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Original Article

Descriptive and Correlation Analysis of Income, Spending, and Commodity Turnover in Azerbaijan's Transport Sector

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Abstract: *There has been a stunning growth of the Azerbaijani air transport industry in recent years. In the context of the air transport system, this paper makes a statistical evaluation/comparison between commodity turnover and incomes/outgoings of the circulation of goods in air traffic services. Descriptive statistics of revenue and costs are shown, with covariance (correlation) between the two variables being analysed. A jumps test of the commodity turnover graph demonstrates a perpetual upward movement, with air transport serving as an example of technology and modern development.*

Pipeline transport is one of the most fundamental components of energy, national and international logistics, enabling continuous, long-distance, and cost-effective movement of crude oil, natural gas, refined petroleum, and a variety of chemicals from producers to consumers. Approximately millions of kilometers of interconnected pipelines create network systems within strategic corridors across the globe, ensuring energy security and the progress of industrial growth. For a detail account of Azerbaijan's History 4 travel industry as well data on its pipeline network and developments see Stepanov et al (2000) -Travel Related Data 13 This study investigates the growth in structure and transportation capacity of Azerbaijan's pipeline complement, Azerbaijan's strategic location in the world energy system, as well as the impact that major oil/gas production projects are having on the country's for-profit commodity flows by means of pipelines.

Seaborne transportation is heavily dependent on the development and capabilities of the seaports it serves. Internationally, there are nearly 3,000 major seaports in use that process more than 50 million tons of cargo each year. Some fifteen ports around the globe are responsible for the turnover of more than 200 million tons of cargo annually. There is a marine criticism that has at its core the system of international trade, and which is an important part of global tourism, as cruise travel is increasingly popular. The maritime sector is becoming increasingly competitive due to growing competing modalities of containerized shipping and broadening port services. Due to this competition, the ships owned by companies in industrialised countries and operated under flags which are cheaper to register (such as "flags of convenience") have been transferred overseas, leading to lower fees from the ship owners' own market. As a result, countries like Panama, Liberia and Greece became particularly favorable for ship registry.

Keywords: *Air Transport, Income, Expenditure, Descriptive Statistics, Covariance, Correlation, Pipeline System, Descriptive Analyze, Correlation, T-Test.*

I. INTRODUCTION

Throughout the last twenty years, the civil aviation of Azerbaijan has been experiencing rapid growth and has transformed from relative obscurity to the large and dynamic industry it is today. The country's national carrier, Azerbaijan Airlines (AZAL), is based in Baku and operates out of Heydar Aliyev International Airport, an AQTA regional air carrier which spot location that serves as the US Federal Aviation Administration UBAW and the country's largest international gateway. During its existence, AZAL has gradually developed and currently travels to 57 destinations as of 2023.

Significant funds have also been poured into upgrading aviation facilities. After modernization, international status was inaugurated at Nakhchivan, Ganja, Lankaran and Zagatala airports. The opening of Gabala Airport (2012) and Heydar Aliyev International Airport's Terminal 2 (2014) reinforced Azerbaijan's regional aviation status. Fuzuli International Airport (2021) and Zangilan International Airport (2022) were both constructed in the newly liberated territories within an extremely short timeframe, and Lachin International Airport is also currently under construction.

Pipeline transportation has also become more and more significant because of progressively growing worldwide oil and gas production. Pipelines continue to serve as an efficient and dependable means of transporting crude oil, natural gas and petroleum products over long distances. The worldwide pipeline transportation market size exceeded USD 20 billion in 2023 and is further growing.

History The construction of pipelines began in Azerbaijan in 1878 with an oil pipeline from the city of Balakhany, near Baku, to the Black Town, later called Sabunçu, south of Baku. Among the important modern pipelines are Baku–Novorossiysk, Baku–Supsa, the Western Route Export Pipeline and TANAP (The Trans-Adriatic Pipeline). The Baku-Tbilisi-Ceyhan pipeline played a crucial but small role in CACI's role in exporting oil through Georgia. It used to export around 50 million tons of crude oil per year, only from Azerbaijan, into world markets. Azerbaijan's emerging status as a regional gas supplier has bolstered its standing in energy security worldwide.

The importance of shipping to Azerbaijan's economy is also significant as a result of the country's location on the Caspian. Traditionally, the main landing point for oil exports, port infrastructure was recently upgraded with the completion of Alat's Baku International Sea Trade Port , which is capable of handling 25 million tons of cargo and 1 million TEUs at full capacity. There are lines of marine transportation to Russian, Iranian, Kazakh and Turkmen ports providing access to these four countries as well.

The maritime industry of Azerbaijan is also effectively interacting within the documents for adoption of the "Trans-Caspian International Transport Route" (TITR) that corresponds to the modern Great Silk Road. The opening of Baku–Tbilisi–Kars (BTK) railway has made a significant addition to the significance of Alat port as a major logistics center linking Europe and Asia.

