

Business Freedom and Market Efficiency: Evidence from GCC Stock Markets***Boudjemala Anissa***

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Abstract: This study examines the effects of Business Freedom (BF) on financial market liquidity in six GCC countries, using market capitalization turnover as a proxy for liquidity. Employing panel ARDL (PMG) on data covering the period 2000-2024 for 6 GCC countries, the results reveal that business freedom has a positive and highly significant long-run impact on liquidity, confirming that improvements in regulatory and business environments enhance market efficiency. Short-run effects are heterogeneous across countries, with Bahrain responding immediately to business freedom reforms and Saudi Arabia with delay, while others exhibit insignificant effects. Interestingly, the interaction between business freedom and Internet penetration is negative in most countries, suggesting that while digital infrastructure facilitates information flow, it may initially moderate the short-run effect of regulatory improvements due to volatility or cautious investor behavior. These findings highlight the critical role of regulatory reforms and digital connectivity in promoting efficient and liquid financial markets. The study provides actionable policy implications, emphasizing the need for coordinated efforts to improve business freedom and digital infrastructure to maximize both short- and long-term market performance.

Keywords: Business Freedom, Market efficiency, Liquidity, GCC

JEL Classification Codes : G120, G140, G180

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1.Introduction

Financial markets play a central role in modern economies by facilitating capital allocation, promoting investment, and enhancing overall economic performance. Well-functioning markets improve the efficiency of financial intermediation, lower transaction costs, and support economic diversification and long-term development (King & Levine, 1993). Within this broader landscape, the financial markets of the Gulf Cooperation Council (GCC) countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) have expanded significantly over the past two decades as part of broader strategies aimed at reducing dependence on hydrocarbon revenues and positioning financial services as engines of growth (Woertz, 2012). Despite considerable progress in market capitalization, institutional development, and technological modernization, these markets continue to exhibit varying degrees of depth, dynamism, and resilience.

A crucial dimension of financial market performance is liquidity, commonly interpreted as the ease and speed with which assets can be traded without causing substantial price changes. Liquidity is widely regarded as a key indicator of market efficiency because liquid markets foster price discovery, attract domestic and foreign investors, and reduce the cost of capital. As such, understanding what drives liquidity in the GCC is particularly important given the region's efforts to strengthen financial linkages, integrate with global markets, and create more competitive investment environments.

Among the factors that shape liquidity, regulatory quality and specifically the degree of Business Freedom plays a fundamental role. Business Freedom captures the simplicity, transparency, and flexibility of a country's regulatory framework encompassing entry barriers, licensing procedures, contract enforcement, and operational rules (Jin et al., 2025). A regulatory environment that minimizes frictions and enhances predictability can stimulate market participation, encourage entrepreneurial activity, and improve the overall functioning of financial systems. In the context of GCC economies, which are undergoing structural reforms and rapid institutional modernization, business freedom is particularly relevant as it directly influences investor confidence, corporate transparency, and trading activity. Moreover, the rise of digital infrastructure, especially Internet penetration, has transformed how financial transactions are executed, information is disseminated, and markets operate, suggesting a potentially interactive effect between regulatory conditions and digital connectivity on market liquidity.

While a large body of literature has examined institutional quality, governance, corruption, and political risk as determinants of financial development, specific attention to Business Freedom remains limited, and empirical studies focusing on the GCC markets are especially scarce. Existing research tends to emphasize broader institutional indicators or macroeconomic fundamentals, often overlooking the micro-regulatory conditions that shape day-to-day market functioning. Furthermore, the potential interplay between business regulation and technological readiness particularly Internet diffusion has received minimal empirical attention, despite being increasingly relevant for electronic trading and investment behavior. The COVID-19 pandemic further highlighted the importance of digitalization, as trading volumes, market participation, and information flows shifted rapidly toward online platforms, making it essential to revisit the drivers of liquidity in a post-pandemic environment.

Against this backdrop, this study contributes to the literature by examining the short- and long-run effects of Business Freedom on financial market liquidity in the GCC, while explicitly accounting for the moderating role of Internet penetration and the structural changes induced by the COVID-19 period. Using a Pooled Mean Group (PMG) PARDL framework on annual data covering the period 2000-2024 for six GCC countries, the study aims to provide a more nuanced understanding of how regulatory conditions interact with digital infrastructure to shape liquidity dynamics in hydrocarbon-dependent emerging financial markets.

Accordingly, the study is guided by the following research questions: Does Business Freedom influence financial market liquidity in the GCC in the short and long run? Does Internet penetration modify or amplify the effect of Business Freedom on market liquidity?

Based on theoretical expectations, the study advances the hypotheses that **H1**: higher Business Freedom increases financial market liquidity; **H2**: Internet penetration strengthens the positive effect of Business Freedom on liquidity. The study's hypotheses draw on Fama's Efficient Market Hypothesis (EMH) and digital microstructure theory of which provide coherent explanations for why Business Freedom and digital penetration should influence financial market liquidity. Fama's EMH (Fama, 1970) posits that markets become more liquid and informationally efficient when barriers to trading decline and information flows smoothly across participants. Business Freedom embodies these mechanisms by reducing bureaucratic constraints, simplifying business procedures, and creating a predictable regulatory climate conditions that theoretically lower market frictions and enhance liquidity, forming the basis for H1, that higher Business Freedom increases financial market liquidity. At the same time, digital microstructure theory (Pagano & Röell, 1996) complements EMH by emphasizing that technological infrastructure improves the speed, accuracy, and breadth of information dissemination, reducing asymmetric information and enabling more efficient electronic trading. Thus, greater Internet penetration strengthens the transmission of regulatory improvements into tangible liquidity gains, providing the rationale for H2, that Internet penetration amplifies the positive effect of Business Freedom on liquidity. These theoretical pillars will be further elaborated and connected to the empirical literature in the following review.

