GROUP WORK PROJECT **# 1** MScFE 560: FINANCIAL MARKETS
GROUP NUMBER: **5797**

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Statement of integrity: By typing the names of all group members in the text boxes below, you confirm that the assignment submitted is original work produced by the group (excluding any non-contributing members identified with an "X" above).

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Note: You may be required to provide proof of your outreach to non-contributing members upon request.

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Executive Summary

Stock Portfolio: A set 3 **Income Stocks** from the Nigerian Stock Exchange Market was selected to create a portfolio. The 3 assets analyzed include:

- Asset 1: Berger Paints Nigeria Plc– a Nigerian Chemical Industry (*https://simplywall.st/stocks/ng/materials/ngse-berger/berger-paints-nigeria-shares*)
- Asset 2: United Bank for Africa (UBA) – a Nigerian Commercial Bank (*https://simplywall.st/stocks/ng/banks/ngse-uba/united-bank-for-africa-shares*)
- Asset 3: Total Energies Marketing Nigeria Plc – an Energy marketing and distribution industry in Nigeria (*https://simplywall.st/stocks/ng/energy/ngse-total/totalenergies-marketing-nigeria-shares*)

The industries were randomly selected from the Nigeria Stock Exchange market and their periodical data analyzed. The captured data comprises stock price of the each of these assets on yearly basis specifically from FY21 to FY23. The difference in stock price year-on-year (December 31st of one year to December 31st of another) was harnessed to effectively calculate the annualized returns for each asset. I proceeded to the utilize these returns generate descriptive statistics for the data comprising Average Return, Standard Deviation, Skewness and Kurtosis ***(as shown in Table 1.2).*** Other relevant statistics such as a *correlation* and *covariance* in *Table 1.3 and Table 1.4* respectively.

Note: The stocks in the asset class were not assigned weighted averages, therefore deductions are only on the basis of the portfolio's descriptive statistics

Bond Portfolio

Overall Portfolio: The total portfolio saw a average return of 0.47%.
Specific Investments: The 5 Year US Treasury Note (FVX) performed the best individually with a return of 1.30%. Municipal and TIPS bonds (NTNYX, TIP) showed returns while the Short Term Corporate Bond Fund (VCSH) had a nearly neutral performance.
Market Volatility: The 5 Year Maturity US Treasury Note (FVX) displayed the volatility, with a deviation of 5.95%. The overall portfolio had volatility at 2.16%.
Skewness & Kurtosis: All assets exhibited skewness and kurtosis suggesting chances of larger positive returns but also potential for bigger losses. The portfolio showed the skewness among all assets.
Correlations: The 5 Year US Treasury Note (FVX) had the correlation with the overall portfolio. The TIP ETF demonstrated correlations with assets, even slightly negative when compared to the Municipal Bond Fund (NTNYX).
Covariance: Similar trends were observed in covariance measurements underscoring the impact of the Treasury Note on the portfolio.
Key Points
The portfolios performance was generally positive yet modest, in nature.
The performance and risk of the portfolio are greatly influenced by Treasury Notes. There is diversification, in place as TIPS bonds have a correlation with assets. Nonetheless all investments suggest a tendency, towards gains.

Cryptocurrency Portfolio

Overall Portfolio Performance: The consolidated portfolio has an average return of 0.25% with a volatility (standard deviation) of 5.80%. This indicates moderate risk.

Individual Assets:

- Bitcoin (BTC) and Ethereum (ETH) show positive average returns but high volatility.
- Tether (USDT), a stablecoin, has near-zero return and minimal volatility.

Skewness and Kurtosis: The portfolio has a negative skewness and high kurtosis, implying a greater chance of occasional significant losses than significant gains.

Correlations:

- Bitcoin and the overall portfolio are highly correlated, meaning they move in tandem.
- Tether exhibits weak negative correlation with Bitcoin and Ethereum.

Task 2: Safeguarding Crypto Assets After the FTX Incident: An Interview

This paper goes into the FTX scandal. We prepared a mock interview surrounding regulation over cryptocurrencies in the after-math of the scandal. The collapse of FTX shed light, on the vulnerability of customer funds held on exchanges. Experts are discussing a proposed regulation that would require separating customer funds from exchange operations. This rule is designed to enhance customer protection promote transparency and align the crypto industry with established financial security measures.

