DOES THE CYCLICALLY ADJUSTED PRICE-TO-EARNINGS RATIO WORK AT THE MACROECONOMIC LEVEL? A GULF COOPERATION COUNCIL ANALYSIS

Wafaa Sbeiti *, Ahmad Alqatan **

* American University of Kuwait, Salmiya, Kuwait
** *Corresponding author*, Arab Open University, Al-Safat, Kuwait
Contact details: Arab Open University, Ardiya Industrial Area, Farwanya, P. O. Box 3322, Al-Safat 13033, Kuwait

OPEN ACCESS

How to cite this paper: Sbeiti, W., & Alqatan, A. (2025). Does the cyclically adjusted price-to-earnings ratio work at the macroeconomic level? A Gulf Cooperation Council analysis. *Journal of Governance & Regulation, 14*(2), 8–17. https://doi.org/10.22495/jgrv14i2art1

ISSN Online: 2306-6784
ISSN Print: 2220-9352

Received: 23.09.2024
Revised: 10.12.2024; 24.02.2025; 27.03.2025
Accepted: 03.04.2025

JEL Classification: E37, G12, G14, G15
DOI: 10.22495/jgrv14i2art1

Abstract

The study aims to investigate the application of the cyclically adjusted price-to-earnings (CAPE) ratio at the macroeconomic level within Gulf Cooperation Council (GCC) economies. The research problem seeks to explore the role of the CAPE ratio in enabling earnings prediction and the ratio's relationship with other valuation metrics. The research methodology utilizes data from the World Bank and Refinitiv Eikon databases. Regression and vector autoregression (VAR) models value the markets at the country and regional levels. The primary variables are the CAPE ratio, price-to-sales (P/S) ratio, and earnings. Regression is used as the primary analytical technique. The sample is for the GCC region from 1999 to 2020. The study finds that the GCC countries (markets) behave differently under the influence of similar shocks and variables. The CAPE ratio was significant at the regional rather than the country level (Radha, 2018; Kenourgios et al., 2022). The study concludes that there is a need for granular market analyses and a reliable framework to facilitate better investment management and economic policy making. The paper's relevance is that it offers new knowledge by demonstrating CAPE's utility in macroeconomic valuation within underexplored contexts.

Keywords: CAPE Ratio, Earnings, Valuation, GCC Region, Valuation, Macroeconomics

Authors' individual contribution: Conceptualization — W.S.; Methodology — W.S.; Software — W.S.; Validation — W.S.; Formal Analysis — W.S. and A.A.; Investigation — W.S. and A.A.; Resources — W.S. and A.A.; Data Curation — W.S.; Writing — Original Draft — W.S.; Writing — Review & Editing — W.S. and A.A.; Visualization — W.S. and A.A.; Supervision — W.S.; Project Administration — W.S.; Funding Acquisition — W.S. and A.A.

Declaration of conflicting interests: The Authors declare that there is no conflict of interest.

1. INTRODUCTION

The business world is influenced by numerous pieces of advice and suggestions on earning positive returns and the interpretation of various available models/theories. The suggestions may be a mathematical model (Weigand & Irons, 2007) or the behavioural theory given by Kahneman and Tversky (1979). The financial sector is frequently being tested by researchers for forecasting and predicting financial and economic variables. The efficient markets hypothesis, proposed by Fama (1965), expects the market to vary on a scale from a weak form and a strong one. Behavioural

anomalies of investors and random walk movements of financial markets make them difficult to generalize and depend on any single model. Thus, behavioural finance is also becoming more prevalent in recent investment strategies.

The cyclically adjusted price-to-earnings (CAPE) ratio is one financial variable of significant interest to researchers. It is used to time and value a market or a firm. It is derived from the seminal work of Dr Robert Shiller and Dr John Campbell (Campbell & Shiller, 1988; Shiller, 2005). As Katsenelson (2010) explained, the CAPE ratio is a valuation method for financial securities based on inflated adjusted earnings over the past ten years and the stock's current market price. The CAPE ratio, also known as the CAPE ratio, is a measure of stock market valuation that considers earnings over 10 years. It is calculated by dividing the current price of the stock market index by the average of the index's inflation-adjusted earnings over the past 10 years. Drudi and Nucera (2022) found that the CAPE ratio is positively related to economic growth and negatively related to the real long-term interest rate. Catanho and Saville (2022) used a modified measure, the excess CAPE yield (ECY), to offer an alternative model for predicting global stock market returns. Pietraszewski (2022) found that the CAPE ratio, price-to-earnings (P/E), market-to-book value, and price-to-sales (P/S) revenue ratios strongly predict cumulative returns in long-term horizons. Cho (2023) observed that investors expect more compensation to hold low sustainability stocks under a negative economic outlook, while they are interested in high sustainability stocks under a positive economic outlook.

The CAPE ratio determines whether the stock market is overvalued or undervalued compared to historical norms. A high CAPE ratio suggests the market is overvalued, while a low CAPE ratio suggests the market is undervalued. Catanho and Saville (2022) found that the CAPEs peak at interest rates between 3% and 5%.

The CAPE ratio can be used to time the market as overpriced, fairly priced, and underpriced (Katsenelson, 2010). As a general professional understanding, a high price-to-earnings (P/E) value for an investment indicates overvaluation (Aydogan & Güney, 1997). Bunn et al. (2014) used the CAPE ratio in the context of sectors in the United States (US) economy and categorized them as overvalued/ undervalued. Shiller (2013) also found that when the value of the CAPE ratio is above 25, the market is considered expensive relative to the market earnings and hence overvalued. The market is fairly priced if the CAPE ratio is between 15 and 25, while it is considered undervalued if this value is below 15 relative to its earning history (Shiller, 2013).