2. Literature review

Several studies have examined how regulatory and business environment conditions influence financial market development. For instance, (Guo, 2025) investigates the impact of corruption crimes on regional financial markets using provincial panel data from 2003 to 2023. The study finds that corruption significantly reduces market growth, partly by weakening rule of law efficiency, and that the negative effects are stronger in regions with higher income inequality. These results suggest that clear, predictable, and efficient regulatory conditions support more active market participation, providing support for H1, that higher Business Freedom improves financial market liquidity.

Similarly (Gao et al., 2025) examines the role of political relationship building in market efficiency, using China's 2012 anti-corruption campaign as a quasi-natural experiment with a difference-in-differences approach. The study finds that interruptions in political relationship building with government officials enhanced market efficiency by improving information quality and reducing noise trading, especially in firms with high transparency. These results suggest that reducing informal or opaque political linkages can improve market outcomes, further

emphasizing how clear and predictable institutional and regulatory environments central aspects of Business Freedom can positively influence financial market liquidity.(Tan et al., 2024)investigates the relationship between international financial integration (IFI) and financial stress in emerging market economies, focusing on the moderating role of institutional quality. Using a Financial Stress Index and panel threshold regression, the study identifies threshold effects of institutional quality, showing that variations in institutional factors can influence how integration affects financial stability. The findings highlight that stronger institutions and regulatory frameworks help EMEs benefit from financial liberalization while mitigating financial stress, which aligns with the broader logic that improvements in the business and regulatory environment akin to Business Freedom support healthier and more liquid financial markets.Additionally, (Asteriou et al., 2021) examines the impact of corruption, economic freedom, bank regulation, and transparency on bank profitability and stability in 326 banks across 19 Eurozone countries from 2005 to 2018. Using dynamic panel GMM estimations, the study finds that corruption and transparency negatively affect bank profitability and stability, whereas greater economic freedom and effective regulation enhance these outcomes. The results suggest that sound regulatory frameworks and economic freedom strengthen financial institutions, supporting the notion that a favorable business climate contributes to more stable and efficient financial markets.

Furthermore, research on institutional quality and economic development demonstrates that regulatory effectiveness not only strengthens financial system performance but also promotes broader economic growth through more efficient financial markets. For instance,(Topcu, 2024)investigates the indirect effects of financial market development on the environment in China, highlighting the mechanisms through which markets influence economic and environmental outcomes. The study identifies sustainability, production, and consumption channels, and finds that while production activities can increase emissions, the overall beneficial effects of financial market development dominate once the negative impact of political corruption is accounted for. These findings suggest that well-functioning financial markets, supported by effective regulatory and institutional frameworks, not only enhance market efficiency but also contribute to broader economic and social outcomes, reinforcing the importance of Business Freedom for promoting both financial performance and economic development.Additionally, (Bui & Thi Doan, 2025)examines the impact of financial development on green growth in ASEAN-6 countries, emphasizing the moderating role of institutional quality. Using GMM and Bayesian regression methods, the study finds that financial development positively influences green growth, and that strong institutional quality amplifies this effect, particularly for financial markets rather than financial institutions. These results highlight that well-functioning financial markets, supported by effective regulations and institutional frameworks, can drive broader economic and sustainable development, reinforcing the importance of regulatory efficiency and Business Freedom in promoting both financial and economic outcomes.

Despite extensive research on institutional quality, regulation, and financial market development, there is limited evidence on how Business Freedom interacts with digital infrastructure to influence financial market liquidity, particularly in emerging and transitional economies. This study addresses this gap by examining the joint effect of Business Freedom and Internet penetration, showing that a favorable business environment, supported by digital

connectivity, enhances market efficiency and liquidity. Furthermore, it highlights the mechanism through which regulatory reforms promote broader economic outcomes through financial channels, demonstrating that improvements in Business Freedom not only strengthen markets but also support efficient capital allocation and economic growth. The findings provide actionable insights for policymakers, suggesting that combining regulatory reforms with digital infrastructure investments can maximize liquidity gains and economic benefits.

3. Data and Descriptive statistics

3.1. Data

In this study, we use market turnover (TURNOVER) as a proxy for financial market efficiency in the GCC countries. Turnover, defined as the ratio of total trading volume to market capitalization, measures market liquidity, which reflects how easily securities can be traded without significantly affecting prices. High liquidity indicates that assets can be quickly bought or sold, suggesting that information is rapidly incorporated into prices, a key aspect of market efficiency. Using turnover as a proxy is particularly suitable in emerging and frontier markets, like the GCC, where other efficiency measures (e.g., bid-ask spreads) are less consistently available across countries.

