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Stock markets, volatility, and bank lending: Communication channels and institutional mediation in developed and southern mediterranean economies

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C H R O N I C L E

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A B S T R A C T

This studyinvestigates whether stock market dynamics influence credit allocation forcapital and project investments, and how this relationship is moderated byinstitutional quality. Comparing ten developed and Southern Mediterraneaneconomies over the 2008–2023 period, the analysis employs a bootstrap panelGranger causality framework to assess equity returns and GARCH (1,1)conditional volatility channels. The findings reveal that while developedmarkets display integrated risk-taking dynamics affecting investment credit,Southern Mediterranean markets exhibit defensive banking behaviour wherefinancial volatility sharply constraints project-related CapEx withoutresponding to positive market signals. These heterogeneities underscore thatproject financing efficacy relies heavily on robust institutional frameworks, suchas investor protection and creditor enforcement, challenging the assumption ofuniform capital availability across institutionally diverse projectenvironments.

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1. Introduction

The relationship between stock market development and project credit and capital expenditure (CapEx) financing has long attracted the attention of economists and financial scholars. A large body of literature suggests that developed financial markets and active banking systems tend to reinforce one another. Levine and Zervos (1998), for example, showed that stock market development predicts credit growth even after accounting for banking sector characteristics, while Levine (1997) argued more broadly that financial intermediation supports economic growth through more efficient capital allocation. In theory, rising equity prices increase the value of collateral, relax borrowing constraints, and stimulate investment, a mechanism formalised by Kiyotaki and Moore (1997) within the credit cycle framework. Adrian and Shin (2010) further demonstrated that lower market volatility may encourage banks to expand their balance sheets, creating additional interactions between financial markets and project credit activity. Taken together, these arguments suggest that deeper stock markets should normally coexist with more dynamic credit systems. However, the experience of many emerging economies appears less consistent with this prediction. In countries such as Morocco, Egypt, or Jordan, CapEx does not seem to respond strongly to stock market developments despite the gradual expansion of local exchanges over the past two decades. Bekaert and Harvey (2000) documented this type of disconnect early in the financial liberalisation literature, showing that integration into global markets did not necessarily translate into stronger domestic financial transmission mechanisms. A common explanation is that emerging stock markets remain too small or illiquid to generate meaningful informational signals. While this argument is partly convincing, it may not fully explain the observed differences across countries. Even relatively small markets can convey useful information when supported by credible institutions and transparent financial environments.

This paper argues that the key distinction between developed and developing financial systems lies not only in market size, but also in the institutional environment that gives financial prices their informational value. In economies characterised by

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stronger investor protection, reliable disclosure standards, and effective legal enforcement, stock prices are more likely to reflect meaningful assessments of firm quality and prospects. Under such conditions, banks may incorporate market signals into CapEx decisions. By contrast, in weaker institutional settings, stock prices may contain greater levels of noise arising from concentrated ownership structures, limited transparency, or informational asymmetries. Banks may therefore rely more heavily on relationship-based CapEx rather than market-based signals. We refer to this mechanism as the institutional mediation hypothesis (Bernanke & Blinder, 1992; Bernanke & Gertler, 1995).

The theoretical foundations of this argument are well established. Akerlof's (1970) analysis of adverse selection suggests that markets function poorly when asset quality cannot be properly observed, implying that stock prices in weak governance environments may lose part of their informational content. Stiglitz and Weiss (1981) showed that under uncertainty, banks may ration credit rather than simply adjust CapEx rates, particularly when they cannot easily distinguish between genuine improvements in borrower quality and temporary market optimism. Holmstrom and Tirole (1997) further argued that financial intermediation functions more efficiently in transparent and well-capitalised institutional environments. More recently, Dawood et al. (2025) found that institutional quality moderates financial relationships in developing Asian economies in a nonlinear manner, suggesting that below certain institutional thresholds, conventional market mechanisms may operate less effectively. Similarly, Nguyen et al. (2023) find that the interaction between banking activity strategies and stability is conditioned by the uncertainty environment, underscoring that external market shocks do not affect all banking systems uniformly, a pattern that motivates the comparative heterogeneous framework adopted in this study.

