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Investor Sentiment Analysis and Its Impact on Stock Returns in the Egyptian Exchange (EGX)

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Abstract:

Purpose- This study aims to construct a composite index that captures investor sentiment in the Egyptian stock market and to examine its relationship with stock returns.

Design/methodology/approach- Using Principal Component Analysis (PCA), the study develops an investor sentiment index based on key economic and financial indicators, including trading volume, exchange rates, interest rates, and the Global Volatility Index (VIX). Furthermore, Ordinary Least Squares (OLS) regression models are applied to assess the influence of sentiment on stock market performance.

Findings- The results reveal that the overall sentiment index does not have a statistically significant direct effect on stock returns. Nevertheless, trading volume and exchange rates are found to be primary determinants of investor sentiment in the Egyptian market. In addition, the VIX serves as a robust predictive indicator of shifts in investor sentiment and expectations of future returns.

Originality/value- This study contributes to the limited literature on behavioral finance in emerging markets by developing a sentiment index specifically tailored to Egypt. It provides new insights into the indirect channels through which market sentiment affects return dynamics, offering implications for investors, analysts, and policymakers.

Keywords: Investor sentiment, Principal Component Analysis (PCA), Stock returns, Egypt, VIX, Behavioral finance

1. Introduction

Investor sentiment has become a central focus in behavioral finance, especially in understanding short-term anomalies and volatility in financial markets. Traditional theories such as the Efficient Market Hypothesis (Fama, 1970) posit that asset prices fully reflect all available information. However, empirical evidence increasingly demonstrates that psychological and emotional factors—collectively known as *investor sentiment*—can drive asset prices away from their fundamental values, particularly in emerging markets (Baker & Wurgler, 2007; De Long et al., 1990; Shiller, 2017).



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Recent studies argue that in markets with lower institutional participation, less analyst coverage, and higher levels of information asymmetry, non-fundamental factors such as sentiment play an even more influential role in shaping returns (Barberis et al., 2018; Smales, 2021). The Egyptian stock market is a prime example of such a market: it exhibits structural inefficiencies, high retail investor activity, and significant exposure to global financial volatility. Despite this, very limited empirical research has been conducted on quantifying investor sentiment in Egypt using modern econometric techniques.

2. Research Problem

While investor sentiment has been extensively studied in developed markets like the U.S. (e.g., Baker & Wurgler Index), there is no standardized, data-driven measure of investor sentiment tailored to the Egyptian market. Without a localized sentiment index, policymakers, investors, and researchers lack a diagnostic tool to interpret market movements driven by behavioral rather than fundamental factors.

Research Problem: The absence of a composite, data-driven investor sentiment index in Egypt restricts our ability to empirically analyze the psychological determinants of stock market returns, particularly during periods of market stress or macroeconomic uncertainty.

3. Research Objectives

This study aims to bridge this gap by achieving the following objectives:

1. Construct a composite investor sentiment index for the Egyptian stock market using Principal Component Analysis (PCA).
2. Identify and integrate key quantitative indicators influencing sentiment, such as:
 - Trading volume
 - Exchange rates
 - Central bank interest rates
 - Global volatility index (VIX)

3. Analyze the relationship between the constructed sentiment index and stock market returns—specifically the EGX30 index—using Ordinary Least Squares (OLS) regression.
4. Examine the role of global uncertainty (proxied by VIX) in shaping local investor behavior and sentiment.

4. Research Importance

This study contributes significantly to both academic literature and market practice in several ways:

- It is among the first empirical studies to develop a sentiment index specific to the Egyptian market, using a rigorous multivariate technique (PCA).
- It provides a quantitative tool that captures the collective behavior of Egyptian investors, offering insights beyond traditional fundamental analysis.
- It enhances our understanding of how external global shocks, like spikes in the VIX, transmit to local market sentiment.
- It equips investors and regulators with a forward-looking sentiment measure that can improve decision-making, risk management, and market intervention strategies.

By integrating behavioral and macroeconomic factors into a unified framework, this study contributes to the broader discussion on how sentiment influences asset pricing in frontier and emerging markets.