Cho (2023) observes that the economic condition of an economy is an important factor for returns from sustainability stocks. The CAPE ratio has immense utility in the economics domain. Apart from its proven utility in predicting stock returns, the CAPE ratio can also be used to study the relationship between stock market valuation and economic growth. Higher stock market valuations can indicate stronger economic growth, but can also be a sign of overvaluation. By examining changes in the CAPE ratio over time, economists can gain insights into the relationship between stock market valuations and economic growth. It can also be used to evaluate an economy's fiscal policy. If a government implements a policy expected to boost economic growth, this could lead to higher stock market valuations. By examining changes in the CAPE ratio following changes in fiscal policy, economists can evaluate the effectiveness of these policies. Overall, the CAPE ratio is useful for economists and investors to analyze stock market valuations and make informed investment decisions. Its ability to predict long-term stock returns and provide insights into the relationship between stock market valuations and economic growth makes it a valuable tool in economics.

It is generally suggested that in a research study, a researcher must understand the research's theoretical approach so that the research's objective is achieved and it contributes to the literature. The CAPE ratio is a traditional technique applied to value a firm. It is also used to explain the valuations based on firm-level variables. It is interesting to explore the implications of a technique/ratio in different domains, so that its robustness may be tested and new findings may emerge.

The primary research question that the study aims to answer is:

RQ: Does the valuation dynamics of the CAPE ratio operate at a macroeconomic level?

Lansing (2017) and Catanho and Saville (2022) used the CAPE ratio from a macroeconomic perspective. In their research, Waser (2021) and Siegel (2016) have also used a similar methodology based on the CAPE ratio. There were hardly any studies that used the CAPE ratio to value a market for the Gulf Cooperation Council (GCC) region; thus, this study aims to add to the existing literature on the subject.

The CAPE ratio has been applied and tested in different contexts:

- macroeconomic scenario (Radha, 2018);
- stock market returns in emerging markets (Aras & Yilmaz, 2008);
- European market (Kenourgios et al., 2022);
- comparative study on P/E and CAPE ratios (Weigand & Irons, 2007).

Davis et al. (2018) used the CAPE ratio to predict stock returns in the US. Peláez (2021) found that the relative total return CAPE ratio has a short-term signalling value. Radha (2018) framed a country yield forecasting mechanism based on the CAPE for a medium-term yield forecast at a country level. Kenourgios et al. (2022) found the CAPE (5-year earnings) ratio to be an efficient estimator of future returns. Philips and Kobor (2020) improved Shiller's CAPE methodology and used a year return instead of a 10-year return, reducing the forecast error by 40% for a 10-year return. Bunn et al. (2014) applied CAPE for economic sectors, while Radha (2020) used it to forecast country-level returns. Peláez (2021) developed a relative total return CAPE ratio and found that it has a short-term signalling value. Griffin (2002) studied country-specific three-factor models using Fama and French-style models, which are best done within a country. Greenwood et al. (2019) studied the US data for the period (1926–2014) and found that a sharp price increase indicates a price crash.

While the CAPE ratio and gross domestic product (GDP) are important economic indicators, they are different economic barometers, but are connected. An economy's GDP changes may impact its stock market valuations, and consequently, the CAPE ratio may be affected. This relationship may also flow in the inverse direction. For example, strong economic growth may lead to higher

corporate earnings and, thus, higher stock market valuations, which could cause the CAPE ratio to increase. There have been few studies on the application of the CAPE ratio in a macro context (Radha, 2018) and stock market returns, Aras and Yilmaz (2008) for emerging markets, and Kenourgios et al. (2022) for the European market, but hardly any study is found on the application of CAPE ratio in the context of Gulf economies. This research addresses this gap and aims to bring novelty to the existing literature on the subject. Moreover, the economic environment is profoundly influenced by dynamic social, political, and cultural forces — as seen in virtual political campaigns — which effectively reshape communication strategies, and investor sentiment, and reveal how the prevailing cultural context significantly affects earnings management practices (Makni Fourati et al., 2024; Alhaimer, 2025).

Further, the unique features of GCC countries, in terms of their dependence on oil revenues and unique economic dynamics, provide a unique context for testing the macroeconomic applicability of CAPE. As the introduction illustrates, existing studies have explored CAPE in developed and emerging markets. For example, Aras and Yilmaz (2008) examined the CAPE together with other valuation indicators in emerging markets; Kenourgios et al. (2022) assessed the predictive power of CAPE in European markets; and Radha (2018) questioned CAPE in a macroeconomic framework for medium-term yield forecasting in country-level studies. Other research includes a study by Peláez (2021) that highlighted the construction of a relative total return CAPE ratio to examine short-term signals in broader markets, as well as work by Weigand and Irons (2007), who carried out a comparative study between CAPE and P/E ratios for predicting stock returns in developed markets. The studies mentioned above suggest a lack of research focused on GCC markets. As such, this research exercise is intended to fill the existing gap in knowledge through a comprehensive analysis of the effectiveness of the CAPE ratio in earnings predictability at the regional and national levels in the GCC. This focused analysis will take account of economic disruptions and dissimilar inflationary trends. Moreover, in emerging economies like Saudi Arabia, the moderating role of gender in determining enterprise performance highlights the significance of region-specific factors that can influence market valuation metrics, particularly in the context of corporate social responsibility (Arslan et al., 2021; Hassan et al., 2021; Hichri & Alqatan, 2024; Alqatan, 2024; Alqatan et al., 2025). Similarly, a move toward digital transformation in political arenas can foster bold innovation and broader social impact, which in turn may reshape the macroeconomic environment and affect long-term valuation metrics (Alhaimer, 2024).

The paper is structured as follows. Section 2 reviews the existing literature, critically examining the strengths, weaknesses, and gaps in research on CAPE regarding its applicability, predictive ability, and adaptations in light of changing macroeconomic conditions. Section 3 outlines the research methodology used in the study, detailing the research method used and identifying the data collection methods, variables, and analytical techniques. Section 4 presents the results, analyzes the data collected, and provides a detailed discussion. Section 5 provides a comprehensive conclusion and outlines the relevance of the study.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The CAPE ratio, pioneered by Campbell and Shiller in 1988, has become one of the most widely applied tools to assess the long-term valuation of stock markets. This valuation metric normalizes earnings over 10 years, adjusted by inflation to smoothen the short-term volatility in the market. CAPE relies on the premise that longer-term valuations are a far better predictor of subsequent returns for equities than near-term market fluctuations. Over the course, many academic writings have tried and applied the CAPE ratio in various contexts with different economic regimes that try to assess how strong of a predictor this indicator would make. This literature review critically examines the strengths, weaknesses, and gaps in research on CAPE regarding its applicability, predictive ability, and adaptations in light of changing macroeconomic conditions.