II. LITERATURE REVIEW

Imamoglu and Imanov (2008) reach the conclusion that the commercial air transport activities consume large amounts of fossil fuel and CO_2 emissions, which in general deteriorate the environment. The effect of national income, energy consumption and use of fossil fuel on environmental quality is investigated by the authors, taking into account the ARDL model with data covering a period of 108 quarters from 1992 to 2014. Their empirical results validate the presence of EKC for Azerbaijan.

G. Ahmadova's (2009) "Improving Air Transport Infrastructure Management" claims that modernizing the air transport complex of Azerbaijan is crucial for the implementation of the innovative model for economic growth in the country. The report explores outstanding problems with airport and ground-handling infrastructure, their current state and the management of them. By way of systems-based and economic analysis, the author argues that an increase in air facilities is necessary to protect territorial integrity and security, as well as foster socio-economic growth. Various suggestions for a more effective management of infrastructure are made.

Nuray Kazimli's study on "Assessment of the Influences of COVID-19 Pandemic to Aviation Sector in Azerbaijan" analyses how COVID-19 changed customer needs and airline activities. Azerbaijan resumed some flights in 2021, but prices increased to make up for losses, lowering demand from passengers. The research emphasises that further steps are needed to restore the aviation sector to its pre-COVID performance.

In terms of pipeline transportation, it is stated by Babalı (2005) that the aim of constructing the BTC pipeline was to minimise Russian and Iranian influence and maximise Azerbaijan–Georgia–Turkey cooperation. BTC and BTE are two main options for Caspian energy to reach world markets. Geopolitical, for the most part, not economic efficiency considerations played a role in such decisions as Baku the Ceyhan oil pipeline and the Trans-Caspian gas pipeline (Askerov 2008). He also points out that the "Contract of the Century" in 1994 signals a tactical turning point in Azerbaijan's foreign policy.

Azakov (2018) maintains that Azerbaijan has turned into a trusted and cost-effective energy provider for the EU. By 2018, more than $30 billion had been spent on the Southern Gas Corridor, bringing Caspian gas to Europe via a commercially viable and geopolitically steadying pathway. It's a corridor that dramatically strengthens both Europe's energy security and Azerbaijan's position in the region.

A Sabou Aida 2016 Noting that the fate of the Trans-Caspian Gas Pipeline remains uncertain as a result of Russia and Iran's opposition, an unclear EU policy and Turkmenistan's dependence on China. While Azerbaijan stands to gain as a transit state, near-term collaboration is more limited. TCP is only viable if there will be changes in the future of the local energy structure.

In sea transport, researchers have indicated that shipping transportation accounts for more than 80 % of global trade and hence remains the lifeblood of international logistics. According to the 2024 study "Determinants of Maritime Freight Volume Using an Augmented Gravity Model", economic size, port capacity, maritime connectivity and liner service frequency were found to be decisive factors for freight volume. According to the 2023 research "Volatility and Shock Transmission in Maritime Freight Rates: A SARIMAX-EGARCH Approach", it is characterized by high volatility and shock transmission, with freight markets being influenced mainly by global trade cycles, fuel cost fluctuations and geopolitical tensions. Finally, the

2025 study "Profiling Global Maritime Hubs" employs cluster analysis to distinguish different types of ports and finds that trade performance is linked to how well-connected ports are and their position in the global shipping network (Chen 2013; Woxenius 2016), which can assist in assessing port competitiveness.

Recent academic work on Azerbaijan's economic development, trade flows, transport system and macroeconomic conditions provides a holistic portrayal of the changing patterns of its economy. The literature review also covers the following subjects: Food Security; Foreign Trade, Exchange rate and Dynamics; Transport Policy; Investment Flows Participation in Inclusive development; General Assessments on Tourism–Growth Relationships.

(About food security, n.d., presentation) One can find in Huseynova (n.d.) an analytical overview of food security, and the paper highlights that it is not only the production of food that affects security but also transport and distribution systems. Her research draws attention to the systemic quality of food-related economic relations and emphasises secure, efficient commodity circulation as a condition for national economic stability. The State Statistical Committee of Azerbaijan (2024) also supports this type of analysis by detailed national accounts and macroeconomic indicators, providing the indispensable empirical basis for assessing long-term structural patterns.

In foreign trade elasticity, Huseynova and Babazade (n.d.) use econometrics to examine the import–export operations of Azerbaijan in response to fluctuations of the manat exchange rate and population income. Their results confirm the existence of large elasticities and suggest that exchange rate volatility continues to be a key factor in determining trade flows. Backed up by the work of Huseynova & Qurbanova (2025), this is consistent with how state policy acts as a regulator in the transportation and logistics services sector. They contend that government policy interventions influence foreign trade performance positively, in particular, through increased connectivity and market accessibility in Azerbaijan.