To examine these issues empirically, this study compares five developed stock markets, the United States (S&P 500 and NASDAQ), the United Kingdom, France, and Germany, with five Southern Mediterranean markets: Morocco, Egypt, Tunisia, Lebanon, and Jordan, over the period from January 2008 to December 2023. The analysis employs the bootstrap Granger causality framework proposed by Kónya (2006), which is particularly suitable for heterogeneous panel structures and does not require pretesting for unit roots. In addition, GARCH (1,1) models are estimated for each market to examine whether stock market volatility influences CapEx dynamics, and vice versa. Distinguishing between the returns channel and the volatility channel proves especially important, as the two mechanisms may reflect different forms of financial transmission.
The results reveal clear differences between developed and Southern Mediterranean markets. In developed economies, stock market returns predict credit only in the case of the FTSE 100, while limited reverse causality is observed for the NASDAQ. In the Mediterranean sample, no significant relationship emerges between returns and CapEx activity. The volatility channel, however, produces more differentiated patterns. Four developed markets exhibit bidirectional relationships between volatility and credit, whereas Morocco and Egypt display only a unidirectional effect running from volatility to CapEx. Tunisia presents the opposite configuration, with credit dynamics appearing to influence market volatility. No statistically significant relationship is detected for Lebanon or Jordan. Overall, these findings suggest that banks in weaker institutional environments react defensively to uncertainty while remaining less responsive to positive market signals.

The remainder of the paper is organised as follows. Section 2 presents the theoretical framework. Section 3 describes the data and methodology. Section 4 reports the empirical results. Section 5 discusses the policy implications. Section 6 concludes.

2. Institutional Quality and the Stock Market–CapEx Nexus

2.1 When prices carry information and when they do not

According to the efficient market hypothesis of Fama (1970), prices in well-functioning markets aggregate dispersed information rapidly and efficiently. In such environments, a bank observing a sustained increase in a borrower's stock price may reasonably infer an improvement in firm fundamentals, a strengthening of collateral value, and a reduction in default risk. This mechanism underpins the classical stock market–credit nexus and has been widely documented in the empirical literature. Levine (2005) shows that stock market development is associated with credit growth even after controlling for banking sector conditions, while Levine (1997) highlights the broader role of financial intermediation in improving capital allocation and supporting economic growth. At the macro-financial level, Kiyotaki and Moore (1997) formalise how rising asset prices relax collateral constraints and amplify credit cycles. In addition, Adrian and Shin (2010) demonstrate that lower volatility environments tend to encourage balance sheet expansion in financial intermediaries, reinforcing the feedback between markets and credit.

However, the informational content of prices is not invariant across institutional environments. When insider trading is more prevalent, disclosure requirements are weak, and analyst coverage is limited, price movements may reflect noise as much as fundamentals. In such contexts, an increase in stock prices does not necessarily distinguish high-quality firms from low-quality ones. The logic of Akerlof (1970) becomes directly relevant: when quality is difficult to observe, adverse selection emerges, and price signals lose their ability to efficiently sort risk. In emerging stock markets where these features are often present, banks may therefore face difficulties in using equity prices as reliable indicators of borrower creditworthiness.
This logic is further developed by Stiglitz and Weiss (1981), who show that in the presence of information asymmetries, banks respond to uncertainty not by adjusting prices but by rationing credit. Importantly, this response is asymmetric. When uncertainty increases, often reflected in higher stock market volatility, banks tend to reduce CapEx. However, when asset

prices rise, banks do not necessarily expand credit, as they cannot distinguish whether price increases reflect genuine improvements in fundamentals or simply greater noise. This asymmetry is consistent with the patterns observed in the Southern Mediterranean sample.

From the perspective of financial intermediation, Holmstrom and Tirole (1997) further emphasise that only well-capitalised financial institutions operating in transparent environments are able to effectively monitor borrowers and incorporate market signals into CapEx decisions. In contrast, in weaker institutional settings, banks rely more heavily on relationship CapEx, becoming relatively insulated from stock market information.

2.2 The institutional mechanism: three preconditions for the credit channel to work

The collateral channel proposed by Kiyotaki and Moore (1997), through which rising asset prices relax borrowing constraints and expand credit, rests on three implicit but critical preconditions. First, stock prices must contain credible information about firm fundamentals. Second, creditor rights must be enforceable so that collateral values are meaningful in practice. Third, financial intermediaries must have the capacity and incentives to interpret and act upon market signals. These conditions are not consistently satisfied in the Southern Mediterranean economies considered in this study. Indicators from the World Bank Doing Business database suggest relatively weak investor protection and limited efficiency in legal enforcement mechanisms in Morocco, Egypt, Tunisia, Jordan, and Lebanon. Even when formal contractual arrangements exist, the enforcement of collateral claims may be slow and uncertain. In addition, a significant portion of credit allocation is conducted through state-owned or politically connected banks, where CapEx decisions are not purely market driven. Under these circumstances, variations in stock indices such as the MASI are unlikely to provide clear or actionable information for credit decisions.

La Porta et al. (1998) demonstrate that legal origin is a fundamental determinant of financial development, particularly through its effect on investor protection and enforcement quality. North (1990) similarly argues that institutions shape economic performance by defining the rules of the game and the incentives facing economic agents. More recently, Dawood et al. (2025) provide evidence that institutional quality plays a nonlinear moderating role in the finance–growth relationship, with a clear threshold below which financial mechanisms lose effectiveness.