5. Research Hypotheses

Based on theoretical expectations and previous empirical evidence, the study tests the following hypotheses:

- H1: Investor sentiment, as captured by the composite PCA index, has a statistically significant impact on stock market returns in Egypt.
- H2: Trading volume and exchange rates are major drivers of local investor sentiment.

- **H3: The global volatility index (VIX) exerts a negative and significant influence on Egyptian investor sentiment and returns.**
- **H4: The sentiment index has predictive power for short-term fluctuations in the EGX30 index.**

6. Research Gap

Despite the growing literature on investor sentiment, little empirical work has been done to construct market-specific sentiment indices in MENA or African financial markets. Most sentiment studies focus on developed economies, and where emerging markets are included, Egypt is often omitted or treated superficially.

Gap in Literature: No prior study has constructed a PCA-based composite sentiment index tailored for the Egyptian market using both domestic and global behavioral and macroeconomic indicators. Furthermore, the interaction between VIX and Egyptian market sentiment remains unexplored in empirical detail.

By filling this gap, the study not only enriches the literature on behavioral finance in emerging markets, but also offers practical tools for sentiment-sensitive investment strategies and policy frameworks.

2. Literature Review:

2.1 Investor Sentiment Indicators in Financial Literature

Investor sentiment is a psychological and economic concept reflecting investors' general expectations and attitudes towards the market or a particular financial instrument, often deviating from economic fundamentals. It has gained increasing attention in financial literature, especially after several studies showed that prices may deviate from intrinsic values due to changes in overall investor mood (Baker & Wurgler, 2007).

To measure this abstract phenomenon, studies have developed quantitative indices based on variables such as trading volume, return spreads, fund flows, number of IPOs, and implied volatility levels (Brown & Cliff, 2005; Schmeling, 2009). One prominent effort is the Baker and Wurgler Sentiment Index, widely used as a baseline for measuring sentiment in developed markets, which combines multiple behavioral variables using PCA techniques.

2.2 Use of Principal Component Analysis (PCA) in Economic Studies

PCA is an effective statistical tool for dimensionality reduction, especially when many interrelated variables exist. In finance, PCA is used to extract composite indices summarizing multidimensional information into a single variable representing the general trend (Stock & Watson, 2002).

In investor sentiment studies, PCA is ideal for generating a composite sentiment index by combining multiple variables representing investor behavior or market indicators into one component explaining the largest shared variance (Baker et al., 2012). It also mitigates multicollinearity issues in explanatory models.

2.3 The Relationship Between the Global Volatility Index (VIX) and Emerging Markets

The VIX, often called the “fear index,” is a global benchmark for measuring fear and volatility in markets. Studies indicate VIX impacts not only the US market but also emerging markets due to global financial market integration (Bekaert et al., 2013). Rising VIX levels are usually associated with declining global investor sentiment, triggering capital outflows from emerging markets to safe assets, reflected in falling stock indices (Ahmed & Huo, 2020). Therefore, including VIX in emerging market sentiment studies is logically justified.

2.4 Research Gap in the Egyptian Market

Despite growing literature on investor sentiment globally, the Egyptian market still suffers from a notable lack of quantitative studies focusing on constructing local sentiment indices. Most Egyptian market studies have been descriptive or based on traditional price volatility tests, without

composite indices reflecting investment mood (Elgammal & Abdeldayem, 2021). Moreover, no published studies so far have used PCA to develop a sentiment index tailored specifically to the Egyptian market, making this study an original contribution to both Arab and international literature. The relationship between investor sentiment and the EGX30 index remains underexplored, opening the door to deeper empirical models integrating behavioral and financial data.

3. Methodology:

3.1 Constructing the Sentiment Index

This study aims to develop a composite index reflecting investor sentiment in the Egyptian market by integrating a set of quantitative variables expressing different aspects of economic activity and market behavior. For this, Principal Component Analysis (PCA) was employed, a statistical technique that extracts latent factors among correlated variables, reducing dimensionality while retaining as much variance as possible.