TASK 1

1.1 Equity Portfolio Summary

A. **Annualized Return Statistics**:

Table 1.1 Annualized Returns

Annualized Returns for period of 3 years (FY21 - FY23)						
Period	Asset 1: Berger Paints Nig Plc		Asset 2: United Bank for Africa		Asset 3: Total Energies Marketing Nigeria	
	Stock Price (in Naira)	Returns (Year on Year)	Stock Price (in Naira)	Returns (Year on Year)	Stock Price (in Naira)	Returns (Year on Year)
Dec-20	7.350	0.000	8.650	0.000	130.000	0.000
Dec-21	8.550	0.163	8.050	-0.069	221.900	0.707
Dec-22	6.000	-0.298	7.850	-0.025	193.000	-0.130
Dec-23	13.000	1.167	25.650	2.268	385.000	0.995

B. Portfolio Statistics

Table 1.2 Portfolio Statistics

Portfolio Statistics			
Statistics	Asset 1	Asset 2	Asset 3
Average	0.258	0.543	0.393
Standard Deviation	0.635	1.150	0.544
Skewness	1.457	1.996	0.187
Kurtosis	2.510	3.988	-4.400

C. Correlation Matrix:

Table 1.3 Correlation Matrix

Correlation Matrix			
	Asset 1	Asset 2	Asset 3
Asset 1	1.000	0.950	0.877
Asset 1	0.950	1.000	0.722
Asset 1	0.877	0.722	1.000

D. Covariance Matrix:

Table 1.4 Covariance Matrix

Covariance Matrix			
	Asset 1	Asset 2	Asset 3
Asset 1	0.346	0.763	0.305
Asset 1	0.763	1.133	0.700
Asset 1	0.305	0.700	0.254

The following are the deductions and discussions from the results obtained:

- **Excess Kurtosis:** The Kurtosis for Asset 1 and 2 is above 1 while Asset 3 is less than 0. This is an indication that the distribution for Assets 1 and 2 are non-Gaussian (i.e. not normal). And as such the standard deviation for these assets are not worthy representatives of the volatility rates of these stocks: it shows greater probability for extreme events of volatility (profits and loss) for these business during this period. Additionally, **Skewness** is the clear differentiator between Asset 1 and 2. Asset 2 is highly (positively) skewed and has higher chance of large gains as well as potential for larger losses.
- **Correlation:** Since the correlation matrix for all three show values that are significantly close to 1, we can assume positive relationship among these assets and ***undiversified*** portfolio. This also indicates high volatility in the portfolio (which further corroborates discussion under "Excess Kurtosis" section of this discussion).
- **Covariance:** Covariance measures the direction in which these assets move when compared to each other. It also tells us how the expected returns of one asset can be altered just by simply diversifying an investment portfolio (I, e. combining stocks). From the table, it is observed that
    - ✓ Combining Asset 1 with Asset 2 in the same portfolio effectively increases the rate of return of the portfolio (with an increase from 0.346 to 0.763) unlike Asset 3 that negatively impacts on the rate of return of Asset 1, when combined.
    - ✓ Asset 2 should not be combined with any of the other assets as they both significantly cause a decline in it expected return.
    - ✓ Combining Asset 3 and 1 clearly increased the returns (from 0.254 to 0.346), yet opting for the Asset 2 instead, gives a higher yield (of 0.700).

Having meticulously analyzed the portfolio on the basis of the descriptive statistics of the results, we need to determine if there are any probable credit risk as well the possibility for selling any of these assets short.

Short selling: Interestingly, each and every asset in the portfolio can be sold short. Of course, short selling is riskier than going long in that there could be an unprecedented spike in the price of capital investments after short selling. Income stocks are similar to fixed income securities, hence dividend payments (which is a representation of the contribution of the investor's capital investment to the periodical income of the company) are guaranteed for stockholders in the event that company actually decide to pay dividends to its stockholders and not retain its earnings at the end of fiscal period. It is safe to state that short selling a portfolio with preemption that stock prices would fall could be very risky for any investor.