2.3 Two channels, two stories: returns versus volatility

Distinguishing between the returns channel and the volatility channel is not merely a technical refinement; it reflects two distinct economic mechanisms. Stock returns capture directional information about market expectations, while volatility reflects uncertainty and disagreement among investors, independently of whether prices are rising or falling. Adrian and Shin (2010) focus on the volatility channel and show that financial intermediaries adjust leverage procyclically in response to changes in market risk. In periods of low volatility, banks tend to expand balance sheets, while in periods of heightened volatility, they contract CapEx. This mechanism operates independently of whether price signals are informative in a fundamental sense, as volatility directly captures perceived risk and uncertainty. As a result, even in relatively opaque and thin markets, volatility may still influence bank behaviour. However, the existence of feedback from banks to stock markets depends on the depth and informational efficiency of the financial system. In developed economies, changes in CapEx can significantly affect firm investment, earnings expectations, and therefore equity valuations, creating bidirectional dynamics between credit and markets. In contrast, in Southern Mediterranean economies, stock markets are often too shallow and segmented for changes in CapEx to be fully reflected in price dynamics. The result is an asymmetric structure of transmission: volatility shocks are transmitted to banks, but CapEx decisions do not significantly feed back into equity markets.

3. Methods

3.1 Sample

The study covers the period from January 2008 to December 2023, corresponding to 192 monthly observations. This horizon is particularly relevant as it includes several major global and regional economic and financial episodes, including the Global Financial Crisis of 2008, the European sovereign debt crisis, the Arab Spring, the COVID-19 recession, and the subsequent monetary tightening cycle. The use of a long-time span encompassing multiple macroeconomic regimes is intended to reduce the risk that the results are driven by short-lived or crisis-specific dynamics, and to better capture structural relationships between financial markets and CapEx. The developed market group consists of five major stock indices: the S&P 500 and NASDAQ Composite in the United States, the CAC 40 in France, the FTSE 100 in the United Kingdom, and the DAX in Germany. The Southern Mediterranean group includes the MASI (Morocco), EGX 30 (Egypt), TunIndex (Tunisia), BLOM Stock Index (Lebanon), and Amman SE General Index (Jordan). The sample was selected based on three criteria: geographic representativeness of each economic bloc, continuous data availability over the full 2008–2023 period, and sufficient market capitalisation to generate reliable price signals. Monthly closing prices are obtained from Bloomberg and Yahoo Finance, and monthly returns are computed as log differences of consecutive closing prices. CapEx is measured using domestic credit to the private sector by banks as a percentage of GDP, obtained from the World Bank's World Development Indicators (2024). This indicator captures the scale of bank intermediation relative to economic size and allows for meaningful cross-country

comparisons. The series is available at an annual frequency and is expressed in nominal terms relative to nominal GDP. Consistent with standard practice in the literature (Beck & Levine 2004; Claessens & Kose 2013), no deflation by CPI is applied. To align the frequency with monthly financial data, annual observations are interpolated linearly across the twelve months of each year. Given the nature of the ratio, no seasonal adjustment is applied.

A specific note is required for Lebanon. From late 2019 onwards, the Lebanese financial system experienced a severe structural collapse involving sovereign default, banking sector paralysis, and extreme currency depreciation. In the GARCH framework, the BLOM index exhibits a persistence parameter ($\alpha + \beta$) greater than one, indicating a non-stationary volatility process. Lebanon is retained in the analysis for completeness, but its results are interpreted with caution due to this structural break. Readers interested in more stable regional dynamics may consider excluding Lebanon when interpreting aggregate Mediterranean patterns.

3.2 Cross-sectional dependence and slope heterogeneity

Before estimating causality relationships, two key panel assumptions are examined. The first concerns cross-sectional independence, namely whether error terms are uncorrelated across countries. Given the inclusion of major global crises such as 2008 and COVID-19, this assumption is unlikely to hold in practice. The Breusch-Pagan (1980) LM test is therefore applied, which is appropriate in panels with relatively small cross-sectional dimensions compared to the time dimension (N = 5, T = 192). The rejection of cross-sectional independence justifies the use of seemingly unrelated regression (SUR) techniques within the Kónya framework. The second assumption relates to slope homogeneity, i.e., whether the underlying relationships are identical across countries. This is tested using the $\tilde{\Delta}$ statistic proposed by Pesaran and Yamagata (2008). Rejecting slope homogeneity is particularly important in this context, as it supports the presence of meaningful heterogeneity across countries, which is central to the institutional mediation hypothesis developed in this study.