The existing literature identifies CAPE about various macroeconomic variables. Drudi and Nucera (2022) contribute to this stand by assessing the relation of CAPE with economic growth, long-term interest rates, and measures of economic volatility. They found that CAPE was positively related to economic growth and negatively related to long-term interest rates and economic volatility. Their study showed that deviations of the CAPE ratio from its fair value were negatively related to future stock returns. Therefore, the relationship implies that CAPE can indicate future market performance, helping investors assess whether the market is overvalued or undervalued. They also document that a model based on deviations of CAPE from its fundamental value outperforms a model using only the level of CAPE, both in-sample and out-of-sample. This study underlines the sensitivity of CAPE to macroeconomic variables, reinforcing its value for market valuation. Similarly, Kenourgios et al. (2022) point out that CAPE significantly influences predicting equity returns. The study found that the relationship between CAPE and future returns is inversely proportional. It means the expected return is lower if the ratio is higher. The use of CAPE as a predictive tool is critical since it ensures that there are effective stock-return estimates.

Waser (2021) extends this work further by presenting a model that explains over 90% of the variation in the CAPE ratio over the last six decades. His study focuses on one key limitation of the CAPE ratio: it is not mean-reverting. According to Waser (2021), one of the most significant drivers of CAPE, inflation, cannot be assumed to be mean-reverting, which complicates using CAPE for long-term forecasting. His model, however, provides a fair-value estimate of the stock market at any point in time and can be used to simulate expected returns under various economic scenarios, including recessions. The author's work is important in showing how prediction capability has been overestimated for the CAPE ratio in some contexts, especially during sustained periods of low inflation or unconventional monetary policy. This, however, points to the intrinsic limitations in using CAPE as the sole determinant of market return forecasts in those environments; Waser's model considers such factors, which is an improvement upon CAPE.

Despite its widespread use, the CAPE ratio has been criticized for losing much of its predictive

power in specific macroeconomic environments, especially those characterized by low interest rates. Catanho and Saville (2022) put forward a modification to CAPE, the ECY, which includes real interest rates in the CAPE formula. The authors find that CAPE peaks in the 3–5% range for real interest rates, but the resulting ECY does not meaningfully enhance the predictive power of CAPE. This finding points to one of the weaknesses of the ability of CAPE to adapt to changing global economic conditions, particularly the long-term decline in interest rates in the past decades. The inability of the ECY model to outperform the traditional CAPE model illustrates the challenge of adapting CAPE to modern economic conditions. Knowledge concerning the cost of capital's effect on CAPE as a valuation indicator's efficiency is at variance; hence, further research is needed to improve those models for the current realities full of low interest rates. In his study, Alshaer (2022) analyzes the CAPE ratio's signalling capabilities and offers an analysis of the performance of the asset pricing models. The results indicate that the CAPE ratio provides a good signal on the returns if analyzed using multiple factors such as value and size. However, the performance was inconsistent as predicted, making it difficult to classify the trading strategies using any valuation signals. Therefore, the studies show that the CAPE ratio is inefficient in predicting stock returns.

Another related theme in the literature involves the interaction of behavioural economics with CAPE. Jacob and Pradeep (2022) investigate the relationship between CAPE and investor behaviour. They document that while a high CAPE results in lower future returns, it is associated with higher demand for initial public offerings and more optimistic earnings forecasts by analysts. Therefore, their findings suggest that high CAPE reflects market overvaluation and investor optimism that fuels demand for new equity issues. The study emphasizes how investor sentiment and market timing interact with CAPE to influence the broader market environment. This behavioural perspective qualifies or even tempers the predictive power of CAPE since it may indeed flash an overvaluation signal, but be moderated by the psychology of investors, pushing market prices further upwards despite fundamental overvaluation.

Marchesi (2024) develops this argument further by analyzing the predictive power of macroeconomic and behavioural variables-investor sentiment-on CAPE fluctuations. Marchesi (2024) merges behavioural factors with macroeconomic data to provide new insights into how psychological factors influence the efficiency of CAPE in predicting market performance. This research underlines one important gap in the literature: how behavioural economics interfaces with macroeconomic fundamentals in determining stock market valuations. While the added depth by Marchesi (2024) is extremely valuable in analyzing the CAPE, it also points to questions of generalizability for the latter as a purely economic model, not considering behavioural dynamics that may drive stock market prices in the short term. The other relevant literature is based on the application and usage of CAPE across a wide range of geographical regions and market conditions. Kenourgios et al. (2022) study the relationship between CAPE and future returns in the Greek stock market, along with other valuation ratios such as P/E and price-to-book (P/B) value. Empirical results show that while P/E and P/B cannot predict future returns, CAPE is a good estimator of future equity return, particularly its five-year version. This also aligns with the work of Keimling (2016), who proves that CAPE can predict long-term returns across 17 MSCI country indices since 1979. While both papers illustrate the power of CAPE in distinct markets, they also highlight that predictive ability may vary across markets with distinct structural characteristics. This would imply a geographical difference in the efficiency of CAPE and could suggest that, compared to other markets, CAPE is reliable in some, raising questions about the need for either CAPE modifications or additional variables to further improve performance in certain contexts.