To account for macroeconomic and structural factors that may influence market activity, we include control variables: GDP growth captures overall economic performance, inflation reflects macroeconomic stability, and internet penetration proxies for access to market information and digital infrastructure, which can facilitate trading and improve market efficiency. We also include a COVID-19 dummy variable to capture exogenous shocks during pandemic years, coded as 1 for years affected by COVID-19 and 0 otherwise. This allows us to isolate the impact of extraordinary events on market turnover. Additionally, we construct an interaction term between Business Freedom and Internet penetration to examine whether the effect of regulatory freedom on market efficiency is moderated by the level of digital infrastructure, reflecting that the benefits of better business environments may be amplified in more connected, information-rich markets.

Overall, this variable setup ensures that the model captures both direct effects (Business Freedom, macroeconomic conditions) and conditional/moderating effects (interaction with Internet), while controlling for external shocks, enabling a robust estimation of long-run and short-run dynamics in the GCC stock markets.

Table 01. Variables of the study

Variable	Abbreviation	Description / Measurement	Data Source	Notes / Calculation
Market Turnover	TURNOVER	Liquidity of the stock market, measured as total trading volume ÷ market capitalization per period	AMF	Market cap turnover = total trading volume ÷ market capitalization
Business Freedom Index	BF	Measures the business freedom ,	Heritage Foundation /	Scale 0–100; higher values indicate greater business freedom
GDP Growth	GDP	Annual percentage change in real GDP , capturing macroeconomic performance	World Bank, IMF, or national statistical agencies	Used as a control variable for economic conditions
Inflation	INFLATION	Annual percentage change in consumer price index (CPI)	World Bank, IMF, or national statistical agencies	Reflects macroeconomic stability; control variable
Internet Penetration	INTERNET	Percentage of the population using the Internet	World Bank	Proxy for digital infrastructure and market information access; control variable
COVID-19 Shock	COVID	Dummy variable equal to 1 for years affected by COVID-19, 0 otherwise	Author's coding based on WHO / World Bank pandemic timeline	Exogenous short-run shock
Interaction Term	DOING_INTERNET	Interaction between Business Freedom and Internet penetration	Generated in dataset	Captures moderating effect of digital infrastructure on the impact of business freedom

Source: Author's compilation based on data from AMF, IMF, WB, Heritage

3.2. Descriptive statistics

Table 01 presents the descriptive statistics for the main variables included in the analysis. The average turnover ratio across GCC stock markets is 38.77%, with a wide range from 1.44% to 1,057.38%, and a high standard deviation (98.01), indicating substantial variation in market activity across countries and over time. As shown in Figure 1, Saudi Arabia exhibits the highest turnover, consistent with its relatively large and liquid market. The large dispersion further suggests that liquidity conditions differ notably across the region, with some markets remaining relatively thinly traded.

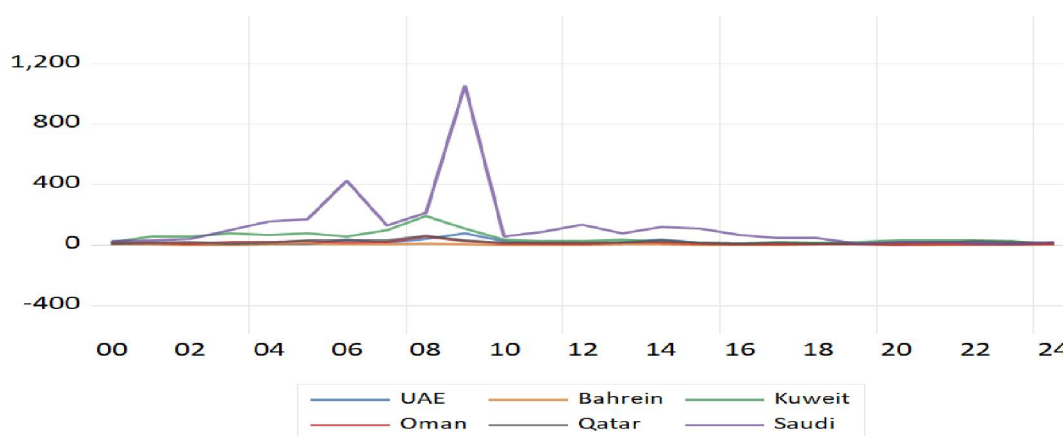
The Business Freedom (BF) index averages 69.72, ranging between 48.20 and 87.50, with moderate variation (SD = 8.87), reflecting differing levels of regulatory openness and ease of doing business across GCC economies.

The average GDP growth rate is 4.19%, with considerable volatility (SD = 4.93) and extreme values between 7.08% and 26.17%, which likely capture covid crisis, cyclical fluctuations and oil-related economic shocks characteristic of GCC economies. Inflation remains relatively low and stable (mean = 2.41%, SD = 3.08), consistent with the region's pegged exchange rate systems and strong fiscal positions.