There is also a growing literature on macroeconomic adjustment mechanisms. Giving an empirical test of the J-curve and testing the Marshall–Lerner condition for Azerbaijan Alirzayev and Huseynova (2025). Their results indicate that currency devaluation does not initially benefit the trade balance, thereby verifying the existence of the J-curve phenomenon. In the long run, exchange ratej volatilities have a positive effect on trade, which is in line with the Marshall–Lerner condition. This information is vital to policymaking regarding exchange rate strategy in an oil-based economy.

Studies of international capital flows widen the economic debate. Charkasov ve Huseynova (2024), yabancı doğrudan yatırım girişlerinin belirleyicilerini tespit etmek amacıyla ARDL bağımlılık testi yaklaşımını kullanmaktadirlar. They found that macroeconomic stability, institutional quality and openness are the main determinants of location choice for investment. To attract more diversified FDI, attention needs to be paid to improving the competitiveness and regulatory transparency of non-oil sectors, as per their findings.

The effects of industry-specific factors are also influential in the literature. Huseynova and Rzamova (2025) examine the cointegrating relationship between the tourism sector and economic development in the long run. The findings indicate that the positive effect of tourism on national economic growth is an indication to suggest that tourism diversification could reduce the reliance on oil-sector related activities. Likewise, Huseynova (2023) studies the impact of inclusive development indicators on an economy's progress and reveals that increases in living standards, as well as socioeconomic policies and institutional arrangements, all have a beneficial impact on sustainability.

Collectively, the literature emphasizes several consistent themes:

1. Economic diversification through tourism, logistics, and investment policy remains central to Azerbaijan's sustainable growth.
2. Exchange rate dynamics play a decisive role in shaping trade performance, investment flows, transportation and macroeconomic stability.
3. Infrastructure development and state regulation, particularly in transport and logistics, are crucial for strengthening foreign trade competitiveness.
4. Human development and inclusiveness emerge as increasingly important pillars in achieving long-term economic transformation.

Overall, these studies contribute a rich empirical and theoretical foundation for understanding Azerbaijan's evolving economic landscape, highlighting the need for continued diversification, strategic state policies, and enhanced integration into global markets.

III. EMPIRICAL STUDIES

The graph shows the turnover of goods between 1996 and 2024. The degree of economic activity and logistical capability varies every year. Turnover was below 500 units for many years. Between 2004 and 2006, there was a minor

increase. It demonstrates low trade volume and inadequate logistics infrastructure. After 2013, a discernible shift started. By 2019, turnover had steadily risen to 1,000 units. This shift is a sign of more industrial activity and better transportation systems. After 2020, there will be the biggest growth. Within four years, turnover increased dramatically from 1,000 to 3,000 units. Increased import and export activities, significant infrastructural developments, and the post-pandemic economic rebound are some of the drivers.

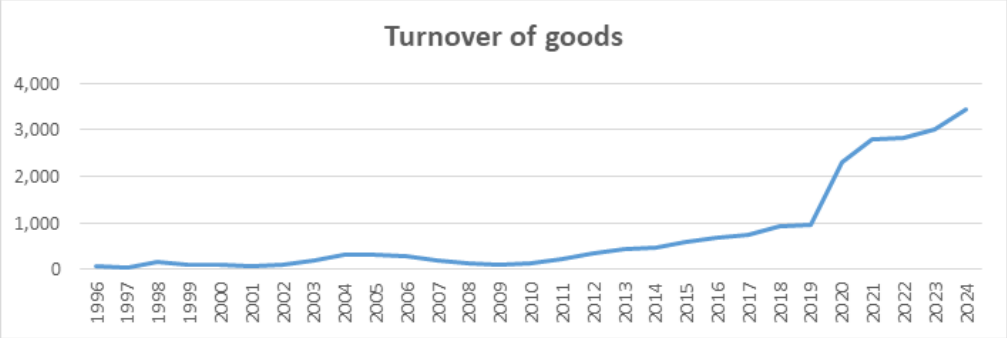

Figure 1. Turnover of goods in air transport

This graph shows us the turnover of goods in the pipeline sector and mechanisms of changes through the years (2000-2024).

After 2006, industry had a period of fast expansion, particularly after the Baku–Tbilisi–Ceyhan (BTC) oil pipeline's construction, and there was a dramatic increase in turnover numbers. The BTC pipeline significantly increased the region's energy export environment once the first oil tanker was loaded at the Ceyhan terminal in June 2006. BTC greatly enhanced the amount of crude oil moved via pipelines by giving Azerbaijan a secure, high-capacity connection to international markets.