While CAPE proved efficient in some markets, its limitations have become more apparent with the changing global economic landscape. Siegel (2016) criticizes CAPE's reliance on GAAP earnings and demonstrates that substituting national income and product account corporate profits for using GAAP earnings significantly improves its forecasting ability. This points out one of the critical gaps in CAPE's methodology- that the computation of earnings has changed over time, and using these outdated methods may, therefore, be overly pessimistic when the economic conditions have altered. Siegel's (2016) study infers that future research in CAPE will be more sensitive to these differences in earnings data and investigate measures of earnings that better reflect present economic conditions. Similarly, Chan (2021), in his study, questions the effectiveness of the CAPE ratio because, since 2010, the ratio has risen steadily and has seen a reduction in the global GDP and earning reduction in publicly traded companies. It indicates that the predictive power of the CAPE ratio is weak, and it does not account for the changes in the accounting rules on how to calculate earnings. The study's findings state that the high values in the CAPE ratio result from not considering the changes in variables that affect the ratio. An investor is required to incorporate critical variables when calculating the CAPE ratio to ensure the values are fair.

There are still many gaps despite the vast research effort that has already been invested in CAPE. While there have been studies like those by Drudi and Nucera (2022) and Waser (2021) into the relationship between CAPE and macroeconomic fundamentals, comprehensive research is still limited on how CAPE interacts with newer economic variables such as digitalization, globalization, and geopolitical risks, which may significantly impact stock market valuations and require new models accounting for their influence on CAPE. Second, while behavioural insights have been incorporated into some studies (Jacob & Pradeep, 2022; Marchesi, 2024), more work is needed to explore the psychological and sentiment-driven aspects of market valuations and how these factors interact with economic fundamentals. Lastly, there is limited research on CAPE in emerging markets, and more studies are needed to understand how CAPE can be applied in markets with different economic structures and levels of market development.

Therefore, though the CAPE is still useful in assessing long-term stock market valuations, it is not omniscient, particularly in today's low interest rate and more volatile economic environment. While the literature has progressed with the introduction

of variants of CAPE and incorporating macroeconomic and behavioural variables, further refinements of these models are needed to strengthen their predictive power. Addressing underlying research gaps, particularly in accounting for behavioural factors, regional variations, and evolving economic conditions, will make CAPE more useful for investors and policymakers in mapping increasingly complex market dynamics.

Since this is a macroeconomic cross-country study, two hypotheses are formulated based on the research objective:

H1: The CAPE ratio does not affect the earnings at the country level.

H2: The CAPE ratio does not affect the earnings at the regional level.

3. RESEARCH METHODOLOGY

Cyclically adjusted price-to-earnings ratio has primarily been used to understand stock market returns. The basic rationale of the technique can be modified and applied in different contexts. This research attempts to apply the CAPE ratio in a macroeconomic context and studies data from GCC economies. The primary objective is to understand if a version of the CAPE ratio can be applied successfully at a macroeconomic level. Drudi and Nucera (2022) also worked on applying the CAPE ratio in a macroeconomic setting. Cho (2023) used Shiller's CAPE ratio and the real GDP forecast in his research. Drudi and Nucera (2022) suggest that the CAPE ratio can be used to measure economic volatility using industrial production and inflation data.

The methodology used in this research is based on the CAPE ratio and its application to value national markets and regions. It relies on a structured approach that documents the data sources, variables, equations, and analytical methods to allow the replication of the results.

3.1. Data collection and sources

The basic analysis process adopted in the study includes analysis of basic statistics of the sample data, correlation analysis, and regression analysis. SPSS 20.0 and Gretl software have been used to perform the analysis. The input data files and analysis scripts used in the study can be shared upon request to facilitate replication. The sample period is for the period 1999–2020, and it is segmented into two parts. The data from 1999 to 2008 has been used to calculate average earnings for 10 years, while the data from 2009 to 2020 has been used for analysis. Annual time series data has been extracted from the World Bank and the Refinitiv Eikon databases, offering reliable and comprehensive coverage. Therefore, the study's forecasting horizon is medium to long-term. Two samples were analyzed at the regional (GCC region) and the country level. The average values of all firms are used at the national and regional levels. In similar research, Jivrai and Shiller (2017) have applied the CAPE ratio to forecast country, sector, and firm returns. Kenourgios et al. (2022) applied linear regression based on the price-to-equity ratio, P/B value ratio, and different variants of the CAPE ratio in their research on Greek stock returns. Radha (2018) formulated a country yield forecasting mechanism based on the CAPE for a medium-term yield forecast at the country level.

A simple regression model based on a set of macroeconomic explanatory variables explains fluctuations in the CAPE ratio (Lansing, 2017). Ordinary least squares (OLS) based regression has been used in this study as this standard regression model measures the deviations and is hence effective in estimation (Allen et al., 2017). Additionally, vector autoregression (VAR) has been used to test for the robustness of linear relationships (Ahmad & Premaratne, 2018).

Alternatively, the study can use an autoregressive integrated moving average (ARIMA) since it is an appropriate model for univariate time-series data. It can be extended to vector ARIMA for multivariate analysis (Chiang et al., 2024; Alsaber et al., 2022).

Market capitalization of firms (in USD), share price (in USD), earnings per share (EPS), and sales (in USD) are used as the primary study variables for all the sample firms. Inflation (consumer prices, annual percentage values) has been used as measured by the consumer price index, which reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. As required, the country-level and GCC-level average values have been calculated.

3.2. Summary of variables

This study considers a number of variables, including the following:

- Dependent variable: Earnings per share (*EPS*), aggregated at the regional and country levels.
- Independent variables: *CAPE ratio* and *P/S ratio*.