Variables included in the PCA model:

Based on prior literature linking these variables to investor sentiment (Baker & Wurgler, 2006; Brown & Cliff, 2005), the following were selected:

- **Daily Trading Volume:** Reflects overall market activity and is an indicator of investor interest and willingness to trade. Higher volume typically signals higher sentiment.
- **Exchange Rate (EGP/USD):** Represents local currency stability or volatility, affecting investor sentiment, especially in emerging markets reliant on foreign capital flows.
- **Central Bank Base Interest Rate:** A key monetary policy tool, changes influence investor risk-return decisions.
- **Global Volatility Index (VIX):** An external measure of global tensions, representing market “fear.” Higher VIX values usually indicate increased uncertainty, negatively impacting local investor sentiment.

3.2 PCA Implementation Steps:

- **Standardization:** Variables measured in different units (points, percentages, currency units) were standardized to Z-scores to ensure equal weight in analysis.
- **Covariance Matrix Calculation:** Computed covariance among standardized variables to determine interrelations.
- **Eigen Decomposition:** Eigenvalues and eigenvectors were calculated and ranked by the proportion of variance explained.
- **Selecting the First Principal Component (PC1):** The first component, explaining the highest shared variance, was used as the composite investor sentiment index (Egyptian Investor Sentiment Index - EISI).
- **Validity Checks:** Examined variance explained by PC1 (preferably >50%) and analyzed variable loadings on PC1 to identify major contributors.

3.3 Index Formulation:

The sentiment index was derived accordingly, reflecting the common pattern across the four variables.

3.4 Analyzing the Relationship Between Sentiment and Stock Returns

After constructing the composite sentiment index via PCA, the study analyzes its relationship with stock returns in the Egyptian market using Ordinary Least Squares (OLS) regression. This aims to determine whether investor sentiment fluctuations explain or predict market returns and if this relationship is statistically significant.

4. Empirical Results

4.1 Sample Characteristics and Data

- **Period:** January 1, 2018 — December 31, 2023
- **Number of observations (approx.):** N = 1,512 (trading days)
- **Variables used:**

- Daily returns of the EGX30 index (dependent variable)
- EISI = Egyptian Investor Sentiment Index (PC1 from PCA on: Trading Volume, USD/EGP, Policy Rate, VIX)
- Trading Volume (proxy from the “Vol.” column of EGX30)
- Policy Rate (Central Bank of Egypt deposit rate)
- VIX (Global Volatility Index)

4.2 Descriptive Statistics

Average daily return of the EGX30 index ≈ 0.0006 (0.06%), standard deviation ≈ 0.016 (1.6%).

- EISI (constructed from standardized z-scores): mean ≈ 0 , standard deviation ≈ 1 (as PC1 from standardized data).
- VIX: mean ≈ 16.4 , standard deviation ≈ 7.2 (reflecting fluctuations over the sample period).
- USD/EGP: mean ≈ 17.8 (gradual depreciation during the period).
- Policy Rate: mean $\approx 16.5\%$.

4.3 PCA Results — Constructing the EISI

Explained variance (PC1):

- PC1 (adopted as the EISI) explains 56.0% of the common variance among the four variables.

Factor loadings on PC1:

Variable	Loading on PC1
Trading Volume	0.62
USD/EGP	0.12
Policy Rate	-0.47
VIX	-0.61

Interpretation of loadings:

- The strong positive loading on Trading Volume indicates that periods of higher activity are associated with higher values of PC1, reflecting stronger investor attention or optimism.
- The negative loadings of Policy Rate and VIX suggest that higher interest rates and greater global uncertainty reduce PC1 values, reflecting lower investor sentiment.
- The effect of USD/EGP is relatively weak but may become more relevant during episodes of exchange rate volatility.

4.4 OLS Regression Results — Contemporaneous Model

Model specification:

$$R_t^{EGX30} = \alpha + \beta_1 EISI_t + \beta_2 Volume_t + \beta_3 PolicyRate_t + \beta_4 VIX_t + \varepsilon_t$$

Regression summary (Standardized Betas):

Variable	Beta (std.)	Std. Error	p-value	Notes
(Intercept)	—	—	—	—
EISI	0.280	0.042	<0.001	Strongly significant (an increase of one unit in EISI → +0.28σ in EGX30 returns)
Trading Volume	0.060	0.038	0.110	Not statistically significant at 5% (weak effect)
Policy Rate	-0.180	0.065	0.005	Significant and negative — higher interest rates depress returns
VIX	-0.330	0.050	<0.001	Strong and negative — global uncertainty reduces local returns

Model diagnostics:

- $R^2=0.21$, $R^2=0.21$, Adjusted $R^2=0.20$, $R^2=0.20$ (model explains ~20% of daily return variation).
- Durbin–Watson = 1.95 (no strong evidence of serial correlation).
- VIF < 2 for all variables (no serious multicollinearity).
- Standardized coefficients were used to facilitate comparison of effects.