3.3 Bootstrap Granger causality in heterogeneous panels

The main empirical analysis is based on the heterogeneous panel Granger causality approach developed by Kónya (2006). This method estimates a system of seemingly unrelated regression (SUR) equations for each country separately, allowing all coefficients to vary across cross-sectional units. Unlike standard panel causality approaches, it does not impose homogeneity restrictions and does not require prior unit root testing, which is particularly useful when the stationarity properties of financial ratios such as credit-to-GDP are uncertain. For each country i and time t, the system is specified as:

$$y(i,t) \;=\; \alpha(i) \;+\; \Sigma\, \lambda(i,j)\, y(i,t-j) \;+\; \Sigma\, \beta(i,j)\, x(i,t-j) \;+\; \varepsilon(i,t)$$

The null hypothesis of no Granger causality from *x* to *y* in country *i* is given by β(i,j) = 0 for all *j*. This framework is applied in both directions: returns → credit, credit → returns, volatility → credit, and credit → volatility. Panel-wide W-bar and Z-bar tilde statistics are computed following Dumitrescu and Hurlin (2012), which test for the presence of Granger causality in at least one cross-sectional unit. The lag length is set to one based on the Akaike Information Criterion (AIC), and inference is conducted using 500 bootstrap replications.

3.4 GARCH (1,1) volatility estimation

Stock market volatility is modelled using the standard GARCH (1,1) specification of Bollerslev (1986):

$$h(t) \;=\; \omega \;+\; \alpha \cdot \varepsilon^2(t-1) \;+\; \beta \cdot h(t-1)$$

In this specification, α measures the short-term impact of shocks on volatility, while β captures the persistence of volatility over time. Prior to estimation, the presence of ARCH effects is confirmed using Engle's (1982) ARCH-LM test, which rejects the null hypothesis of homoskedasticity for all return series in the sample. The resulting conditional volatility series are then incorporated into the Kónya causality framework as an alternative financial market variable, replacing equity returns in order to separately identify the volatility channel of transmission between stock markets and CapEx. The GARCH (1,1) specification is well suited to this context: Alfeus et al. (2025), examining realised volatility in South African emerging markets, confirm that GARCH-based models effectively capture both volatility clustering and the persistence dynamics that characterise thin emerging market indices, properties directly relevant to the Mediterranean markets in this study.

4. Results

4.1 Descriptive statistics and preliminary tests

Table 1 presents the descriptive statistics and preliminary diagnostic tests. Several important patterns emerge. First, there is a clear and substantial difference in financial depth between the two groups. The average credit-to-GDP ratio is 67.22% in developed markets, compared to 38.40% in Southern Mediterranean economies. The dispersion is also markedly higher in developed markets (standard deviation of 41.59), reflecting significant cross-country heterogeneity, particularly driven by the

very high credit ratios in the United States. In contrast, Mediterranean economies display both lower levels and more constrained variation, consistent with more structurally limited financial intermediation. This pattern aligns with Beck et al. (2007), who emphasise that credit access in developing economies is shaped not only by supply constraints but also by institutional frictions such as weak enforcement, high collateral requirements, and underdeveloped credit information systems. Second, equity market characteristics also differ, although less sharply in mean returns. Developed markets exhibit slightly higher average monthly returns (0.59% versus 0.34%), while Mediterranean markets are, somewhat surprisingly, more volatile (5.61% versus 5.03%). This combination, higher volatility but weaker financial transmission, already suggests a decoupling between risk and credit allocation in these economies. Both groups display clear deviations from normality, with strong kurtosis in developed markets (11.38), indicating fat tails and crisis sensitivity. The Jarque-Bera statistics strongly reject Gaussianity in all cases. The Breusch-Pagan LM tests confirm strong cross-sectional dependence in both groups, justifying the use of SUR-based bootstrap inference. The Pesaran-Yamagata test does not reject slope homogeneity within each group, suggesting that heterogeneity is more pronounced between groups than within them. Finally, all ARCH-LM tests reject homoskedasticity, validating the use of a GARCH specification.

Table 1
Descriptive Statistics and Preliminary Tests, January 2008–December 2023

	Developed Markets		**Mediterranean Markets**	
	Credit (% GDP)	**Returns**	**Credit (% GDP)**	**Returns**
Panel A: Summary Statistics				
Observations	960	960	960	960
Mean	67.22	0.0059	38.40	0.0034
Std. deviation	41.59	0.0503	25.13	0.0561
Minimum	0.33	−0.192	3.26	−0.332
Maximum	197.99	0.201	125.19	0.399
Panel B: Distribution				
Skewness	—	0.674	—	−0.355
Kurtosis	—	11.377	—	3.390
Jarque-Bera	—	2847.677***	—	54.558***
Panel C: Correlation, ρ(Credit, Returns)				
Pearson ρ	0.4219		0.3521	
Panel D: Preliminary Tests				
Breusch-Pagan LM	364.074***		197.443***	
Pesaran-Yamagata $\tilde{\Delta}$	−0.201		−0.344	
Panel E: ARCH-LM by Index	**Statistic**		**Statistic**	
S&P 500	36.031***	MASI (Morocco)	6.532**	
CAC 40	37.839***	EGX 30 (Egypt)	16.356***	
NASDAQ	48.535***	Tunindex (Tunisia)	6.203**	
FTSE 100	37.419***	BLOM (Lebanon)†	5.323**	
DAX	141.749***	Amman SE (Jordan)	6.412**	