The sample countries from the GCC region include Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE). Data from a total of 710 firms has been used in the study. Annual average values were calculated at the regional and country levels to capture firms' earnings. Subsequently, a 10-year moving average was calculated for the period 2008–2020, and the annual average inflation rate was subtracted to calculate real earnings. CAPE ratio is calculated as Eq. (1). The process is repeated for analysis at the country level for the six sample countries. Based on Shiller (2013), the CAPE ratio formula used in the study is as per Eq. (1).

$$CAPE\ ratio_{it} = Market\ price/EPS_t\ for\ 10\ years\ adjusted\ for\ inflation \quad (1)$$

Earnings are adjusted differently for different purposes, such as using the inflation rate (for real earnings), outlier values (for data smoothing), or scaling for normal data distribution. In this research, it is appropriate (for uniformity) that the real earnings should be used as this is a cross-country study, and each country operates with different inflation rates. This study uses Eq. (2) to calculate the inflation-adjusted earnings. In Eqs. (1) and (2), *t* indicates the year varying from 2008 to 2020.

$$Inflation\ adjusted\ earnings_t = EPS_t * (1 - Inflation\ rate_t) \quad (2)$$

$$Intrinsic\ value\ (IV) = CAPE * Price\ per\ share * Number\ of\ shares \quad (3)$$

$$Market\ value\ (MV) = Price\ per\ share * Number\ of\ shares \quad (4)$$

If the intrinsic value (IV) is less than the market value (MV), then the market (economy) is considered undervalued, while if the IV is more than the MV, then the market (economy) is considered overvalued.

The study is focused on enhancing its replicability. Therefore, the interpretation of regression outputs, including coefficients, R-squared values, and p-values, is conducted directly from the software-generated result.

4. RESULTS AND DISCUSSION

The analysis and comparison of GCC regional data with the country-level data reveals variations in volatility. The SPSS outputs showed that the highest volatility was in Kuwait based on the EPS of 631% and CAPE of 310%, while the lowest volatility in EPS was observed for Qatar (18%). The lowest volatility in the CAPE ratio was observed for Bahrain (26%) and Saudi Arabia (26%); the values confirm the countries' market stability compared to other GCC countries.

The correlation coefficient (regional level) between the CAPE ratio and earnings was observed as -0.64 (p-value < 0.05). Subsequently, the correlations between earnings and CAPE ratios at a country level were analyzed, and none of the values were observed to be significant. The highest correlation, although (r = 0.31), was observed for UAE as a country.

The results from regression analysis of earnings over CAPE ratio (country level) are illustrated in Table 1. It is observed that only at the regional level the CAPE ratio was able to significantly explain 41% of the variation in earnings (p-value < 0.05), although with a negative coefficient. The P/S ratio as a standalone independent variable was observed as statistically insignificant (p-value = 0.24) in predicting earnings at the GCC level. Additionally, the CAPE ratio, along with the P/S ratio (multivariate regression), significantly explained 41% of the variation (p-value < 0.1) in earnings at the regional level. These results align with prior studies by Jivrai and Shiller (2017), who found CAPE's effectiveness to vary across regions and contexts.

Subsequently, to check for the robustness of the relationship between the GCC region's earnings and its CAPE ratio, a VAR was performed. Ahmad and Premaratne (2018) used the VAR technique to analyze the macroeconomic variables for India and Sri Lanka. With the CAPE ratio being the independent variable and the GCC region's earnings as the dependent variable, it is observed that this relationship is optimum and significant at a lag of 2 years (R-squared = 90%, p-value = 0.01). The Akaike information criteria (AIC) was used to determine the lag period in the VAR system. The regression coefficients were also observed to be negative here (as in linear regression analysis) for the CAPE ratio. Additionally, it was observed that the decomposition of forecasted error variance was best explained at a lag of 1 year (99%) and one standard deviation shock in the CAPE ratio.

Table 1. Results from the regression analysis

Dependent variables	*Independent variables*	*R-squared value (%)*	*p-value*	*Coefficient*
EPS.GCC	*CAPE.GCC*	41	0.02	-0.017
EPS.Bah	*CAPE.Bah*	0.7	0.78	-0.003
EPS.Kw	*CAPE.Kw*	2.1	0.63	0.0001
EPS.Om	*CAPE.Om*	0.5	0.82	-0.001
EPS.Qat	*CAPE.Qat*	11	0.28	-0.001
EPS.SA	*CAPE.SA*	0.1	0.9	0.002
EPS.UAE	*CAPE.UAE*	9.5	0.3	0.012
EPS.GCC	*CAPE.GCC*	41	0.07	-0.02
	PS.GCC			-0.004
EPS.Bah	*CAPE.Bah*	10	0.58	-0.001
	PS.Bah			-0.21
EPS.Kw	*CAPE.Kw*	16	0.43	0.00003
	PS.Kw			-0.04
EPS.Om	*CAPE.Om*	10	0.58	-0.004
	PS.Om			0.27
EPS.Qat	*CAPE.Qat*	Negative R-squared values		
	PS.Qat			
EPS.SA	*CAPE.SA*	10	0.6	0.014
	PS.SA			-0.07
EPS.UAE	*CAPE.UAE*	30	0.16	0.02
	PS.UAE			-0.03

Source: Authors' elaboration.

A CAPE ratio-based approach [see Eqs. (3) and (4)] were followed to study the valuations at the national and regional levels. For the period 2008–2020, the UAE market was observed as overvalued, the Saudi Arabia market was observed as overvalued (2008–2012) and then undervalued (2009–2020), Qatar's market was observed as undervalued (2008–2020), Omani market was overvalued (2008–2011) and undervalued (2012–2020). The Kuwait market indicated volatility as it was observed as undervalued for the years (2008–2015 and 2020) and overvalued for the years 2016, 2018, and 2019. The Bahrain market indicated the most variation in valuation, where it was observed as overvalued for the years 2008, 2011, and 2014 to 2018, while it was observed as undervalued for the years from 2009 to 2010, 2012, 2013, 2019, and 2020. Table 2 indicates whether the country-level and regional-level markets were overvalued (O) or undervalued (U) based on the rationale from Eq. (3). These findings contradict Shiller (2013), who identified CAPE's stability in developed markets.