<u>Shorting Process Mechanics for Investors entails:</u>

1. Borrowing Shares: A broker find shares of the stock to short and goes on to borrow it temporarily.
2. Selling the Shares: And then sell these borrowed shares at the market price.
3. Repurchasing Shares: later on, buy back the number of shares at a price that is hopefully lower.
4. Returning the Shares: and finally returns the borrowed shares back to the lender.
5. Profit/Loss Outcome: If the stock price decreases profit is made from the difference between the sale price and repurchase price (minus borrowing fees). However, if the stock price increases a loss incurred

Credit Risk: As earlier stated, dividend payments are a guarantee for stockholders. However, in the event that the company who own these assets default in the payment of dividends (if eventually the company shareholders decide to do this), the company would most likely lose invaluable investors as a result of mistrust. Investors would most likely short sell their stocks – which would ultimately crash stock prices. Also, if the company eventually goes bankrupt, stockholders and other general creditors take priority in terms of debt payments according to Bankruptcy law ***(Fordham Journal of Corporate & Financial Law, 551)***

1.2 Government & Corporate Bonds Summary

Assets chosen:

Nuveen New York Municipal Bond Fund (NTNYX) [0.2]	5-year maturity US Treasury Note (FVX) [0.4]	Vanguard Short-Term Corporate Bond Index Fund (VCSH) [0.25]	iShares TIPS Bond ETF (TIP) [0.15]	Consolidated Portfolio [1]

- **Average Return**
  - Nuveen New York Municipal Bond Fund (NTNYX): -0.09%
  - 5-year maturity US Treasury Note (FVX): 1.30%
  - Vanguard Short-Term Corporate Bond Index Fund (VCSH): -0.05%
  - iShares TIPS Bond ETF (TIP): -0.11%
  - Consolidated Portfolio: 0.47%
- **Volatility (standard deviation)**
  - Nuveen New York Municipal Bond Fund (NTNYX): 0.92%
  - 5-year maturity US Treasury Note (FVX): 5.95%
  - Vanguard Short-Term Corporate Bond Index Fund (VCSH): 0.42%
  - iShares TIPS Bond ETF (TIP): 0.94%
  - Consolidated Portfolio: 2.16%
- **Skewness**
  - Nuveen New York Municipal Bond Fund (NTNYX): 39.33%
  - 5-year maturity US Treasury Note (FVX): 54.00%
  - Vanguard Short-Term Corporate Bond Index Fund (VCSH): 33.73%
  - iShares TIPS Bond ETF (TIP): -19.34%
  - Consolidated Portfolio: 68.39%
- **Kurtosis**
  - Nuveen New York Municipal Bond Fund (NTNYX): 215.22%
  - 5-year maturity US Treasury Note (FVX): 119.68%
  - Vanguard Short-Term Corporate Bond Index Fund (VCSH): 97.34%
  - iShares TIPS Bond ETF (TIP): 64.22%
  - Consolidated Portfolio: 173.90%

Correlations among assets within the same portfolio

- The Correlation Matrix displays how assets are correlated with each other. A correlation of 1 signifies a strong positive relationship and -1 indicates a strong negative relationship and 0 shows no correlation.

- The highest correlation exists between the 5 year US Treasury Note (FVX) and the Consolidated Portfolio (0.992) indicating they move together.

- The lowest correlation is seen between the iShares TIPS Bond ETF (TIP) and the Nuveen New York Municipal Bond Fund (NTNYX) (0.358) suggesting a relationship.

Covariances among assets within the same portfolio

- A positive covariance suggests they move together while a negative covariance means they move in directions. A covariance of 0 indicates no relationship.

- The strongest relationship is observed between the 5 year maturity US Treasury Note (FVX) and the Consolidated Portfolio (0.002014).

- The lowest covariance is between the Vanguard Short Term Corporate Bond Index Fund (VCSH) and the iShares TIPS Bond ETF (TIP) (0.000017).

Shorting

Q.) Can you short the assets in this portfolio?

Yes it is possible to short the assets in this portfolio. However, factors to consider:

Bond Liquidity: The ease of shorting bonds depends on their liquidity. Bonds that are highly liquid, such, as US Treasuries are easier to borrow and sell short.

Short Selling Restrictions: Some bonds or bond funds may have restrictions on short selling imposed by regulations or their specific structure.