*Notes: *, **, *** denote significance at the 10%, 5%, and 1% levels respectively. Credit = domestic credit to private sector by banks (% of GDP), World Bank WDI (2024); annual data linearly interpolated to monthly frequency. Returns = monthly log-differences of closing prices. Breusch-Pagan LM tests H_0 of cross-sectional independence. Pesaran-Yamagata $\tilde{\Delta}$ tests H_0 of slope homogeneity. ARCH-LM tests H_0 of no conditional heteroskedasticity. † Lebanon (BLOM): $\alpha + \beta > 1$ reflects non-stationary variance during the 2019–2021 financial collapse; results interpreted with caution.*

4.2 Do equity returns predict bank credit?

Table 2 reports the panel-wide test statistics; Table 3 gives the country-by-country results. At the aggregate level, neither developed nor Mediterranean markets show statistically significant evidence of causality between returns and credit in either direction. The W-bar and Z-bar tilde statistics are well within the non-rejection region for all four combinations. This already tells us something important: whatever causality exists, it is not a general property of stock markets as such it is specific to certain markets, in certain directions, under certain institutional conditions.

Table 2
Panel-Wide Test Statistics: Returns and Credit (Dumitrescu and Hurlin, 2012)

	Returns → Credit		**Credit → Returns**	
Group	**W-bar**	**Z-bar tilde**	**W-bar**	**Z-bar tilde**
Developed Markets	3.272	0.517	−0.598	−0.350
Mediterranean Markets	0.416	−0.252	0.132	−0.275

Notes: None of the panel-level statistics is significant at conventional levels. Negative Z-bar tilde values indicate test statistics that fall below their expected value under H_0. Critical values are bootstrapped (500 replications).

The country-level results in Table 3 bring out the contrasts more clearly. Among developed markets, only the FTSE 100 shows a significant causal link running from returns to credit (Z-bar = 12.342, Z-bar tilde = 0.642; $p < 0.01$). London's financial market is unusual even among developed exchanges in its liquidity, its creditor-rights framework under English common law, and its integration with the global Euromarket. If institutional depth is what enables stock prices to guide CapEx, the FTSE 100 is exactly where we should see it first. The NASDAQ shows a marginal reverse link from credit to returns ($p < 0.10$), plausibly because financing conditions genuinely matter for the technology sector's growth expectations. For the S&P 500,

CAC 40, and DAX, the absence of monthly causality most likely reflects the mismatch between monthly equity signals and the quarterly or annual rhythm of bank credit decisions. Across the five Mediterranean markets, no country shows significant causality in either direction at any conventional level. Notably, several of the Z-bar and Z-bar tilde statistics are negative — for example, −1.780 and −0.408 for EGX 30, and −2.438 and −0.457 for Tunindex in the credit-to-returns direction. A negative Z-bar statistic means the estimated test statistic is below its expected value under the null hypothesis of no causality. This is an emphatic confirmation that no causal mechanism is at work. The Stiglitz and Weiss (1981) adverse selection logic predicts exactly this: banks in these environments do not use stock prices to make CapEx decisions, because the prices carry too much noise.

Table 3
Country-Level Bootstrap Granger Causality: Returns and Credit (Kónya, 2006; 1 lag)

	Returns → Credit		Credit → Returns		
Index / Country	**Z-bar**	**Z-bar tilde**	**Z-bar**	**Z-bar tilde**	**Direction**
Developed Markets					
S&P 500	1.547	1.220	−0.401	−0.306	None
CAC 40	−1.580	−0.393	−1.580	−0.393	None
NASDAQ	2.251	1.106	−3.516	−0.537*	Credit → Returns*
FTSE 100	12.342***	0.642***	0.764	−0.219	Returns → Credit***
DAX	1.158	−0.190	−0.255	−0.295	None
Mediterranean Markets					
MASI (Morocco)	0.946	−0.205	3.784	0.005	None
EGX 30 (Egypt)	−1.780	−0.408	−0.597	−0.320	None
Tunindex (Tunisia)	0.053	−0.272	−2.438	−0.457	None
BLOM (Lebanon)†	−1.080	−0.356	3.234	−0.035	None†
Amman SE (Jordan)	2.359	−0.100	−3.341	−0.524	None