Table 02. Descriptive statistics

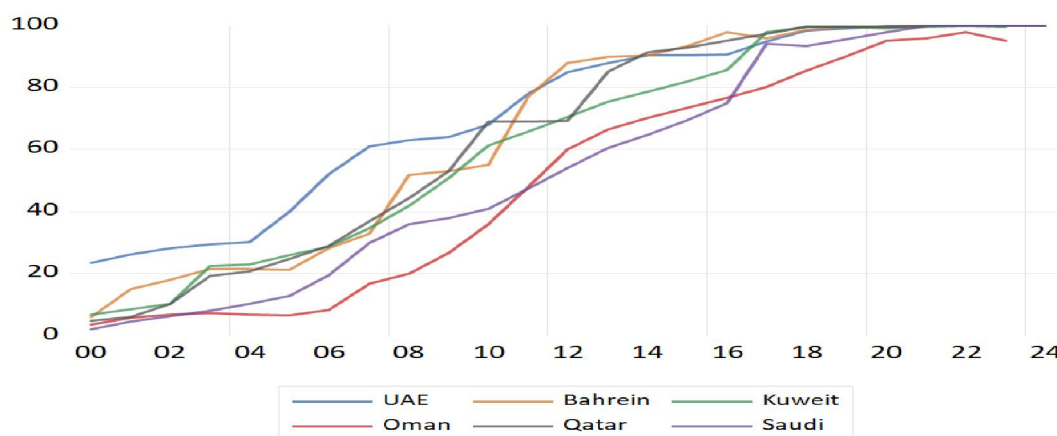
Variable	Mean	Maximum	Minimum	Std, Dev,
Turnover	38,77	1057,38	1,44	98,01
Bf	69,72	87,50	48,20	8,87
Gdp	4,19	26,17	-7,08	4,93
Inflation	2,41	15,05	-4,86	3,08
Internet	61,37	100,00	2,21	34,69

Source: Author's calculation based on eviews 13 output

Figure 1: Evolution of Market capitalisation turnover in GCC from 2000 to 2024

Source: Author's illustration based on EViews 13 output.

Finally, internet penetration has a mean of 61.37% but a large standard deviation (34.69), highlighting strong growth over time. As shown in Figure 2, all GCC countries display a clear upward trend in internet usage: initially low in the early years, then rising sharply toward full coverage. This pattern explains the observed dispersion driven not by cross-country gaps, but by rapid temporal growth in digital adoption.

Figure 2: Evolution of internet usage in GCC from 2000 to 2024

Source: Author's illustration based on EViews 13 output.

Overall, the statistics and graphs together suggest substantial cross-country heterogeneity in financial market activity and steady structural progress in digital infrastructure and business freedom across the GCC.

Table 3 presents the pairwise correlations among the key variables in the GCC sample. The dependent variable, TURNOVER, shows no significant correlation with the main explanatory variable, Business Freedom (BF) ($r = -0.022$), indicating that a simple linear relationship between these two variables is weak or absent. Similarly, TURNOVER is negatively correlated with INTERNET ($r = -0.190$, $p < 0.05$) and positively with INFLATION ($r = 0.177$, $p < 0.05$), but the magnitudes remain relatively small, reflecting low contemporaneous association.

Table 03. Correlation matrix

Variable	Turnover	Bf	Inflation	Internet	Gdp
Turnover	1	-0.022	0.177**	-0.190**	-0.043
Bf	-0.022	1	-0.359***	0.019	-0.053
Inflation	0.177**	-0.359***	1	-0.114	0.357***
Internet	-0.190*	0.019	-0.114	1	-0.328***
Gdp	-0.043	-0.053	0.357***	-0.328***	1

** sig at 5%

*** sig at 1%

Source: Author's calculations based on EViews 13 output.

Other variables exhibit expected patterns, for instance, INFLATION is negatively correlated with BF ($r = -0.359$, $p < 0.01$) and GDP is positively correlated with INFLATION ($r = 0.357$, $p < 0.01$) while negatively correlated with INTERNET penetration ($r = -0.328$, $p < 0.01$).

The lack of significant correlation between TURNOVER and BF does not imply the absence of a meaningful relationship. Correlation measures only instantaneous, linear associations and does not account for dynamic effects over time, lagged responses of turnover to policy changes, or heterogeneity across countries.

Given these considerations, and the panel structure of our data across GCC countries over time, we proceed with a dynamic panel econometric approach. Specifically, we employ the Panel ARDL framework (PMG/MG/DFE), which allows us to estimate both short-run dynamics and long-run relationships while accounting for heterogeneity and exogenous shocks. This methodology is well-suited to uncover the potentially delayed and complex impact of Business Freedom, macroeconomic variables, and digital infrastructure on market turnover.

4. Methodology

Before estimating the dynamic relationships among the variables, it is essential to examine their stationarity properties. Panel data series that are non-stationary may produce spurious regression results if not properly accounted for. In this study, we apply panel unitroot tests to all variables, including the dependent variable (TURNOVER) and explanatory variables (Business Freedom, GDP growth, Inflation, Internet penetration) to determine their order of integration.

Given the close economic and financial integration among the GCC countries, it is reasonable to expect cross-sectional dependence across panel units. Shocks to one market (such as changes in oil prices or regional policy developments) are likely to affect other markets simultaneously.

In this study we first tested for cross-sectional dependence (CSD) among the GCC countries using the Breusch-Pagan LM and Pesaran scaled LM tests. The results in table 4 revealed that cross-sectional dependence is present for all variables, which is expected given the high degree of economic and financial integration among GCC economies, particularly their shared exposure to oil price fluctuations, similar monetary policies, and regional trade and investment linkages.