Process of Shorting a Bond Portfolio: is the same as descriven in the Income Stock/Equity Assets Section

Credit Risk

Is there any possibility of credit risk, in this investment portfolio?

Yes every portfolio that includes bonds carries a level of credit risk. This refers to the risk that the bond issuer may fail to make interest payments or be unable to repay the amount upon maturity.

Specific Credit Risks in Your Investment Portfolio

Corporate Bonds: The Vanguard Short Term Corporate Bond Index Fund (VCSH) contains bonds, which generally pose a credit risk compared to government bonds due to the potential for corporate defaults.

Municipal Bonds: The Nuveen New York Municipal Bond Fund (NTNYX) invests in bonds. While these are typically considered safer than bonds they still carry credit risk based on the stability of the issuing municipality.

US Treasury Notes: The 5 year US Treasury Note (FVX), with its short maturity period carries credit risk since the US government is widely regarded as a borrower.

TIPS: The iShares TIPS Bond ETF (TIP) holds inflation protected US Treasury securities effectively reducing credit risk.

1.3 Crypto Currencies

CRYPTOCURENCIES chosen:

BTC	ETH	USDT

- **Average Return**
  - Bitcoin (BTC): 0.37%
  - Ethereum (ETH): 0.35%
  - Tether (USDT): 0.00%
  - Consolidated Portfolio: 0.25%
- **Volatility (standard deviation)**
  - Bitcoin (BTC): 7.91%
  - Ethereum (ETH): 9.78%
  - Tether (USDT): 0.09%
  - Consolidated Portfolio: 5.80%
- **Skewness**
  - Bitcoin (BTC): -6.78%
  - Ethereum (ETH): -53.10%
  - Tether (USDT): 257.05%
  - Consolidated Portfolio: -44.78%
- **Kurtosis**
  - Bitcoin (BTC): 167.14%
  - Ethereum (ETH): 161.30%
  - Tether (USDT): 2984.51%
  - Consolidated Portfolio: 137.68%
- **Correlations among assets within the same portfolio**
  - The Correlation Matrix shows the correlation between each pair of assets. A correlation of 1 indicates a perfect positive relationship, while a correlation of -1 indicates a perfect negative relationship. A correlation of 0 indicates no relationship.
  - The highest correlation is between Bitcoin (BTC) and the Consolidated Portfolio (0.9552). This indicates these 2 assets tend to move in the same direction.
  - Tether (USDT) has a very weak negative correlation with both Bitcoin (BTC) and Ethereum (ETH) (-0.0573 and -0.0443, respectively).

- **Covariances among assets within the same portfolio**
    - The highest covariance is between Bitcoin (BTC) and the Consolidated Portfolio (0.00479).
    - Tether (USDT) has a very low covariance with both Bitcoin (BTC) and Ethereum (ETH) (0.0031 and 0.0048, respectively).

Shorting:
Yes it is possible to sell in this portfolio.
The process involves borrowing shares of an asset from a broker. Selling them with the expectation that their price will decrease. Later they can be bought back at a cost for profit.

Credit Risk:
Yes. there is credit risk associated with the portfolio.
The risk arises from volatility and lack of proper cryptocurrency regulation.
Regulatory challenges could have an impact on the value of these cryptos. This can lead to negatively affecting the performance of the portfolio.

TASK 2

Interviewer: Thank you for tuning in to our report, on the response following the FTX collapse. Today I have the pleasure of speaking with Ms. Sarah Ellis, an expert in financial risk analysis and Mr. Alex Parker, a specialist in cryptocurrency markets. Our conversation will center around a proposed regulation: the separation of customer funds. This particular regulation has gained importance post the FTX incident. We intend to explore its implications on the crypto market thoroughly. Lets kick things off with a question. Ms. Ellis, could you elaborate on what this regulation involves?
Non-Tech (Ms. Ellis): Of course. This regulation is a reaction to the fallout from FTX, where customer funds were utilized for ventures by the exchange itself. It serves as a measure to prevent occurrences in the future. The rule would require exchanges to keep customer deposits in accounts that're entirely distinct from their operational finances—a practice commonly seen in traditional finance but less so in the realm of cryptocurrencies. These segregated accounts would be subject to oversight and regular audits to ensure adherence to regulations—a step, towards enhancing transparency and accountability within the crypto space (Adams, 2022).