*Notes: *, *** denote significance at the 10% and 1% levels respectively. Bootstrap critical values from 500 replications. Negative Z-bar and Z-bar tilde values confirm the absence of any causal relationship. † Lebanon: results reflect the systemic collapse of the financial system from 2019 onwards (α + β > 1 in GARCH estimation); interpret with caution.*

4.3 How persistent is stock market volatility?

Before turning to the volatility–credit causality tests, it is useful to examine the GARCH estimates reported in Table 4, which reveal structural differences that run deeper than the causality results alone. In developed markets, volatility persistence ranges from 0.40 (NASDAQ) to 0.79 (S&P 500). The NASDAQ figure is particularly revealing high α means it responds sharply to new information, but low β means that response fades quickly. This is what an efficient, liquid market looks like, shocks are registered and priced, then the market moves on. The S&P 500 and DAX sit at the moderate end, reflecting the broader macroeconomic role these indices play as global barometers. Mediterranean markets tell a very different story. The MASI and Amman SE both have persistence parameters above 0.93, meaning that a volatility shock that hits in January is still detectable in March or April. EGX 30 is an outlier in a different way: its ARCH parameter is 5.42, indicating explosive overreaction to news, when something happens, Cairo's market moves violently, but its GARCH parameter is essentially zero, meaning there is no sustained regime change. Shocks are dramatic and then gone. This pattern is consistent with thin, retail-dominated markets where information is unevenly distributed, and herding is common (Holmstrom and Tirole 1997).

Table 4
GARCH (1,1) Estimation Results

Index	***μ***	***ω***	**α (ARCH)**	**β (GARCH)**	**α+β**	**Profile**
Developed Markets						
S&P 500	0.004**	0.005***	0.143*	0.645***	0.788	Moderate persistence
CAC 40	0.005*	0.006***	0.125**	0.448***	0.573	Shocks dissipate quickly
NASDAQ	0.007**	0.003***	0.246***	0.151***	0.397	High reactivity, short memory
FTSE 100	0.005**	0.004***	0.156***	0.325***	0.481	Shocks dissipate quickly
DAX	0.006**	0.003***	0.165***	0.354***	0.519	Moderate persistence
Mediterranean Markets						
MASI (Morocco)	0.003***	0.0003*	0.140**	0.797***	0.937	High persistence
EGX 30 (Egypt)	0.007***	0.0002***	5.417***	−0.011*	5.406	Explosive short-term reaction
Tunindex (Tunisia)	0.001***	0.0002***	0.517***	0.219**	0.736	Moderately elevated persistence
BLOM (Lebanon)†	−0.0009**	5.25E-05	0.328***	0.702***	1.030†	Non-stationary variance†
Amman SE (Jordan)	0.007**	0.002**	0.740***	0.196**	0.936	High persistence

*Notes: *, **, *** denote significance at the 10%, 5%, and 1% levels respectively. α + β measures volatility persistence; values close to 1 indicate near-integrated variance. † Lebanon (BLOM): α + β = 1.030 > 1 reflects non-stationary conditional variance during the 2019–2021 systemic financial collapse.*

4.4 Does market volatility predict credit and does credit predict volatility?

Table 5 contains the final set of causality results, where the most interesting cross-country variation appears. Four of the five developed markets show bidirectional causality between volatility and credit, the S&P 500, NASDAQ, FTSE 100, and DAX. This is exactly what the Adrian and Shin (2010) risk-taking channel predicts in settings where banks and markets are tightly integrated: volatility shapes CapEx, and CapEx shapes expectations. The CAC 40 is the exception, with one-way causality

running from volatility to credit. French banks appear to adjust credit in response to market uncertainty without their decisions being large enough to register in market volatility itself.

Table 5

Country-Level Bootstrap Granger Causality: Volatility and Credit (Kónya, 2006; 1 lag)

	Volatility → Credit		Credit → Volatility		
Index / Country	**Z-bar**	**Z-bar tilde**	**Z-bar**	**Z-bar tilde**	**Direction**
Developed Markets					
S&P 500	23.243***	21.528**	20.529**	19.512**	Bidirectional**
CAC 40	−20.826**	−20.337**	−1.593	−0.629	Volatility → Credit**
NASDAQ	10.957**	2.538**	−22.380**	−20.453**	Bidirectional**
FTSE 100	22.759**	20.737**	42.074**	2.855**	Bidirectional**
DAX	−19.944**	−18.421**	24.823**	0.827**	Bidirectional**
Mediterranean Markets					
MASI (Morocco)	24.458**	1.544**	0.475	−0.240	Volatility → Credit**
EGX 30 (Egypt)	21.874**	−0.136**	9.216	0.409	Volatility → Credit**
Tunindex (Tunisia)	3.796	0.006	14.849**	0.828**	Credit → Volatility**
BLOM (Lebanon)†	1.295	−0.179	−1.206	−0.366	None†
Amman SE (Jordan)	0.498	−0.246	2.431	−0.095	None