Table 2. Qualitative representation of valuation of markets/economies

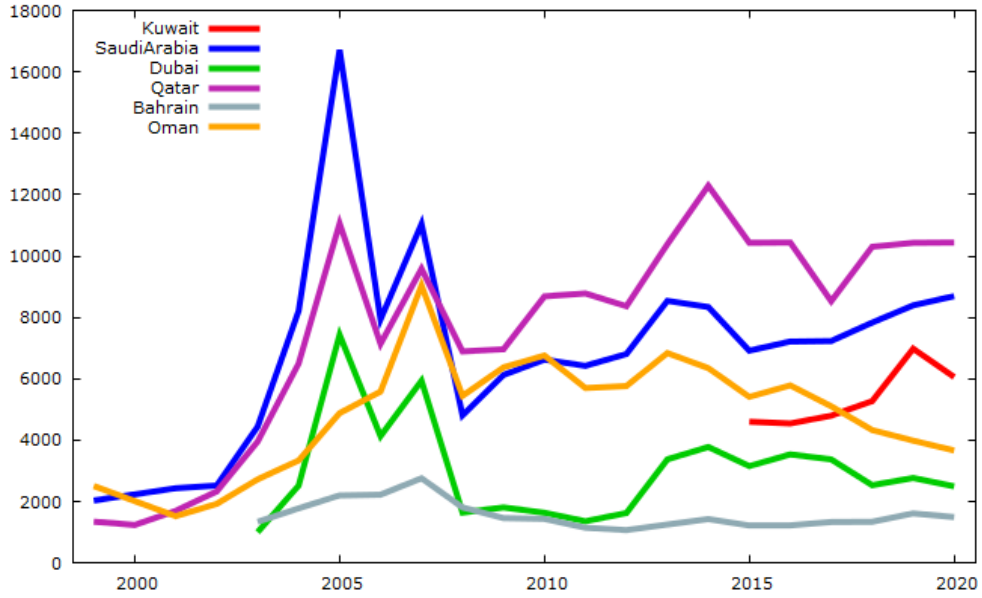
Year	*Bahrain*	*Kuwait*	*Oman*	*Qatar*	*Saudi Arabia*	*UAE*	*GCC*
2008	O	U	O	U	O	O	U
2009	U	U	O	U	O	O	U
2010	U	U	O	U	O	O	U
2011	O	U	O	U	O	O	O
2012	U	U	U	U	O	O	U
2013	U	U	U	U	U	O	U
2014	O	U	U	U	U	O	U
2015	O	U	U	O	U	O	U
2016	O	O	U	U	U	O	U
2017	O	O	U	U	U	O	U
2018	O	O	U	U	U	O	U
2019	U	O	U	U	U	O	U
2020	U	U	U	U	U	O	U

Source: Authors' elaboration.

Table 3. List of market indices used

Country	*Country codes*	*National stock indices*
Kuwait	Kw	Premier Market Index
Saudi Arabia	SA	Tadawul All Share Index
UAE	UAE	DFM General Index (Dubai)
Qatar	Qat	Qatar Exchange General Index
Bahrain	Bh	Bahrain All Share Index
Oman	Om	MSM 30 Index

Figure 1. Graphical representation of market indices (1999–2020)



Source: Authors' elaboration.

The research aims to understand the implication of the CAPE ratio at the macroeconomic level and to infer its effectiveness in regression-based forecasting. A negative and significant correlation (-0.64) was observed at the regional level between the CAPE ratio and the GCC region's earnings, indicating that an increase in earnings at the macro (regional) level decreases the market valuation. This relationship was found insignificant at the country level. Additionally, it is observed that only at the regional level was the CAPE ratio able to significantly explain 41% of the variation in the region's earnings. A negative regression coefficient confirmed the negative relationship between the CAPE ratio and EPS. The VAR results confirmed this negative relationship, where the CAPE ratio explained 90% of the variance in GCC earnings. A lag of 1 year is also significant in this relationship. The CAPE ratio and the P/S ratio could explain 41% of the variation in earnings at the regional level. Thus, the first hypothesis (*H1*) could not be rejected while the second hypothesis (*H2*) was rejected based on regression analysis. This further implies the significance of the CAPE ratio to earnings at the regional level rather than at the country level.

In a country-level analysis, earnings and CAPE ratios were the most volatile for Kuwait as a national market. At the same time, Qatar indicated the lowest volatility in its earnings. The lowest volatility for the CAPE ratio was observed for Bahrain and Saudi Arabia. A higher volatility makes a variable less reliable as an estimator. Thus, the CAPE ratio can be a robust estimator for valuing the Bahrain and Saudi Arabian markets. Subsequently, the CAPE ratio-based valuation approach indicated that the Saudi Arabian market (see Table 2) was observed as overvalued (2008–2012) and then undervalued (2009–2020). It is also observed (see Table 2) that the UAE as a market was overvalued through

the period (2008–2012); the Saudi Arabian market was initially overvalued, while the Kuwaiti market was initially undervalued. The global financial crisis of 2008 also had a different effect on different sample countries regarding valuation (see Table 2). These valuation categories are contrary to Shiller (2013). Figure 1 indicates a similar trend for almost all the GCC countries during the study period, but with high volatility.

CAPE ratio demonstrates stronger predictive power at the regional level, such as GCC, compared to an individual country level, corroborating Radha's (2018) and Kenourgios et al.'s (2022) findings. The strong negative relationship between CAPE and regional earnings is consistent with worldwide trends identified by Drudi and Nucera (2022) and indicates the relevance of CAPE in a macroeconomic context. VAR analysis confirmed that CAPE is robust in forecasting regional earnings and thus useful for medium-to-long-term valuation. Finally, the regional effectiveness of CAPE forms an avenue through which policymakers and investors can draw an emphasis on contextual applications of financial modelling. In presenting results, all interpretations have been drawn directly from the findings of SPSS and VAR analyses.

5. CONCLUSION

The objective of the research was to understand the implication of the CAPE ratio and other market-based variables on the earnings at a country level and regional level and to infer its forecasting prowess. It is generally concluded that the CAPE ratio and the P/S ratio could be used to value regional markets, particularly the GCC market. A negative and significant correlation (-0.64) was observed at the regional level between the CAPE ratio and GCC earnings, while the CAPE ratio could significantly explain 41% of the variation in GCC earnings. A negative regression coefficient confirmed the negative relationship between the CAPE ratio and EPS. The significant negative correlation (-0.64, $p < 0.05$) between CAPE and regional earnings highlights CAPE's utility in identifying market valuation trends. The negative regression coefficient (-0.017) also reinforces this inverse relationship. The CAPE ratio was a better predictor of earnings than the P/S ratio at the regional level. The CAPE ratio should be used for forecasting earnings at the GCC level, while the P/S ratio should be used to forecast specific cases, such as the Qatar market.