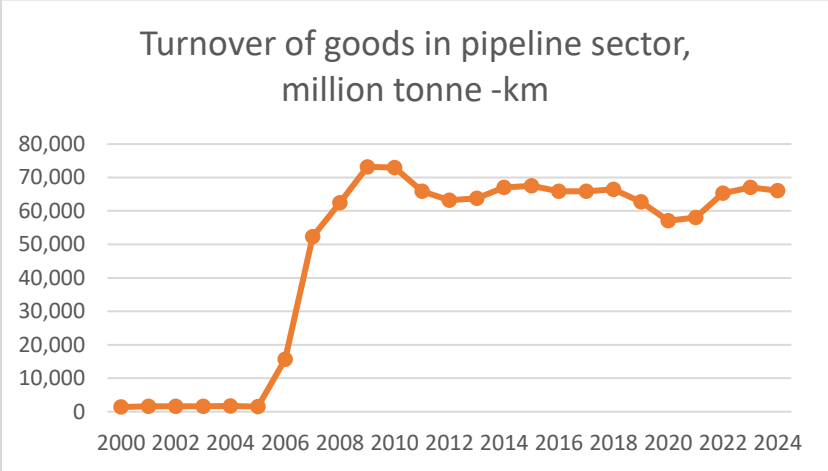

Figure 2. Turnover of Goods in Pipeline Transport

The line graph shows as the line graph of the Turnover of goods in the Sea transport sector.

As we can see here, the turnover of goods in sea transportation started to increase from 2000 to 2006, but from 2007 to 2016, the maritime trade decreased. There are some reasons for this:

A) Relocation of Baku Port (2007-2014)

The old Baku port was overloaded and could not expand. During the construction and relocation to the new Alat(Baku) Port, cargo flow temporarily slowed down, causing:

- Lower shipping volume
- Logistical disruption

B) Sharp decline in global oil prices (2014-2016)

Azerbaijan's maritime cargo depends heavily on oil and oil products. When oil prices fell from around 100$ to 30$:

- Oil export volumes dropped
- Total cargo handled in ports decreased
- Investment in the energy and transport sectors slowed down

C) Devaluation of the Azerbaijani manat (2015-2016)

Azerbaijan experienced 2 major devaluations:

- February 2015: ~33% devaluation
- December 2015: ~48% devaluation

Combined, the manat lost over 80% of its value within a year, and it is directly affected by everything, especially sea transport:

- Higher costs for shipping companies
- Less investment in transport infrastructure
- Businesses shifted to cheaper transport routes

After the country came out of devaluation, its economy and the value of the manat started to increase; maritime transport also increased.

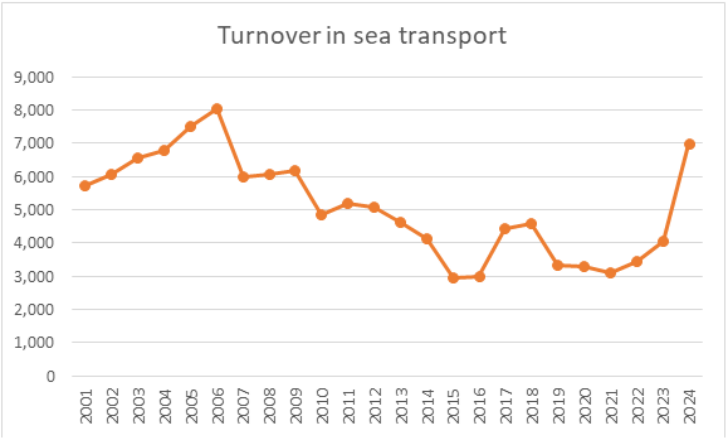

Figure 3. Turnover of Goods in Sea Transport

Data on air travel income and expenditure from 1996 to 2024 are displayed in the graph. It demonstrates how the aviation industry has expanded and evolved throughout time. Income was comparatively modest in the 1990s, but expenses exceeded income. For instance, revenue was 10,553 in 1997, but expenses were 18,718. These years show that the aviation industry is having financial difficulties. Income and expenses started to rise more dramatically in 2006. Between 2006 and 2015, income increased from 109,586 to 531,000. However, because maintaining aircraft services is expensive, spending remained high. By 2021, income had increased from $717,528 in 2016 to more over $3 million. By 2024, spending had also surpassed 4 million. This increase was impacted by a number of reasons, including the growth of air cargo and the expansion of international routes.

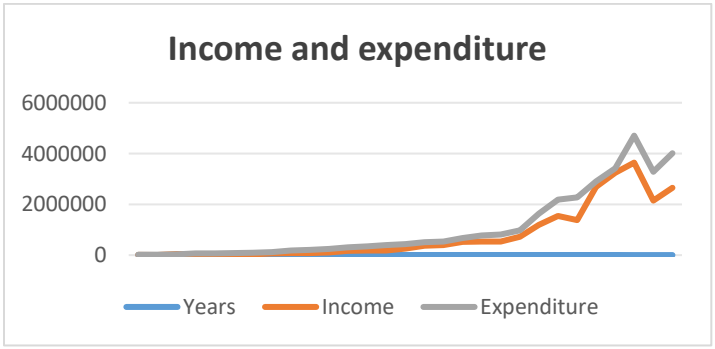

Figure 4. Income and Expenditure in Air Transport

This graph shows which type of transport has a greater impact on the total turnover of pipeline transportation(million tonne-km through the years). We can see both oil and gas pipelines' roles in there, and also observe that the dramatic growth of the total pipeline system is directly related to old pipelines.