Table 04. Breusch-Pagan LM and Pesaran scaled LM CSD tests

Variable	Test P-Value		Interpretation
	Breusch-Pagan LM	Pesaran scaled LM	
TURNOVER	0.00	0.00	Presence of cross sectional dependence
BF	0.00	0.00	Presence of cross sectional dependence
INFLATION	0.00	0.00	Presence of cross sectional dependence
INTERNET	0.00	0.00	Presence of cross sectional dependence
GDP	0.00	0.00	Presence of cross sectional dependence

Source: Author's calculations based on EViews 13 output.

Given the evidence of cross-sectional dependence, traditional first-generation unit root tests such as Levin, Lin & Chu (LLC) and Im, Pesaran & Shin (IPS) which assume cross-section independence may yield biased results. Therefore, we employ the second-generation panel unit root test, namely the Cross-sectionally Augmented Im, Pesaran, and Shin (CIPS) test proposed by (Pesaran, 2007).

The CIPS test corrects for the presence of common shocks by including cross-sectional averages of lagged levels and first differences of the series, making it more reliable in panels with strong interconnections such as the GCC. The test results in table 5 indicate that TURNOVER is non-stationary at level but becomes stationary after first differencing, indicating that it is integrated of order one, I(1). Conversely, Business Freedom, Inflation, Internet penetration, and GDP growth are stationary at level, i.e., integrated of order zero, I(0).

This finding satisfies the key requirement for the use of the Panel ARDL framework, which allows for a combination of I(0) and I(1) variables and captures both short-run and long-run dynamics (Pesaran et al., 2001).

Table 05. Unit root test Pesaran CIPS

Variable	P-Value level I(0)	P-value I(1)	Interpretation
TURNOVER	> 0.1	< 0.1	Stationary at 1 st difference I(1)
BF	< 0.01	< 0.01	Stationary at level I(0)
INFLATION	< 0.01	< 0.01	Stationary at level I(0)
INTERNET	< 0.01	< 0.01	Stationary at level I(0)
GDP	< 0.01	< 0.01	Stationary at level I(0)

Source: Author's calculations based on EViews 13 output.

Therefore, based on the presence of cross-sectional dependence and the integration orders obtained, the Panel ARDL approach is considered the most appropriate econometric technique for further analysis.

4.1. Model Specification

As shown in the previous section, our variables are a mix of stationary (I(0)) and first-difference stationary (I(1)) series. The dependent variable, TURNOVER, is I(1), while the main

independent variable (Business Freedom) and control variables (GDP growth, Inflation, Internet penetration) are $I(0)$. This combination of integration orders makes traditional cointegration methods unsuitable.

The Autoregressive Distributed Lag (ARDL) framework is particularly suitable for such situations because it allows for both $I(0)$ and $I(1)$ variables in the same regression, provided none of the series are $I(2)$. In addition, ARDL models are capable of capturing short-run dynamics and long-run equilibrium relationships simultaneously.

Given the panel structure of the data (six GCC countries over 2000–2023), we adopt the Panel ARDL framework, which extends the single-country ARDL to a heterogeneous panel setting (Pesaran et al., 1999).

In the Panel ARDL framework, several estimators can be employed depending on the assumptions regarding heterogeneity across countries. The Pooled Mean Group (PMG) estimator constrains the long-run coefficients to be equal across countries while allowing the short-run dynamics, error variances, and speed of adjustment to differ. This approach is suitable when the long-run effects are expected to be similar across countries, but short-run responses may vary. By contrast, the Mean Group (MG) estimator estimates separate ARDL models for each country and then averages the coefficients, making it appropriate when countries are highly heterogeneous in both short- and long-run dynamics. Finally, the Dynamic Fixed Effects (DFE) estimator constrains both long-run and short-run coefficients to be identical across all countries, and is used when full homogeneity of coefficients is reasonable (Pesaran et al., 1999). The choice among these estimators is typically guided by a Hausman test, which helps determine whether the restrictions imposed by PMG or DFE are statistically valid.

The following equation presents the formal specification of the dynamic Panel ARDL model, capturing both short-run adjustments and long-run equilibrium relationships.

$$\Delta \text{Turnover}_{i,t} = \sum_{j=1}^{p-1} \lambda_{ij} \Delta \text{Turnover}_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij} \Delta X_{i,t-j} + \varphi(Y_{t-1} - \beta_i X_{i,t}) + \theta \text{Covid}_{it} + \beta_{int}(\text{BF}_{i,t} \times \text{Internet}_{i,t}) + v_i + \varepsilon_{it} \quad (1)$$

Where,

$\Delta \text{Turnover}_{i,t}$	First difference of the dependent variable (market turnover) for country (i) at time (t), capturing short-run changes in market efficiency .
$\sum_{j=1}^{p-1} \lambda_{ij} \Delta \text{Turnover}_{i,t-j}$	Lagged differences of the dependent variable, capturing short-run dynamics and persistence in turnover.
$\sum_{j=0}^{q-1} \delta_{ij} \Delta X_{i,t-j}$	Lagged differences of explanatory/control variables, where (X) is the set of independent variables: Business Freedom (BF), GDP growth, Inflation, and Internet penetration . These terms capture the short-run effects of changes in these variables on market turnover.
$\varphi(Y_{t-1} - \beta_i X_{i,t}) +$	Error-correction term , representing the long-run equilibrium relationship between turnover and explanatory variables. Here, β_i denotes long-run coefficients , and φ is the speed of adjustment toward equilibrium. A negative and significant φ indicates convergence to the long-run relationship.
v_i	Country-specific fixed effect, capturing unobserved heterogeneity across GCC countries.
ε_{it}	Idiosyncratic error term, assumed to have zero mean and constant variance.