The CAPE-based methodology was used to identify the market as overvalued/undervalued/ fairly valued, and the approach indicated that the Saudi Arabian market was observed as overvalued (2008–2012) and then undervalued (2009–2020). The CAPE ratio was identified as a robust estimator for valuing the Bahrain and Saudi Arabian markets as it indicated low volatility. It is generally observed (see Table 2 and Figure 1) that similar markets behave differently to economic shocks (such as the financial crisis of 2008), where one market may be overvalued (Saudi Arabia) while another similar market may be undervalued (Kuwait). The results highlight the need for country-specific analyses rather than broad regional generalizations.

This study confirms the applicability of the CAPE ratio for regional-level earnings forecasting in the GCC and its utility as a robust valuation tool for specific markets such as Bahrain and Saudi Arabia. Such findings are coherent with studies, such as those by Drudi and Nucera (2022) and Radha (2018), which identify CAPE as capable of being applied in macroeconomic contexts.

It is important to highlight the managerial implications. The CAPE ratio and the P/S ratios were found to explain the variation in regional earnings, and thus, policymakers in these regions should consider them while making earnings forecasts for the region. International investors interested in investing in the Gulf region should not only look at the GCC economy together, but also at all the GCC countries differently and separately. A lag of one or two years should be considered while analyzing the impact of the CAPE ratio on the GCC region's earnings.

The analysis is based on average values, so there might be a presence of average bias. The study could be replicated at the firm level to enhance its applicability. The negative relationship between the GCC's CAPE ratio and earnings should be further probed to better understand these dynamics. Future studies should explore firm-level applications and consider incorporating additional macroeconomic variables to refine CAPE-based forecasting models further.

REFERENCES

Ahmad, M. U., & Premaratne, H. A. G. (2018). Effect of low and negative interest rates: Evidence from Indian and Sri Lankan economies. *Business Perspectives and Research, 6*(2), 90–99. https://doi.org/10.1177/2278533718764503

Alhaimer, R. (2024). Digital transformation on the design and implementation of virtual political campaigns in Kuwait: Perceptions and attitudes of politicians and campaign managers for bold innovation and social impact in Kuwait. *Journal of Science and Technology Policy Management.* Advance online publication. https://doi.org/10.1108/JSTPM-11-2023-0212

Alhaimer, R. (2025). Comparing virtual political campaigns with traditional political campaigns: Evidence from Kuwait during the COVID-19 pandemic. *Global Knowledge, Memory and Communication, 74*(1–2), 548–563. https://doi.org/10.1108/GKMC-07-2022-0182

Allen, J., Leibs, C., Manteuffel, T., & Rajaram, H. (2017). A fluidity-based first-order system least-squares method for ice sheets. *SIAM Journal of Scientific Computing, 39*(2), 352–374. https://doi.org/10.1137/14097497

Alqatan, A. (2024). The impact of board diversity on earnings management in Kuwait. *Journal of Financial Reporting and Accounting.* Advance online publication. https://doi.org/10.1108/JFRA-05-2024-0279

Alqatan, A., Hussainey, K., & Hichri, A. (2025). Does board diversity affect firm performance in Kuwait? *Review of Accounting and Finance.* Advance online publication. https://doi.org/10.1108/RAF-06-2024-0258

Alsaber, A. R., Setiya, P., Al-Sultan, A. T., & Pan, J. (2022). Exploring the impact of air pollution on COVID-19 admitted cases: Evidence from vector error correction model (VECM) approach in explaining the relationship between air pollutants towards COVID-19 cases in Kuwait. *Japanese Journal of Statistics and Data Science, 5*(1), 379–406. https://doi.org/10.1007/s42081-022-00165-z

Alshaer, W. Y. I. (2022). *The analysis of stock returns in the London Stock Exchange in the context of the cyclically adjusted price-to-earnings ratio signals* [Doctoral dissertation, Robert Gordon University]. OpenAIR. https://doi.org/10.48526/rgu-wt-1712715

Aras, G., & Yilmaz, M. K. (2008). Price-earnings ratio, dividend yield, and market-to-book ratio to predict the return on the stock market: Evidence from the emerging markets. *Journal of Global Business Technology, 4*(1), 18–30. https://mkyilmaz.com/wp-content/uploads/2014/11/price-earnings-ratio.pdf

Arslan, M., Abeuova, D., & Alqatan, A. (2021). Corporate social responsibility and institutional investors: Evidence from emerging markets. *Pakistan Journal of Commerce and Social Sciences, 15*(1), 31–57. https://ssrn.com/abstract=3831461

Aydogan, K., & Güney, A. (1997). Price-earnings ratio and dividend yield as predictors of stock returns. *ISE Review, 1*(1), 83–96.

Bunn, O., Staal, A., Zhuang, J., Lazanas, A., Ural, C., & Shiller, R. (2014) Es-cape-ing from overvalued sectors: Sector selection based on the cyclically adjusted price-earnings (CAPE) ratio. *The Journal of Portfolio Management, 41*(1), 16–33. https://doi.org/10.3905/jpm.2014.41.1.016

Campbell, J. Y., & Shiller, R. J. (1988). The dividend-price ratio and expectations of future dividends and discount factors. *The Review of Financial Studies, 1*(3), 195–228. https://doi.org/10.1093/rfs/1.3.195

Catanho, R., & Saville, A. (2022). A modified Shiller's cyclically adjusted price-to-earnings (CAPE) ratio for stock market index valuation in a zero-interest rate environment. *Investment Analysts Journal, 51*(1), 49–66. https://doi.org/10.1080/10293523.2022.2045701

Chan, L. H. (2021). *A note on the impacts of growth rate on P/E ratio and CAPE ratio*. https://www.researchgate.net/publication/352107119