There 3 different lines: the yellow line represents the gas pipeline, the gray line represents oil, and the orange line represents the total pipeline. It is evident that the oil industry's turnover of goods began to rise sharply in 2006. Azerbaijan's oil production grew so quickly that it became one of the world's and the region's leading exporters. The primary export oil pipeline connecting Baku, Tbilisi, and Ceyhan began service on July 13, 2006. This pipeline's construction allowed Azerbaijan's "black gold" to be transported to the global market via the quickest and safest path. The Baku-Tbilisi-Ceyhan main export pipeline is now an essential component of Turkey's and Europe's energy security infrastructure.

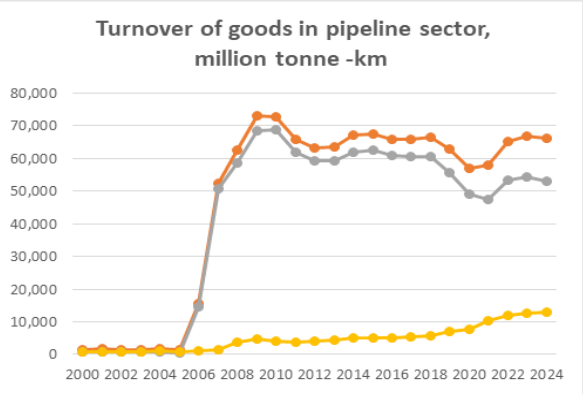

Figure 5. Turnover of Goods in the Gas Pipeline, Oil and Total Pipeline

The table shows descriptive statistics of the turnover of goods. The median turnover value is 310, much lower than the mean of 762.10. It means that the distribution is not symmetrical. The mode, 204, shows that during the observed period, the most repeated amount of turnover of goods is 204. The sample variance of more than one million and the extraordinarily high standard deviation of 1026.37 show that the turnover of goods varies greatly over time. The enormous difference between the lowest value of 39 and the highest value of 3444 indicates that there has been a huge development in air transport over many years. This huge disparity amply illustrates the notable increase in turnover, particularly in the last few years. Distribution is on the right side, according to the turnover data's positive skewness of the turnover data of 1.703. The distribution appears to have heavier tails than a normal distribution, according to the kurtosis value of 1.4956. The descriptive statistics clearly show a sector undergoing transformative growth, with 29 observations and a total turnover of 22,101. Low and steady turnover characterized the early years, but recent years have seen remarkable increases that drastically alter the dataset.

Table 1: Descriptive Statistics of the Turnover of Goods

Turnover of goods	
Mean	762.1034483
Standard Error	190.5929195
Median	310
Mode	204
Standard Deviation	1026.374282
Sample Variance	1053444.167
Kurtosis	1.495636452
Skewness	1.703194072
Range	3405
Minimum	39
Maximum	3444
Sum	22101
Count	29
Largest(1)	3444
Smallest(1)	39
Confidence Level(95.0%)	390.4118974

Total turnover of goods in the transport sector, million tonne-km

In here, Kurtosis is negative, which means that the distribution is soft, so the total turnover of goods is low, with low volatility. Also, Skewness is negative, which means that the distribution is on the left side. Total turnover of goods in the transport sector is decreasing.

Turnover of pipeline, million tonne-km

In here, Kurtosis is negative, which means that the distribution is softness, so the turnover of the pipeline is low, with low volatility. Also, Skewness is negative, which means that the distribution is on the left side. Turnover in the pipeline sector is decreasing.

Table 2: Descriptive Statistics of the Turnover of Goods in Pipeline Transport

Total Turnover of goods in the transport sector, million tonne -km		**Turnover of pipeline, million tonne-km**	
Mean	71681.24	Mean	47513.32
Standard Error	6190.853174	Standard Error	5681.509613
Median	90110	Median	63172
Mode	#N/A	Mode	#N/A
Standard Deviation	30954.26587	Standard Deviation	28407.54807
Sample Variance	958166575.6	Sample Variance	806988787.1
Kurtosis	-0.844001376	Kurtosis	-0.948777321
Skewness	-1.012697841	Skewness	-0.994320157
Range	81756	Range	71824
Minimum	15948	Minimum	1371
Maximum	97704	Maximum	73195
Sum	1792031	Sum	1187833
Count	25	Count	25
Largest(1)	97704	Largest(1)	73195
Smallest(1)	15948	Smallest(1)	1371
Confidence Level(95.0%)	12777.29296	Confidence Level(95.0%)	11726.05952

Table 2 presents the results of the analysis of statistical characteristics of both the Total turnover of goods and the Turnover of goods in Maritime, based on statistical indicators (especially Kurtosis and Skewness)in maritime turnover. It can be observed that trade is weakening. The Kurtosis value for total turnover of goods and turnover of goods in maritime is negative number(-0.402 an -0.976), it means that the distribution is softness and the Skewness for total turnover of goods is also negative which means that distribution is left side(-1.182), but for turnover of goods in maritime is positive, which is distribution is right side(0.208).