4.2. Empirical Result

After estimating the candidate PARDL models, the Hausman test reported in Appendix 1, was applied to determine the most appropriate estimator for the analysis. The test compares the pooled PARDL (PMG) estimator with the Mean Group (MG) and Dynamic Fixed Effects (DFE) estimators to assess whether the differences in coefficients are systematic (Pesaran et al., 1999). The null hypothesis of the Hausman test is that the pooled estimator is consistent and efficient, while the alternative suggests that MG or DFE would be preferred. The results indicate p-values of 0.26 for the pooled versus MG comparison and 0.68 for the pooled versus DFE comparison. Since both p-values exceed the conventional 0.05 threshold, we fail to reject the null hypothesis, implying that the pooled PARDL estimator is consistent and efficient. Accordingly, the PMG model is selected as the most appropriate for the subsequent empirical analysis, allowing us to exploit the full panel variation while providing reliable long-run and short-run coefficient estimates.

The PMG framework provides estimates of both short-run adjustments and long-run relationships. While short-run coefficients capture immediate effects of the explanatory variables on the dependent variable, the long-run coefficients reflect the equilibrium impact under the assumption of mean homogeneity across the panel.

Following the selection PMG estimator, we first present the estimated long-run coefficients, reflecting the common equilibrium relationships across the panel in table 6. This is followed by the short-run coefficients in table 7, which capture the immediate adjustments of the dependent variable to changes in the explanatory variables.

Table 06 : Long-Run PMG Results

Variable	Coefficient	Prob.	
BF	0.078	0.00	Significant
GDP	-0.119	0.67	Not significant
INFLATION	2.586	0.00	Significant
INTERNET	0.594	0.00	Significant

Source: Author's calculations based on EViews 13 output.

The long-run coefficients estimated from the model indicate that business freedom has a positive and highly significant effect on the market capitalization turnover, with a coefficient of 0.078 and a p-value of 0.0005, suggesting that improvements in BF contribute positively to the long-run equilibrium. GDP, however, does not have a statistically significant effect, with a coefficient of -0.119 and a p-value of 0.676, indicating that long-run changes in GDP do not significantly influence the liquidity in financial markets. Inflation exhibits a strong positive and highly significant impact, with a coefficient of 2.587 and a p-value below 0.001, implying that a one-unit increase in inflation is associated with a 2.587-unit increase in the dependent variable in the long run. Similarly, Internet penetration positively affects the dependent variable in the long run, with a coefficient of 0.595 and a p-value below 0.001, highlighting the important role of digital connectivity in shaping the long-run behavior of the liquidity of financial markets in GCC. Overall, these results underscore the dominant influence of inflation, Internet access, and business freedom on the long-run equilibrium, while GDP appears to have a negligible effect.

The short-run dynamics of market capitalization turnover across the six GCC countries reveal considerable heterogeneity in the effects of Business Freedom (BF). In Bahrain, BF

exhibits a strong positive and highly significant short-run impact, both contemporaneously and with a one-period lag, indicating that improvements in business regulatory conditions have an immediate and persistent effect on market activity. In Saudi Arabia, the contemporaneous BF effect is negative and insignificant, but the one-period lagged BF coefficient is positive and significant at the 10% level, suggesting that regulatory improvements take time to translate into higher market turnover in this market. In contrast, the UAE, Kuwait, Oman, and Qatar show either negative or non-significant short-run effects of BF, highlighting the uneven short-term responsiveness of turnover to regulatory freedom across the region. Notably, the interaction term BF*Internet is negative and statistically significant in most countries, including the UAE, Bahrain, Kuwait, Oman, and Qatar, implying that the combined effect of business freedom and digital connectivity may dampen short-run turnover.