Interviewer: Your explanation was very clear: thank you.
Now Mr. Parker, could you explain how this regulation would actually work in practice? What specific steps would need to be taken to ensure its enforcement?

Tech (Mr. Parker): From a point of view putting this regulation into place would require important actions. Firstly exchanges would probably need to partner with custodians who specialize in managing cryptocurrency assets. These custodians have the expertise and resources to safeguard customer funds effectively. Secondly it would be essential to have proof of reserves, in place. This involves providing evidence that shows what assets the exchange holds ensuring they can cover all customer deposits. These measures aim to address a vulnerability highlighted by the FTX incident – the lack of clarity regarding asset holdings (Zhao, 2022).

Journalist: This regulation appears to carry weight. Could you delve deeper into why it's deemed necessary and how it ties into financial oversight principles? How does it fit within the context of regulations?

Non-Tech (Ms. Ellis): Undoubtedly this regulation holds importance in bringing the market closer in line, with established financial frameworks. Consider your traditional bank account – regulations and deposit insurance prevent banks from engaging in behaviors with your money.
They make sure your money stays safe even if the bank fails. Unfortunately similar safeguards have been missing in the world of cryptocurrencies. This has exposed customers to misuse like what happened with FTX. The proposed regulation aims to fill that gap. It's, about ensuring that cryptocurrency exchanges uphold the levels of safety and transparency that customers expect from traditional financial institutions.

Journalist: That sounds reasonable. Now Mr. Parker, are there worries that such regulations could hinder innovation in this changing field? Are there outcomes?

Tech (Mr. Parker): Absolutely finding the right balance is key here. On one side regulations are necessary to safeguard customers and maintain market stability.. Strict custody requirements could pose challenges, for smaller or more experimental exchanges. We also need to recognize that not all crypto assets are identical: some like stablecoins might need approaches. Another concern is if custodial solutions themselves aren't secure enough we might just be transferring the risk elsewhere. It's vital for any regulation to be thoughtfully crafted to address these subtleties.
Journalist: That's a good point.
Now Ms. Ellis, lets delve deeper into FTX. How does this proposed regulation tackle the issues that led to its collapse? What can we glean from the FTX case?
Non-Tech (Ms. Ellis): The FTX incident serves as a warning of the risks, in the cryptocurrency market. FTX neglected fundamental financial responsibilities. Customer funds were mixed with FTXs assets, utilized for risky investments and even to cover losses. This regulation aims to address this by establishing a separation between customer funds and the exchanges operations. The goal is to prevent exchanges from taking risks with customer funds and promote accountability. In cases where an exchange misuses customer funds there should be repercussions (Turner, 2023).
Tech (Mr. Parker): Additionally I want to highlight the importance of transparency in this matter. FTX operated covertly without disclosing details such as their leverage or their connections with Alameda Research, their sister company. All of which were concealed from customers. Implementing fund segregation along with proof of reserve requirements would enhance visibility. Make it more challenging to execute similar deceptive tactics. It is crucial for customers to have access, to information that enables them to make informed decisions (Mackintosh, 2022).
Journalist: The recent FTX controversy has sparked discussions, about behavior. Do you believe this crisis was primarily due to incompetence or intentional fraud? Is there a distinction between the two?
Non-Tech (Ms. Ellis): Unfortunately, its challenging to distinguish between the two. There was negligence, possibly accompanied by ignorance. However when environments lack controls it creates opportunities for activities. The absence of frameworks allowed FTX to conceal losses and engage in behaviors. This serves as a reminder that regulations not prevent incompetence but also act as a deterrent against fraud (Vigna & Goldstein 2022).
Journalist: That's a thought provoking perspective. In your opinion would ethics training or a stronger focus on accountability have made a difference in this situation?. Is fundamental change the key solution?
Tech (Mr. Parker): I have reservations about ethics training being sufficient on its own to address issues. When the potential gains from fraudulent actions are substantial and the perceived risk of detection is low relying on ethics training is insufficient as a deterrent measure. Implementing changes—such as regulations that alter the risk reward dynamics—often proves effective, in preventing similar scandals from occurring. Creating a setting where engaging in actions carries little to no benefit is Coffee, 2003).

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