Table 3: Descriptive Statistics of the Turnover of Goods in Sea Transport

Total Turnover of Goods		**Turnover of Goods in Maritime**	
Mean	74003.45833	Mean	5081.208333
Standard Error	5983.125277	Standard Error	308.2119012
Median	90209.5	Median	4960.5
Mode	#N/A	Mode	#N/A
Standard Deviation	29311.20799	Standard Deviation	1509.923781
Sample Variance	859146914	Sample Variance	2279869.824
Kurtosis	-0.402328446	Kurtosis	-0.976442348
Skewness	-1.182896614	Skewness	0.208334114
Range	79257	Range	5106
Minimum	18447	Minimum	2937
Maximum	97704	Maximum	8043
Sum	1776083	Sum	121949
Count	24	Count	24
Largest(1)	97704	Largest(1)	8043
Confidence Level(95.0%)	12377.03764	Confidence Level(95.0%)	637.5848949

The table shows the descriptive statistics of income and expenditure. While the mean expenditure is higher at roughly 1,079,924, the mean income is roughly 788,637. This suggests that respondents' average spending level is higher than their average income. Because the median income (256,551) is less than the mean, the distribution may be right-skewed. Expenditure exhibits a similar pattern, with a median of 437,695, which is likewise less than the mean. The standard deviation

of income is 1,072,216, whereas the standard deviation of expenses is 1,361,280, indicating even more variability. This implies that the values of expenditures vary more than those of income. This disparity is further supported by the range: income ranges from 94,385 to 364,299 (range = 363,350), while expenditures range from 17,343 to 4,704,789, indicating a much wider spread.

The skewness values for income and expenses are 1.53 and 1.42, respectively. A small number of extremely high values pulls the distribution toward the upper end, indicating right-skewed distributions, as indicated by both positive values. For both income and expenses, the analysis is based on 29 observations. The recorded total income is roughly 22.87 million, but the total expenditure is much higher at 31.3 million.

Table 4: Descriptive Statistics of Income and Expenditure

Income		**Expenditure**	
Mean	788636.9655	Mean	1079923.828
Standard Error	199105.4504	Standard Error	252783.2921
Median	256551	Median	437695
Mode	#N/A	Mode	#N/A
Standard Deviation	1072215.665	Standard Deviation	1361279.689
Sample Variance	1.14965E+12	Sample Variance	1.85308E+12
Kurtosis	1.19241988	Kurtosis	0.859468377
Skewness	1.5283209	Skewness	1.41952309
Range	3633503	Range	4687446
Minimum	9435	Minimum	17343
Maximum	3642938	Maximum	4704789
Sum	22870472	Sum	31317791
Count	29	Count	29
Largest(1)	3642938	Largest(1)	4704789
Smallest(1)	9435	Smallest(1)	17343
Confidence Level(95.0%)	407849.0266	Confidence Level(95.0%)	517803.1009

Here, the Kurtosis is negative for income from transportation in the transport sector, thousand manats, which means that the distribution is soft. It means income from transportation in the transport sector, thousand manats, has low peaks and low volatility.

Also, Skewness is positive for income from transportation in the transport sector, thousand manats, which means that the distribution is on the right side. There are improvements, growth or development.

Kurtosis is negative for the pie of oil pipeline in total, which means the distribution is soft and has low peaks and low volatility. Skewness is also negative, which means that the distribution is on the left side. It means there is a recession or a recession.

Table 5: Descriptive Statistics of Income from Pipeline Transport

Income from transportation in the transport sector, thousand manats		*Pie of the oil pipeline in total*	
Mean	1352021.483	Mean	820648.6
Standard Error	228013.0817	Standard Error	121393.3
Median	1448865	Median	1127013
Mode	#N/A	Mode	#N/A
Standard Deviation	1227888.023	Standard Deviation	653723.1
Sample Variance	1.50771E+12	Sample Variance	4.27E+11
Kurtosis	-0.839521879	Kurtosis	-1.77885
Skewness	0.413703494	Skewness	-0.36849
Range	3746686	Range	1592673
Minimum	18996	Minimum	6424
Maximum	3765682	Maximum	1599097
Sum	39208623	Sum	23798809
Count	29	Count	29
Largest(1)	3765682	Largest(1)	1599097
Smallest(1)	18996	Smallest(1)	6424
Confidence Level(95.0%)	467063.625	Confidence Level(95.0%)	248663

A comprehensive descriptive statistical comparison of income and expenditure illustrates clear distinctions in their central tendency, dispersion, and distributional characteristics. The average income (137,401) is higher than the average expenditure (128,298.46). The same pattern occurs for Medians. Both of the variables also exhibit high levels of variation (as demonstrated by standard deviations of 53,741.2 and 51,349.95 in terms of income and expenditure, respectively), suggesting that there is a large spread of observations around their respective means, and their distributions also differ.