*Notes: **, *** denote significance at the 5% and 1% levels. Conditional volatility = fitted GARCH(1,1) series from Table 4. Bootstrap critical values: 500 replications. † Lebanon: results reflect crisis-regime dynamics (2019–2021); normal transmission mechanisms were not operative during this period.*

In the Mediterranean group, Morocco and Egypt both show volatility causing credit but not the reverse. When the MASI or EGX 30 becomes more volatile, Moroccan and Egyptian banks pull back on CapEx. But when those banks lend more or less, nothing registers in equity volatility. This constitutes what we term defensive banking: institutions that respond to risk without generating systemic feedback. Stiglitz and Weiss (1981) predict precisely this asymmetry — rising uncertainty triggers tighter credit, but positive signals from rising prices do not trigger the opposite, because the informational problem runs in one direction only.

Tunisia is different again. Credit significantly causes volatility (Z-bar = 14.849, Z-bar tilde = 0.828; $p < 0.05$), but volatility does not cause credit. Tunisia has perhaps the most bank-dominated financial system in the sample; when banks tighten or loosen credit, listed firms' investment plans and earnings expectations shift, and that shift registers in the Tunindex. The direction of influence runs from lenders to markets, not the other way around entirely consistent with a system in which banks are the dominant financial intermediaries.

Lebanon and Jordan show nothing in either direction. For Lebanon, this reflects the 2019–2021 collapse: when a financial system is frozen, the usual transmission mechanisms simply stop operating. For Jordan, the evidence points to genuine structural disconnection a stock market and a banking sector that run in parallel without significant interaction.

4.5 Robustness

Three arguments provide reassurance regarding the robustness of the main findings. First, if COVID-19 were driving the results, one would expect broadly similar volatility–credit causality across all markets during 2020–2021. This is not the case. The two most structurally fragile markets, Lebanon, where the financial collapse predates COVID-19, and Jordan, which has persistently low market depth, do not exhibit significant causality patterns. The observed results are therefore not consistent with a pandemic-driven artefact.

Second, the analysis deliberately excludes macroeconomic control variables such as interest rates, inflation, or GDP growth. While this represents a recognised limitation, it is also a methodological choice aimed at isolating financial transmission mechanisms. In a small heterogeneous panel (N = 5, T = 192), adding macro controls would reduce the efficiency of bootstrap inference. Moreover, previous studies on stock market–credit linkages have often adopted similarly parsimonious specifications (Beck and Levine 2004; Kónya 2006).

Finally, if omitted macroeconomic factors were systematically driving the results, one would expect more uniform or spurious causality patterns across countries. Instead, the evidence is characterised by heterogeneity, weak relationships, and structural asymmetries, particularly in the Mediterranean sample. This reduces the likelihood that omitted variables are biasing the main conclusions in a systematic way.

5. Discussion and Policy Implications

5.1 The FTSE 100 as an institutional benchmark

At first glance, the absence of a strong returns–credit relationship in most developed markets may appear surprising. However, the results become more understandable when viewed through an institutional lens. The FTSE 100 occupies a particularly distinctive position among global financial markets. Beyond its size and liquidity, it operates within a legal and financial environment characterised by strong investor protection, deep banking traditions, and high levels of market transparency. As highlighted by La Porta et al. (1998), common-law systems tend to provide stronger protections for creditors and investors,

allowing financial prices to incorporate information more efficiently. In this context, the finding that equity returns help predict CapEx in the FTSE 100 is consistent with the idea that stock prices can serve as credible informational signals for banks. The absence of similar patterns elsewhere suggests that market size alone is insufficient for this mechanism to emerge, what matters more is the broader institutional environment.

5.2 Defensive banking behaviour in Morocco and Egypt

The unidirectional relationship running from market volatility to CapEx in Morocco and Egypt offers important insights. Banks in these markets appear sensitive to increases in financial uncertainty. Periods of higher volatility are associated with tighter CapEx behaviour, suggesting that banks respond defensively when market conditions deteriorate. However, the reverse dynamic is much weaker: rising equity prices do not appear to translate into a comparable expansion of credit. One possible interpretation is that banks perceive negative market signals as more credible or informative than positive ones. In environments where informational asymmetries remain high, increases in stock prices may not be interpreted as reliable indicators of borrower quality or future economic strength. As a result, the financial transmission mechanism operates asymmetrically: market stress influences bank behaviour more strongly than market optimism. These findings imply that measures aimed solely at increasing stock market valuations may not be sufficient to stimulate CapEx if the institutional and informational foundations of financial markets remain fragile.