Table 07. Short run results

Variable	UAE Coeff (p-value)	Bahrain Coeff (p-value)	Kuwait Coeff (p-value)	Oman Coeff (p-value)	Qatar Coeff (p-value)	Saudi Coeff (p-value)
COINTEQ	-1.492 (0.006)	-0.997 (0.003)	-0.522 (0.0002)	-0.359 (0.069)	-0.946 (0.003)	-0.331 (0.129)
D(TURNOVER(-1))	0.662 (0.030)	0.305 (0.217)	0.375 (0.025)	0.077 (0.835)	0.149 (0.619)	-0.178 (0.261)
D(BF)	0.223 (0.713)	0.798 (0.0003)	-1.015 (0.308)	0.270 (0.281)	-0.095 (0.854)	-6.667 (0.127)
D(BF(-1))	-0.849 (0.184)	0.471 (0.011)	-1.244 (0.122)	0.021 (0.937)	-0.092 (0.851)	7.441 (0.061)
D(GDP)	2.130 (0.091)	0.570 (0.084)	0.022 (0.966)	-0.018 (0.964)	-0.093 (0.742)	-21.064 (0.017)
D(INFLATION)	-4.923 (0.003)	-1.261 (0.095)	14.177 (0.000001)	2.717 (0.003)	-1.124 (0.187)	-2.157 (0.913)
D(INFLATION(-1))	-0.252 (0.849)	-0.134 (0.796)	4.575 (0.075)	0.870 (0.519)	-0.798 (0.396)	76.678 (0.001)
D(INTERNET)	3.295 (0.083)	0.308 (0.007)	3.477 (0.002)	-0.868 (0.261)	0.044 (0.906)	-6.323 (0.415)
D(INTERNET(-1))	-1.953 (0.177)	-0.097 (0.275)	1.209 (0.190)	1.389 (0.064)	0.914 (0.042)	20.687 (0.025)
COVID	13.295 (0.448)	11.785 (0.010)	12.465 (0.435)	5.322 (0.393)	11.583 (0.181)	294.144 (0.161)
BF*INTERNET	-0.0103 (0.007)	-0.0093 (0.004)	-0.0066 (0.001)	-0.0038 (0.035)	-0.0075 (0.002)	-0.0165 (0.104)

Source: Author's calculations based on EViews 13 output.

Overall, these results suggest that while BF can stimulate short-term market activity in certain countries, its effect may be delayed or moderated when combined with Internet penetration, underscoring the complex interplay between regulatory conditions and digital infrastructure in GCC financial markets.

4.3. Discussion

The long-run results indicate that Business Freedom (BF) has a positive and highly significant effect on market capitalization turnover across the GCC countries, confirming Hypothesis 1 and aligning with the literature that emphasizes how transparent and predictable regulatory environments enhance market efficiency. This suggests that improvements in business regulations consistently promote financial market liquidity over the long term. In contrast, the short-run dynamics show considerable heterogeneity: Bahrain exhibits immediate and persistent

positive effects of BF, Saudi Arabia displays lagged responsiveness, while the UAE, Kuwait, Oman, and Qatar show negative or insignificant short-run effects. This variation likely reflects differences in market structure, investor behavior, and the pace of regulatory implementation. Interestingly, the interaction term $BF \times \text{Internet penetration}$ is negative and significant in most countries, contrary to Hypothesis 2. This unexpected finding may result from short-run adjustment effects, where simultaneous improvements in regulations and digital connectivity increase information flow and volatility, causing cautious investor behavior. It may also reflect differences in market maturity, absorptive capacity, and institutional practices, where digital infrastructure amplifies perceived regulatory gaps in the short term. Overall, these results underscore that while Business Freedom reliably enhances long-run liquidity, the combined effect of regulatory improvements and digitalization is more complex in the short run, highlighting the nuanced interplay between institutional reforms and technological infrastructure in GCC financial markets.

5. Conclusion

This study investigates the impact of Business Freedom (BF) and Internet penetration on financial market liquidity across the six GCC countries. The results show that BF has a strong and positive long-run effect on market capitalization turnover, confirming that improvements in regulatory and business environments consistently enhance financial market efficiency. In contrast, GDP appears to have a negligible long-run impact, while inflation and Internet penetration also contribute positively to long-run liquidity. Short-run effects, however, are heterogeneous across countries, with some markets responding immediately to BF improvements and others exhibiting delayed or insignificant effects. Notably, the interaction between BF and Internet penetration is negative in most countries, suggesting that while digital infrastructure facilitates information flow, it may also initially increase market volatility or investor caution, moderating the short-run effect of regulatory improvements.

These findings have important policy implications. First, policymakers should prioritize reforms that enhance Business Freedom by reducing bureaucratic barriers and improving regulatory predictability, as these measures have a clear positive effect on long-term market liquidity. Second, investments in digital infrastructure should be carefully coordinated with regulatory improvements, as the interaction may produce complex short-term effects. Finally, country-specific strategies may be necessary to account for differences in market maturity, institutional capacity, and investor behavior, ensuring that the combined benefits of regulatory reform and digitalization are fully realized. Overall, this study highlights the critical role of a favorable business environment, supported by digital connectivity, in promoting efficient, liquid, and resilient financial markets in the GCC region.

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7. Appendices

Table 01. PMG Hausman test

PMG Hausman Specification Test
Null hypothesis: Estimator is statistically similar to the PMG estimator

Estimator	Stat.	DOF	p-Value
Mean Group	5.226187	4	0.2649
Dynamic Fixed Effects	2.313743	4	0.6783

Source: Author's calculations based on EViews 13 output.

