	0.001133	0.001343	0.006191	0.003533	0.000505	0.001413	0.008456	0.009362	0.000512	0.000722	0.005629	0.003069
Kurtosis	4.99434	1.851705	2.798146	-0.08295	34.33097	25.91307	3.24844	2.938402	9.640325	376.6249	167.8565	665.6407	10.7623	5.838224	2.741854	0.015878
Skewness	0.044509	0.08037	0.083967	0.099629	0.332524	0.134588	0.166431	0.094551	0.319288	13.83434	7.538264	21.15725	-0.08544	-0.04481	0.11902	0.121498
Range	0.232736	0.243497	0.684809	0.332179	0.814698	0.834081	0.837606	0.792887	0.330255	1.187899	2.395783	3.226357	0.333023	0.340772	0.692831	0.384792
Minimum	-0.13022	-0.10461	-0.32853	-0.16411	-0.40107	-0.39502	-0.37019	-0.39229	-0.16003	-0.1346	-0.34248	-0.17305	-0.19247	-0.16704	-0.33162	-0.2055
Maximum	0.102514	0.138888	0.35628	0.16807	0.413623	0.439056	0.467421	0.400599	0.170225	1.053302	2.053302	3.053302	0.140551	0.173733	0.361214	0.179295
Sum	-0.64617	37.50527	-1.29274	4.003571	0.129742	38.28118	-0.51683	4.779487	-0.19893	38.97688	1.322432	7.469872	-0.06439	38.08704	-0.71097	4.58535
Count	1481	1481	1481	1481	1481	1481	1481	1481	1481	1481	1481	1481	1481	1481	1481	1481

	UAL	UAL1P	UAL1L	UAL1M	ALGT	ALGT1P	ALGT1L	ALGT1M	AAL	AAL1P	AAL1L	AAL1M
Mean	-0.0003	0.025462	-0.00074	0.002841	-0.00052	0.025242	-0.00096	0.002621	-0.00085	0.024908	-0.00129	0.002287
Standard Error	0.000815	0.000905	0.002033	0.001549	0.00072	0.000821	0.001981	0.0015	0.000865	0.000949	0.002047	0.001571
Median	-0.00118	0.024345	-0.00096	0.001683	-0.00097	0.024498	-0.00054	0.001647	-0.00235	0.02266	-0.00293	0.000362
Mode	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Standard Deviation	0.031356	0.034814	0.078237	0.059597	0.027713	0.031576	0.076224	0.057709	0.033287	0.036539	0.078789	0.060474
Sample Variance	0.000983	0.001212	0.006121	0.003552	0.000768	0.000997	0.00581	0.00333	0.001108	0.001335	0.006208	0.003657
Kurtosis	11.44093	7.968269	2.47123	0.610005	9.751645	5.229375	2.46508	0.457893	24.56442	16.86168	2.770236	1.617795
Skewness	0.393873	0.294516	0.084108	0.1792	0.488681	0.244837	0.106175	0.183032	2.08271	1.605183	0.135401	0.425598
Range	0.462593	0.467287	0.681822	0.501844	0.447484	0.432859	0.69218	0.517527	0.623119	0.626807	0.807479	0.604248
Minimum	-0.25587	-0.23044	-0.3294	-0.2689	-0.23627	-0.21084	-0.32675	-0.2493	-0.20522	-0.17979	-0.38875	-0.21824
Maximum	0.206719	0.236846	0.352427	0.232946	0.211213	0.22202	0.365429	0.268231	0.4179	0.447022	0.418727	0.386005
Sum	-0.44257	37.70887	-1.08914	4.207178	-0.76831	37.38313	-1.41488	3.881438	-1.26286	36.88858	-1.90943	3.386884
Count	1481	1481	1481	1481	1481	1481	1481	1481	1481	1481	1481	1481