5.3 Tunisia and the banking dominance dynamic

The Tunisian case reveals a notably different pattern. Rather than stock market volatility influencing bank credit, the causality appears to run in the opposite direction. This result reflects the dominant position of the banking sector within the broader financial system. In economies where firms rely heavily on bank financing, changes in CapEx conditions can rapidly affect investment expectations, corporate performance, and ultimately stock market stability. Under such conditions, the stock market operates less as an independent source of economic information and more as a reflection of banking-sector conditions. This dynamic has implications for macroprudential policy design: in highly bank-dominated systems, financial stress may emerge through credit contractions and their effects on market confidence. Monitoring market volatility alongside credit indicators could provide policymakers with a more comprehensive view of systemic risk, consistent with the amplification mechanisms described by Borio and Zhu (2012).

5.4 Implications for financial development policy

Taken together, these findings challenge the assumption that stock market expansion and credit development automatically reinforce one another across all economic contexts. The complementarity between the two depends heavily on the quality of institutions, the credibility of market information, and the structure of the financial system itself. In contexts where legal protections, disclosure standards, and enforcement mechanisms are stronger, stock markets are more likely to generate reliable informational signals that banks can incorporate into CapEx decisions. In weaker institutional environments, however, expanding stock markets may increase financial activity without necessarily improving the informational efficiency of the system, potentially generating additional volatility without substantially strengthening credit allocation.

These results echo broader arguments in the literature. Stiglitz (2002) warned against transferring financial structures from developed economies into developing contexts without considering institutional foundations, while Acemoglu and Robinson (2012) emphasised the central role of inclusive institutions in enabling markets to function effectively. Similarly, Levine (2005) argued that the benefits of financial development depend critically on the institutional infrastructure supporting financial intermediation. For policymakers in the Southern Mediterranean region, monetary and financial transmission mechanisms may not operate through market expectations in the same way as in advanced economies. As a result, central banks may need to rely more heavily on direct instruments, including reserve requirements, targeted CapEx facilities, and banking-sector supervision, rather than assuming that market-based channels alone will efficiently transmit policy signals to the real economy.

6. Conclusion

This study began with a straightforward but important question: do stock markets influence CapEx in the same way across different economic environments? The findings suggest that they do not. The interaction between stock markets and bank credit depends fundamentally on the institutional context in which financial actors operate. By examining ten developed and Southern Mediterranean markets between 2008 and 2023, this study shows that the informational role of stock markets remains uneven across countries. In developed economies, banks appear more responsive to market signals, particularly to market volatility, reflecting stronger integration between financial markets and the banking sector. In contrast, Southern Mediterranean markets display weaker and more fragmented linkages. In some cases, banks react defensively to market uncertainty; in others, the banking sector itself dominates market dynamics rather than responding to them. These differences highlight the central role of institutional quality. Where disclosure standards, investor protection, and financial transparency are stronger, stock prices are more likely to convey credible information that banks can incorporate into CapEx decisions.

Where institutions remain weaker, stock market signals become less informative, encouraging banks to rely instead on traditional relationship-based CapEx practices.

The study also carries important policy implications. Expanding stock markets alone is unlikely to improve credit allocation in environments where institutional foundations remain fragile. Financial liberalisation without parallel institutional reform may increase vulnerability to instability and external shocks. Policymakers should therefore design macroprudential frameworks that reflect the specific financial transmission mechanisms operating within each country rather than adopting uniform policy approaches. Finally, this research opens several avenues for future work. Further studies could incorporate structural break analyses to better capture major crises such as COVID-19 or the Lebanese financial collapse. Including broader macroeconomic controls may also help disentangle financial effects from wider economic conditions. Extending the analysis to other emerging regions would allow researchers to assess whether the institutional mediation mechanism identified in this study holds beyond the Mediterranean context.

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Competing interests

The authors have no relevant financial or non-financial interests to disclose.

Data availability

The data used in this study are sourced from Yahoo Finance (https://finance.yahoo.com), the World Bank World Development Indicators database (https://databank.worldbank.org), and Bloomberg Terminal. Yahoo Finance and World Bank data are freely accessible through their respective platforms. Bloomberg data are subject to subscription and licensing agreements.

Declaration of AI use

Generative AI tools were used to assist with language refinement, grammar correction, and improving the clarity and readability of the manuscript. All generated content was carefully reviewed, revised, and validated by the authors. No AI tool was used for data collection, data analysis, interpretation of results, or the generation of scientific conclusions.

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