Income shows a clear positive skewness (1.01), you can infer the distribution is right side and concentration towards lower end with some big observations at higher end, however for the Expenditure it also show little bit of the skewness (0.32) but again structure is in right side then, kurtosis values indicates that income kurtosis as negative (-0.022) which means distribution is flat compare to expenditure and for kurtois providing less peak(i.e., not more thicker). There is also a great spread within both sets: the ranges are 181,385 for income and 170,262.90 for expenditure. Collectively, these statistical indicators provide a rigorous assessment of the central, dispersive, and distributional properties of income and expenditure, thereby contributing to a more comprehensive understanding of their behavior within the dataset.

Table 6: Descriptive Statistics of Income and Expenditure in Sea Transport

Income		**Expenditure**	
Mean	137401	Mean	128298.4583
Standard Error	10969.9	Standard Error	10481.76466
Median	112679	Median	108633.15
Mode	#N/A	Mode	#N/A
Standard Deviation	53741.2	Standard Deviation	51349.95003
Sample Variance	2.9E+09	Sample Variance	2636817368
Kurtosis	-0.0218	Kurtosis	-1.07770786
Skewness	1.01349	Skewness	0.315700831
Range	181385	Range	170262.9
Minimum	71536	Minimum	53466
Maximum	252921	Maximum	223728.9
Sum	3297619	Sum	3079163
Count	24	Count	24
Largest(1)	252921	Largest(1)	223728.9
Smallest(1)	71536	Smallest(1)	53466
Confidence Level (95.0%)	22692.9	Confidence Level (95.0%)	21683.18223

Income and expenditure have a correlation of 0.983, which is very near to +1. This suggests a nearly flawless positive linear relationship. Practically speaking, in this dataset, people with higher incomes nearly always have higher levels of spending.

Table 7: Correlation of Income and Expenditure in Air Transport

	Income	**Expenditure**
Income	1	
Expenditure	0.983038228	1

In correlation calculation, we are finding degree of relation between variables of goods turnover, million tonne-km and investment to fixed capitals, thousand manats. Correlation is higher than 0.7 (>=0.7), which means that there is a **strong relation** between goods turnover, million tonne-km and investment in fixed capital, thousand manats.

Table 8: Correlation of Goods Turnover and Investment in Fixed Capital

	Goods turnover, million tonne-km	**İnvestment in fixed capital, thousand manats**
Goods turnover, million tonne-km	774709235.7	
İnvestment in fixed capital, thousand manats	434001272.1	9145476548

The correlation between income and expenditure is ~0.92, which is $V_{xy} > 0.7$, and they have a strong relationship. According to these data, we can say that people with higher incomes always have higher levels of expenditure.

Table 9: Correlation of Income and Expenditure in Maritime Transport

	Income	Expenditure
Income	1	
Expenditure	0.921619463	1

In correlation calculation, we are finding the degree of relation between variables of income from transportation in the transport sector, thousand manats and investment in fixed capital, thousand manats. Correlation is less than 0.3 (<=0.3), which means that there is a weak relation between income from transportation in the transport sector, thousand manats and investment in fixed capital, thousand manats.

Table 10: Correlation of income and investment with fixed capital

	Income from transportation in the transport sector, thousand manats	**İnvestment in fixed capital, thousand manats**
Income from transportation in the transport sector, thousand manats	1	
İnvestment in fixed capital, thousand manats	-0.006018487	1

IV. DISPERSION

As the dispersion is equal to standard deviation^2, the dispersion for income will be 1072215.665^2, while the dispersion for the expenditure is 1361279.689^2.

As the dispersion is equal to standard deviation^2, the dispersion for goods turnover in pipeline transport will be 28407.54807^2, while the dispersion for the income from pipeline transport is 653723.1^2.

As the dispersion is equal to the standard deviation square, the dispersion for income will be 288116577,44, while the dispersion for the expenditure is 2636817365,002.