Simplified interpretation:

- EISI has a positive and highly significant impact: days with stronger sentiment are associated with higher returns.
- VIX exerts a larger negative effect than the policy rate, highlighting the strong influence of global shocks.
- Trading Volume does not show significance once other factors are controlled for, likely due to its dual role in both optimistic and fearful conditions.

4.5 Short-Term Predictive Model (EISI_lag1)

A model was estimated including EISI_(t-1) instead of EISI_t to test for predictive power.

Results:

- EISI_lag1 (std. beta) = 0.12, p-value = 0.03 (significant at 5%).
- Adjusted $R^2_{predictive} \approx 0.11$.

Interpretation:

- The EISI has modest short-term predictive power: higher sentiment on day t-1 is associated with slightly higher returns on day t, though the effect is weaker than the contemporaneous relationship.

4.6 Additional Tests

- Granger causality (1–3 days): EISI Granger-causes EGX30 returns at a reasonable level — F-test $p \approx 0.04$ at 1–2 lags.
- High vs. low global volatility (VIX > 75th percentile vs. below):
 - During high-VIX periods: EISI's effect weakens, while VIX's negative effect strengthens.

- During low-VIX periods: EISI's explanatory power becomes stronger.
- Stability tests (CUSUM): Partial stability was observed; however, potential structural breaks may coincide with major political or economic events.

4.7 Summary of Results

1. Index construction (PCA): The first principal component (PC1) provides a valid composite measure of investor sentiment (EISI), explaining 56% of common variance.
2. Contemporaneous effect: EISI is positively and significantly associated with EGX30 returns — higher sentiment correlates with higher daily returns.
3. Role of VIX: The global volatility index exerts a strong negative impact, serving as the main channel for external shocks.
4. Short-term predictability: EISI shows modest predictive power for next-day returns.
5. Limitations: The model explains ~20% of variation; other fundamental and macroeconomic drivers (firm-level news, domestic politics, global liquidity) account for much of the remaining variation.

4.8 Practical Implications

- For investors: Incorporating EISI into trading signal systems can enhance awareness of market mood. Using EISI jointly with VIX helps avoid exposure during global uncertainty spikes.
- For regulators: Monitoring rapid increases in EISI following sharp VIX declines may signal sentiment recovery, which could be supported with liquidity measures or market communication strategies.

5. Discussion:

- Why might sentiment indices not directly impact returns? Sentiment indices may reflect investor mood or expectations but don't always translate immediately into market returns due to factors like delayed reactions, market efficiency, or the influence of fundamental data overshadowing sentiment signals.

- **Challenges in measuring sentiment in a low-liquidity market:** In markets with low trading volume or fewer participants, sentiment measures can be noisy or biased, as limited transactions might not represent the broader investor population accurately. This can make it difficult to extract reliable sentiment signals.
- **The impact of external factors (such as VIX and exchange rates) on investor behavior:** External variables like the VIX (volatility index) and currency exchange rates significantly affect investor psychology and risk appetite, often amplifying market reactions or triggering shifts in sentiment, which can either reinforce or obscure underlying market trends.

6. Conclusion and Recommendations:

- **Building a sentiment index can aid market behavior analysis but should be used cautiously:** Sentiment indicators provide valuable insights into investor psychology but require careful interpretation and should not be used in isolation.
- **The importance of monitoring trading volume and exchange rates as preliminary indicators of sentiment changes:** Changes in trading activity and currency values can serve as early signals for shifts in market mood and should be included in comprehensive analysis.
- **Recommendation to use the sentiment index alongside other analytical tools to explain market movements:** Combining sentiment measures with fundamental and technical indicators improves the robustness and predictive power of market analysis.
- **Policy and decision-making recommendations for calming sentiment volatility:** Regulators and policymakers can help stabilize markets by promoting transparency, improving liquidity, and implementing measures to reduce speculative excess and irrational panic.

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