Chiang, S., Zito, J., Rao, V. R., & Vannucci, M. (2024). Time-series analysis. In S. Chiang, V. R. Rao, & M. Vannucci (Eds.), *Statistical methods in epilepsy* (pp. 166–200). Chapman and Hall/CRC. https://doi.org/10.1201/9781003254515-8

Cho, E. (2023). Time-varying preferences for ESG investments: Evidence from an emerging market. *Journal of Derivatives and Quantitative Studies, 31*(2), 121–138. https://doi.org/10.1108/JDQS-11-2022-0025

Davis, J., Aliaga-Díaz, R., Ahluwalia, H., & Tolani, R. (2018), Improving U. S. stock return forecasts: A "fair-value" CAPE approach. *The Journal of Portfolio Management, 44*(3), 43–55. https://doi.org/10.3905/jpm.2018.44.3.043

Drudi, M. L., & Nucera, F. C. (2022). *Economic fundamentals and stock market valuation: A CAPE-based approach* (Working Paper No. 1393). Bank of Italy Temi di Discussione. https://doi.org/10.2139/ssrn.4462815

Fama, E. F. (1965). Random walks in stock market prices. *Financial Analysts Journal, 21*(5), 55–59. https://doi.org/10.2469/faj.v21.n5.55

Greenwood, R., Shleifer, A., & You, Y. (2019). Bubbles for Fama. *Journal of Financial Economics, 131*(1), 20–43. https://doi.org/10.1016/j.jfineco.2018.09.002

Griffin, J. M. (2002). Are the Fama and French factors global or country specific? *The Review of Financial Studies, 15*(3), 783–803. https://doi.org/10.1093/rfs/15.3.783

Hassan, H., Abdelkader, A., Alhaimer, R., & Abdelkader, M. (2021). Moderating role of gender in influencing enterprise performance in emerging economies: Evidence from Saudi Arabian SMEs sector. *Problems and Perspectives in Management, 19*(3), 148–161. https://doi.org/10.21511/ppm.19(3).2021.13

Hichri, A., & Alqatan, A. (2024). Exploring integrated reporting's influence on international firms' value relevance. *International Journal of Ethics and Systems*. Advance online publication. https://doi.org/10.1108/IJOES-11-2023-0249

Jacob, J., & Pradeep, K. P. (2022). *Cyclically adjusted PE ratio (CAPE) and stock market characteristics in India* (IIMA Working Paper No. 2022-09-03). Indian Institute of Management Ahmedabad. https://doi.org/10.2139/ssrn.4284806

Jivraj, F., & Shiller, R. J. (2017). *The many colours of CAPE*. Barclays Bank PLC. https://doi.org/10.2139/ssrn.3258404

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*(2), 263–291. https://doi.org/10.2307/1914185

Katsenelson, V. N. (2010). *The little book of sideways markets: How to make money in markets that go nowhere*. John Wiley & Sons.

Keimling, N. (2016). *Predicting stock market returns using the Shiller CAPE an improvement towards traditional value indicators?* https://doi.org/10.2139/ssrn.2736423

Kenourgios, D., Papathanasiou, S., & Bampili, A. C. (2022). On the predictive power of CAPE or Shiller's PE ratio: The case of the Greek stock market. *Operational Research, 22*, 3747–3766. https://doi.org/10.1007/s12351-021-00658-x

Lansing, K. J. (2017). Stock market valuation and the macroeconomy. *FRBSF Economic Letter, 33*. https://www.frbsf.org/wp-content/uploads/el2017-33.pdf

Makni Fourati, Y., Zalila, M., & Alqatan, A. (2024). Does culture still matter post-IFRS? *Journal of Financial Reporting and Accounting*. Advance online publication. https://doi.org/10.1108/JFRA-09-2023-0530

Marchesi, F. (2024). *Redefining financial forecasting: A CAPE-based approach to S&P 500 analysis and portfolio construction* [Master's thesis, Università Ca' Foscari Venezia]. https://unitesi.unive.it/handle/20.500.14247/9865

Peláez, R. F. (2021). Tactical asset allocation with the relative total return CAPE. *The Journal of Portfolio Management, 47*(4, special issue), 180–191. https://doi.org/10.3905/jpm.2021.1.206

Philips, T. K., & Kobor, A. (2020). Ultra-simple Shiller's CAPE: How one year's data can predict equity market returns better than ten. *The Journal of Portfolio Management, 46*(4), 140–155. https://doi.org/10.3905/jpm.2020.1.124

Pietraszewski, P. (2022). Predictability of stock returns in Central and Eastern European countries. *Acta Universitatis Lodziensis. Folia Oeconomica, 1*(358), 14–31. https://doi.org/10.18778/0208-6018.358.02

Radha, S. S. (2018). A prognostic yield measure for country selection in the medium term using Shiller's PE. *The Journal of Beta Investment Strategies, 9*(1), 49–65. https://doi.org/10.3905/jii.2018.1.060

Radha, S. S. (2020). Using CAPE to forecast country returns for designing an international country rotation portfolio. *The Journal of Portfolio Management, 46*(7), 101–117. https://doi.org/10.3905/jpm.2020.1.160

Shiller, R. J. (2005). *Irrational exuberance* (2nd ed.). Princeton University Press.

Shiller, R. J. (2013). *Finance and the good society*. Princeton University Press. https://doi.org/10.1515/9781400846177

Siegel, J. J. (2016). The Shiller CAPE ratio: A new look. *Financial Analysts Journal, 72*(3), 41–50. https://doi.org/10.2469/faj.v72.n3.1

Waser, O. (2021). Modelling the Shiller CAPE ratio, mean reversion, and return forecasts. *The Journal of Portfolio Management, 47*(3), 155–171. https://doi.org/10.3905/jpm.2021.1.210

Weigand, R. A., & Irons, R. (2007). The market P/E ratio, earnings trends, and stock returns forecast. *The Journal of Portfolio Management, 33*(4), 87–101. https://doi.org/10.3905/jpm.2007.690610