T-calculated is 2,048 and t-table is 2,045.T-calculated is bigger than T-table.(t-calculated > t-table)

Table 11: T-Test: Paired Two-Sample for Means for Income and Expenditure in Air Transport

t-Test: Paired Two-Sample for Means		
	Income	Expenditure
Mean	788636.9655	1079923.828
Variance	1.14965E+12	1.85308E+12
Observations	29	29
Pearson Correlation	0.983038228	
Hypothesized Mean Difference	0	
df	28	
t Stat	-4.300075024	
P(T<=t) one-tail	9.35321E-05	
t Critical one-tailed	1.701130934	
P(T<=t) two-tail	0.000187064	
t Critical two-tailed	2.048407142	

- When Tcalculated >= Ttable, it means that the correlation coefficient is important
- When Tcalculated <= Ttable, it means that the correlation coefficient is unimportant

According to observations = 25, Ttable = 2,060 and our t Critical two-tailed (2.063899) is bigger than Ttable.

Table 12: T-Test: Paired Two-Sample Test for Means for Income and Expenditure in Pipeline Transport

	Variable 1	**Variable 2**
Mean	1561102	371286.2
Variance	1.43E+12	1.05E+11
Observations	25	25
Pearson Correlation	0.933087	
Hypothesized Mean Difference	0	
df	24	
t Stat	6.600981	
P(T<=t) one-tail	3.96E-07	
t Critical one-tailed	1.710882	

P(T<=t) two-tail	7.93E-07	
t Critical two-tailed	2.063899	

T-calculated for Income and Expenditure is 2.0687, and t-table 24 observation is equal to two-tailed 2.064, and T-calculated is bigger than T-table(2.0687> 2.064), which means that the correlation coefficient is important.

Table 13: T-Test: Paired Two-Sample Test for Means for Income and Expenditure in Sea Transport

t-Test: Paired Two-Sample for Means		
	Income	Expenditure
Mean	137400.7958	128298.4583
Variance	2888114896	2636817368
Observations	24	24
Pearson Correlation	0.921619463	
Hypothesized Mean Difference	0	
df	23	
t Stat	2.129925472	
P(T<=t) one-tail	0.022048763	
t Critical one-tailed	1.713871528	
P(T<=t) two-tail	0.044097526	
t Critical two-tailed	2.06865761	

V. CONCLUSION

Azerbaijan's air travel industry has experienced significant growth in recent years, according to statistical analysis. In this research, the statistics of the turnover of goods from 1996 to 2024 are observed. The turnover of goods was low in the 1990s and early 2000s; however, it began to increase after 2013. The fastest growth was between 2020 and 2024, due to the opening of new international airports, the development of logistics infrastructure and the recovery of international trade following the pandemic.

Similar changes may be seen in income and expenditure statistics, with both of them experiencing significant increases after 2006. The large positive covariance and high correlation coefficient show that income and spending grew nearly proportionately. All three indicators, turnover, income, and expenditure, show right-skewed distributions, according to descriptive statistics, which also show the structural shift from low early values to abnormally high values in recent years.

At the conclusion, we can say that there is a positive expansion in the turnover of goods in the transport sector in Azerbaijan. Even though there are fluctuations in the tables that come from positive reasons like new projects(BTC, TAP, TANAP), high demand for energy, there are also declining directions that are affected by negative reasons like Covid-19 or political events. There is clear that, Azerbaijan played significant role for world energy system, especially for European countries which these factors effect positively to economical and political power of Azerbaijan.

The research on maritime transport in Azerbaijan from 2001 to 2024 demonstrates how the sector functions as a vital economic driver while showing high vulnerability to internal and external market fluctuations. The statistical data indicate that sea transport goods turnover expanded continuously through the first part of the 2000s before it dropped substantially from 2007 until 2016. The Baku Port relocation, together with worldwide oil price instability and a decrease in the Azerbaijani manat value decrease, caused the sector to experience a major decline. The combination of these events led to short-term shipping problems, which decreased cargo movement while making maritime operations more expensive for shipping companies. The sector began its recovery after 2017, also due to the stability of the country's economy and development around the Baku International Sea Trade Port in Alat, as well as Azerbaijan becoming more involved in the Trans-Caspian International Transport Route. The current increase in maritime transit is due to improved port facilities and Azerbaijan's growing trade links with international markets. The statistical description of income and expenditure data provides important operating features of the sector.

Average income levels exceed expenditure amounts, but both measures fluctuate greatly as a result of economic shocks and changes in oil prices and transportation needs. The close correlation ($r \approx 0.92$) between income and expenditure reveals that revenue growth from maritime business directly translates into higher operational costs. The result of the paired t-test showed a statistically significant difference between the income and expenditure, which confirms the reality of trends observed during data collection. As the research data indicates, sea transportation is a key driver of Azerbaijan's freight network and trading activities. The sector will be developed in a sustainable manner by investment in port facilities, expansion of maritime networks, and participation in international transport partnerships. Improvement of the efficiency of maritime operations will contribute to the aspirations of Azerbaijan in transforming into a leading regional transport hub, as well as increase the economic worthiness of sea transport.

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