Appendix 02. Short run results

Bahrain

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ	-0.997286	0.273150	-3.651049	0.0033
D(TURNOVER(-1))	0.305261	0.234274	1.303008	0.2170
D(BF)	0.797718	0.161133	4.950691	0.0003
D(BF(-1))	0.471188	0.156236	3.015877	0.0107
D(GDP)	0.570053	0.303094	1.880776	0.0845
D(INFLATION)	-1.261287	0.694746	-1.815466	0.0945
D(INFLATION(-1))	-0.134188	0.507181	-0.264576	0.7958
D(INTERNET)	0.308246	0.094317	3.268203	0.0067
D(INTERNET(-1))	-0.097266	0.085008	-1.144196	0.2749
COVID	11.78451	3.891241	3.028470	0.0105
BF*INTERNET	-0.009266	0.002578	-3.594616	0.0037

Kuwait

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ	-0.521810	0.097432	-5.355658	0.0002
D(TURNOVER(-1))	0.374568	0.144578	2.590774	0.0251
D(BF)	-1.015410	0.950760	-1.067998	0.3084
D(BF(-1))	-1.244185	0.742454	-1.675773	0.1219
D(GDP)	0.022272	0.508716	0.043782	0.9659
D(INFLATION)	14.17705	1.519024	9.333003	0.0000
D(INFLATION(-1))	4.574627	2.324761	1.967784	0.0748
D(INTERNET)	3.477379	0.873709	3.980022	0.0022
D(INTERNET(-1))	1.208682	0.865039	1.397257	0.1899
COVID	12.46525	15.40121	0.809368	0.4355
BF*INTERNET	-0.006572	0.001518	-4.328345	0.0012

Oman

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ	-0.359308	0.178534	-2.012548	0.0693
D(TURNOVER(-1))	0.076941	0.360538	0.213405	0.8349
D(BF)	0.270326	0.238331	1.134245	0.2808
D(BF(-1))	0.020798	0.259015	0.080296	0.9374
D(GDP)	-0.017507	0.383596	-0.045639	0.9644
D(INFLATION)	2.716933	0.713188	3.809559	0.0029
D(INFLATION(-1))	1.307053	1.307013	0.665680	0.5193
D(INTERNET)	-0.868344	0.733034	-1.184589	0.2611
D(INTERNET(-1))	1.388718	0.673601	2.061632	0.0637
COVID	5.322135	5.982285	0.889649	0.3927
BF*INTERNET	-0.003775	0.001568	-2.408033	0.0347

Qatar

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ	-0.945893	0.256598	-3.686282	0.0031
D(TURNOVER(-1))	0.148751	0.291505	0.510288	0.6191
D(BF)	-0.095378	0.508517	-0.187560	0.8544
D(BF(-1))	-0.091560	0.476734	-0.192056	0.8509
D(GDP)	-0.093023	0.276390	-0.336562	0.7423
D(INFLATION)	-1.123891	0.803560	-1.398639	0.1872
D(INFLATION(-1))	-0.798132	0.907661	-0.879328	0.3965
D(INTERNET)	0.043864	0.364791	0.120244	0.9063
D(INTERNET(-1))	0.914171	0.402252	2.272633	0.0422
COVID	11.58334	8.149574	1.421343	0.1807
BF*INTERNET	-0.007542	0.001975	-3.819297	0.0024

Saudi

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ	-0.330602	0.203075	-1.627979	0.1295
D(TURNOVER(-1))	-0.177684	0.150665	-1.179329	0.2611
D(BF)	-6.666725	4.061276	-1.641535	0.1266
D(BF(-1))	7.441026	3.598849	2.067613	0.0609
D(GDP)	-21.06392	7.644007	-2.755612	0.0174
D(INFLATION)	-2.156746	19.34833	-0.111469	0.9131
D(INFLATION(-1))	76.67768	16.96300	4.520289	0.0007
D(INTERNET)	-6.323340	7.493170	-0.843880	0.4152
D(INTERNET(-1))	20.68703	8.059347	2.566837	0.0247
COVID	294.1438	197.1174	1.492226	0.1615
BF*INTERNET	-0.016537	0.009389	-1.761272	0.1036

UAE

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ	-1.491579	0.448610	-3.324889	0.0061
D(TURNOVER(-1))	0.661879	0.268003	2.469668	0.0295
D(BF)	0.223441	0.592482	0.377126	0.7127
D(BF(-1))	-0.849285	0.602182	-1.410346	0.1838
D(GDP)	2.130340	1.159942	1.836592	0.0912
D(INFLATION)	-4.922752	1.321920	-3.723941	0.0029
D(INFLATION(-1))	-0.251866	1.294902	-0.194506	0.8490
D(INTERNET)	3.294522	1.743329	1.889788	0.0832
D(INTERNET(-1))	-1.952623	1.362618	-1.432994	0.1774
COVID	13.29485	16.94570	0.784556	0.4479
BF*INTERNET	-0.010322	0.003148	-3.279019	0.0066

Source: Author's calculations based on EViews 13 output.

Appendix 03. Long run results

Dependent Variable: D(TURNOVER)
 Method: ARDL
 Date: 11/14/25 Time: 12:02
 Sample: 2002 2024
 Included observations: 136
 Number of cross-sections: 6
 Dependent lags: 2 (Automatic)
 Automatic-lag linear regressors (2 max. lags): BF GDP INFLATION
 INTERNET
 Static regressors: COVID BF*INTERNET
 Deterministics: No constant and no trend (Case 1)
 Model selection method: Akaike info criterion (AIC)
 Number of models evaluated: 162
 Selected model: PMG(2,2,1,2,2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Long-run (Pooled) Coefficients				
BF	0.078411	0.022042	3.557317	0.0005
GDP	-0.119042	0.283881	-0.419339	0.6757
INFLATION	2.586589	0.381623	6.777870	0.0000
INTERNET	0.594952	0.109492	5.433744	0.0000

Source: Author's calculations based on EViews 13 output.

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